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Islamic Republic of Pakistan: Preparing the Power Distribution Enhancement Multitranche Financing Facility (Financed by the Japan Special Fund)

Prepared by British Power International

For Pakistan Electric Power Company (PEPCO)

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EXECUTIVE SUMMARY

- 1. The Federal Government of Pakistan (GoP) has set ambitious targets for growth of the country's GDP which has a consequential effect on the demand for and consumption of electricity. In line with these targets, demand for electricity is expected to increase by around 12 % per annum.
- 2. The Government of Pakistan has an agreement in principle with the Asian Development Bank (ADB) to support the necessary infrastructure development to achieve these targets.
- 3. ADB has already signed a long term financing facility with the Government of Pakistan (GoP), for onward lending to the National Transmission and Despatch Company (NTDC) for development of the national transmission network and this is now in the implementation phase.
- 4. ADB and GoP now expect to sign a further long term financing facility to address the priority developments necessary on the distribution networks of the eight independent distribution companies (DISCOs) to distribute power to end user customers. The funding from ADB is expected to be released in stages (tranches) under an umbrella agreement known as the Multi Tranche Finance Facility (MFF) available from the Bank.
- 5. Under this Project Preparatory Technical Assistance (PPTA) potential subprojects for funding under the financing facility have been evaluated and those that are both viable and able to have all preparatory work completed in the time scale, are included in the proposals for Tranche 1 funding.
- 6. The PPTA commenced on 14 May 2007, the Inception Report was submitted on 31 May 2007 and the Interim Report was submitted following the ADB Appraisal Mission held between 28 January and 8 February 2008.
- 7. ADB requested the Consultant to deliver this PPTA to meet with the timescale agreed between the GoP and the Bank for processing this Facility, with a target for all documents ready for circulation within ADB by 20 March 2008.
- 8. The total investment cost of DISCO's investment plans for 2008-2017 is estimated at \$5.2 billion. The maximum amount available under the MFF is \$810 million. Tranche 1 subprojects amount to a total investment of \$327million, of which ADB is funding \$241million.
- 9. 209 potential subprojects have been reviewed and of these 146 subprojects have been included in Tranche 1 proposals. 117 of these subprojects relate directly to the Secondary Transmission Grid (STG) system and between them add approximately 2200 MVA of much needed transformer capacity to the system as well as reinforcing some overhead lines and building short extensions to connect new substations.
- 10. The remaining sub projects include a variety of different types including reconductoring, reconfiguring networks, 11kV/LV extensions, installation of capacitors and off network projects such as automated meter reading and computerised accounting systems.
- 11. The list of sub projects was first prepared during the ADB fact finding mission in June 2007 and has remained substantially unchanged, although some revisions have been made to accommodate projects that became urgent or were no longer required.

- 12. During the course of the PPTA the Consultant has developed the full list of projects to be included in Tranche 1. All subprojects have been analysed in accordance with ADB procedures to ensure that they are technically, financially and economically viable and also comply with the necessary environmental and social safeguards required by the bank.
- 13. A financial management assessment was undertaken to evaluate each DISCO's ability to undertake and fulfil ADB's fiduciary requirements for the identified subprojects. The DISCOs have been under severe financial pressure, principally because tariffs have not been increased despite their power purchase costs increasing. An amount in excess of Rs 140 billion remains due to NTDC and DISCOs are currently reliant on subsidy payments from GoB for financial sustainability.
- 14. However, financial projections prepared for each of the DISCOs show that, with appropriate safeguards and provided tariffs are promptly adjusted to reflect increased costs of operations and government subsidies are promptly paid, they will be able to support the financing obligations from the MFF.

PURPOSE

15. This Final Report is submitted by British Power International (BPI) in fulfilment of the terms of reference (ToR) for this PPTA which required the Consultant to produce a Final Report on completion of the project. Specifically, this Report is required to document all reports and analysis performed to comply with the ToR.

BACKGROUND

- 16. The Federal Government of Pakistan announced, in its Medium Term Development Plan for 2005 2010, ambitious economic development plans with aggressive targets in GDP growth of 8% per annum. Applying a conventionally accepted multiplier to this growth rate implies an increase in power demand of 12%, with still greater increases in energy consumption. Even with the more conservative estimates of load growth that may actually be experienced this equates to an increase in power requirements of around 1000MW per annum. Based on the most recent experience, albeit that these are mainly snapshot views, this number could potentially double.
- 17. The power sector is central to the current and future prosperity of Pakistan through the supply of low cost electricity to domestic customers throughout the country¹ and by virtue of its capacity to stimulate commercial and industrial development. The development and operation of thermal and hydro power resources is being addressed by a number of agencies, which are having some success in promoting private sector investment in thermal and hydro power plants and renewable energy sources.
- 18. The effective evacuation of power from all of the existing generating stations, and connection of the stations to be commissioned in future, is vested in the National Transmission and Despatch Company (NTDC), and is being supported by the ADB MFF loan negotiated in December 2006. This is currently in its implementation phase. These developments together address the generation and primary transmission of electric power to the eight geographically based distribution companies.

¹ There was a target announced of connecting all villages to the grid by December 2007. At the time of preparing this report this target has not, to our knowledge, been revised.

- 19. The DISCOs receive electric power from NTDC in their respective geographic areas and have inherited the distribution assets at operating voltages of 132kV and below. With this goes the obligation to distribute electricity and make supplies available within their geographic boundaries under rules, service conditions and tariffs laid down by the National Electric Power Regulatory Authority (NEPRA). The networks inherited by the DISCOs are problematic on several counts. They (a) do not provide complete geographic coverage; (b) have a shortage of capacity in areas they do cover; and (c) suffer from the consequences of years of inadequate maintenance and under investment. An overview of the Pakistan distribution sector is set out as Appendix 1.
- 20. This PPTA has been about planning for the delivery and disbursement of a major loan from the Asian Development Bank to the Government of Pakistan, for onward lending to the DISCOs via PEPCO. This loan will enable the DISCOs to invest in the more urgent needs to upgrade and extend the distribution networks to address the current shortfalls that exist and to expand the capacity and coverage of the network thereby facilitating delivery of the Government's development plan.
- 21. The loan, which is of the ADB Multi-Tranche Finance Facility (MFF) type (The Facility), described in Appendix 1 to the Inception Report, is to be used to finance a number of distribution subprojects identified by the eight DISCOs and then developed and prioritised jointly with the Consultant. Three tranches of disbursement are envisaged for the MFF. At the time of preparing this report, work on Tranche 1 is substantively complete and amounts to USD327M from a total expected facility of USD 810 million.
- 22. Work on the overall facility documentation is complete. Importantly this has set the framework for the detailed evaluation, design and safeguards phase which will cover the necessary implementation support for all tranches of the loan. It has already been deployed for Tranche 1 subprojects.
- 23. Tranche 1 subprojects address, in the main, identified capacity shortfalls in the existing distribution networks to cope with distributing the additional generating capacity that is being installed and remove constraints from the distribution sector. These subprojects will support the growing demand, allow new connections and reduce the need for load shedding.
- 24. Also included with the first tranche are subprojects designed to enhance power quality, improve power factor, and reduce technical losses.
- 25. Further subprojects of an "off-network" nature have been included and more of this type may be included in future tranches if they are identified by the DISCOs as supporting their business sustainability.
- 26. Work on further tranches is set to commence immediately following the approval of the Facility and Tranche-1 by ADB.
- 27. The overall value of the loan is now set but the allocation between the tranches remains flexible. The tranches are not of necessity totally sequential and may overlap based upon the technically, financially and economically justified portfolio of subprojects that also meet the requirements of the various agencies in terms of environmental impact and social issues, and for which the delivery capacity is available.

SCOPE

28. The scope of this TA is summarised by a number of key documents and exchanges of information. Prime is the contract for consultancy services, which is based upon ADB's Outline Terms of Reference (ToR), the Technical Proposal of the Consultant, together with the amendments agreed with ADB as part of the contract negotiation. We are also grateful for the input and co-operation of senior staff from the Executing Agency (EA) and Implementing Agencies (IAs). Other documents provide information and guidance but where there are potential differences of interpretation, we have relied upon these prime sources.

PROJECT MANAGEMENT

Mobilisation

- 29. During negotiations to finalise the detail of the ToR and resolve any contractual matters, it was agreed that the project should be brought forward to commence by 14 May 2007. The advance team of the Consultant arrived in Lahore that day and met with ADB and the EA on 15 May 2007.
- 30. The advance team consisting of the Team Leader and Deputy Team leader along with a representative from each main discipline of Distribution Engineering, Economics, Finance, Environmental and Resettlement. These were available for the entire week.
- 31. Due to the large size of the team (21 members) the remainder of the team were mobilised following the preliminaries, ensuring that adequate logistical arrangements were put in place to usefully deploy them, and that base data was available for them to work on. Remaining team members, other than the international resettlement expert, were available for mobilisation by 28 May.
- 32. Achieving this target required flexibility of working arrangements between ADB, EA, the eight IAs and the Consultant. It was critically dependent upon the timely flow of information to the Consultant from the IAs.
- 33. Due to the urgency of the project and the unusually short timescale between contract signing and mobilisation, the international team members contributed some input from their home bases. Domestic team members mobilised during the period from 14 May to 5 June as arrangements were put in place to deploy them effectively.
- 34. A series of inception meetings between PEPCO senior management, senior representatives from each of the DISCOs, ADB, and the Consultant were held during the first few days in Lahore. In particular, a kick off workshop for all DISCOs, with presentations from ADB and the Consultant, was held in Lahore on 16 May 2007.
- 35. The Consultant's team visited all the DISCOs to introduce the project to staff there and begin data collection. These discussions were helpful in clarifying and focussing aspects of the ToR, confirming the critical dependence on gathering useful and timely information from DISCOs and understanding the expectations of senior staff from the EA and IAs. They also served to agree priorities of the ToR to support delivery of output to meet the GoP / ADB programme for processing the loan, and in gaining the commitment of key stakeholders to support this objective.

Resourcing Team

- 36. During the period between submission of the proposal and mobilisation, some team changes were made and recorded through contract variation request number 1, with no contract price implications.
- 37. Dr David W Green replaced Mr Sunil Choukiker as environmental specialist after mobilisation. Mr Sunil Choukiker had become conflicted between two ADB projects, mainly due to the moving dates on both projects. It was agreed with the ADB project officer that it would be more appropriate for Mr Choukiker to attend to his conflicting project and that Dr David W Green would substitute on this PPTA due to his previous experience in Pakistan and availability. This change was recognised to have a cost implication.
- 38. Also after mobilisation, one member of the domestic finance team, Mr Naseer UI Haq became unavailable for an early start. A review of the situation indicated that his proposed programme was unacceptable and a substitute with a stronger CV was recommended. The substitute, Mr Riaz Hussain Chaudhry was a former Finance Director of PESCO and has particular and highly relevant knowledge of the PESCO accounts.
- 39. Later in the year, and before he started work on the PPTA, Mr Anis Ahmed Chaudhury's health deteriorated and he was therefore unable to travel to any remote locations. To meet the timescale of the project Mr Iftikhar Ahmed was recruited at short notice as a replacement to carry out the necessary environmental site works.
- 40. A contract variation request to address these changes was submitted prior to the Interim Report.

Facilities

- 41. The contract set out facilities that were to be provided by the EA, via the IAs, which include serviced office accommodation, transport for site visits, local communication, and importantly for meeting the tight time schedule, counterpart staff. These facilities, together with ready access to all relevant data, information and documents, were essential for meeting the timetable.
- 42. Some of the key team members were able to continue to work in the office in WAPDA house previously used by the team on TA 4665 and prior to that by the NTDC Capacity Building TA team. This office remained available and was well served with communications, computers and internet connections. Due to the larger team size, desk space was also required at each Implementing Agency, along with transport for local site visits etc.
- 43. The Consultant did not require permanently allocated vehicles or dedicated office space, hence no significant budget burden was imposed on the DISCOs. The requirements for office space and transport for visits should have primarily been provided by PEPCO in the case of offices, and by the consultant in the case of transport, and hence have been no more than sharing routine operational requirements in the DISCOs.
- 44. An office at LESCO was made available to the team and was used when the full team was active in Lahore. At other times the work has been delivered from the PEPCO provided facilities in WAPDA House and offices in the field.

45. In delivering these facilities the support of PEPCO staff was much appreciated. We are grateful for their help.

Method of Working

- 46. The ToR properly calls for workshops involving PEPCO, the DISCOs, ADB and the Consultant (along with other stakeholders as appropriate) following each report submission. They further call for the Consultant to prepare status reports highlighting issues that will become critical for the timely completion of the TA and that require attention either from the EA, IAs or ADB. The Consultant fully supported this approach to delivery of the PPTA but also recognised the logistical problems in achieving this requirement in the compressed timescale in which the PPTA was delivered, and the geographically dispersed locations of key players.
- 47. As expected, formal meetings were arranged as and when it was logistically practical to do so, to fit the timeline for ADB's processing requirements for this MFF. However, the EA and IAs were invited and encouraged to maintain regular dialogue with the Consultant at any time by telephone, email or visits to the Consultant's office when convenient.
- 48. Important though the formal consultations were, our method of working was designed to ensure that we went beyond the formal requirements in terms of engaging with those we worked with. During the project we anticipated being able to work as a team with DISCO staff delivering the critical subprojects to meet the schedule.
- 49. Whilst all activities progress in parallel to some extent, there were three major phases to the PPTA, each with concentrated activity to match the ADB loan preparation process. These are described in the table below.
- 50. Under the original project's timetable it was expected that ADB's appraisal mission would be during August/September 2007 and the Consultant's resources were scheduled to fit in with this. However, the mission was delayed until January 2008 and the Consultant rearranged plans so that sufficient consulting input was available in Lahore at that time to assist ADB in preparation of the draft RRP.

ADB Milestone	Completion Date	Main PPTA Work Components
		Technical selection of most suitable subprojects for MFF tranche 1 funding
Fact Finding	16 June 2007	First pass Financial and economic appraisal of each possible subproject, ranking and prioritisation
Memoire		Environmental Framework Documentation
		Draft Indigenous People's Development Framework
		Land Acquisition and Resettlement Framework
Appraisal Mission, production of RRP and Management Review Meeting		Feasibility Studies for each subproject or subproject group including generic subproject types.
	28 January - 8 February 2008	Support to PEPCO and each DISCO in preparation of single, overall PC-1 Document for distribution enhancement
		Approach for ranking subprojects
ADB Board		Completion of PPTA to draft final report stage, completion of input to ADB's RRP document
approval scheduled on agenda	31 March 2008	Detailed Technical Analysis of each subproject, production of work packages. Financial, economic, environmental, resettlement analysis for each subproject

PLAN AND TIMETABLE

Project Plan

51. A key purpose of the inception phase was to prepare a work plan. The high level plan for the project is included at Appendix 2, showing the main areas of the ToR, interrelationships and target outputs. The modified staff schedule showing time spent by each expert on the project is included as Appendix 3. There were a number of interdependencies between work areas that had further implications for the staffing schedule meaning that the dates set as targets were subject to continual review as the project progressed, particularly to accommodate ADB's programme for the production of key documents. In particular, a significant amount of the consultant's staff resources were deferred until January and February 2008 to be available for the ADB Appraisal Mission.

STATUS OF PREPARATION FOR THE MFF

General

52. The early priority of the PPTA (three weeks to early June) was to carry out sufficient analysis of the subprojects proposed to be in a position to report to ADB during the June fact finding mission that there were sufficient subprojects justified on a technical, financial and economic basis to form the basis of a viable Facility. This objective was relatively easily achieved given the urgency for significant volumes of work on the eight distribution systems. There was little doubt, even at the inception stage, that viable subprojects would be available at all voltage levels,

and that the only constraint for Tranche 1 would be the processing requirements for a prioritised subproject list.

- 53. It has been important to be able to confirm that the subprojects proposed will have identified and measurable benefits and that they are appropriately prioritised to address currently known system constraints and operating conditions. It is very easy to invest capital into distribution systems without gaining any measurable benefit. Investing wisely to deliver ongoing sustainable networks requires more careful analysis.
- 54. As the work has developed over 50% of the proposed Tranche 1 is on capacity expansion of the existing Secondary Transmission Grid, where there is a large population of heavily loaded and overloaded 132/11kV and 66/11kV transformers. This has not precluded other justified schemes that could be prepared within the timescale from being included in the first tranche of the loan.

Subprojects Proposed for Inclusion in Tranche 1 of the Facility

- 55. The DISCOs already had a number of PC-1 documents approved covering subprojects under different categories for their distribution networks. Each DISCO had a PC-1 document approved for each of the following categories:
 - (i) STG Secondary Transmission Enhancement
 - (ii) ELR Energy Loss Reduction
 - (iii) DOP Distribution of Power
 - (iv) Installation of Capacitors.
- 56. An initial list of candidate subprojects was identified from these PC-1s for each of the DISCOs. These lists were then reviewed by the DISCOs, in conjunction with the Consultant's team. Some projects were withdrawn as they were to be funded by other means. The subprojects which did not have funding approvals were initially taken as candidate projects for this MFF, included in the review process, and prioritised in conjunction with the DISCOs.
- 57. The STG sub projects included in Tranche1 of the facility were mainly drawn from the approved PC-1 documents.
- 58. DISCOs requested further subprojects, not already covered by these approved PC-1 documents, that delivered benefits in terms of further system loss reduction; rehabilitation of substations and substation equipment to improve system reliability thereby reducing customer interruptions and customer time without supply; improved protection of distribution transformers reducing customer interruptions and costly replacements; system modernization by introducing sectionalisers and auto reclosers on distribution primary feeders; automatic meter reading projects to reduce commercial losses; and procurement of construction plant to improve Health and Safety at Work and reduce operating costs. In the ADB documentation these are grouped and referred to under the generic headings of Modernisation and Rehabilitation.
- 59. In total, 209 proposed subprojects have been reviewed and of these 146 have been recommended for inclusion in Tranche1 of the Facility. The remaining projects have not been included, mainly because of changed priorities within the DISCOs and timing of key critical pre-requisite steps, such as route surveys and land acquisition. No projects were rejected as unsuitable for ADB funding, although some had queries on procedural issues that had to be resolved. Some

subprojects not included for Tranche1 are expected to be ready as fully prepared subprojects for inclusion in Tranche2.

- 60. Due to the large number of subprojects, each has been allocated a unique reference number to avoid confusion during the period of the facility. Any new subproject requested must be routed via the central register before consideration. For the purpose of maintaining a record of all jobs considered, and tracking those that may be transferred to Tranche 2, a complete register of jobs, including those deferred from Tranche 1 is maintained, and included as Appendix 4 to this report.
- 61. The subprojects have been selected in accordance with subproject selection criteria developed to select and prioritize projects on the basis of overall economic benefit to Pakistan, distribution system urgency, technical and financial feasibility and the ability to implement whilst complying with GoP and ADB safeguard requirements. The selection criteria are listed as Appendix 5 to this report.
- 62. Of the subprojects in Tranche-1, 117 are Secondary Transmission Grid (STG) projects, adding a total of 2200MVA of transformer capacity on the secondary transmission grid system, along with increased system security. A list of these subprojects is set out as Appendix 6. Each of these has a significant and identifiable capital cost and is manageable as a discrete project with its own implementation plan. The majority, around 110, are single site projects. Each of the subprojects in this category has been individually reviewed technically, financially and economically. Feasibility reports and environmental and resettlement reviews complying with ADB guidelines have been completed. These projects account for approximately \$175m of the total Tranche-1 subproject proposal of \$327m.
- 63. The remaining subprojects include those which will be further subdivided into many, lower level jobs of a very comparable nature across the eight distribution systems, covering the major part of Pakistan.
- 64. By nature, the subprojects of this type are not restricted to a single site for which a detailed subproject analysis can be delivered, an environmental impact study be made or social issues easily reviewed. They require work and investment at a collection of individual locations across the whole of the DISCOs' licensed areas. At each of these locations an 11kV or low voltage distribution network will exist and require a combination of modification and reconfiguration, new equipment commissioned, time expired equipment decommissioned and possibly some dismantlement. However, by definition because these subprojects are generally modifications to parts of existing DISCO facilities, the environmental impacts and social issues, if any, are negligible.
- 65. The 29 sub projects that make up the balance of the Tranche 1 list consist of many individual jobs, numbering several hundred. The sub projects were made up from an identified and justified list presented to the Appraisal Mission by the eight DISCOs. The distribution system is dynamic in nature with its requirements for extension and reinforcement changing in relatively short time scales in response to demand changes and operational requirements. It is recognized that the list of individual jobs and job sites will be a dynamic list but changing only on a professionally justified, priority review basis.
- 66. Types of Jobs that are included in these 29 subprojects are summarised in Appendix 7. Delivery of subprojects of this multiple job, multi-site characteristic will require robust overall program management to ensure that they remain on track and deliver the benefits as planned.

- 67. For these subprojects to be successful in achieving their objectives, standards of design, construction and maintenance in the DISCOs have to be rigorously implemented. During visits to review subprojects it has become evident from discussion with DISCOs that recognized good practice in construction and maintenance has not always been applied. This is also self evident by observing some existing installations. Further, there is a lack of emphasis for safety, both of public and employees of the DISCO. The proposed subprojects will in effect refurbish a significant percentage of the existing 11kV and low voltage distribution systems, and if the rebuilding and replacement is carried out to the required quality controlled standard of construction, should leave a system free of major expenditure requirements for at least twenty years. This will be demanding on both the DISCO and on the contractors they employ, whether the contracts are let on a time and material, fixed price for labour only, or on a turnkey basis.
- 68. These subprojects will be spread across the DISCOs' licensed areas and the logistical issues of procuring the necessary equipment and issuing through to construction teams (whether direct staff or local contractors) are not to be underestimated. The alternative approach of issuing the work through turnkey contracts will have different issues but will still require a robust management regime to ensure timely and quality delivery. It is all too easy with major programs on this scale for the initial capital expenditure to be made and the focus of delivery lost such that no benefits are actually achieved.
- 69. Each job within these subprojects will need individual benefit determination at implementation to confirm the optimum solution, ensuring that in each case all the technical requirements and possible solutions are considered.
- 70. To ensure prudent application of the facility for its intended and itemised purpose, a rigorous approach to implementation has to be applied, providing for a clear audit trail to confirm projects have been delivered to time, specification and quality, and that the projected benefits are delivered in each case. Professional utility business management procedures support this requirement and the demands of processing the hundreds of jobs required in some of the subprojects would not become a burden to a well managed distribution business.
- 71. Each individual job in a subproject could typically consist of an expenditure of between \$5000 and \$10,000 on a discrete and identifiable piece of work. Whilst this is a small percentage of the whole Facility and even of the Tranche1, it remains a significant investment for a distribution business and should be justified at a work planning level. Each location will be slightly different and will of necessity require some advance planning.
- 72. A simple to execute process that involves planning the job, detailing the projected expenditure, calculating the expected benefits, expected completion date and a statement of any intangible benefits must be produced and authorised prior to commencement. This must be supported by an adequate job costing system/process such that actual costs can be identified and appropriate controls are in place to ensure expenditure is properly authorised. On completion the project sheet, with confirmed costs and completion dates will be signed off by the original authorising officer. Any projects with costs that deviate by more than plus or minus 10% must have an explanation included before sign off. Completed sheets will be retained for the duration of the Facility and available for the auditors appointed by the DISCO to carry out random sampling to the satisfaction of ADB. A random selection of project completion reports may be selected by ADB for post investment appraisal.

73. It is expected that Implementation Consultants will be required to ensure that this process is complied with and to ensure effective and accurate implementation reporting back to ADB.

Technical

- 74. The DISCOs had candidate subprojects for Tranche 1 of the Facility identified at the beginning of the TA. The majority of the subprojects proposed had already been approved, through the planning commission approval process and as such the initial technical studies had been completed. Funding had not been identified and the subprojects were proposed for this Facility. Additional subprojects which had been identified by the DISCOs since the PC-1 approvals were also proposed.
- 75. The majority of the subprojects proposed at this stage were enhancements and augmentations to the secondary transmission system (STG) where the DISCOs had identified the need for reinforcement at this level to enable them to accept power from the NTDC transmission system. Each of these proposed subprojects was individually identified and scoped. A number of other subprojects were proposed for lower system voltages (33kV and below) but these were generic in nature, for example installation of capacitors to improve power factor, but even with these types of projects some DISCOs had carried out the background analysis to identify specific sites and installation details.
- 76. The Consultant has carried out independent system studies using system analysis software and confirmed the need for the STG subprojects proposed. Studies undertaken by the DISCOs in preparing the subprojects were reviewed by the Consultant and included an assessment on whether updating was needed in the light of new independent studies carried out taking into account the timescale since original preparation, and different scenarios for demand and generation, and transmission modification. Each subproject of this nature has been confirmed as justified on technical reasons of capacity of the secondary transmission system, and as technically viable for implementation. An evaluation of each subproject has been prepared and feasibility reports have been prepared grouping similar project types within each DISCO, for example IESCO STG Augmentations and PESCO STG Extensions. Appendix 10 provides a full list of the feasibility reports prepared, and the feasibility reports themselves were provided electronically to ADB in July 2007, and will be reproduced in final form, in both electronic and hard copy with the Final TA Report.
- 77. For later tranches, studies will be considered under different demand scenarios. The consultant has already prepared system studies for 10 year horizons, with projected demand and consumption growth identifying areas of the network where further reinforcement will be required during that period, and significant further investment requirements are identified. As stated in our Inception Report to this TA, there are concerns that the demand projection methodology used by NTDC is not directly transferable to the DISCOs due to it being based on a nationwide regression model that does not address localised demand growth, However, presently this is the only demand projection technique used in the sector. At a country wide level the possible inaccuracies are less likely to result in inappropriate decision making for system enhancement and expansion but at a DISCO level we would recommend a more localised approach is taken.
- 78. Internationally accepted practice for demand projection is to build the projection "bottom up" with distribution businesses building up their local projections based upon localised economic circumstances and activity, commercial and industrial presence, domestic development and specific local requirements. This is then built

up into regional and national projections giving not only the overall demand projection but system development requirements that are location specific.

- 79. The current situation in Pakistan is that demand projection is built "top down" using a national regression model which within sensible accuracy limits is probably adequate at a national level compared with the bottom up approach, but in terms of geographic specificity does not address the situation at all.
- 80. The benefits to be delivered from the subprojects in Tranche-1 include, addition of approximately 2,200 MVA of transformer capacity, improved security of supply to customers by moving towards compliance with regulatory security standards governing planning and operation of the sub-transmission system, with reliability and availability improvements on the lower voltages.
- 81. Subprojects to extend and augment existing grid substations, or build new grid substations have been selected following routine operational load readings and system management. They have then been confirmed by a load flow studies, including analysis of any alternative solutions. The studies are based on expected 2013 conditions and follow the NTDC demand forecast for the transmission system and the individual distribution companies, modified as considered appropriate by the DISCOs and ADB. As such, the distribution investments are optimized and prioritized and represent a least cost approach.
- 82. Feasibility reports were prepared for sub projects and an example (covering sub projects extensions for IESCO) is attached as Appendix 8. Generic feasibility reports were also prepared for projects where, at this stage, it was not possible to identify specific locations. An example of this type of feasibility report, dealing with the installation of capacitors, is attached as Appendix 9 to this report.
- 83. With the current demand on the network and the anticipated growth, the risk of any investment in Tranche-1 subsequently being found to be avoidable, or significantly in advance of need, is considered minimal. The subprojects to be included in the Tranche-1 will not be affected by any drastic changes in the long-term system expansion plan. They are considered to be urgent and have been selected to address previous inadequate planning, underinvestment, and lack of maintenance. The Tranche-1 subprojects are summarized in the list below:
 - (i) 2 subprojects will build new substations adding a total of 100 MVA of capacity;
 - (ii) 111 subprojects will add transformers or replace existing transformers, in overloaded/heavily loaded locations, adding a further 2,100 MVA of capacity;
 - (iii) 7 subprojects, with multiple subcomponents address power factor correction;
 - (iv) 18 subprojects, with multiple subcomponents address system rehabilitation and extension of networks to improve system losses and reliability;
 - (v) 4 subprojects address health and safety, operating cost reduction and improve management information and control; and
 - (vi) 4 subprojects will upgrade voltage levels on existing secondary transmission systems to improve power transfer capacity.
- 84. The requirements of the subprojects for procurement purposes have been collated on a DISCO by DISCO basis and procurement packages prepared for each DISCO.

- 85. Preparation of a composite PC-1 document covering all subprojects not already included in previous PC-1 documents has been drafted on behalf of PEPCO.
- 86. Terms of reference for implementation support consultants have been drafted and delivered to PEPCO for their consideration.

FINANCIAL ANALYSIS

87. The priority during the early part of the PPTA, until subprojects were identified from the DISCOs, was to address financial tasks F4, F5 and F7, which together assess the financial strength of each company, its project cost control procedures and through the course of the PPTA an assessment of the financial management capacity and sustainability of each DISCO. All DISCOs were visited during the early weeks of the project to gather information.

Financial Management of DISCOs

- 88. The financial management assessment was undertaken to evaluate the DISCOs' ability to undertake and fulfil ADB's fiduciary requirements for the identified subprojects. Field interviews were used to review the present standing of financial management in all DISCOs. Due consideration was given to the fact that the DISCOs were under transition from utilities dependent on central support and control by WAPDA, towards the long term goal of achieving financial and operational independence.
- 89. Financial Management Assessment Questionnaires (FMAQ) and Financial Internal Control and Risk Assessment (FMICRA) were completed for all DISCOs in accordance with ADB's procedures. These were used to highlight weaknesses within current arrangements and assist in making recommendations for improvement.
- 90. During the early stages of the PPTA, and in preparation for ADB's fact finding mission and the production of the Aide Memoire, the DISCOs' financial accounts for the year ended 30 June 2006 were reviewed in detail. These accounts were the latest available at that time, although accounts for the year ended 30 June 2007 became available in January 2008.
- 91. Details of the DISCO reviews were summarised in separate draft financial management reports for each DISCO and a further draft report covering the overall situation and common issues. These reports were updated during the course of the PPTA as new information became available (for example the availability of audited accounts for the year ended 30 June 2007)
- 92. A sound corporate governance framework was found to exist in all DISCOs and in most instances financial management was found to be adequate. However, some DISCOs² could benefit from external assistance to improve financial capability during the transition to full financial independence.
- 93. DISCOs had been under severe financial pressure because tariffs have not been increased despite their power purchase costs increasing. Consequently, seven of the eight DISCOs recorded financial losses during the year ended June 2006 and six reported losses for the year ended June 2007. The situation has meant that WAPDA has continued to exert considerable influence over the DISCOs which are yet to achieve full financial independence.

² In particular PESCO, HESCO and QESCO

- 94. The regulator (NEPRA) determined revised tariffs for DISCOs in February 2007. The tariff methodology is designed to allow DISCOs to pass through to customers their cost of power, to recover their operating costs and to earn a return on investment. This approach should allow DISCOs to move towards greater financial independence. However, all DISCOs appealed against the determinations, challenging NEPRA's underlying assumptions. The appeal process was protracted and although NEPRA issued revised determinations in January 2008 these had not become effective at the time of the Appraisal Mission. Delays in the implementation of tariff increases has placed an additional financial burden on the DISCOS.
- 95. GoP notifies tariffs that are at a lower level than NEPRA's determinations and the difference is paid to DISCOs as subsidies by the GoP. DISCOs are, therefore reliant upon the Government paying these subsidised amounts promptly. The sector has estimated that the subsidy amount for the year ended June 2008 will be Rs 57 billion plus an amount of Rs 18 billion to cover subsidies due which have exceeded the Government's current year budget.
- 96. The time lag between raising customer tariffs and power purchase costs has meant that DISCOs have been unable to pay for the full cost of power purchased and a large outstanding balance remains due to NTDC. At the year ended June 2006 the total balance due from all DISCOs (excluding KESC) was Rs 123 billion and rose to Rs 140 billion at the end of June 2007. This represents a significant financial burden for the sector which has yet to be resolved.
- 97. Financial projections were prepared for each of the DISCOs for a 10 year period from FY 2008 to FY 2017. They were originally prepared in June 2007 using the DISCO financial accounts for the year ended 30 June 2006 as the base and were updated in January 2008 to reflect DISCO accounts for the year ended 30 June 2007 and the latest tariff information.
- 98. The projections show that, provided tariffs are adjusted annually to reflect increased costs of operations and government subsidies are promptly paid, most DISCOs (with the exception of QESCO and PESCO) will start to deliver acceptable financial results. This will, however, rely on their ability to meet forecast growth in unit sales and to continue to reduce system losses. The projections show that these DISCOs will be able to support the additional debt from the investment program with sufficient earnings to accommodate debt repayments. Both debt service coverage ratios (DSCR) and gearing levels are forecast to be within acceptable limits.
- 99. The two financially weaker DISCOs, QESCO and PESCO will continue to face severe challenges. Both DISCOs effectively have negative equity as a result of accumulated losses over a number of years and will not, therefore, be in a position to show acceptable DSCR throughout the program. This could partly be addressed through a revaluation of assets (which are currently accounted for at historic valuations) to current replacement values, but may also require additional financial restructuring.
- 100. The projections show PESCO to be profitable from FY 2008 and in a position to meet debt service through adequate coverage.
- 101. QESCO, however, is expected to continue to make financial losses because of its large proportion of low revenue earning customers, particularly the agricultural tube

wells which pay subsidized rates³. This DISCO will, clearly, require some additional support in order to achieve an acceptable level of financial performance, ideally through being allowed to recover full cost tariffs.

102. Financial analysis of each sub-project was carried out and the Financial Internal Rate of Return (FIRR) of each sub-project was calculated. Financial analysis of the MFF and Tranche 1 as a whole was also carried out to justify the investment in financial terms.

Financial Analysis of Projects

- 103. In the early part of the PPTA the Consultant carried out financial analysis to ensure that the sub-projects which had been identified as technically feasible were also financially feasible, so that this could be reported to the ADB fact finding mission in June 2007. The financial analysis of each sub-project, in the event that it reflected an improvement to the existing system, presented a "with" and "without" project analysis of projected cash flows. Where the sub-project was entirely new or an addition to the system only, the "with project" scenario was relevant. This analysis was carried out in accordance with the ADB Guidelines, "Financial Management and Analysis of Projects" and "Guidelines for the Financial Governance and Management of Investment Projects". All assumptions relating to the preparation of projected cash flows were set out clearly.
- 104. Once the sub-projects had been accepted in principle by the ADB mission, their project costs were further refined and the assumptions for cash flows were reviewed. The end result was a project cost estimate, prepared using COSTAB software depicting all project components and sub-components, separating foreign exchange and local currency costs, including physical and price contingencies, interest during construction and other financing charges. A financing plan was also prepared setting out ADB, GoP and other sources of funding. A financial internal rate of return (FIRR) was presented for each sub-project and the project as whole. Sensitivity analysis was carried out on key variables. Based on the terms and conditions of the sources of funding, a weighted average cost of capital (WACC) for the project was also computed.
- 105. The subproject FIRRs were calculated for three components; (i) secondary transmission grid (STG), (ii) distribution of power (DOP), and, (iii) the installation of capacitors. These subproject FIRRs were aggregated at the DISCO level and for the overall project.
- 106. For the STG component, incremental benefits arise from the increased evacuation of power through the distribution system due to additional transformer capacity. The incremental demand was translated into incremental sales using DISCO specific load factors, power factors and projected growth in demand. The distribution margin, using NEPRA methodology to fulfil the DISCO annual revenue requirement, was used to convert the incremental energy into monetary terms. The "first circuit out" benefit arises as a result of investment in a second circuit with the ability to service demand in the event the first one fails. This was valued at the distribution margin on the assumption of a 1% probability. The loss reduction benefit was valued at the power purchase price (PPP) to reflect the need for lower energy purchase to serve demand.

³ Agricultural customers are billed at notified rates but are charged up to a maximum of Rs 4,000 per month per connection. The subsidized amount is bourne in the ratio 40.30.30 by the GoP, the Government of Balochistan and QESCO. The cost to QESCO during the year ended 30th June 2007 was Rs 2.4 million.

- 107. For the analysis, projected demand growth rates of between 6-8% per annum and load factors of between 55-62% were used depending on the DISCO. PPP rates, ranging between PRs 3.49/kWh to PRs 3.86/kWh were used and actual losses at both 132kV and 11kV of between 9.9% to 34.2% were used to determine the effective tariff and the distribution margin, independent of generating capacity.
- 108. DOP components involve the extension of 11kV distribution networks and installing additional distribution transformers to make electricity grid connections available to additional customers, primarily in rural areas. FIRRs were developed using a generic model as it is not possible to identify the precise locations of all schemes. The generic model involves a 10km extension of the 11kV line connecting a remote village with the existing 11 kV overhead line network. There are three distribution transformers connected to the line, each transformer having a 0.4 kV network connecting 10 new customers and therefore 30 new customers will be connected. The variations on this basic scheme depend upon the distance from the proposed customers' locations to the nearest existing 11kV line, the number of customers to be connected, and the collective demand in kW of those customers. The FIRR assumed that 30 new customers would consume 2,000 kWh of electricity annually. This incremental benefit was valued at the average distribution margin after adjusting for losses for each DISCO. Operation and maintenance (O&M) expenses are likely to be quite high. Routine maintenance costs was assumed to be small but the ongoing potential for system faults causing outages and requiring repair was assumed to be costly.
- 109. The installation of capacitors results in a higher power factor resulting in the reduction of distribution system losses. The model assumed 1MW of demand being supplied at a power factor of 0.85 and revised up to 0.95 using a capacitor. The reduction of the distribution losses results in savings in power purchases and therefore the benefit was valued at the average purchase price. No allowance was assumed for incremental O&M cost of the capacitor as it is considered negligible.

Tariff Methodology

- 110. In parallel with the assessment of the financial statements and the financial management function, the Consultant was also required to review the power tariff structure to determine whether the true cost of supply is being adequately recovered or subsidised in a transparent manner. The viability of the tariff structure was tested through the production of the financial projections for the DISCOs.
- 111. The procedure for tariff petition and methodology used in the tariff determination by National Electric Power Regulatory Authority (NEPRA) may be summarised as follows. DISCOs make a petition for revision of tariff to NEPRA. After receipt of the application, NEPRA notifies the stakeholders, the public at large, of the salient features of the petition through publication in a local news paper. NEPRA receives comments and interventions from stakeholders and gives DISCOs a chance to respond before making its determination. The tariff becomes effective after Government notification in the official gazette. This tariff will remain effective until the next petition by DISCOs, determination by NEPRA and notification by the Government.
- 112. In the last determination by NEPRA, the tariff was based on the PPP (dependent on the generation mix and fuel price), which is a pass through cost to the consumer and adjusted for line losses. NEPRA allowed the addition of a distribution margin, which was based on an annual revenue requirement for operations and maintenance, administration, depreciation, income tax and a return on assets and net of other income. The return on assets was based on the

regulatory asset base, comprising of the average net fixed assets and capital work in progress, and reduced by the extent of deferred credit and other income. The rate of return was based on NEPRA's assessment of each DISCOs Weighted Average Cost of Capital (WACC). The cost of debt was based on the actual cost of existing borrowings. The rationale of determination of the cost of equity was not stated, whilst the actual debt to equity ratios for each DISCO were used.

Weighted Average Cost of Capital

113. For estimating the weighted average cost of capital (WACC), it was assumed that the ADB would finance 74% of overall project costs through Tranche 1 with the expectation that the Government would on-lend the funds with the same duration in Rupees to DISCOs at about 13% on an ad hoc basis, substantially lower that the 17% as stated in the 1996 government circular. Foreign exchange risk will not be borne by DISCOs. The balance will be financed through self-generated funds (equity). 15% is assumed for nominal cost under equity contribution, consistent with rate of return allowed for DISCOs. Domestic inflation is assumed to be 7.5% per annum. The WACC is estimated at 10% (Table 1). Tax benefits on interest were not taken into account since DISCOs currently do not pay taxes.

Tranche 1 combined	ADB Loan	ADB Grant	Internally Generated Funds
Amount (\$ million)	241	10	76
Weighting	74%	3.1%	23%
Nominal Cost	13.0%	0.0%	15.0%
Tax Rate	0.0%	0.0%	0.0%
Tax-Adjusted Nominal Cost	13.0%	0.0%	15.0%
Inflation Rate	1.2%	1.2%	7.5%
Real Cost	11.7%	-1.2%	7.0%
Weighted Component of WACC	8.6%	0.0%	1.6%
Weighted Average Cost of Capital (Real)	10.2%		

Table 1: Combined Weighted Average Cost of Capital (US\$ million)

ADB = Asian Development Bank, WACC = Weighted Average Cost of Capital, MFF=Multi Tranche Financing Facility

Note: 7.5% is the average of domestic cost escalation forecasts by ADB for 2006-2010 *Source: ADB and PPTA Consultants estimates*

Financial Internal Rate of Return

114. The overall tranche 1 project FIRR is calculated at 19% and is presented at Table2. The overall rate compares favourably with the estimated value of WACC at 10%, substantiating the financial viability of the project.

Fiscal Year	Capital Cost	O&M Cost	Total Cost	Revenue	Net Benefit
2009	-7,079		-7,079	0	-7,079
2010	-7,079	-566	-7,645	1,882	-5,763
2011	-3,392	-702	-4,094	2,312	-1,782
2012		-702	-702	2,756	2,054
2013		-702	-702	3,226	2,524
2014		-702	-702	3,725	3,023
2015		-702	-702	4,256	3,554
2016		-702	-702	4,685	3,983
2017		-702	-702	5,105	4,403
2018		-702	-702	5,547	4,845
2019		-702	-702	5,954	5,252
2020		-702	-702	6,326	5,624
2021		-702	-702	6,326	5,624
2022		-702	-702	6,326	5,624
2023		-702	-702	6,326	5,624
2024		-702	-702	6,326	5,624
2025		-702	-702	6,326	5,624
2026		-702	-702	6,326	5,624
2027		-702	-702	6,326	5,624
2028		-702	-702	6,326	5,624
				FIRR	19%
				NPV	12,174

Table 2: Aggregate Financial Internal Rate of Return (Rs million)

FIRR Note:

= Financial Internal Rate of Return; NPV = Net Present Value

1. Capital costs include base costs, physical but not price contingencies and interest during construction.

2. No residual value assumed

3. O&M costs are estimated at 4% of initial capital cost.

Source: ADB and PPTA Consultants estimates

Sensitivity Analysis

115. A sensitivity analysis has been carried out by: (i) reducing benefits by 10%; (ii) increasing costs by 10%; and (iii) reducing benefits and increasing costs by 10%. The results are presented in Table 3. The sensitivity analysis reveals that the project is attractive even in the event that both benefits and costs change to its disadvantage by 10%.

Sensitivity Parameter	FIRR	Switching Value
Base Case	19%	
Reduce benefits by 10%	17%	-38%
Increase costs by 10%	17.5%	83%
Reduce benefits by 10% and increase costs by 10%	15.5%	
0 100 100T1 0 11 1		

Table 3: Sensitivity Analy	ysis
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Source: ADB and PPTA Consultants

116. Regulatory risk is low since there is a functioning and independent NEPRA for tariff determination, with a well defined tariff methodology. There is little risk of downward revision of the tariff. Delays in tariff filing by DISCOs, tariff determination by NEPRA, and subsequently tariff notification by GOP pose some risks, which

could be effectively eliminated with prudent management by each of the concerned parties. The NEPRA determined tariff is never fully recovered by DISCOs from consumers due to the lesser GoP mandated tariff. The difference is reimbursed by GOP through a subsidy payment, however, often not on a regular basis, placing the DISCOs in cashflow difficulties. This poses risks for the project, which is outside of DISCOs' direct control. The GoP has taken measures to pay subsidy liabilities to each DISCOs' direct control of customer collections instead of remittances through WAPDA is in the process of reform.

117. Geopolitical and political risks are present as for all projects in Pakistan. The number of investments and geographical spread of these investments lessen the risk of significant number of projects being disabled to make the Tranche 1 unsustainable.

ECONOMIC ANALYSIS

- 118. The Secondary Grid System expansion plan of each DISCO was evaluated by running load flow studies. The sub projects selected for Tranche 1 of the MFF were mostly part of each DISCO's expansion plans, although some sub projects were identified as a result of the load flow studies which revealed current and urgent which needed immediate redress. The load flow studies also provided the additional capacity and energy (including losses avoided) that each sub project would make available to the system. This was achieved by means of 'with' and 'without' load flow runs. The benefits were evaluated on the basis of prevailing consumer tariff plus consumer surplus; all system additions resulted in incremental supply being made available to the system.
- 119. Economic analysis methodology was prepared and each sub-project was analysed, together with the whole MFF and Tranche 1. The economic feasibility of the sub-projects, Tranche 1 and MFF was established clearly and unambiguously.
- 120. Economic costs used in the study have been expressed in United States Dollars at 2007 prices. Non-tradable inputs were converted to economic prices using an estimated Standard Conversion Factor of 0.9. Capital costs included physical contingencies, but excluded taxes, price contingencies and financial charges during construction.

Estimation of Benefits

121. The project will deliver incremental output. Incremental output meets increased demand for electricity and has been valued using consumers' estimated willingness-to-pay (WTP). For the incremental part of the output, the benefits of the overall project and of the individual sub-projects have been based on prevailing tariffs, including consumer surplus (assigned to primary transmission) and for the non-incremental part of the output, benefits have been based on resource cost savings. Given the scale of the proposed project, no attempt was made to value environmental or any other external benefits.

Incremental Consumption – Valued at Willingness-to-Pay

122. Willingness-to-pay (WTP) for incremental consumption was estimated by comparing the current price of electricity with the price of alternative sources of energy. The fundamental concept is that consumers would be willing to pay a proportion of the difference between what they currently have to pay for an alternative source of energy and the amount they would actually have to pay for

incremental units of electricity. A semi-log electricity demand function is generally assumed in estimating WTP, but a lack of primary energy consumption data prevents an accurate calculation in this instance. A conservative view has therefore been taken that the consumer surplus is given by 50% of the difference between the electricity tariff and the cost of alternative energy sources.

- 123. Due to the fact that the secondary grid system and the primary and secondary distribution system are peak-constrained, it has been assumed that the bulk of incremental consumption will be in the residential sector. Residential consumers typically use kerosene lamps for reserve lighting when grid-supplied electricity is unavailable (constrained-off), as these represent the next best viable alternative from an economic perspective. The economic cost of kerosene lamp based lighting is approximately Rs 9.36/kWh.
- 124. In the commercial, industrial and agricultural sectors, diesel generators are typically employed to provide back-up electricity when grid supplied electricity is constrained-off. Thus, diesel generators were assumed to be the next best alternative, at an estimated life-cycle cost of Rs. 6.36/kWh, Rs. 30.99/kWh and Rs. 13.78/kWh for each of the three sectors respectively.

Sector	WTP (Rs/kWh)
Residential	9.30
Agricultural	6.37
Commercial	6.71
Industrial	5.88
Weighted average	7.67

Table 4: Willingness-to-Pay Estimates

125. The WTP estimates assigned to 132 kV and 66kV (secondary System), 11 kV primary distribution system (distribution network) and 0.4 kV secondary distribution system are 10.17%, 5.9% and 10.48% respectively of the total – that is, Rs. 0.78/kWh (USc 1.28/kWh), Rs. 0.45 (USc 0.74) and Rs. 0.80 kWh (USc 1.32/kWh) respectively. Economic analysis has been performed based on benefits quantified on WTP estimates at \$30 oil prices. WTP at different oil prices are summarized as follows:

Summary	Willingness to pay Rs./kWh				
Oil Price \$/bbl.	45	60	80		
Residential	11.56	13.82	16.84		
agricultural	8.55	10.73	13.63		
commercial	6.36	11.07	13.97		
industrial	8.06	10.24	13.14		
weighted total	9.89	12.11	15.07		
weighted total c/kWh	16.24	19.88	24.74		

Table 5: Willingness to pay at different oil prices

126. In the case of analysis of sub projects, WTP was calculated for each Disco. These are presented in Table 6.

	Tariff		Consumer	[·] Surplus	WTP	
DISCO	Rs /kWh	US \$/kWh	Rs /kWh	US \$/kWh	Rs /kWh	US \$/kWh
LESCO	4.66	0.077	2.72	0.0447	7.38	0.1212
GEPCO	4.35	0.071	3.64	0.0598	7.99	0.1312
FESCO	4.38	0.072	3.15	0.0517	7.53	0.1236
IESCO	4.63	0.076	3.34	0.0548	7.97	0.1309
MEPCO	4.14	0.068	3.49	0.0573	7.63	0.1253
PESCO	4.16	0.068	3.97	0.0652	8.13	0.1335
HESCO	4.76	0.078	3.00	0.0493	7.76	0.1274
QESCO	3.23	0.053	3.45	0.0567	6.68	0.1097

Table 6: Value of WTP used in economic analysis by DISCO

127. Using the above values of WTP and other assumptions described above, economic analysis of sub projects has been undertaken. The DISCO wise summary of results of economic analysis of sub projects i.e. extension / augmentation is given in Table 7. The overall economic cost which includes costs of sub projects (STG), ELR, DOP and Capacitors etc and the summary of results based on the above mentioned capital cost are given as under:

DISCO	Economic Cost (Rs. Million)	EIRR%
LESCO	2,718.23	44.55
GEPCO	918.46	17.47
FESCO	1,690.08	30.49
IESCO	2,050.4	51.75
MEPCO	1,774.63	26.83
PESCO	2,360.83	25.09
HESCO	2,733.18	12.27
QESCO	1,791.73	19.63
All DISCOs	16,037.5	30.96

Table 7: Summary of Economic Analysis by DISCO

(source: consultant's analysis)

128. The economic analysis of Tranche 1 presented in Table 8, establishes the investment to be economically feasible. The analysis results in an EIRR of 30.3% and a NPV of over M \$ 430. The economic analysis of the whole MFF presented in Table 9, also establishes the proposed MFF to be economically feasible, with an EIRR of 23.0% and a NPV of about US\$ 2.20 billion. Both results were tested at various assumptions and were found to be robust in light of various assumptions related to costs, benefits and delays in implementation of the proposed program.

Table 8: Economic Analysis of Tranche 1 Projects									
	Benefits (\$millions)				Costs (\$ million)				
	Electricity Supply	Total Benefits	Supply Cost	Investment Cost	Total Investment Cost	Fixed Cost	Total Operating Cost	Total Costs	Net Benefits
2008				62	62	3	3	65	- 65
2009	233	233	234	125	359	9	9	368	- 134
2010	333	333	250	125	375	16	16	390	- 57
2011	356	356	268	-	268	16	16	283	73
2012	381	381	286	-	286	16	16	302	79
2013	432	432	292	-	292	16	16	308	124
2014	432	432	292	-	292	16	16	308	124
2015	432	432	292	-	292	16	16	308	124
2016	432	432	292	-	292	16	16	308	124
2017	432	432	292	-	292	16	16	308	124
2018	432	432	292	-	292	16	16	308	124
2038	432	432	292		292	16	16	308	124
NPV		2,773			2,231		109	2,340	433
EIRR %	0								30.3%
Sensiti	vity Analysis	of EIRR							
			Change						
			in	NPV	EIRR (%)	SI			
			Variable						
Base C	ase			433	30.3				
i) Capital Cost Overun (%) 20		295	20.7%	1.6					
ii) Benefit Reduction (%) -20		-10%	10.0%	5.1					
iii) Implementation Delay I year		-141	6.3%						
iv) Com	iv) Combination of i), ii) and iii) -196 1.7%								

Notes:

i) Discount Rate 12%

ii) Standard Conversion Factor (SCF) 0.9

iii) Transmission and distribution cost are based on long run marginal cost

iv) Sensitivity indicator is the ratio of percentage change in the economic NPV divided by the percentage change in the given parameter

v) Switching value is the percentage change in a parameter for the projevct decision to change, that is for the economic NPV to become zero or the EIRR to fall to the cut off rate.

Table 9: Economic Analysis of Sector Investment Plan

	Benefits (\$millions)			Costs (\$ million)					
	Electricity Supply	Total Benefits	Supply Cost	Investment Cost	Total Investment Cost	Fixed Cost	Total Operating Cost	Total Costs	Net Benefits
2008				100	100	5	5	105	(105)
2009	463	463	277	350	627	23	23	650	(187)
2010	1,079	1,079	899	500	1,399	48	48	1,447	(368)
2011	1,760	1,760	1,467	600	2,067	78	78	2,145	(385)
2012	2,506	2,506	2,089	800	2,889	118	118	3,007	(501)
2013	3,389	3,389	2,825	800	3,625	158	158	3,783	(394)
2014	4,338	4,338	3,616	450	4,066	180	180	4,246	92
2015	5,273	5,273	4,395	400	4,795	200	200	4,995	278
2016	6,240	6,240	5,201	400	5,601	220	220	5,821	419
2017	7,195	7,195	5,997	400	6,397	240	240	6,637	558
2018	8,178	8,178	6,816	400	7,216	260	260	7,476	702
2038	9,238	9,238	7,700		7,700	210	210	7,910	1,328
NPV		35,658			32,352		1,067	33,419	2,239
EIRR %	6								23.0%
Sensitivity Analysis of EIRR									
			Change						
			in	NPV	EIRR (%)	SI			
			Variable						
Base Case			2,239	23.0					
i) Capital Cost Overun (%)		20	2,312	21.6	-0.2				
ii) Benefit Reduction (%)			-52	63	23.4	4.9			
iii) Implementation Delay			l year	(273)	9.1%				
iv) Combination of i), ii) and iii)			-	(922)	5.1				

(Source: Calculations)

ENVIRONMENTAL IMPACT ANALYSIS

- 129. Until individual subprojects were finalised, the focus of the environmental work stream was on addressing policy and framework issues. This was to include the approach that will be recommended for satisfying the requirements of the federal and provincial governments' environmental agencies for each subproject that is ultimately funded. Experience with the NTDC PPTA indicates that a consistent approach for small scale projects between the different provincial agencies and between the provinces and the centre is in development. The indications are that the agencies are prepared to work with the sector to develop a practical approach to facilitate the progress of work but within the statutory requirements for environmental assessment. A key aspect of this approach is full and transparent disclosure of all subprojects by the DISCOs to the provincial environmental authorities as early as possible. This will enable the directors of the relevant provincial EPAs to decide on the requirements for environmental assessment of all subprojects in their jurisdiction as required by the Pakistan Environmental Protection Act 1997 (EPA 1997- as amended and regulated).
- 130. It is understood that the enabling legislation for the environmental agencies does include in their remit the supervision of not just the environmental aspects but also broader issues that currently do not have any other enforcement agency in Pakistan, for example Health and Safety of the public, and of workers during the construction phase.
- 131. The early thinking within the PPTA team was that for projects with no perceived environmental impact a simplified approach would be developed and proposed to the agencies. This approach, if accepted, would allow clearance to be given for a "batch" of jobs with similar characteristics under a single application to the respective agencies. Typical jobs to qualify under this category would be addition of items, e.g. capacitors or transformers, increasing transformer sizes all within the boundary confines of existing DISCO operational sites. However full disclosure of all subprojects would still be required under section 12 of the EPA 1997 as it is the provincial EPA's authority that would decide on the requirements for environmental assessment.
- 132. For this to work it was expected that the application would have to demonstrate detailed environmental management planning to control all environmental impacts to within acceptable levels to safeguard all neighbours from adverse effect, what mitigation measures would be committed to be implemented against design phase, construction phase and operational environmental impacts and hazards. The implementation of how it would manage construction phase safety precautions would also be included.
- 133. Environmental assessment for all the subprojects of Tranche-1 has been conducted in accordance with ADB's Environment Policy (2002) and Environmental Assessment Guidelines (2003). Subprojects prepared under future tranches will all have environmental assessment to comply with the Environmental Assessment and Review Framework (EARF) agreed by the Federal (Pakistan) Environmental Protection Agency (PEPA) and ADB and the Government's environmental Assessment regulations and guidelines under the Pakistan Environmental Protection Act 1997. The Tranche-1 subprojects have been categorized as B and IEE reports have been prepared for all the subprojects that include an environmental management plan (EMP) with implementation budget. A summary IEE (SIEE) is included as Appendix 11. No component of any Tranche-1 subproject falls in an environmentally sensitive or protected area.

- 134. To mitigate the potential adverse impacts of the construction stages of subprojects, detailed environmental management plans (EMPs) have been prepared as part of the IEEs. The numerous subprojects in Tranche -1 are all geographically far apart with many in different provinces and therefore there is little potential for cumulative impacts in the construction, or operational phases. The objective of the Project however, is to produce cumulative benefits to the secondary transmission and distribution systems in the operational phase. The overall beneficial cumulative impacts of the redesigning, upgrading and restructuring of the distribution facilities will accrue in the medium to long term. Therefore negative impacts should be short lived and manageable and on balance there should be minimal negative cumulative impact expected on the sector.
- 135. The DISCOs will implement and monitor the submission and clearance of IEEs and EIAs under statutory provisions (EPA 1997). They will ensure that bidding documents and contracts include the EMPs that describe in detail the mitigation measures, as required by the IEEs/EIAs and EMPs. The Project requires the establishment of an environmental and social cell within each DISCO, and the appointment of environmental and social specialists within that cell as a condition for Tranche-2 of the Investment Program to be effective. The DISCOS will also check that the contractors are made aware of the requirements, that selected contractors have the capability or can develop the capability to implement the EMP and the DISCO will also allot sufficient resources (in the form of environmental and social units) ensure mitigation measures are monitored and implemented by the contractors and that EMPs are updated as necessary to deal with ant unexpected impacts as the projects are rolled out.

RESETTLEMENT ANALYSIS

- 136. The Resettlement and Indigenous People framework and the Land Acquisition and Resettlement Programme developed for the NTDC Transmission Enhancement Project under PPTA 4665 were largely applicable to this Distribution Enhancement Project.
- 137. The two frameworks were updated and modified for applicability to projects delivered under the proposed distribution MFF, which will by its nature involve many more in number, but lower in impact subprojects. Each subproject, however, is likely to have more immediate though less significant impact on a larger number of people.
- 138. These documents were publicised and made readily available to potentially affected persons in accordance with ADB guidelines.
- 139. Tranche 1 of the MFF was expected to include mainly extension projects i.e. projects located within DISCO owned land, therefore land acquisition will not be triggered. Subprojects summary feasibility studies will be prepared that will document these facts. For new projects a detailed survey will be undertaken and a complete documentation of the land acquisition and affecters will be prepared and presented to the DISCO for concurrence before submission to the Bank. Detailed analysis of subprojects following initial visit to gather data will be undertaken.
- 140. Minimal land acquisition and resettlement (LAR) or livelihood impacts may be expected for subprojects requiring the construction of new grid substations or transmission lines. For subprojects entailing the construction of distribution lines (up to 11 kV), a subproject type where poles are to be sited within public roads

corridors, no LAR will be needed, nor allowed under the LAR Framework or LARF (see FFA, schedule 5).

- 141. LAR for new grid stations is expected to be carried out through mechanisms which will not trigger the ADB's Policy on Involuntary Resettlement such as purchase/sale between willing buyer and willing seller, use of unoccupied government land or voluntary donations from DISCOs clients. In these cases a due diligence report (DDR) will be prepared to provide proof that the land was acquired through the mechanisms specified above but no land acquisition and resettlement plans (LARP) will be required. LAR for transmission lines, on the contrary, will have to be carried out through the application of the right of eminent domain and will thus trigger the implementation of the ADB Involuntary Resettlement Policy and require the preparation of LARPs. This will also be the case of subprojects involving substation construction if the above detailed mechanism cannot be applied and LAR will entail the exercise of eminent domain.
- 142. The LARF is summarized in detail in Appendix 12 and is provided in full in the Supplementary Appendixes. The LARF details all mechanisms for the preparation and implementation of LARPs in a manner fitting the requirements of ADB Resettlement Policy and the MFF guidelines. The LARF has been prepared by PEPCO and endorsed by each DISCO. The appraisal of successive tranches will require a review of the LARF to ensure that its content fits the conditions of the new subprojects. Under tranche-1 of this Investment Program 7 secondary transmission lines will require the preparation of a short LARP and 2 substations will require the preparation of a DDR (one of the DDRs is included in the Short LARP for one transmission line). These document are provided in the Supplementary Appendixes.
- 143. To fit this project context it has been agreed that the term "Indigenous peoples" (IP) used by ADB fully corresponds to the term "tribal Peoples" (TP) used in Pakistan. IP/TP may be affected only by projects in the North-West Frontier Province's tribal areas. However due diligence needs to be carried out also for projects in Baluchistan where groups who are not officially defined as tribal but who practice a collective system of land property reside. For some of these projects appropriate documentation inclusive of appropriate social assessment and mechanics for the acquisition of collective property will have to be prepared. An Indigenous Peoples Development Framework (IPDF) for the Investment Program has been prepared by PEPCO and agreed with DISCOs and ADB (see Supplementary Appendixes). No indigenous peoples are affected by Tranche-1 subprojects. Appraisal of successive tranches will require a review of the IPDF so as to reflect the specificities of the new subprojects.

POVERTY ANALYSIS

- 144. The impact of the subprojects has analysed for impact upon the poverty situation. Provision of power in itself does result in some financial transfers to the low consumption domestic consumers. The subproject implementation, by themselves will promote economic activity and this will pull some households above the poverty line. The construction activity generated by these subprojects will have a direct impact in way of provision of employment to the target households.
- 145. In Pakistan consumption is taken as the welfare indicator for the measurement of the poverty status and is derived on the basis of income which can provide daily intake of 2,350 calories per adult equivalent per day along with expenditure on non-food items. On this basis of current price level, the poverty line is taken as

monthly per capita income of Rs.879 and the persons lying below this line are estimated as 24 percent of the total population. The urban regions of Sindh Province had the lowest poverty in the year 1999 while the rural areas of NWFP had the highest. Punjab Province has also significant gradients in poverty among its different Regions. The findings of ADB Poverty Analysis in Pakistan show extreme pockets of poverty in rural Sindh and southern Punjab whereas the whole Province of Baluchistan is poor by all indicators of poverty. Similar is the case with NWFP Province.

146. For the purpose of estimating distribution effects of the Power Distribution Enhancement Project and evaluating poverty impact, project beneficiaries have been divided into: electricity consumers; the operating authority (respective DISCO in this case); the economy at large and; labour. A poverty impact assessment is presented in Appendix 14. This analysis is based upon ADB guidelines. The poverty reducing impact of the project has been identified by evaluating the expected distribution of net benefits to different groups benefiting as a result of implementation of the project. For this purpose, firstly, the present value of net economic benefits and project economic costs, both, capital and operating have been computed at 12 % discount rate. Secondly, net present value of financial benefits and costs has also been computed. Thirdly, the absolute difference of net present values (financial and economic) is calculated. Lastly, the difference is apportioned between various beneficiaries. Crucial to the poverty impact analysis is the appropriate distribution assumptions on the proportion of net benefits accruing to each stakeholder category that eventually goes to the poor. The results of the poverty analysis is summarized in Table 10.

DISCO	Poverty Impact Ratio (%)
LESCO	10.62
FESCO	12.08
IESCO	16.15
MEPCO	15.50
PESCO	21.63
HESCO	20.53
QESCO	22.29

Table 10: Poverty Impact Ratio by DISCO

(source: consultant's analysis)

LIST OF ABBREVIATIONS AND SHORT FORMS USED

Abbreviation	Full description
ADB	Asian Development Bank
AP	Affected person
CCGT	Combined cycle gas turbine
Consultant	British Power International
DDR	Due Diligence Report
DPR	Detailed Project Report
DISCO	(Power) Distribution Company
DOP	Distribution of Power
EA	Executing Agency, in this case Technical Director, Pakistan Electric Power Company.
EIA	Environmental Impact Assessment
ELR	Energy Loss Reduction
EM	Electro-Mechanical
EMP	Environmental Management Plan
EPC	Engineering, Procurement and Construction (contract)
FESCO	Faisalabad Electric Supply Company (One of the DISCOs)
GDP	Gross Domestic Product
GEPCO	Gujrawala Electric Power Company (One of the DISCOs)
GIS	Geographic Information System or Gas Insulated Switchgear (clear by context)
GoP	Government of Pakistan
GWh	Giga watt hour (1,000,000,000 watts for one hour duration)
HES	Health, Environment and Safety
HESCO	Hyderabad Electric Supply Company (One of the DISCOs)
ННН	High Head Hydro
IA	Implementing Agency
IEE	Initial Environmental Examination
IESCO	Islamabad Electric Supply Company (One of the DISCOs)
IP	Indigenous People
IPDF	Indigenous Peoples Development Framework
IPO	Initial Public Offering
IPP	Independent Power Producer.

Abbreviation	Full description
KESC	Karachi Electric Supply Company
kV	Kilovolt (1,000 volts)
LAA	Land Acquisition Act, 1894
LARF	Land Acquisition and Resettlement Framework
LAC	District Land Acquisition Collector (a role defined under the LAA)
LESCO	Lahore Electric Supply Company (One of the DISCOs)
LHH	Low Head Hydro
MEPCO	Multan Electric Power Company (One of the DISCOs)
MFF	Multi tranche Finance Facility
MVA	Megavolt- ampere (1,000,000 Volt amperes)
MW	Megawatt (1,000,000 watts)
NTDC	National Transmission and Despatch Company
OCGT	Open cycle gas turbine
O&M	Operations and Maintenance
PC-1	Planning Commission Document 1; an outline document in prescribed from to gain approval for expenditure on the networks
PEPCO	Pakistan Electric Power Company
PESCO	Peshawar Electric Supply Company (One of the DISCOs)
PPA	Power Purchase Agreement
QESCO	Quetta Electric Supply Company (One of the DISCOs)
RPF	Resettlement Policy Framework
RRP	Report and Recommendations of the President to the Board of Directors
SIEE	Summary Initial Environmental Examination
SODA	Scheme of delegated authority (which describes the limits of Directors' and Managers' authority)
STG	Secondary Transmission Grid
ТА	Technical Assistance Grant made by the ADB, for the purposes of this report TA 4665
TNA	Training Needs Analysis
ToR	Terms of Reference (for the PPTA 'Power Transmission Enhancement Project - Pakistan' TA 4665)
ТР	Tribal Peoples
USD	United States Dollar
WAPDA	Water and Power Development Authority

APPENDIX 1: OVERVIEW OF THE PAKISTAN DISTRIBUTION SECTOR

- 1. The distribution sector in Pakistan consists of eight distribution companies, each holding an electricity distribution licence, issued by the National Electric Power Regulatory Authority (NEPRA) for a defined geographic area. These eight companies were incorporated in 1999 on the unbundling of the Water and Power Development Authority (WAPDA).
- 2. Each DISCO thereby holds the obligation for distribution of electricity in its licensed area in accordance with standards of supply and service set by NEPRA.
- 3. The DISCOs receive electric power, in the main, from the generating stations via the national transmission network owned and operated by the National Transmission Despatch Company, (NTDC). NTDC is responsible for the primary transmission system at voltages above 132kV and for the transmission of power from generation stations to the bulk intake points of the DISCOs.
- 4. In June 2006, maximum demand on the NTDC network (the eight DISCOs combined plus a contribution to KESC) was 13066 MW and there was 17395 MW of installed generating capacity. These figures are taken from Power System Statistics, up to June 2006.
- 5. NTDC's Primary transmission system links all major generating stations with the main load centres at 500kV and 220 kV level. The 500kV system provides the main power flow route between the North (Tarbela Hydropower plant being the most northerly point) and the South (Karachi). The bulk of the generation capacity is connected in the North (hydropower) and the South (thermal) with the major load centre being mid country centred around Lahore, Faisalabad and Islamabad. As a result there are always significant power flow requirements from the north or the south to the centre, depending upon the season and the availability of hydropower.
- 6. Power is distributed by the DISCOs via an extensive network of 132 kV and 66 kV (secondary transmission) lines spanning through their areas, and then by a more localised network of 11kV and 0.4kV circuits.
- 7. During periods of peak demand, the generation plant margin is insufficient to allow for spinning reserve, so any loss of generation, or insufficient transmission capacity leads to load shedding in order to maintain system frequency within acceptable levels.
- 8. At a more localised level constraints on the distribution network may have the same effect and it is evident from early reviews that a high proportion of transformers on the 132kV network are heavily loaded or overloaded (about 70%). Power demands at many of the load centres are reported by NTDC and the DISCOs to be of low power factor. This causes excessive consumption of MVArs from the NTDC transmission system at the interconnection points, resulting in transmission system voltages falling below acceptable levels, and being further exacerbated by the effect on the distribution network. Steps were taken to address this on the NTDC system under the transmission MFF, and similar steps are likely to be included in equivalent projects under the distribution MFF.
- 9. The aggregate growth in demand of domestic, industrial and agricultural sectors is reported to be aggregated to around 8% per annum. Long term plans issued in 2005 show the development of generation plant will increase the capacity of the country to 3000MW in 2008/9 and 6000 MW by 2019/20. The plans further show that around 14500 MW of Hydro Power generation capacity is planned during the
period from 2015 up to 2024/25. In addition to this, there are further plans to connect IPPs (gas and hydro plant) of some 4000 MW. This includes direct connection to some of the DISCOs networks in the high demand centres in FESCO, LESCO and GEPCO.

- 10. The ADB MFF approved in December 2006 provided support for the development of the NTDC transmission system to keep pace with this.
- 11. The final distribution of power to satisfy the growing demand depends upon the distribution networks of the eight DISCOs. These networks do not provide complete geographic coverage, have inadequate capacity for the current demand and as a result have a high percentage of overloaded transformers.
- 12. Initial review of the information available from the DISCOs indicates that many of the transformers with 132kV or 66kV primaries are overloaded, with an even larger number loaded in excess of 80% of nameplate rating and under rapid load growth conditions. The Consultant's initial findings indicate that in the order of 960 transformers in this class should be changed because of existing overloading or anticipated overloading in the near future. Transformer changes at this level involve heavy plant, transfer to site by road, and lengthy outages to replace under emergency conditions. In addition to this, there is a very high world wide level of demand for large transformers from reputable manufacturers such that lead time for delivery is measured in months. Currently, the minimum expectation on delivery is of six months, and this is not expected to improve in the short to medium term.
- 13. In many cases the option exists to add an additional transformer or replace an existing transformer with a larger size. The latter option offers advantage in that it makes the displaced transformer available for service at a lower loaded location, removes the need for permanent use of additional space, and does not add to the system plant headcount on high voltage switchgear or protection systems.
- 14. The Secondary Transmission Grid is now severely stressed, the result of previous under investment for expansion and high economic growth rates in the recent past. All eight Discos have a very high number of transformers that are overloaded. This has resulted in the need for load shedding and load management even when generation capacity was available and primary transmission had the capability to deliver the load to the secondary network.
- 15. About 70% of the secondary transmission system transformers in five of the eight DISCOs are over loaded. The overloading of transformers is resulting in un-served energy and also inhibiting load growth that is needed to sustain the high economic growth rates.
- 16. The secondary system has not, generally, been designed to meet the (n-1) criteria required under the Grid Code and Licence Conditions.
- 17. Distribution system losses were reduced between 1980 and 1992 from around 20% to 12%. However, this trend then reversed and distribution losses increased to 27.5% in 1999. Since then improvements have been achieved and in 2006 losses had been reduced back to 15.1% nationally. This figure will vary widely between the DISCOs due to their completely different geographic, demographic and hence network characteristics.
- 18. Recently, losses have decreased for all DISCOs except for PESCO and HESCO which have registered an increase of 4.89% and 3.04% respectively for the period 2001 to 2006. Losses in TESCO have increased at 23.06% average. p.a. over the

period 2003-06. All other DISCOs have achieved a reduction in losses. There remains, however, opportunity for reduction of losses even in the well performing DISCOs.

- 19. The failure of distribution transformers (11kV/0.4kV) is another area of concern. Distribution transformer failures are reported as requiring replacements worth about US \$20 M every year. These failures are due to a number of prime causes; inadequate monitoring of demand on transformers; inadequate protection of transformers (including of using improvised fuses); lack of operational procedures to take mitigating steps to avoid repetitive overload damage; absence of any small area load forecast effort; absence of any linkage between billing data and demand at distribution transformers.
- 20. The DISCOs are not adequately equipped with regional control centres to professionally manage their networks, or to accurately compile the returns that may be expected (but not currently implemented) by the regulator, NEPRA. This is not an immediate priority but will be a medium term investment requirement for managing the capital intensive distribution network effectively. The NTDC Load Despatch Centre is currently under modernisation and augmentation, and may require more appropriate and timely information from regional control centres to better understand and monitor the demands on the national transmission.

APPENDIX 2: PROJECT WORKPLAN

Task ref.	Work Area/Task – Transmission Engineering	ToR Ref.	Team	Output
DE1	Review Eight Disco's power systems and mid term investment plans, identify priority subprojects for ADB funding, focusing first on 132kV & 66kV transmission circuits & substations.	2(i)	DE	 i. Prioritisation methodology report for use in all tranches. ii. Prioritised list of subprojects for Interim Report from Disco's overall lists, prioritised on benefit, technical specification and implementation period, and any other appropriate criteria developed during the first stage.
DE2	Determine whether the Discos' subprojects deliver beneficial and cost effective solutions for meeting the distribution networks' capacity requirements.		DE	Least cost review of projects
DE3	Review the technical approach of the eight Discos to demand forecasting. Propose modifications to process as appropriate and prepare 10 year forecast.	2(iii)	DE	Joint output with economists on methodology for demand forecasting
DE4	Prepare project implementation and procurement arrangements, including contract packages in accordance with ADB guidelines for procurement, and a project implementation schedule		DE	Proposals for project procurement and tendering
DE5	Prepare engineering designs & technical specifications for overhead lines and substations in accordance with relevant technical standards. Prepare bills of quantities for materials requirements and detailed cost estimates for contract packages, identifying local currency & foreign exchange.		DE	High level engineering designs (detailed design is out of scope of PPTA) to sufficient level of detail to enabled detailed designs to be delivered. Bills of quantities for main procurement items
DE6	Prepare detailed project implementation schedules showing anticipated progress of works for each contract package. Prepare bidding projects for subprojects following ADB bidding guidelines	2(vi) 2(vii)	DE	Detailed project schedules Bidding documents for contract packages
DE 7	Assess the capacity of each DISCO to implement a project, and identify any need for capacity building. Prepare ToR for Project Implementation consulting including resettlement and environmental impact monitoring. Prepare RFPs in accordance with ADB guidelines.	2(viii)	DE	Review document on DISCO's system study and implementation capability. Business case and ToR for Implementation Consultants

Project ref	Work Area/Task – Financial Analysis	ToR Ref.	Team	Output		
F1	Financial impact assessment of each subproject to establish FIRR, in accordance with ADB Guidelines,	3(i)	F	Incremental FIRR for each subproject		
F2	Identify all risks to project revenue & costs, conduct sensitivity analysis on financial results	3(i)	F/TE	Risk and Sensitivity Table		
F3	Prepare entire project cost estimate, separating foreign exchange and local currency, including physical and price contingencies, IDC, commitment fee and other finance charges	3(ii)	F/TE	Project Cost estimate and financing plan		
F4	Review most recent audited and/or unaudited financial statements of each DISCO to assess historical financial performance, retail tariff levels, capital structure and generation of sufficient internal funds to ensure sustainability.		F	Report on historical performance, accounting policies, capital structure and sustainability of each DISCO		
F5	Review recent audited power projects of DISCOs to determine proper accounting and cost control.		F	Audit reports on selected power projects		
F6	Prepare an Appendix to the RRP briefly summarizing past historical and projected financial performance including 10 year proforma financial statements for each DISCO, assess compliance with measures and ratios in pro forma statements		F	Drafted Appendix with Tables (Balance Sheet, Income Statement and Cashflow) summarising past and future performance for each DISCO. List of Assumptions		
F7	Assess DISCOs' financial management capabilities including reviews of earlier ADB and other lender studies. From these and Consultants own assessment make recommendations for institutional strengthening of financial management with time bound action plan.	3(vi)	F	Report (combined with F6) on financial management capability		

Project ref	Work Area/Task – Economic Analysis	ToR Ref.	Team	Output
EC1	Conduct an Economic and distributional evaluation of the project comparing with and without bases for different load flow scenarios. This to include EIRR calculations for each subproject, taking into account economic costs and benefits in accordance with ADB guidelines.	4(i)	EC	Process for EIRR calculation of each subproject in the MFF. EIRR calculation for each subproject in tranche 1.
EC2	entify all risks to project revenue & costs & conduct sensitivity analysis.		EC	Methodology for risk analysis and sensitivity analysis to be applied to each subproject in the MFF.
EC3	Analyse economic subsidies in current tariff structure and the extent of cross subsidy between different customer groups and regions. Review appropriateness of current lifeline tariff.	4(ii)	EC	Statement of tariffs and subsidies for inclusion in Final Report
EC4	Update existing estimates of costs of unserved energy due to system unreliability, and develop scenarios for load growth forecast.	4(iii)	EC	Value of unserved energy calculation. Load growth projections to different scenarios
EC5	Preparation of relevant sections of the RRP		EC	Drafted sections for RRP

Project ref	Work Area/Task – Environmental Impact Analysis	ToR Ref.	Team	Output	
EN1	Conduct initial environmental examination for distribution lines and substations taking into account likely impact of locations, designs and construction activity as well as long term impacts of operation		EN	IEE Report for the project, based on IEE of selected (prioritised) subprojects	
EN2	Recommend appropriate environmental mitigation measures for significant impacts with monitoring plans to address the impacts and assess environmental benefits of proposed activities.	5(ii)	EN	Identified impact types from subprojects in MFF with recommended mitigation measures appropriate to each. Statement of environmental benefits.	
EN3	Identify any Human Resource and Institutional capacity-strengthening measures needed for implementation of management and monitoring plans.	5(ii)	EN	Draft document on capacity strengthening requirements of PEPCO and the eight DISCOs fro Final Report.	
EN4	Prepare IEE report and a summary based on the environmental assessment requirements of ADB's Environmental Guidelines for selected Infrastructure Development Projects, and any procedures required by Government	5(iii)	EN	IEE Report for MFF with summary fro Final Report	
EN5	Assess Environmental Impact of each subproject, undertake IEE and present in IEE report and summary.	5(iv)	EN	IEE statement for each subproject in tranche 1	
EN6	If the IEE recommends a full EIA conduct the EIA and prepare the report and its summary, including an environmental management plan to implement mitigation measures.	5(v)	EN	EIA Report (if required), to include an environmental management plan to implement mitigation measures.	

Project ref	Work Area/Task – Social & Resettlement	ToR Ref.	Team	Output
SR1	Assist the Executing and Implementing Agencies in designing the project to minimise resettlement effects, including development of LARF	7(i)	SR	LARF
SR2	Identify & prepare socioeconomic profiles of affected communities by household sizes, demography, income sources & levels, occupations, socioeconomics, social service infrastructure and social organisations in accordance with ADB guidelines and requirements of Pakistan.	7(ii)	SR	Section for Final Report
SR3	Prepare GAP and local ethnic minority profiles, asses the need for an indigenous people's development plan (IPDP) and carry out necessary surveys	7(ii)	SR	IPDP and section for Final Report
SR4	Undertake full census and inventory of lost assets of affected people (including temporary causes) and a baseline socioeconomic survey of affected population.	7(iii)	SR	Inventory of loss assets for Final Report
SR5	Determine scope of likely resettlement effects and list likely losses of households, agricultural lands, business and income opportunities as well as communal assets & public buildings		SR	Statement on probable resettlement impacts, likely losses. Baseline socioeconomic survey Section for Final Report
SR6	Prepare entitlement matrix listing all effects of permanent and temporary land acquisition to determine replacement costs of all losses.	7(iv)	SR	Entitlement matrix for al types of potential losses and impacts of the sub project types im the MFF
SR7	Prepare an indicative budget for land acquisition and resettlement costs with specific sourcing and approval process.	7(iv)	SR	Indicative budget by DISCO for land acquisition and resettlement requirements of identified subprojects.
SR8	Prepare an implementation schedule consistent with the resettlement plan requirements, ensuring that all compensation is carried out prior to commencement of any works.	7(v)	SR	Implementation process to ensure compensation is agreed and completed before work is commenced.
SR9	Prepare grievance mechanism and appeal procedures, with mechanisms for disclosing resettlement plan to affected persons readily understood form.		SR	Grievance procedure fro APs readily available in English and Urdu for all potential APs.
SR10	Prepare resettlement plan with full stakeholder participation including EA and IAs for subprojects involving resettlement.	7(vi)	SR	Resettlement plan Short resettlement plan for "not significant" projects Summary resettlement plan

Project ref	Work Area/Task – Poverty Analysis	ToR Ref.	Team	Output		
P1	Prepare a sub-economic and poverty profile of primary project beneficiaries. Include gender and local ethnic minority profile's and their poverty status. Analyse causes of deprivation and causes of poverty and vulnerability.	6(i)	Ρ	Sub economic profile report Analysis of deprivation and poverty causes.		
P2	Analyse access to electricity, affordability, consumption levels and consumer satisfaction across socioeconomic groups. Assess determinants and elasticities of demand for power by socio economic group. Conduct demand projections for different growth scenarios.	6(ii)	Ρ	Access to electricity profile		
P3	Analyse sector growth impacts of proposed project on the country level and its impacts on the poor. Review bottlenecks for poverty reduction and potential constraints for small and medium scale enterprise development in relation to power sector.	6(iii)	Ρ	Analysis of sector growth and impact on poor for Final Report		
P4	In accordance with ADB requirements, analyse the social, poverty and development impact of subprojects. Prepare poverty impact assessment	6(iv)	Р	Initial Poverty & Social Assessment (IPSA) PSAs as required		

Notes to Work Schedules

- 1. Team the first listed team is responsible for leading and delivering this task. In many cases, broader team involvement will be required but the clear allocation of responsibility is important. The 'team' for this purpose means the international and domestic professional in each discipline.
- 2. There are some areas of overlap and dependencies between work areas. The lead team will manage these dependencies and overlaps.
- 3. ToR Terms of Reference.



APPENDIX 3: MODIFIED STAFF SCHEDULE

											M	ONT	Ή											Т	MC	NTHS IN	PUT
NAME	POSITION	May		June		July	Aug	gust	Sep	oteml	b O	ctobe	er N	oven	nb [Dece	mb	Jan	uary	Fel	bruary	N	larch	F	IELD	HOME	TOTAL
INTERNATIONAL																								T			
Bill Slegg	Power Distribution Expert/TL	1	1	1 1 1							1	1 1	1			Π				1 1	1		Т		2.40	1.62	4.02
Jayath Atukorala	Financial Analysis Expert			1		П			Π	П	Π	П		Τ	Π	П			П			П	Π	T	0.27	1.39	1.65
Glen Chapman	Financial Manager	1	1 1	1	1 1	111	1		Π	П	Π	Π			П	П	П		1	1		П	Π	Т	2.70	1.80	4.50
lan Walker	Economic Evaluation Expert			1 1	Π	Π			Π	П	П	П			П	П	П			П	\square	Π	Π		0.50	0.50	1.00
David Green	Environmental Aspects			1 1	11		П		1 1	11	1	П			П	П	П		П	П	Π	П	Π		2.03	0.71	2.75
Jean Williams*	Poverty Analysis Expert		Т		Π	П	П		Π	Π	П	П			П	П	П	Т	П	П		П	Π	Т	-	0.23	0.23
Jean Williams	Resettlement Expert		Т		Π	Π	П		Π	П	П	П			П		П		П	П	П	Π	Π	Т	-	1.23	1.23
	SUB-TOTAL																							T	7.90	7.47	15.37
NATIONAL																								Т			
Javed Rashid	Distribution Expert Team 1 / Dep T/L	1	1 1	1 1 1	11	1 1	11		1 1	11	1	П	1	1 1	1 1	1 1	1	1	1 1	1 1	1	Π	Π	T	2.69	5.30	7.98
Javed Anwar Chaudrey	Economist (team 1)	1		1 1 1	11	1 1			Π	Π	П	П		Τ	Π	П			1	11	1	П	П		1.34	1.57	2.91
Ahsan Ali Chughtai	Financial expert (team 1)	1		1 1 1	11	1 1	11	11	1 1	1 1	1 1	11	1		П	П			П			П	П		2.55	2.95	5.50
Syed Wali Waheed	Environment expert (team 1)		1	1 1 1	11	1 1		11			1 1	1			П	П			П		П	П	П		1.60	2.90	4.50
Aqeel Abro	Resettlement expert (team 1)	ПП		1 1 1	1 1	1 1			1 1		1 1	1			П	П		-	1 1	11	1 1 1	Π	Т		3.30	1.02	4.32
Muhammad Iqbal Khan	Economist (team2)	1	1 1	1 1	1 1	1 1			Π	Π	П					IT	П		1	1		П		Т	1.24	1.67	2.91
Aslam Khan	Distribution expert (team 2)	1		1 1 1	11	1 1			1 1	1 1	1 1	1 1	1	1 1	1 1	1 1	1		1	1 1	1 1 1	Π	++	Т	1.63	6.70	8.33
Riaz Hussain Chaudhry	Financial expert (team 2)	1		1 1 1	1 1	1 1	1 1	1	Π	Π	П					Ш	Π			П		П		Т	1.48	1.75	3.23
Iftikar Ahmed	Environment expert (team 2)	ПП		1 1 1	11	1 1		11	1 1	1 1	1 1	11	1		П	П	П		П	П	\mathbf{T}	П	TT	Т	3.49	1.43	4.92
lqbal Niazi	Resettlement expert (team 2)		1 1	1 1	1 1	1 1			1 1		1 1		1 1	1 1	1	П	П		1 1	1 1	1 1 1	П		Т	5.58	1.10	6.68
Moin Ud din	Economist (team3)	1		1 1 1	11	1 1			Π	Π	П	П			Π	П	П		1	1				Т	1.20	1.67	2.87
Hassan Jafar Zaidi	Distribution expert (team 3)	1		1 1 1	1 1	1 1			1 1	1 1	1 1	1 1	1		1	1 1	1	1	1	1 1	1 1 1	П		Т	4.33	3.73	8.06
Zaid Ansari	Financial expert (team 3)	1		1 1 1	1 1	1 1	1 1	1 1	1 1	1	П	П			Π	П	П			1				Т	2.30	2.18	4.48
Mrs Bushra Wahid	Environment expert (team 3)	1		1 1	1 1	1 1		1 1		1 1	1 1	1 1	1 1	1 1	1	П	П		1 1	1 1	1 1 1	П		Т	3.18	4.72	7.90
Anwar Fazal Ahmad	Resettlement expert (team 3)			1 1 1	1 1	1 1			1 1		1 1			1 1	1 1	1 1	1	1 1	1	П				Т	4.12	2.43	6.55
	SUB-TOTAL																								40.03	41.11	81.13
	TOTAL																							T	47.93	48.58	96.51

LEGEND

IN-COUNTRY - Full time

HOME OFFICE - Full time

APPENDIX 4: COMPLETE REGISTER OF DISCO JOBS

DISCO	No.	Brief Name	Brief Description	Status	Comment
HESCO	1	Sarkrand	Add 2 13 MVA transformers	16/06/2007 not included tranche 1	Removed by DISCO
HESCO	2	Hyd Hala Road	Add 13 MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
HESCO	3	Hyd Qasimabad	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
HESCO	4	Khipro	ITC 4-13MVA	16/06/2007 not included tranche 1	Removed by DISCO
HESCO	5	Jaccobabad	ITC 13-26MVA		
HESCO	6	Larkana-1	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
HESCO	7	Pir Jo Goth	Add 13 MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
HESCO	8	Kot Diji	ITC 6.3-13	16/06/2007 not included tranche 1	Removed by DISCO
LESCO	9	Chung	ITC 13-26MVA		
LESCO	10	Bhai Pheru	Add 26MVA transformer		
LESCO	11	Bhikki	Add 26MVA transformer		
LESCO	12	Rustam	Add 26MVA transformer		
LESCO	13	Shamkey	Add 26MVA transformer		
LESCO	14	Havelli Lakha	ITC 13-26MVA	16/06/2007 not included tranche 1	Removed by DISCO
LESCO	15	Wan Radha Ram (Habibabad)	ITC 13-26MVA		
LESCO	16	Pattoki	ITC 13-26MVA	10/07/2007 removed from tranche 1	
LESCO	17	Allama Iqbal Town	ITC 26-40MVA		
LESCO	18	Said Pur	ITC 26-40MVA		
LESCO	19	Chah Miran	ITC 26-40MVA		
LESCO	20	Defence	ITC 26-40MVA		
LESCO	21	Ellahabad	ITC 13-26MVA	18/06/2007 included tranche 2	added back post wrap-up
LESCO	22	Renala Khurd	ITC 13-26MVA		
LESCO	23	Fateh Garh	ITC 26-40MVA		
LESCO	24	Garden Town	ITC 26-40MVA		
LESCO	25	Gulshan-e-Ravi	ITC 26-40MVA		
LESCO	26	Johar Town	ITC 26-40MVA		
LESCO	27	Kasur	ITC 26-40MVA		
LESCO	28	Mcload Road	ITC 26-40MVA		
LESCO	29	Model Town	ITC 26-40MVA		
LESCO	30	Old Kot Lakhpat (OKLP)	ITC 26-40MVA		
LESCO	31	Okara City-I	ITC 26-40MVA		



DISCO	No.	Brief Name	Brief Description	Status	Comment
LESCO	32	Rehman Park	ITC 26-40MVA		
LESCO	33	Shadman			
LESCO	34	Shahdara New			
LESCO	25				
LESCO	36	Badami Bagh			
LESCO	27	Oortobo			
LESCO	20	Phogiwal			
LESCO	30				
FESCO	39		Add 26MVA transformer		
FESCO	40	Jhang-II	Add 26MVA transformer		
FESCO	41	Gojra	Add 26MVA transformer		
FESCO	42	Sardar Pur Noon	STG		
FESCO	43	Wanbachran	Add 26MVA transformer		
FESCO	44	H.B.Shah	Add 26MVA transformer		
FESCO	45	Old Thermal Faisalabad	ITC 26-40MVA		
FESCO	46	Chiniot Road Faisalabad	ITC 26-40MVA		
FESCO	47	Sammandari Road Faisalabad	ITC 26-40MVA		
FESCO	48	Narwala Road Faisalabad	ITC 26-40MVA		
FESCO	49	Factory Area Faisalabad	ITC 26-40MVA		
FESCO	50	Ludewala	ITC 13-26MVA		
FESCO	51	Second Circuit Nishatabad -	STG		
		Sahahkot			
IESCO	52	CS Shah	ITC 13-26MVA	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	53	H-11 Islamabad	ITC 13-26MVA		
IESCO	54	Chakwal	ITC 26-40MVA		
IESCO	55	Sanjwal	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	56	KTM	ITC 26-40MVA		
IESCO	57	G-5,Islamabad	ITC 13-26MVA	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	58	Kotli	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	59	Khul Ratta	ITC 13-26MVA	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	60	Rajjar	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	61	E-8 Islamabad	ITC 13-26MVA	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	62	New Wah	Add 3 26MVA	16/06/2007 not included tranche 1	Removed by DISCO
			transformers		
IESCO	63	F-6.Islamabad	Add 3X13MVA	16/06/2007 not included tranche 1	added back post wrap-up

DISCO	No.	Brief Name	Brief Description	Status	Comment
			transformers		
IESCO	64	Muree	ITC 13-26MVA	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	65	Rawalkot	ITC 13-26MVA	16/06/2007 not included tranche 1	added back post wrap-up
IESCO	66	Sowan	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
IESCO	67	F-11, Islamabad	ITC 13-26MVA		
PESCO	68	Shabqadar	Add 26MVA transformer		
PESCO	69	D.I.Khan	ITC 13-26MVA		
PESCO	70	Dargai	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
PESCO	71	Lachi	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
PESCO	72	Dalazak	Add 26MVA transformer		
PESCO	73	Peshawar Cant.	Add 26MVA transformer		
PESCO	74	Jhangaria	Add 26MVA transformer		
PESCO	75	Timer Garha	Add 26MVA transformer		
PESCO	76	Battal	Add 26MVA transformer		
PESCO	77	Hattar	Add 26MVA transformer		
PESCO	78	Swabi	STG		Removed by DISCO
PESCO	79	Darosh	Addition of transformer	16/06/2007 not included tranche 1	Removed by DISCO
PESCO	80	Noseri	Addition of transformer	16/06/2007 not included tranche 1	Removed by DISCO
PESCO	81	Hattian	Addition of transformer	16/06/2007 not included tranche 1	Removed by DISCO
MEPCO	82	Hota	In out ,Arifwala-		
			Bahawalnagar,d/c		
MEPCO	83	Lar	in out,Multan-		
		····	bahawalnagar,d/c		
MEPCO	84	WAPDA Town	in out,Bosan Road-		
MEDCO	05	Dehowelseger	Khanewi Road,d/c		
MEPCO	85	Bahawainagar Dahawainagar	Additional line/tx bay		
MEPCO	86	Banawaipur 220 KV	Additional line/tx bay	40/00/0007 + + (+ + + + + + + + + + + + + + + +	
MEPCO	87	Burewala-1	Establish new substation	16/06/2007 not included tranche 1	Removed by DISCO
MEPCO	88				
IESCO	89	Zero Point			
MEPCO	90	Karoor Pacca	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
GEPCO	91	Sallkot Road GRWala	In out, Ghakkar-Pasrur	10/07/07 removed from tranche 1	
05000	00	Observation OIO	Road GRWala,d/c		
GEPCO	92	Sheranawala GIS	INEW SITE	10/07/07 removed from tranche 2	



DISCO	No.	Brief Name	Brief Description	Status	Comment
GEPCO	93	Hafizabad-II	Ghakkar -Hafizabad circuit 1,d/c	16/06/2007 not included tranche 1	Removed by DISCO
GEPCO	94	Pindi Bhatian Industrial	Sukheki-Pindi Bhattian,d/c	16/06/2007 not included tranche 1	Removed by DISCO
GEPCO	95	In out,Daska-Nandipur	Feed for Daska Industrial		
GEPCO	96	Ghakkar-College Road Gwala	STG	16/06/2007 not included tranche 1	Removed by DISCO
GEPCO	97	Sahowala-Paurur Road Sailkot , in out,d/c	Feed for Ghuinki		
GEPCO	98	Sailkot Cantt-Kotli Lodhran,sc.dc towers	STG	16/06/2007 not included tranche 1	Removed by DISCO
GEPCO	99	Gujrat 2-Jalalpur Jatan,s/c.d/c towers	Feed alternative		
GEPCO	100	Ghakkar-Hafizabad circuit 2, in out	STG	16/06/2007 not included tranche 1	Removed by DISCO
GEPCO	101	Sahowala -New Sailkot,reconductorong	Reconductoring		
GEPCO	102	Ghakkar-Hafizabad circuit 1	Feed for Fatehpur		
GEPCO	103	New Sailkot-Head Marala	STG	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	104	Loralai	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	105	Gulistan	ITC 13-26MVA+ Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	106	Mariaabad	Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	107	Pishin	ITC 13-26MVA+ Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	108	Qila Saifullah	ITC 13-26MVA+ Add 26MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	109	Kalat	ITC 13-26MVA+ Add 26MVA transformer		
QESCO	110	Mastung	Add 26MVA transformer		
QESCO	111	Mangochar	STG	16/06/2007 not included tranche 1	Removed by DISCO
MEPCO	112	Gujerat South	Additional line/tx bay		
QESCO	113	Nal	Add 13 MVA transformer		
QESCO	114	Chaman	Add 13 MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	115	Khadkoche	Add 13 MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	116	Wadh	Add 13 MVA transformer	16/06/2007 not included tranche 1	Removed by DISCO
QESCO	117	Sheikh manda-Pishin	Conductoring	16/06/2007 not included tranche 1	Removed by DISCO

DISCO	No.	Brief Name	Brief Description	Status	Comment
QESCO	118	Pishin-Gulistan	Reconductoring		
FESCO	119	Multi - site	Instal 132V&11kV		
			capacitors		
LESCO	120	Multi - site	Instal 132V&11kV		
			capacitors		
MEPCO	121	Multi - site	Instal 132V&11kV		
			capacitors		
HESCO	122	Multi - site	Instal 132V&11kV		
			capacitors		
GEPCO	123	Multi - site	Instal 132V&11kV	16/06/2007 not included tranche 1	Removed by DISCO
			capacitors		
IESCO	124	Multi - site	Instal 132V&11kV		
			capacitors		
PESCO	125	Multi - site	Instal 132V&11kV		
			capacitors		
QESCO	126	Multi - site	Instal 132V&11kV		
			capacitors		
PESCO	127	Multi - site	11kV / LV extensions,		
			distribution s/s		
QESCO	128	Multi - site	11kV / LV extensions,		
			distribution s/s		
HESCO	129	Multi - site	Reconductoring,		
			reconfiguring networks		
QESCO	130	Multi - site	Reconductoring,		
			reconfiguring networks		_
LESCO	131	Multi - site	Replace time expired/ tech.		
			inadequate s/s equip.		_
MEPCO	132	Multi - site	REHAB		
HESCO	133	Multi - site	Replace time expired/ tech.		
			inadequate s/s equip.		
FESCO	134	Multi - site	Replace time expired/ tech.	16/06/2007 not included tranche 1	Removed by DISCO
			inadequate s/s equip.		
IESCO	135	Multi - site	Replace time expired/ tech.		
			inadequate s/s equip.		
GEPCO	136	Multi - site	REHAB		
PESCO	137	Multi - site	Replace time expired/ tech.		

DISCO	No.	Brief Name	Brief Description	Status	Comment		
			inadequate s/s equip.				
QESCO	138	Multi - site	Replace time expired/ tech.				
			inadequate s/s equip.				
LESCO	139		Automatic meter reading				
			project				
FESCO	140		Others	16/06/2007 not included tranche 1	Removed by DISCO		
MEPCO	141		Others				
IESCO	142	Multi - site	Distribution reconfig/				
			improvement				
HESCO	143		Others	16/06/2007 not included tranche 1	Removed by DISCO		
GEPCO	144	Multi - site	Reconductoring.				
			reconfiguring networks				
PESCO	145	Multi - site	Distribution reconfig/				
			improvement				
QESCO	146	Multi - site	Distribution reconfig/				
			improvement				
LESCO	147	Multi - site	Distribution reconfig/				
			improvement				
LESCO	148	Multi - site	Improved distribution				
			transformer protection pilot				
			project		_		
FESCO	149	Off network	Construction Equipment				
FESCO	150	Multi - site	Automatic meter reading				
			project		_		
FESCO	151	Off network	Computerised Accounting				
			System		_		
FESCO	152	Lalian 66kV	Conversion of 66kV site to				
			132kV				
LESCO	153	Sukh Chan Multan Road	New Site		_		
GEPCO	154		11kV / LV extensions,				
			distribution s/s				
GEPCO	155	Ghuinke 132kV	New site	16/06/2007 not included tranche 1	Removed by DISCO		
GEPCO	156	Fateh Pur	Upgrade 66-132kV				
MEPCO	157	Khan Pur	Add 26MVA transformer				
MEPCO	158	Shadan Lund	Add 26MVA transformer				



MEPCO159ShujabadAdd 26MVA transformerMEPCO160Bonga HayatAdd 26MVA transformerMEPCO161Rajan PurAdd 26MVA transformerMEPCO162FerozaAdd 26MVA transformerMEPCO163Sama SattaAdd 26MVA transformerMEPCO164Liaqat PurAdd 26MVA transformerMEPCO164Liaqat PurAdd 26MVA transformerMEPCO165Fazil PurIn-Out Jampur-Rajanpur d/cMESCO166BadinAdd 13 MVA transformerHESCO167Thari MirwashAdd 13 MVA transformerHESCO168DokriAdd 13 MVA transformerHESCO169NabisarITC 6-13MVAHESCO170GambatITC 13-26MVAHESCO171T A YarITC 13-26MVAHESCO172T. AdamITC 13-26MVAHESCO174DeharkiITC 13-26MVAHESCO175Multi - siteReconductoring, reconfiguring networksMEPCO175Multi - siteReconductoring, reconfiguring networks	DISCO	No.	Brief Name	Brief Description	Status	Comment
MEPCO 159 Shiglabdu Add 20WVA transformer MEPCO 160 Bonga Hayat Add 26MVA transformer MEPCO 161 Rajan Pur Add 26MVA transformer MEPCO 162 Feroza Add 26MVA transformer MEPCO 163 Sama Satta Add 26MVA transformer MEPCO 164 Liaqat Pur Add 26MVA transformer MEPCO 165 Fazil Pur In-Out Jampur-Rajanpur d/c d/c MC HESCO 166 Badin Add 13 MVA transformer HESCO 166 Badin Add 13 MVA transformer HESCO 167 Thari Mirwash Add 13 MVA transformer HESCO 168 Dokri Add 13 MVA transformer HESCO 169 Nabisar ITC 13-26MVA HESCO 170 Gambat ITC 13-26MVA HESCO 171 T A Yar ITC 13-26MVA HESCO 172 T. Adam ITC 13-26MVA HESCO 173 Sukkur Site ITC 13-26MVA HESCO 172 T. Adam	MEDCO	150	Shuiphad	Add 26M)/A transformer		
MEPCO 160 Boligan Hayat Add 20MVA transformer MEPCO 161 Rajan Pur Add 26MVA transformer MEPCO 162 Feroza Add 26MVA transformer MEPCO 163 Sama Satta Add 26MVA transformer MEPCO 164 Liaqat Pur Add 26MVA transformer MEPCO 165 Fazil Pur In-Out Jampur-Rajanpur d/c d/c d/c HESCO 166 Badin Add 13 MVA transformer HESCO 167 Thari Mirwash Add 13 MVA transformer HESCO 168 Dokri Add 13 MVA transformer HESCO 168 Dokri Add 13 MVA transformer HESCO 168 Dokri Add 13 MVA transformer HESCO 169 Nabisar ITC 6-13MVA HESCO 170 Gambat ITC 13-26MVA HESCO 171 T A Yar ITC 13-26MVA HESCO 172 T. Adam ITC 13-26MVA HESCO 173 Sukkur Site ITC 13-26MVA HESCO 174 Deharki	MEPCO	109	Shujabau Rongo Hovot	Add 26MVA transformer		
MEPCO 161 Rajar Pur Add 26MVA transformer MEPCO 162 Feroza Add 26MVA transformer MEPCO 163 Sama Satta Add 26MVA transformer MEPCO 164 Liaqat Pur Add 26MVA transformer MEPCO 165 Fazil Pur In-Out Jampur-Rajanpur d/c d/c d/c HESCO 166 Badin Add 13 MVA transformer HESCO 166 Badin Add 13 MVA transformer HESCO 167 Thari Mirwash Add 13 MVA transformer HESCO 168 Dokri Add 13 MVA transformer HESCO 169 Nabisar ITC 6-13WA HESCO 170 Gambat ITC 13-26MVA HESCO 170 Gambat ITC 13-26MVA HESCO 173 Sukkur Site ITC 13-26MVA HESCO 174 Deharki ITC 13-26MVA HESCO 174 Deharki ITC 13-26MVA MEPCO 175 Multi - site Reconductoring, reconfiguring networks DESOO 174 Deharki	MEPCO	160		Add 26MVA transformer		
MEPCO 162 Peroza Add 26MVA transformer MEPCO 163 Sama Satta Add 26MVA transformer MEPCO 164 Liaqat Pur Add 26MVA transformer MEPCO 165 Fazil Pur In-Out Jampur-Rajanpur d/c In-Out Jampur-Rajanpur d/c HESCO 166 Badin Add 13 MVA transformer HESCO 167 Thari Mirwash Add 13 MVA transformer HESCO 168 Dokri Add 13 MVA transformer HESCO 169 Nabisar ITC 6-13MVA HESCO 170 Gambat ITC 13-26MVA HESCO 171 T A Yar ITC 13-26MVA HESCO 173 Sukkur Site ITC 13-26MVA HESCO 174 Deharki ITC 13-26MVA HESCO 174 Deharki ITC 13-26MVA MEPCO 175 Multi - site Reconductoring, reconfiguring networks RECO 174 Deharki ITC 13-26MVA	MEPCO	101				
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HESCO168DokriAdd 13 MVA transformerHESCO169NabisarITC 6-13MVAHESCO170GambatITC 13-26MVAHESCO171T A YarITC 13-26MVAHESCO172T. AdamITC 13-26MVAHESCO173Sukkur SiteITC 13-26MVAHESCO173Sukkur SiteITC 13-26MVAHESCO174DeharkiITC 13-26MVAMEPCO175Multi - siteReconductoring, reconfiguring networksRESCO170Oadaan Anagani	HESCO	167	Thari Mirwash	Add 13 MVA transformer		
HESCO169NabisarITC 6-13MVAHESCO170GambatITC 13-26MVAHESCO171T A YarITC 13-26MVAHESCO172T. AdamITC 13-26MVAHESCO173Sukkur SiteITC 13-26MVAHESCO173Sukkur SiteITC 13-26MVAHESCO174DeharkiITC 13-26MVAMEPCO175Multi - siteReconductoring, reconfiguring networksDECCO470Oardean AmereiAdd 20MVA temperature	HESCO	168	Dokri	Add 13 MVA transformer		
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HESCO 174 Deharki ITC 13-26MVA MEPCO 175 Multi - site Reconductoring, reconfiguring networks	HESCO	173	Sukkur Site	ITC 13-26MVA		
MEPCO 175 Multi - site Reconductoring, reconfiguring networks	HESCO	174	Deharki	ITC 13-26MVA		
reconfiguring networks	MEPCO	175	Multi - site	Reconductoring,		
				reconfiguring networks		
PESCO 176 Gadoon Amazai Add 26MVA transformer	PESCO	176	Gadoon Amazai	Add 26MVA transformer		
PESCO 177 Jalala ITC 13-26MVA	PESCO	177	Jalala	ITC 13-26MVA		
PESCO 178 Mardan II ITC 13-26MVA	PESCO	178	Mardan II	ITC 13-26MVA		
PESCO 179 Chakdara ITC 13-26MVA	PESCO	179	Chakdara	ITC 13-26MVA		
PESCO 180 Khawaza Khela ITC 13-26MVA	PESCO	180	Khawaza Khela	ITC 13-26MVA		
PESCO 181 Rehman Baba Add 26MVA transformer	PESCO	181	Rehman Baba	Add 26MVA transformer		
PESCO 182 Prova Add 26MVA transformer	PESCO	182	Prova	Add 26MVA transformer		
QESCO 183 Musferpur Add 26MVA transformer	QESCO	183	Musferpur	Add 26MVA transformer		
QESCO 184 Sariab Add 26MVA transformer	QESCO	184	Sariab	Add 26MVA transformer		
QESCO 185 Barkham Add 26MVA transformer	QESCO	185	Barkham	Add 26MVA transformer		
QESCO 186 Kuchluk Add 26MVA transformer	QESCO	186	Kuchluk	Add 26MVA transformer		
QESCO 187 Rakni Add 26MVA transformer	QESCO	187	Rakni	Add 26MVA transformer		
PESCO 188 Karak Feeder Domail	PESCO	188	Karak	Feeder Domail		
IESCO 189 Khoi Ratta ITC 26-40MVA	IESCO	189	Khoi Ratta			
		100	Rawal			

DISCO	No.	Brief Name	Brief Description	Status	Comment
IESCO	191	I-8 Islamabad	ITC 26-40MVA		
IESCO	192	Pir Wadhai	ITC 26-40MVA		
IESCO	193	Kahuta City	ITC 26-40MVA		
IESCO	194	Taxila	Add 26MVA transformer		
IESCO	195	Fariqabad	ITC 13-26MVA		
IESCO	196	Margalla	ITC 13-26MVA		
IESCO	197	Gujar Khan	Add 26MVA transformer		
IESCO	198	Dina	Add 26MVA transformer		
IESCO	199	Jatli	Add 26MVA transformer		
IESCO	200	Chak Sawari	Add 26MVA transformer		
IESCO	201	Attock	Add 26MVA transformer		
QESCO	202	QESCO	PLC Link		Removed by DISCO
IESCO	203	Kamalabad	26-40MVA augmentation		added post wrap-up
IESCO	204	Cant Rawalpindi	26-40MVA augmentation		added post wrap-up
IESCO	205	Mangla R Bank	13-26MVA augmentation		added post wrap-up
IESCO	206	Mangla L Bank	13-26MVA augmentation		added post wrap-up
IESCO	207	Mirpur	Extension		added post wrap-up
QESCO	208	Ali Xai	66-132kV conversion		added post wrap-up
QESCO	209	Kanak	66-132kV conversion		added post wrap-up

Legend

Not included in Tranche 1

APPENDIX 5: SELECTION CRITERIA AND SELECTION PROCESS FOR SUBPROJECTS

- 1. The following criteria will apply in selecting and approving subprojects intended for financing under the Facility:
- 2. Subprojects for sub-transmission will include increased transformer capacity at 132kV and 66kV, rehabilitation, augmentation and expansion of transmission systems at 132kV and 66kV that enable a DISCO to distribute power from grid points, to meet increased demand within the DISCO, deliver power through the DISCO, meet the (n-1) criteria on substations and circuits and carry out other development on the sub-transmission system to support effective operation and loss reduction and associated facilities related to the operations of the sub-transmission system.
- 3. Subprojects for distribution systems will include those that increase availability of grid based electricity supply in the DISCO; reduce system technical losses, add protection against non-technical losses through theft, improve reliability and quality of electricity supplies by reduction of unplanned outages, improve daily availability to domestic customers, rehabilitate, augment and expand distribution systems at,11kV and low voltage, support revenue management and collection, provide compliance with statutory and regulatory requirements and associated facilities related to the operations of the power distribution systems.
- 4. Subproject designs, wherever practicable, should be consistent with overall least-cost expansion plans designed on an optimum cost basis and reflect "best practice" design, construction, and operations and maintenance features.
- 5. Subprojects will display performance-based design consistent with international benchmarks for system efficiency and operational risk. Subprojects should have quantifiable energy efficiency improvements.
- 6. Subprojects will be eligible for construction in accordance with the approved feasibility assessment, which includes engineering, financial, economic, environmental and social justifications;
- 7. Subprojects will demonstrate financial and economic viability.
- 8. Safety Measures will be incorporated in the subproject designs as required under the relevant policies, statutory requirements and regulations of GOP as amended;
- 9. Design of subprojects will be finalised taking account of input from public consultation carried out in the social and environmental assessments as appropriate;
- 10. If a subproject requires land to be made available, a meaningful community public consultation process in accordance with ADB's Policy on Involuntary Resettlement, 1995, will be conducted and the information on process of land transfer, assistance/support options and grievance procedures will be disseminated to the Subproject affected communities, and issues shall be resolved before awarding the civil works contract;
- 11. At distribution voltages of 11kV and below subprojects will not be included if land acquisition is required. At other voltages subprojects requiring land acquisition will not be included unless identified at tranche approval stage and assessed and found to be fully compliant with ADB safeguards;

- 12. Subprojects will be environmentally acceptable with no significant residual impacts after mitigation. No Subproject will be located in an environmentally sensitive area, such as a wildlife sanctuary, national park, or statutory protected area for biodiversity or ecological functions, or in critical or sensitive areas identified as archaeological or heritage sites and monuments by relevant authorities⁴;
- 13. An environmental checklist will be prepared for the Subproject in accordance with the EARF, the relevant provisions of the environmental management plan (EMP) including environmental contract clauses that will have been identified;
- 14. Sufficient counterpart funding will be allocated to DISCOs as required to implement as scheduled and maintain the subproject; and
- 15. All necessary Federal and Provincial government approvals will have been obtained for the subproject.

⁴ This condition shall not apply where the identified or sensitive area requires a subproject to facilitate a necessary supply of electricity. In this case the relevant authority must formally request the subproject, and the DISCO shall agree with the relevant authority all design parameters and mitigating actions.

APPENDIX 6: TRANCHE1 STG SUBPROJECTS DEVELOPING SECONDARY TRANSMISSION GRID

DISCO	Sub project number	Project Name	Brief Description	Capital USD (M)
FESCO (13 s	ubproject	5)		
FESCO	39	Kud Lathi	26MVA transformer extension	1.98
FESCO	40	Jhang-II	26MVA transformer	1.80
FESCO	41	Gojra	26MVA transformer	1.43
FESCO	42	Sadar Pur Noon	Additional transformer bay	0.17
FESCO	43	Wanbachran	26MVA transformer extension	1.43
FESCO	44	H.B.Shah	26MVA transformer extension	1.98
FESCO	45	Old Thermal Faisalabad	26-40MVA augmentation	1.51
FESCO	46	Chiniot Road Faisalabad	26-40MVA augmentation	1.51
FESCO	47	Sammandari Road Faisalabad	26-40MVA augmentation	1.51
FESCO	48	Narwala Road Faisalabad	26-40MVA augmentation	1.51
FESCO	49	Factory Area Faisalabad	26-40MVA augmentation	1.51
FESCO	50	Ludewala	13-26MVA augmentation	1.07
FESCO 152		Lalian	26 MVA transformer extension	1.43
GEPCO (1 si	ubproject)			
GEPCO	156	Fateh Pur	Upgrade66-132kV	5.49
HESCO (10 s	subproject	s)		
HESCO	5	Jaccobabad	13-26MVA augmentation	1.07
HESCO	166	Badin	13 MVA transformer extension	1.10
HESCO	167	Thari Mirwash	13 MVA transformer extension	1.10
HESCO	168	Dokri	13 MVA transformer extension	1.11
HESCO	169	Nabisar	6-13MVA augmentation	0.93
HESCO	170	Gambat	13-26MVA augmentation	1.07
HESCO	171	T A Yar	13-26MVA augmentation	1.07
HESCO	172	T. Adam	13-26MVA augmentation	1.07
HESCO	173	Sukkur Site	13-26MVA augmentation	1.07
HESCO	174	Deharki	13-26MVA augmentation	1.07
IESCO(25 su	lbprojects)			
IESCO	53	H-11 Islamabad	13-40MVA augmentation	1.51
IESCO	54	Chakwal	26-40MVA augmentation	1.51

IESCO	56	KTM	26-40MVA augmentation	1.51
IESCO	63	F-6 T/Shaheed	26 MVA transformer	1.98
IESCO	65	Rawalkot	13-26MVA Augmentation	1.07
IESCO	67	F-11, Islamabad	13-40MVA augmentation	1.51
IESCO	89	Zero Point	2 x 26-40MVA augmentation	3.02
IESCO	189	Khoi Ratta	13 MVA extension	1 17
IESCO	190	Rawal	2 x 26-40MVA augmentation	3.02
IESCO	191	I-8 Islamabad	2 x 26-40MVA augmentation	3.02
IESCO	192	Pir Wadhai	26-40MV/A augmentation	1 51
IESCO	102	Kabuta City	13- 26MV/A augmentation	1.07
12000	135	Ranuta Oity	26MVA transformer	1.07
IESCO	194	Taxila	extension	1.43
IESCO	195	Fariqabad	13-26MVA augmentation	1.07
IESCO	196	Margalla	13-26MVA augmentation	1.07
IESCO	197	Gujar Khan	26MVA transformer extension	1.43
IESCO	198	Dina	13-26MVA augmentation	1.07
IESCO	199	Jatli	13-26MVA augmentation	1.07
IESCO	200	Chak Sawari	13-26MVA augmentation	1.07
IESCO	201	Attock	13-26MVA augmentation	1.07
IESCO	203	Kamalabad	26-40MVA augmentation	1.51
IESCO	204	Cant Rawalpindi	26-40MVA augmentation	1.51
IESCO	205	Mangla R Bank	13-26MVA augmentation	1.07
IESCO	206	Mangla I. Bank	13-26MVA augmentation	1.07
.=	200	inaligia E Dalik	26MVA transformer	1.07
IESCO	207	Mirpur	extension	1.43
LESCO (29 s	ubproject	s)		
LESCO	9	Chung	26MVA transformer	1.43
. =			26MVA transformer	1.43
LESCO	10	Bhai Pheru	extension	
LESCO	11	Bhikki	26MVA transformer	1.43
LESCO	12	Rustam	26MVA transformer extension	1.80
LESCO	13	Shamkey	26MVA transformer	1.43
LESCO	15	Wan Radha Ram (Habibabad)	13-26MVA augmentation	1.07
LESCO	17	Allama labal Town	26-40MVA augmentation	1.51
LESCO	18	Said Pur	26-40MVA augmentation	1.51
LESCO	19	Chah Miran	26-40MVA augmentation	1.51
LESCO	20	Defence	26-40MVA augmentation	1.51
LESCO	21	Ellahabad	13–26 MVA augmentation	1.07
LESCO	22	Renala Khurd	13–26MVA augmentation	1.07
LESCO	23	Fateh Garh	26-40MVA augmentation	1.45
LESCO	24	Garden Town	26-40MVA augmentation	1 45
LESCO	25	Gulshan-e-Ravi	26-40MVA augmentation	1.45

	1	r	1	
LESCO	26	Johar Town	26-40MVA augmentation	1.45
LESCO	27	Kasur	26-40MVA augmentation	1.45
LESCO	28	Mcload Road	26-40MVA augmentation	1.51
LESCO	29	Model Town	26-40MVA augmentation	1.51
LESCO	30	Old Kot Lakhpat (OKLP)	26-40MVA augmentation	1.51
LESCO	31	Okara City-I	26-40MVA augmentation	1.51
LESCO	32	Rehman Park	26-40MVA augmentation	1.51
LESCO	33	Shadman	26-40MVA augmentation	1.51
LESCO	34	Shahdara New	26-40MVA augmentation	1.51
LESCO	35	Town Ship	26-40MVA augmentation	1.51
LESCO	36	Badami Bagh	26-40MVA augmentation	1.51
LESCO	37	Qartaba	26-40MVA augmentation	1.51
LESCO	38	Bhogiwal	26-40MVA augmentation	1.07
LESCO	153	Sukh Chan Multan Road	New Site	4.51
MEPCO (14	subproject	s)		
MEPCO	83	Lar	New Site	4.28
MEPCO	85	Bahawalnagar	Additional line bay	0.18
MEPCO	86	Bahawalpur 220kV	Additional line bays	0.36
MEPCO	88	Chistian	Additional line bay	0.18
MEPCO	112	Gujrat South	Additional transformer& line bay	0.36
MEPCO	157	Khan Pur	26MVA transformer extension	1.43
MEPCO	158	Shadan Lund	66 kV to 132 kV Conversion	1.95
MEPCO	159	Shujabad	13-26MVA augmentation	1.07
MEPCO	160	Bonga Hayat	13-26MVA augmentation	1.07
MEPCO	161	Rajan Pur	13-26MVA augmentation	1.07
MEPCO	162	Feroza	Transformer bay extension	0.17
MEPCO	163	Sama Satta	26MVA transformer extension	1.43
MEPCO	164	Liaqat Pur	2 x 26MVA augmentation	2.13
MEPCO	165	Fazil Pur	66 kV to 132 kV Conversion	1.95
PESCO (16 s	subproject	s)		
PESCO	68	Shabqadar	26MVA transformer extension	1.43
PESCO	69	D.I.Khan	13-26MVA augmentation	1.07
PESCO	72	Dalazak	26MVA transformer extension	1.43
PESCO	73	Peshawar Cant.	26MVA transformer extension	1.43
PESCO	74	Jhangaria	26MVA transformer extension	1.43
PESCO	75	Temergara	26MVA transformer extension	2.39
PESCO	76	Battal	26MVA transformer extension	1.43
PESCO	77	Hattar	26MVA transformer	1.43

PESCO	176	Gadoon Amazai	26MVA transformer extension	1.43
PESCO	177	Jalala	13-26MVA augmentation	1.43
PESCO	178	Mardan II	13-26MVA augmentation	1.07
PESCO	179	Chakdara	13-26MVA augmentation	1.07
PESCO	180	Khawaza Khela	13-26MVA augmentation	1.07
PESCO	181	Rehman Baba	26MVA transformer extension	1.43
PESCO	182	Prova	26MVA transformer extension	1.43
PESCO	188	Karak	Transmission line & line bays	1.77
QESCO (9 sı	ubprojects)		
QESCO	109 Kalat		13-26MVA augmentation+ 26MVA transformer extension	2.5
QESCO	110	Mastung	26MVA transformer extension	1.43
QESCO	113	Nal	26 MVA transformer extension	1.43
QESCO	183	Musferpur	26MVA transformer extension	1.43
QESCO	184	Sariab	26-40MVA augmentation	1.51
QESCO	185	Barkhan	26MVA transformer extension	1.43
QESCO	187	Rakni	26MVA transformer extension	1.43
QESCO	208	Ali Zai	66-132kV Conversion	3.28
QESCO	209	Kanak	66-132kV Conversion	2.79
Total 117 ST	G subproje	cts		177

APPENDIX 7: TRANCHE1 NON STG PROJECTS

DISCO	Subproject No	Project Type	Capital USD (M)	
Energy Lo	oss Reduction			
GEPCO	144			
HESCO	129		C1	
MEPCO	175	Re-conductoring, reconliguning networks	01	
QESCO	130			
Distributio	on of Power			
GEPCO	154			
PESCO	127	11kV / LV extensions, distribution s/s	36.	
QESCO	128			
Installatio	n of Capacitors			
FESCO	119			
HESCO	122			
IESCO	124			
LESCO	120	Install 132kV&11kV capacitors	25	
MEPCO	121			
PESCO	125			
QESCO	126			
Moderniza	ation			
FESCO	149	Construction Equipment.		
FESCO	150	Automated Meter Reading		
FESCO	151	Computerised Accounting System		
LESCO	139	Automated Meter Reading		
LESCO	148	Distribution Trans Protection Pilot project	10	
FESCO	140			
LESCO	147	Install reclosers & sectionalisers to improve		
IESCO	142	system performance		
PESCO	145			
Rehabilita	ntion (not covere	d by previously approved PC-1)		
FESCO	134			
HESCO	133			
IESCO	135	Replace time expired / technically inadequate	18	
LESCO	131	s/s equip.	10	
PESCO	137			
QESCO	138			
		Total	150	

APPENDIX 8: SAMPLE FEASIBILITY REPORT (IESCO EXTENSION)

Final

Feasibility Summary

Submitted to the Asian Development Bank by the Islamabad Electric Supply Company (IESCO), Pakistan under Distribution Enhancement Project PPTA 4876-PAK

Tranche 1

Sub-project Numbers 63,189,194 &197,198,199,200,201 & 207

Extension of Sub Stations – Addition of New 13 MVA 26 MVA & 40 MVA, 132/11 kV, Transformer and Bay



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1 INTRODUCTION

1.1 Location

- 1. Islamabad is the capital city of Pakistan, and is located in the Potohar Plateau in the northwest of the country. It is located within the Islamabad Capital Territory, though the area has historically been a part of the crossroads of the Punjab region and the North-West Frontier Province (the Margalla pass being a historic gateway to the North-West Frontier Province, and the Potwar Plateau historically a part of the Punjab). Islamabad is located at 33°40′N, 73°10′E. The city is situated at the edge of the Pothohar plateau, south of the Margalla hills. The modern capital Islamabad and the ancient Gakhar city of Rawalpindi stand side by side, displaying the country's past and present. The area's micro-climate is regulated by three man-made lakes (Rawal, Simli and Khanpur). The city overall has an extreme climate with hot summers with monsoon rains occurring during July and August, and fairly cold winters with sparse snowfall over the hills and sleet in the city. The weather ranges from a minimum of -4°C in January to a maximum of 45°C in June.
- 2. Islamabad Area Electricity Board (AEB) was one of the eight AEB's constituted through amendments in WAPDA Act during 1981. Later the Government of Pakistan approved revamping of WAPDA power sector, forming twelve corporate entities. Eight Distribution and Supply Companies (DISCOs), one National Transmission and Distribution Company (NTDC) and three Generation Companies (GENCOs) were incorporated. All of these companies have been incorporated under the Companies Ordinance 1984. IESCO was incorporated on 25th April, 1998 company registration No. L09499 of 1997-98 under section 32 and certificate for commencement of business was obtained on 1st June, 1998 under section 146(2) of Companies Ordinance 1984. The IESCO service area includes administrative districts of Rawalpindi, Chakwal, Attock, Jhelum and Federal Capital Islamabad., the service area of IESCO is presented in Figure 1 below:



Figure 1: IESCO Service Area

3. This feasibility study relates to augmentation of existing 132/11 kV, 13/26 MVA to 26/40 MVA transformers in sub stations located within the service area of Islamabad Electricity Supply Company (IESCO). The Government of Pakistan (GoP) in 1994 approved the Strategic Plan which envisaged the unbundling of the Water and Power Development Authority (WAPDA) into 12 independent companies. IESCO was created in 1998. IESCO includes six districts. IESCO is divided into four Circles, 19 Divisions and 94 Subdivisions. The IESCO sub-transmission system is presented in Figure 2 below:



Figure 2: IESCO Sub Transmission System

1.2 Description

4. The sub projects included in this feasibility study are all extensions. The scope of work includes addition as a new 26 MVA, 132/11 kV Power Transformer and also a new transformer bay, which includes circuit breaker, isolator, instrument transformers lightning arrestors and other equipments and materials. The sub projects included are presented in Table 1 below:

			10,000		
Sub Pr	oject No.	Extensions	MVA	Voltage	Existing Capacity
1	189	Khoi Ratta	13	132/11	13.00
1	194	Taxila	26	132/11	52.00
1	197	Gujar Khan	26	132/11	52.00
2	201	Attock	26	132/11	26.00
1	198	Dina	26	132/11	26.00
1	199	Jatli	26	132/11	26.00
2	200	Chak Sawari	26	132/11	26.00
	63	Islamabad F- 6	40	132/11	26.00
2	207	Mirpur	26	132/11	52.00

 Table 1:
 Extension Sub Projects – IESCO Tranche 1

2 NETWORK STUDIES

5. The technical justification of these sub stations relate to existing facilities including power transformers in the substation which were overloaded. This over loading if allowed to persist would result in: inability to serve additional demand; inability to connect new customers; inability to serve increase in demand in already connected customers; increased in outage rates; and also decrease in useful life of power transformers. The proposed extensions were the result of load flow studies presented in Appendix 1 and also on the data base which maintains the loading of power transformers.

2.1 Existing Installation

6. The sub projects will be confined to existing 132 kV sub stations owned and operated by IESCO. Single Line diagrams and Layout drawings of each of these sub stations is presented in Appendix 2.

3 PROPOSED

3.1 Planned Installation

7. The proposed expansion is for the addition of a 26 MVa 132/11 kV power transformer and a transformer bay.

3.2 Planned Equipment

8. The necessary equipment and the cost estimate are presented in Table 2 below:

Table 2: Bill of Quantities and Cost Estimate

TRANSFORMER EXTENSION 13 MVA

EQUIPMENT DETAILS			TOTAL	BASE COST	(M.Rs)	TOTAL ES	CALATED CO	OST(M.Rs)**	
220 KV	UNIT	<u>QTY</u>	LOCAL	FOREIGN	TOTAL	LOCAL	FOREIGN	DUTIES ETC	TOTAL
Circuit Breaker Bus Isolator Line Isolator C.T P.T Auto T/F LIGhtning arrestor	Sets Sets Nos Nos Nos Nos	0 0 0 0 0 0	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00
ALLIED EQUIPMENT,			0.00	0.00	0.00	0.00	0.00	0.00	0.00
EQUIPMENT COST 220 K	V					0.00	0.00	0.00	0.00
CIVIL WORKS AND EREC	TION					0.00	0.00	0.00	0.00
<u>132 KV</u>	UNIT	<u>QTY</u>	LOCAL	FOREIGN	TOTAL	LOCAL	FOREIGN	DUTIES ETC	TOTAL
Circuit Breaker Bus Isolator C.T P.T T/F Lightning arrestor	Sets Sets Nos Nos Nos Nos	1 2 0 3 0 1 3	0.00 0.00 0.00 0.00 0.00 24.00 0.00	2.59 0.65 0.00 0.50 0.00 0.00 0.33	2.59 0.65 0.00 0.50 0.00 24.00 0.33	0.00 0.00 0.00 0.00 25.80 0.00	2.76 0.67 0.00 0.52 0.00 0.00 0.34	0.21 0.05 0.00 0.04 0.00 0.00 0.03	2.97 0.72 0.00 0.56 0.00 25.80 0.37
ALLIED EQUIPMENT,			7.20	1.22	8.42	7.74	1.29	0.10	9.13
EQUIPMENT COST 132 kV						33.54	5.58	0.42	39.54
CIVIL WORKS AND ERECTION	COST					11.86	0.00	0.00	11.86
TOTAL 220/132 RV EQUIPMEN	I COST					33.54	5.58	0.42	39.54
						0.00	0.00	0.00	0.00
	1+3CADA					1.02	0.00	0.00	2.06
ENGINEERING						0.00	0.22	0.00	0.00
ENVIRONMENT MITIGATION C	OST					0.00	0.00	0.00	0.00
RE-SETTLEMENT COST						0.00	0.00	0.00	0.00
RESIDENTIAL/NON-RESIDENT	IAL BUILDING	i	ר			0.00	0.00	0.00	0.00
TOTAL PROJECT COST						47.23	5.80	0.42	53.46
TOTAL PROJECT COST	L 47.652852	F 5.8032	T 53.4561						
TOTAL PROJECT COST MIL	LION US.\$= 0	.88	ב						
ADMINSTRATION CHARGES						2.06	0.00	0.00	2.06
AUDIT AND INSPECTION						0.51	0.00	0.00	0.51
INLANDLAND TRANSPORTATI	ON &					1.98	0.00	0.00	1.98
HANDLING CHARGES INSURANCE						0.20	0.00	0.00	0.20
L/C OPENING CHARGES						0.40	0.00	0.00	0.40
CONTINGENCIES						2.62	0.29	0.02	2.93
COST WITHOUT I.D.C.						54.99	6.09	0.44	61.53
IDC						9.47	0.00	0.00	9.47
GRAND TOTAL						64.46	6.09	0.44	71.00
GRAND TOTAL MILLION US \$	1.17								

**=ESCALATION ASSUMED AS 7.5% FOR LOCAL COMPONENT AND 1.6% FOR FOREIGH EXCHANGE COMPONENT IMPORT CHARGES % 7.5 IDC 8.22% PER ANNUM FOR LOCAL AND 12% FOR FEC 1US5=R.58.09

TRANSFORMER EXTENTSION 26 MVA

EQUIPMENT DETAILS TOTAL BASE COST (M.Rs) TOTAL ESCALATED COST(M.Rs)**										
220 KV	UNIT	<u>QTY</u>	LOCAL	FOREIGN	TOTAL	L	OCAL	FOREIGN	DUTIES ETC	TOTAL
O'anailt Dan al	0	<i>c</i>	0.00	0.00	0.00			0.00	0.00	0.00
Circuit Breaker	Sets	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
Bus Isolator	Sets	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
Line isolator	Sets	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00
0.1	INOS	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00
P.I	NOS	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Auto I/F	NOS	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00
LIGhtning arrestor	Nos	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00
ALLIED EQUIPMENT,			0.00	0.00	0.00	(0.00	0.00	0.00	0.00
EQUIPMENT COST 220 KV						(0.00	0.00	0.00	0.00
CIVIL WORKS AND ERECT	ION					(0.00	0.00	0.00	0.00
<u>132 KV</u>	UNIT	QTY	LOCAL	FOREIGN	TOTAL	L	OCAL	FOREIGN	DUTIES ETC.	TOTAL
	Cata		0.00	2.50	2.50		0.00	0.70	0.01	0.07
Circuit Breaker	Sets	1	0.00	2.59	2.59		0.00	2.76	0.21	2.97
Bus isolator	Sets	2	0.00	0.65	0.65		00.00	0.67	0.05	0.72
	Seis	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00
0.1	INOS	3	0.00	0.50	0.50		0.00	0.52	0.04	0.56
P.I	Nos	0	0.00	0.00	0.00	(0.00	0.00	0.00	0.00
I/F	Nos	1	28.38	0.00	28.38	3	2.80	0.00	0.00	32.80
Lightning arrestor	Nos	3	0.00	0.33	0.33	(0.00	0.34	0.03	0.37
ALLIED EQUIPMENT,			8.51	1.22	9.73	ę	9.84	1.29	0.10	11.23
EQUIPMENT COST 132 kV						4	2.64	5.58	0.42	48.64
CIVIL WORKS AND ERECTION C	OST					1	4.59	0.00	0.00	14.59
TOTAL 220/132 KV EQUIPMENT	COST					4	2.64	5.58	0.42	48.64
TOTAL CIVIL WORKS AND EREC	TION					1	4.59	0.00	0.00	14.59
COM. & DESPATCH EQUIPMENT	F+SCADA					(0.00	0.00	0.00	0.00
ENGINEERING						2	2.31	0.22	0.00	2.53
CONTINGENCIES						(0.00	0.00	0.00	0.00
ENVIRONMENT MITIGATION COS	ST					(0.00	0.00	0.00	0.00
RE-SETTLEMENT COST						(0.00	0.00	0.00	0.00
RESIDENTIAL/NON-RESIDENTIAL	BUILDING]			(0.00	0.00	0.00	0.00
TOTAL PROJECT COST				1		5	9.54	5.80	0.42	65.76
TOTAL PROJECT COST	L 59.956052	F 5.8032	T 65.7593							
TOTAL PROJECT COST MILI	LION US.\$= '	.08]							
ADMINSTRATION CHARGES						2	2.53	0.00	0.00	2.53
AUDIT AND INSPECTION						().63	0.00	0.00	0.63
INLANDLAND TRANSPORTATIO	N &						243	0.00	0.00	2 43
HANDLING CHARGES								0.00	0.00	2.70
INSUKANCE).24	0.00	0.00	0.24
L/C OPENING CHARGES).49	0.00	0.00	0.49
CONTINGENCIES						3	3.29	0.29	0.02	3.60
COST WITHOUT I.D.C.						6	9.15	6.09	0.44	75.69
IDC						1	1.54	0.00	0.00	11.54
GRAND TOTAL						8	0.69	6.09	0.44	87.23
GRAND TOTAL MILLION US \$	1.43									

**-ESCALATION ASSUMED AS 7.5% FOR LOCAL COMPONENT AND 1.6% FOR FOREIGH EXCHANGE COMPONENT IMPORT CHARGES %7.5 IDC 8.22% PER ANNUM FOR LOCAL AND 12% FOR FEC 1055=R5.80.9

TRANSFORMER EXTENSION 40 MVA

EQUIPMENT DETAILS			TOTAL	BASE COST	(M.Rs)	TOT	TOTAL ESCALATED COST(M.Rs)**			
220 KV	UNIT	QTY	LOCAL	FOREIGN	TOTAL	LOC	AL FOREIG	N DUTIES ETC	TOTAL	
Circuit Brooker	Soto	0	0.00	0.00	0.00	0.0	0 0 00	0.00	0.00	
Bue legister	Sets	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
Bus isolator	Sels	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
Line isolator	Sets	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
0.1	NOS	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
P.T	Nos	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
Auto T/F	Nos	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
LIGhtning arrestor	Nos	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
ALLIED EQUIPMENT,			0.00	0.00	0.00	0.0	0.00	0.00	0.00	
EQUIPMENT COST 220 KV						0.0	0.00	0.00	0.00	
CIVIL WORKS AND ERECT	ION					0.0	0.00	0.00	0.00	
<u>132 KV</u>	UNIT	<u>QTY</u>	LOCAL	FOREIGN	TOTAL	LOC	AL FOREIG	N DUTIES ETC.	TOTAL	
Circuit Brooker	Soto	1	0.00	2.50	2.50	0.0	0 276	0.21	2.07	
Bup holotor	Sets	2	0.00	2.39	2.55	0.0	0 2.70	0.21	2.57	
Bus isolator	Sels	2	0.00	0.65	0.05	0.0	0.07	0.05	0.72	
Line isolator	Sets	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
C.I	Nos	3	0.00	0.50	0.50	0.0	0 0.52	0.04	0.56	
P.1	Nos	0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	
T/F	Nos	1	42.75	0.00	42.75	45.	96 0.00	0.00	45.96	
Lightning arrestor	Nos	3	0.00	0.33	0.33	0.0	0 0.34	0.03	0.37	
ALLIED EQUIPMENT,			12.83	1.22	14.05	13.	79 1.29	0.10	15.18	
EQUIPMENT COST 132 kV						59.	75 5.58	0.42	65.75	
CIVIL WORKS AND ERECTION C	OST					19.	72 0.00	0.00	19.72	
TOTAL 220/132 KV EQUIPMENT	COST					59.	75 5.58	0.42	65.75	
TOTAL CIVIL WORKS AND EREC	TION					19.	72 0.00	0.00	19.72	
COM. & DESPATCH EQUIPMEN	T+SCADA					0.0	0.00	0.00	0.00	
ENGINEERING						3.2	.0 0.22	0.00	3.42	
						0.0	0.00	0.00	0.00	
ENVIRONMENT MITIGATION COS	ST					0.0	0.00	0.00	0.00	
RE-SETTLEMENT COST						0.0	0.00	0.00	0.00	
RESIDENTIAL/NON-RESIDENTIA	L BUILDING		7			0.0	0.00	0.00	0.00	
TOTAL PROJECT COST			-			82.	67 5.80	0.42	88.89	
	L 83 088772	F	T 88 892							
TOTAL PROJECT COST MIL	LION US.\$= 1	.46	7							
ADMINSTRATION CHARGES						3.4	2 0.00	0.00	3.42	
						0.8	5 0.00	0.00	0.85	
AUDIT AND INSPECTION						0.0	0.00	0.00	0.00	
INLANDLAND TRANSPORTATIO	N &					3.2	9 0.00	0.00	3.29	
INSURANCE						0.3	0.00	0.00	0.33	
L/C OPENING CHARGES						0.6	6 0.00	0.00	0.66	
CONTINGENCIES						4.5	0.29	0.02	4.87	
COST WITHOUT I.D.C.						95.	78 6.09	0.44	102.31	
IDC 15.45 0.00 0.00 15.45									15.45	
GRAND TOTAL						111.	.23 6.09	0.44	117.76	
GRAND TOTAL MILLION US \$ 1.93										

**=ESCALATION ASSUMED AS 7.5% FOR LOCAL COMPONENT AND 1.6% FOR FOREIGH EXCHANGE COMPONENT IMPORT CHARGES % 7.5 IDC 8.22% PER ANNUM FOR LOCAL AND 12% FOR FEC 1US\$=R5.60.9

3.3 Estimated Cost

9. The estimated cost of each of the planned works is US\$ 1.17 million for 13 MVA, US\$1.43M for 26 MVA and US\$1.93 for 40 MVA, 132/11 kV transformer, including transformer bay.

3.4 Benefits

10. The benefits of the sub project are presented in Table 3 as follows, benefits are based on incremental capacity provided:

Subproject No.	Extensions	MVA	Voltage	Existing Capacity (MVA)	2006 % loading	2009 % loading	First Year demand (MW)
189	Khoi Ratta	13	132/11	13.00	99.54	125.39	3.78
194	Taxila	26	132/11	52.00	86.37	108.80	9.58
197	Gujar Khan	26	132/11	52.00	95.40	120.18	13.37
201	Attock	26	132/11	26.00	65.24	82.18	0.36
198	Dina	26	132/11	26.00	86.91	109.48	4.90
199	Jatli	26	132/11	26.00	71.98	90.67	1.78
200	Chak Sawari	26	132/11	26.00	82.70	104.17	4.02
63	Islamabad F- 6	40	132/11	26.00	94.18	118.64	6.43
207	Mirpur	26	132/11	52.00	96.17	121.15	13.69

 Table 3:
 Benefits of Extensions to Existing Sub Stations

4 ECONOMICS

11. The economic analysis below is based upon benefits derived from the load flow studies. The valuation of benefits is on the basis of 'willingness to pay' (WTP). The quantification of benefits and valuation of benefits is presented in detail in the 'Detailed Economic Paper' which is appended to the RRP. Appendix 3 presents the analysis. Table 4 presents the summary of the economic analysis.

Sr	Sub	Name	MVA	Capex	NPV	Base	Sensitivity EIRR (%)		(%)
NO	ct No		EXI	US\$ mill	mill	EIRR (%)	Cost 10%	Benefit (10%)	Cost 10% Benefit (10%)
1	63	Islamabab F-6	40	1.516	4.47	33.97	31.78	31.56	29.53
2	189	Khoi Ratta	13	1.002	2.33	33.2	31.02	30.8	28.78
3	194	Taxila	26	1.122	6.51	560.61	52.85	52.47	48.97
4	197	Gujar Khar	26	1.122	6.51	56.61	52.85	52.47	48.97
5	198	Dina	26	1.122	3.43	34.82	32.56	32.33	30.25
6	199	Jatli	26	1.122	0.57	16.66	15.6	15.49	14.5
7	200	Chak Sawari	26	1.122	2.63	30.06	28.14	27.95	26.17
8	201	Attock	26	1.122	(0.73)	2.89	2.4	2.35	1.87
9	207	Mirpur	26	1.122	8.17	71.9	67.13	66.65	62.19

5 FINANCIAL ANALYSIS

12. The financial analysis is based upon benefits derived from the load flow studies. Benefits are valued on the basis of the tariff allowed by NEPRA (the power regulator) to IESCO less the bulk supply cost to the DISCO. The analysis is presented in the 'Detailed Financial Paper' which is appended to the RRP. The results are summarized as follow in Table 5 below:

Table J. Financial Analysis Summary							
No	Name	Scope of Work	FIRR				
63	F-6,Islamabad	40MVA transformer extension	22%				
189	Khoi Ratta	26MVA transformer extension	18%				
194	Taxila	26MVA transformer extension	25%				
197	Gujar Khan	26MVA transformer extension	17%				
198	Dina	26MVA transformer extension	20%				
199	Jatli	26MVA transformer extension	20%				
200	Chak Sawari	26MVA transformer extension	20%				
201	Attock	26MVA transformer extension	35%				
207	Mirpur	26MVA transformer extension	35%				

Table 5. Einanaial Analysia Summ

SOCIAL ISSUES 6

- 13. The sub-project will include an additional transformer and allied equipment. The transformer and equipment will be fully accommodated within the existing station site and will not require any additional land. The ADB checklists for involuntary resettlement and indigenous people have been completed and are reproduced below. As there will be no land acquisition no social effects will be incurred. Therefore the safequard policies on involuntary resettlement, indigenous people will not require further assessment. This is summarized and presented in Appendix 4
- The project does not involve any resettlement at all as the extension of the grid station 14. is within land owned by IESCO. No indigenous people are involved or displaced as a result of this proposed extension. This is summarized in Appendix 4.

7 ENVIRONMENTAL IMPLICATIONS

Overview and Environmental Assess 7.1

- 15. This review of environmental implications is for the subprojects involving installation of a 26 MVa transformers at existing stations which are listed above. These stations are located within the service area of IESCO in Lahore, Kasur, Sheikhoura and Okara Districts of the Punjab Province. This review follows ADB Environment Policy and Environmental Assessment Guidelines (2003) and the subproject will also be subject to environmental assessment under the regulations and guidelines of GOP.⁵
- Installation of this subproject is within the boundaries of the existing substation and is 16. classified as Category "C" in accordance with ADB Environmental Guidelines (2003)

⁵ The Pakistan Environmental Protection Agency: Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

because there are no significant impacts for the surrounding environment. The Rapid Environmental Assessment checklist is presented in Appendix 5. Environmental assessment is however required in the form of a review of environmental implications that must be included in the RRP. There are no significant impacts, largely because the expansion subproject will be within the boundaries of the existing substation. The consultants for TA4876 have also determined that there are no sensitivities in the vicinity of the substation which could be impacted significantly by the anticipated scope of works and a more detailed impact assessment is not necessary.

17. The environmental assessment requirements of the GOP for power transmission and distribution projects are different to those of ADB. The environmental regulations of the GOP categorize development projects into two schedules according to their anticipated potential environmental impact. The proponents of projects that have more adverse environmental impacts (Schedule II) are required to submit an environmental impact assessment (EIA) to the respective provincial Environmental Protection Agency (EPA). Transmission lines and grid substations are included under energy projects in Schedule II, under which rules EIA is required by GOP for all projects involving transmission lines of 11kv and above and for grid substations. Initial environmental examination (IEE) is required for transmission lines less than 11kv and large distribution projects (Schedule I). A review of the need for EIA/IEE submission is therefore required by the relevant environmental protection authority in this case the Punjab Province Environmental Protection Agency (PEPA) is the responsible authority. There are no formal provisions for the environmental assessment of expanding existing transmission lines and grid substations but EPA requested disclosure of the scope and extent of each subproject in order that the Director General of the provincial EPA can determine if additional land is required and the need for statutory environmental assessment.¹ The details of this subproject have been forwarded to the PEPA (2007) in order to commence the local statutory environmental assessment process.

7.2 Description of the Project

- 18. The subproject will involve the addition of one 26 MVa transformer and associated equipment within the boundary of existing 132 kV sub stations owned and operated by IESCO. These sub stations are located within the service area of IESCO which includes the Districts of Lahore, Kasur, Shjeikhpura and Okara of Punjab Province. The substation location is presented in Appendix 2.
- 19. The feasibility study for the subproject was prepared by consultants under TA4876 has demonstrated the need for the proposed improvements based on electricity demand and network studies and that significant benefit can accrue in the form of reduced outages under fault conditions. Additional capacity added at these sub stations has been recommended.

7.3 Environmental Impacts and Mitigation

20. Location impacts: The impacts arising from the design phase have been minimized by keeping all subproject activities within the boundary of the existing 132kV grid substations. No additional land will be required. The proposed subprojects will not cause any changes to the existing hydrological regime nor will it affect the local communities' day-to-day life.

- 21. There are potential *construction impacts* but these can be minimized at sub projects because the construction impacts such as dust, noise and waste disposal will be inside the grid substation and minimal or insignificant impacts can be expected outside the grid substation as far as the transformer's installation and commissioning are concerned. Any residual impacts should be very minor.
- 22. Existing **waste management** arrangements will be augmented by a waste management plan to be developed in the design phase of the MFF Tranche 1 to assure environmentally acceptable disposal of any additional waste from new transformer installation and operation or disposal of redundant transformers and insulating oils.
- 23. The sub projects will provide a few skilled jobs during the construction phase and lesser jobs in the operational phase.

7.4 Environmental Management Plan and Institutional Requirements

- 24. The Implementing Agency IESCO will notify the provincial EPA and obtain approvals of the environmental clearance in the form of "No Objection Certificate" (NOC) prior to the commencement of construction. IESCO will also comply with any other regulatory requirements that may arise from other government agencies.
- 25. IESCO has engineering and support staff and has also appointed personnel in the environmental field, this cell will handle its environmental responsibilities for these and other subprojects IESCO has allocated dedicated human resources to cover the environmental assessment requirements of the subproject as required by the provincial EPA. IESCO have in consequence appointed an Environmental Officer (EO). The EO and team will work in close cooperation with the respective field-based subprojects. The environmental team of IESCO will need to be supported by training and capacity building efforts.

7.5 Conclusion, Findings and Recommendations-Environmental Assessment

26. The subprojects will have very minor adverse environmental impacts due to the location of the works inside the substation boundaries and due to the remote location of the grid substation. Any residual adverse impacts unpredicted at this stage are likely to be very minor and well within acceptable limits. Based on the review conducted to date ADB environmental Category C is appropriate and further environmental assessment is not necessary.

8 CONCLUSIONS

27. The sub project provides incremental capacity to be delivered. The sub projects are also financially and economically feasible; the results of the economic and financial analysis are summarized above. The sub projects do not pose any insurmountable social or environmental problems and as such are recommended for inclusion in the Tranche 1 of the proposed Distribution Enhancement MFF.


Appendix 1: Load Flow Diagrams







Appendix 2: Site and Location Plans

REFERENCES

S.NO	GRID STATIONS	G.T SHEET NO / DISTRICT GUIDE MAP / GUIDE MAP	G.T SHEET / GUIDE MAP / DISTRICT GUIDE MAP SCALE
1	132KV F-6/1 ISLAMABAD	43 G/2	1:50,000
1	132KV JATLI	43 G/4	1:50,000
2	132KV ATTOCK	43 C/5	1:50,000
3	132KV DINA	43 G/12	1:50,000
4	132KV TAXILA	43 C/13	1:50,000
5	132KV CHAK SAWARI	43 G/16	1:50,000

Subproject 63 F-6



Subproject 189 Khoi Ratta



Subproject 194 Taxila



Subproject 197 Gujar Khan



Subproject198 Dina



Subproject 199 Jatli





Subproject 200 Chak Sawari



Subproject 201 Attock



Subproject 207 Mirpur



Appendix 3: Economic Analysis

Economic Ana	alysis	Tranche 1			1	Commissi	oning date	2009-10
Sub-Project N	lumber		197	,			-	
Gujar Khan				132/11 kV	constructi	ion period	2	years
Mva added			26	MW Added	18.75			
Capital cost, M	I.\$		1.24	1st year demand met	13.37	MW		
Foreign Curren	ncy cost, M	.\$	0.10	Losses,energy	4	%		
Local Currency	/ cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Economi	c Cost M.\$		1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

	-				-	Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.673	0.000	0.673				-0.673	
2	0.449	0.000	0.449				-0.449	
3		0.017	0.017	13.368	67.452	1.062	1.045	
4		0.017	0.017	14.304	72.173	1.137	1.120	
5		0.017	0.017	15.305	77.225	1.216	1.199	
6		0.017	0.017	16.376	82.631	1.301	1.285	
7		0.017	0.017	17.523	88.415	1.392	1.376	
8		0.017	0.017	18.750	94.608	1.490	1.473	
9		0.017	0.017	20.060	101.218	1.594	1.577	
10		0.017	0.017	20.800	104.952	1.653	1.636	
11		0.017	0.017	20.800	104.952	1.653	1.636	
12		0.017	0.017	20.800	104.952	1.653	1.636	
13		0.017	0.017	20.800	104.952	1.653	1.636	
14		0.017	0.017	20.800	104.952	1.653	1.636	
15		0.017	0.017	20.800	104.952	1.653	1.636	
16		0.017	0.017	20.800	104.952	1.653	1.636	
17		0.017	0.017	20.800	104.952	1.653	1.636	
18		0.017	0.017	20.800	104.952	1.653	1.636	
19		0.017	0.017	20.800	104.952	1.653	1.636	
20		0.017	0.017	20.800	104.952	1.653	1.636	
21		0.017	0.017	20.800	104.952	1.653	1.636	
22		0.017	0.017	20.800	104.952	1.653	1.636	
23		0.017	0.017	20.800	104.952	1.653	1.636	
24		0.017	0.017	20.800	104.952	1.653	1.636	
25		0.017	0.017	20.800	104.952	1.653	1.636	
26		0.017	0.017	20.800	104.952	1.653	1.636	
27		0.017	0.017	20.800	104.952	1.653	1.636	
28		0.017	0.017	20.800	104.952	1.653	1.636	
29		0.017	0.017	20.800	104.952	1.653	1.636	
30		0.017	0.017	20.800	104.952	1.653	1.636	
31		0.017	0.017	20.800	104.952	1.653	1.636	
32		0.017	0.017	20.800	104.952	1.765	1.748	
NPV @ 12 %	0.959	0.108	1.067	145.778	735.560	11.588	8.171	
						IRR	71.90	%

Sensitivity	
Base Case	

IRR NPV

% M.\$	IRR	5.27 %
71.90	8 NPV 12%	-320 M.\$

at10%+ costs at 10%-Benefits

at 10% costs,-10%benefits

Economic An	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project	Number		200					
Chak Sawa	ri			132/11 kV	constructi	on period	2	years
Mva added			26	MW Added	5.64			-
Capital cost, N	И.\$		1.24	1st year demand met	4.02	MW		
Foreign Curre	ncy cost, M	İ.\$	0.10	Losses,energy	4	%		
Local Currenc	y cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

						Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.673	0.000	0.673				-0.673	
2	0.449	0.000	0.449				-0.449	
3		0.017	0.017	4.024	20.304	0.320	0.303	
4		0.017	0.017	4.306	21.725	0.342	0.325	
5		0.017	0.017	4.607	23.246	0.366	0.349	
6		0.017	0.017	4.930	24.873	0.392	0.375	
7		0.017	0.017	5.275	26.615	0.419	0.402	
8		0.017	0.017	5.644	28.458	0.448	0.431	
9		0.017	0.017	6.039	30.471	0.480	0.463	
10		0.017	0.017	6.462	32.604	0.513	0.497	
11		0.017	0.017	6.914	34.886	0.549	0.533	
12		0.017	0.017	7.398	37.328	0.588	0.571	
13		0.017	0.017	7.916	39.941	0.629	0.612	
14		0.017	0.017	8.470	42.737	0.673	0.656	
15		0.017	0.017	9.063	45.729	0.720	0.703	
16		0.017	0.017	9.697	48.930	0.771	0.754	
17		0.017	0.017	10.376	52.355	0.825	0.808	
18		0.017	0.017	11.102	56.020	0.882	0.865	
19		0.017	0.017	11.880	59.941	0.944	0.927	
20		0.017	0.017	12.711	64.137	1.010	0.993	
21		0.017	0.017	13.601	68.627	1.081	1.064	
22		0.017	0.017	14.553	73.430	1.156	1.140	
23		0.017	0.017	15.572	78.571	1.237	1.221	
24		0.017	0.017	16.662	84.071	1.324	1.307	
25		0.017	0.017	17.828	89.955	1.417	1.400	
26		0.017	0.017	17.828	89.955	1.417	1.400	
27		0.017	0.017	17.828	89.955	1.417	1.400	
28		0.017	0.017	17.828	89.955	1.417	1.400	
29		0.017	0.017	17.828	89.955	1.417	1.400	
30		0.017	0.017	17.828	89.955	1.417	1.400	
31		0.017	0.017	17.828	89.955	1.417	1.400	
32		0.017	0.017	17.828	89.955	1.529	1.512	
NPV @ 12 %	0.959	0.108	1.067	58.332	294.320	4.639	2.631	
						IRR	30.06	%

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IRR % 30.06

NPV M.\$

IRR 5.27 % 3 NPV 12% -320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		201					
Attock				132/11 kV	constructi	ion period	2	years
Mva added			26	MW Added	5.64			
Capital cost, N	M.\$		1.24	1st year demand met	0.36	MW		
Foreign Curre	ency cost, N	Ī.\$	0.10	Losses,energy	4	%		
Local Currence	y cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

						Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.673	0.000	0.673				-0.673	
2	0.449	0.000	0.449				-0.449	
3		0.017	0.017	0.360	1.816	0.029	0.012	
4		0.017	0.017	0.385	1.944	0.031	0.014	
5		0.017	0.017	0.412	2.080	0.033	0.016	
6		0.017	0.017	0.441	2.225	0.035	0.018	
7		0.017	0.017	0.472	2.381	0.037	0.021	
8		0.017	0.017	0.505	2.548	0.040	0.023	
9		0.017	0.017	0.540	2.726	0.043	0.026	
10		0.017	0.017	0.578	2.917	0.046	0.029	
11		0.017	0.017	0.619	3.121	0.049	0.032	
12		0.017	0.017	0.662	3.340	0.053	0.036	
13		0.017	0.017	0.708	3.573	0.056	0.039	
14		0.017	0.017	0.758	3.823	0.060	0.043	
15		0.017	0.017	0.811	4.091	0.064	0.048	
16		0.017	0.017	0.868	4.377	0.069	0.052	
17		0.017	0.017	0.928	4.684	0.074	0.057	
18		0.017	0.017	0.993	5.012	0.079	0.062	
19		0.017	0.017	1.063	5.363	0.084	0.068	
20		0.017	0.017	1.137	5.738	0.090	0.074	
21		0.017	0.017	1.217	6.140	0.097	0.080	
22		0.017	0.017	1.302	6.569	0.103	0.087	
23		0.017	0.017	1.393	7.029	0.111	0.094	
24		0.017	0.017	1.491	7.521	0.118	0.102	
25		0.017	0.017	1.595	8.048	0.127	0.110	
26		0.017	0.017	1.595	8.048	0.127	0.110	
27		0.017	0.017	1.595	8.048	0.127	0.110	
28		0.017	0.017	1.595	8.048	0.127	0.110	
29		0.017	0.017	1.595	8.048	0.127	0.110	
30		0.017	0.017	1.595	8.048	0.127	0.110	
31		0.017	0.017	1.595	8.048	0.127	0.110	
32		0.017	0.017	1.595	8.048	0.239	0.222	
NPV @ 12 %	0.959	0.108	1.067	5.219	26.332	0.418	-0.733	
						IRR	2.89	%

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IRR %

2.89

NPV M.\$

IRR -1 NPV 12% 5.27 %

-320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		198					
Dina				132/11 kV	construct	ion period	2	years
Mva added			26	MW Added	7.36			
Capital cost, N	M.\$		1.24	1st year demand met	4.90	MW		
Foreign Curre	ency cost, M	Ī.\$	0.10	Losses,energy	4	%		
Local Currence	cy cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

						Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.673	0.000	0.673				-0.673	
2	0.449	0.000	0.449				-0.449	
3		0.017	0.017	4.904	24.744	0.390	0.373	
4		0.017	0.017	5.247	26.477	0.417	0.400	
5		0.017	0.017	5.615	28.330	0.446	0.429	
6		0.017	0.017	6.008	30.313	0.477	0.461	
7		0.017	0.017	6.428	32.435	0.511	0.494	
8		0.017	0.017	6.878	37.137	0.585	0.568	
9		0.017	0.017	7.360	37.135	0.585	0.568	
10		0.017	0.017	7.875	39.710	0.625	0.609	
11		0.017	0.017	8.426	42.490	0.669	0.652	
12		0.017	0.017	9.016	45.464	0.716	0.699	
13		0.017	0.017	9.647	48.647	0.766	0.749	
14		0.017	0.017	10.322	52.052	0.820	0.803	
15		0.017	0.017	11.045	55.696	0.877	0.860	
16		0.017	0.017	11.818	59.594	0.939	0.922	
17		0.017	0.017	12.645	63.766	1.004	0.987	
18		0.017	0.017	13.530	68.229	1.075	1.058	
19		0.017	0.017	14.477	73.005	1.150	1.133	
20		0.017	0.017	15.491	78.116	1.230	1.213	
21		0.017	0.017	16.575	83.584	1.316	1.300	
22		0.017	0.017	17.735	89.435	1.409	1.392	
23		0.017	0.017	18.977	95.695	1.507	1.490	
24		0.017	0.017	20.305	102.394	1.613	1.596	
25		0.017	0.017	20.800	104.952	1.653	1.636	
26		0.017	0.017	20.800	104.952	1.653	1.636	
27		0.017	0.017	20.800	104.952	1.653	1.636	
28		0.017	0.017	20.800	104.952	1.653	1.636	
29		0.017	0.017	20.800	104.952	1.653	1.636	
30		0.017	0.017	20.800	104.952	1.653	1.636	
31		0.017	0.017	20.800	104.952	1.653	1.636	
32		0.017	0.017	20.800	104.952	1.765	1.748	
NPV @ 12 %	0.959	0.108	1.067	70.708	357.901	5.640	3.430	
						IRR	34 82	%

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IRR % 34.82

NPV M.\$

IRR 3 NPV 12% 5.27 %

-320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		63					
Islamabad	F-6			132/11 kV	construct	ion period	2	years
Mva added			40	MW Added	5.64			-
Capital cost, N	И.\$		1.67	1st year demand met	6.43	MW		
Foreign Curre	ncy cost, M	.\$	0.10	Losses,energy	4	%		
Local Currenc	y cost, M.\$		1.57	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.52	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

						Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.909	0.000	0.909				-0.909	
2	0.606	0.000	0.606				-0.606	
3		0.023	0.023	6.432	32.454	0.511	0.488	
4		0.023	0.023	6.882	34.726	0.547	0.524	
5		0.023	0.023	7.364	37.157	0.585	0.562	
6		0.023	0.023	7.879	39.758	0.626	0.603	
7		0.023	0.023	8.431	42.541	0.670	0.647	
8		0.023	0.023	9.021	45.519	0.717	0.694	
9		0.023	0.023	9.653	48.705	0.767	0.744	
10		0.023	0.023	10.328	52.115	0.821	0.798	
11		0.023	0.023	11.051	55.763	0.878	0.855	
12		0.023	0.023	11.825	59.666	0.940	0.917	
13		0.023	0.023	12.653	63.843	1.005	0.983	
14		0.023	0.023	13.538	68.312	1.076	1.053	
15		0.023	0.023	14.486	73.093	1.151	1.128	
16		0.023	0.023	15.500	78.210	1.232	1.209	
17		0.023	0.023	16.585	83.685	1.318	1.295	
18		0.023	0.023	17.746	89.543	1.410	1.387	
19		0.023	0.023	18.988	95.810	1.509	1.486	
20		0.023	0.023	20.317	102.517	1.615	1.592	
21		0.023	0.023	21.740	109.693	1.728	1.705	
22		0.023	0.023	23.262	117.372	1.849	1.826	
23		0.023	0.023	24.890	125.588	1.978	1.955	
24		0.023	0.023	26.632	134.379	2.116	2.094	
25		0.023	0.023	28.496	143.786	2.264	2.242	
26		0.023	0.023	28.496	143.786	2.264	2.242	
27		0.023	0.023	28.496	143.786	2.264	2.242	
28		0.023	0.023	28.496	143.786	2.264	2.242	
29		0.023	0.023	28.496	143.786	2.264	2.242	
30		0.023	0.023	28.496	143.786	2.264	2.242	
31		0.023	0.023	28.496	143.786	2.264	2.242	
32		0.023	0.023	28.496	143.786	2.416	2.393	
NPV @ 12 %	1.295	0.146	1.441	93.239	470.460	7.414	4.470	
						IRR	33 97	%

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IRR % 33.97

NPV M.\$

IRR 5.27 % 4 NPV 12% -320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		199					
Jatli				132/11 kV	construct	ion period	2	years
Mva added			26	MW Added	5.64			
Capital cost, N	И.\$		1.24	1st year demand met	1.78	MW		
Foreign Curre	ncy cost, M	Ī.\$	0.10	Losses,energy	4	%		
Local Currence	y cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

Willingness to pay benefit energy Benefits served **Incremental Demand** excluding of energy O&M Served Capital Total losses served Net Cost Cost Cost benefit Benefit MW Year M.\$ M.\$ M.\$ M.\$ M.\$ M.\$ 0.000 0.673 -0.673 0.673 2 3 0.449 0.000 0.449 -0.449 0.017 0.017 1.776 8.961 0.141 0.124 4 1.900 9.589 0.017 0.017 0.151 0.134 5 0.017 0.017 2.033 10.260 0.162 0.145 6 0.017 0.017 2.176 10.978 0.173 0.156 7 0.017 0.017 2.328 11.746 0.168 0.185 8 0.017 0.017 2.491 12.569 0.198 0.181 9 2.665 0.017 0.017 13.448 0.212 0.195 14.390 10 0.017 0.017 2.852 0.227 0.210 11 0.017 0.017 3.051 15.397 0.242 0.226 12 0.017 3.265 16.475 0.259 0.243 0.017 13 0.017 0.017 3.494 17.628 0.278 0.261 14 0.017 0.017 3.738 18.862 0.297 0.280 15 4.000 0.017 0.017 20.182 0.318 0.301 16 0.017 0.017 4.280 21.595 0.340 0.323 17 0.017 0.017 4.579 23.107 0.364 0.347 18 0.017 0.017 4.900 24.724 0.389 0.373 19 0.017 0.017 5.243 26.455 0.417 0.400 20 0.017 0.017 5.610 28.307 0.446 0.429 21 0.017 6.003 30.288 0.460 0.017 0.477 22 0.017 0.017 6.423 32.409 0.494 0.510 23 0.017 0.017 6.873 34.677 0.546 0.529 24 37.105 0.017 7.354 0.584 0.568 0.017 25 0.017 0.017 7.868 39.702 0.625 0.608 26 7.868 0.017 0.017 39.702 0.625 0.608 27 0.017 0.017 7.868 39.702 0.608 0.625 28 0.017 0.017 7.868 39.702 0.625 0.608 29 0.017 0.017 7.868 39.702 0.625 0.608 30 0.017 39.702 0.608 0.017 7.868 0.625 31 0.017 0.017 7.868 39.702 0.625 0.608 32 0.017 0.017 7.868 39.702 0.737 0.721 NPV @ 12 % 0.959 0.108 1.067 25.745 129.903 2.050 0.567 IRR 16.66 %

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IRR NPV 16.66

%

M.\$

IRR 1 NPV 12% 5.27 %

-320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		189					
Khoi Ratta				132/11 kV	construct	ion period	2	years
Mva added			13	MW Added	5.64			
Capital cost, N	И.\$		1.00	1st year demand met	3.78	MW		
Foreign Curre	ncy cost, M	İ.\$	0.10	Losses,energy	4	%		
Local Currenc	y cost, M.\$		0.90	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	0.91	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

						Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.548	0.000	0.548				-0.548	
2	0.365	0.000	0.365				-0.365	
3		0.014	0.014	3.776	19.053	0.300	0.286	
4		0.014	0.014	4.040	20.386	0.321	0.307	
5		0.014	0.014	4.323	21.814	0.344	0.330	
6		0.014	0.014	4.626	23.340	0.368	0.354	
7		0.014	0.014	4.950	24.974	0.393	0.380	
8		0.014	0.014	5.296	26.723	0.421	0.407	
9		0.014	0.014	5.667	28.593	0.450	0.437	
10		0.014	0.014	6.063	30.595	0.482	0.468	
11		0.014	0.014	6.488	32.736	0.516	0.502	
12		0.014	0.014	6.942	35.028	0.552	0.538	
13		0.014	0.014	7.428	37.480	0.590	0.577	
14		0.014	0.014	7.948	40.103	0.632	0.618	
15		0.014	0.014	8.504	42.911	0.676	0.662	
16		0.014	0.014	9.100	45.914	0.723	0.709	
17		0.014	0.014	9.737	49.128	0.774	0.760	
18		0.014	0.014	10.400	52.567	0.828	0.814	
19		0.014	0.014	10.400	52.567	0.828	0.814	
20		0.014	0.014	10.400	52.567	0.828	0.814	
21		0.014	0.014	10.400	52.567	0.828	0.814	
22		0.014	0.014	10.400	52.567	0.828	0.814	
23		0.014	0.014	10.400	52.567	0.828	0.814	
24		0.014	0.014	10.400	52.567	0.828	0.814	
25		0.014	0.014	10.400	52.567	0.828	0.814	
26		0.014	0.014	10.400	52.567	0.828	0.814	
27		0.014	0.014	10.400	52.567	0.828	0.814	
28		0.014	0.014	10.400	52.567	0.828	0.814	
29		0.014	0.014	10.400	52.567	0.828	0.814	
30		0.014	0.014	10.400	52.567	0.828	0.814	
31		0.014	0.014	10.400	52.567	0.828	0.814	
32		0.014	0.014	10.400	52.567	0.919	0.905	
NPV @ 12 %	0.780	0.088	0.868	50.394	254.389	4.009	2.328	1
						IRR	33.20	%

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IRR % 33.20

NPV M.\$

IRR 2 NPV 12% 5.27 %

-320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		207					
Mirpur				132/11 kV	constructi	on period	2	years
Mva added			26	MW Added	18.75			
Capital cost, N	M.\$		1.24	1st year demand met	13.37	MW		
Foreign Curre	ency cost, M	Ī.\$	0.10	Losses,energy	4	%		
Local Currence	cy cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

Willingness to pay benefit energy Benefits served **Incremental Demand** excluding of energy O&M Capital Total Served losses served Net Cost Cost Cost benefit Benefit MW Year M.\$ M.\$ M.\$ M.\$ M.\$ M.\$ 0.000 0.673 -0.673 0.673 2 3 0.449 0.000 0.449 -0.449 0.017 0.017 13.368 67.452 1.062 1.045 4 14.304 0.017 0.017 72.173 1.137 1.120 5 0.017 0.017 15.305 77.225 1.216 1.199 6 0.017 0.017 16.376 82.631 1.301 1.285 7 0.017 0.017 17.523 88.415 1.376 1.392 8 0.017 0.017 18.750 94.608 1.490 1.473 9 20.060 0.017 0.017 101.218 1.594 1.577 10 0.017 20.800 0.017 104.952 1.653 1.636 11 0.017 0.017 20.800 104.952 1.653 1.636 12 0.017 20.800 104.952 1.653 1.636 0.017 13 0.017 0.017 20.800 104.952 1.653 1.636 14 0.017 0.017 20.800 104.952 1.653 1.636 15 0.017 0.017 20.800 1.636 104.952 1.653 16 0.017 0.017 20.800 104.952 1.653 1.636 17 0.017 0.017 20.800 104.952 1.653 1.636 18 0.017 0.017 20.800 104.952 1.653 1.636 19 0.017 0.017 20.800 104.952 1.653 1.636 20 0.017 0.017 20.800 104.952 1.653 1.636 21 0.017 20.800 1.636 0.017 104.952 1.653 22 0.017 0.017 20.800 104.952 1.653 1.636 23 0.017 0.017 20.800 104.952 1.653 1.636 104.952 24 0.017 1.636 0.017 20.800 1.653 25 0.017 0.017 20.800 104.952 1.636 1.653 26 0.017 0.017 20.800 104.952 1.653 1.636 27 0.017 0.017 20.800 104.952 1.636 1.653 28 0.017 0.017 20.800 104.952 1.653 1.636 29 0.017 0.017 20.800 104.952 1.653 1.636 30 0.017 104.952 0.017 20.800 1.653 1.636 31 0.017 0.017 20.800 104.952 1.653 1.636 32 0.017 0.017 20.800 104.952 1.765 1.748 NPV @ 12 % 0.959 0.108 1.067 145.778 735.560 11.588 8.171 IRR 71.90 %

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IRR NPV 71.90

%

M.\$

IRR 8 NPV 12% 5.27 %

-320 M.\$

Economic Ar	nalysis	Tranche 1.			1	Commissi	oning date	2009-10
Sub-Project I	Number		194					
Taxila				132/11 kV	constructi	ion period	2	years
Mva added			26	MW Added	5.64			
Capital cost, N	И.\$		1.24	1st year demand met	9.58	MW		
Foreign Curre	ncy cost, M	Ī.\$	0.10	Losses,energy	4	%		
Local Currence	y cost, M.\$		1.14	Tariff at 132 Kv	0.1017	\$/kWh		
Total Econom	ic Cost M.\$	5	1.12	CS Plus Tariff at 132 kV	0.01575	\$/kWh		
SCF			0.90	O&M cost	1.5	%		
Load factor		60	%					

						Willingness	s to pay ber	nefit
					energy			
					served	Benefits		
				Incremental Demand	excluding	of energy		
	Capital	O&M	Total	Served	losses	served	Net	
	Cost	Cost	Cost		benefit		Benefit	
Year	M.\$	M.\$	M.\$	MW	M.\$	M.\$	M.\$	
1	0.673	0.000	0.673				-0.673	
2	0.449	0.000	0.449				-0.449	
3		0.017	0.017	9.584	48.359	0.762	0.745	
4		0.017	0.017	10.255	51.744	0.815	0.798	
5		0.017	0.017	10.973	55.366	0.872	0.855	
6		0.017	0.017	11.741	59.241	0.933	0.916	
7		0.017	0.017	12.563	63.388	0.998	0.981	
8		0.017	0.017	13.442	67.825	1.068	1.051	
9		0.017	0.017	14.383	72.573	1.143	1.126	
10		0.017	0.017	15.390	77.653	1.223	1.206	
11		0.017	0.017	16.467	83.089	1.309	1.292	
12		0.017	0.017	17.620	88.905	1.400	1.383	
13		0.017	0.017	18.853	95.129	1.498	1.481	
14		0.017	0.017	20.173	101.788	1.603	1.586	
15		0.017	0.017	20.800	104.952	1.653	1.636	
16		0.017	0.017	20.800	104.952	1.653	1.636	
17		0.017	0.017	20.800	104.952	1.653	1.636	
18		0.017	0.017	20.800	104.952	1.653	1.636	
19		0.017	0.017	20.800	104.952	1.653	1.636	
20		0.017	0.017	20.800	104.952	1.653	1.636	
21		0.017	0.017	20.800	104.952	1.653	1.636	
22		0.017	0.017	20.800	104.952	1.653	1.636	
23		0.017	0.017	20.800	104.952	1.653	1.636	
24		0.017	0.017	20.800	104.952	1.653	1.636	
25		0.017	0.017	20.800	104.952	1.653	1.636	
26		0.017	0.017	20.800	104.952	1.653	1.636	
27		0.017	0.017	20.800	104.952	1.653	1.636	
28		0.017	0.017	20.800	104.952	1.653	1.636	
29		0.017	0.017	20.800	104.952	1.653	1.636	
30		0.017	0.017	20.800	104.952	1.653	1.636	
31		0.017	0.017	20.800	104.952	1.653	1.636	
32		0.017	0.017	20.800	104.952	1.765	1.748	
NPV @ 12 %	0.959	0.108	1.067	119.578	603.363	9.506	6.511	
					•	IDD	EC 64	0/

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NPV IRR % 56.61

M.\$

IRR 7 NPV 12% 5.27 %

-320 M.\$

Appendix 4: Indigenous Peoples Impact Categorization and Involuntary Resettlement Check List

A. Project Data	INDIGENO	US PEOPL	ES IMPAC	I CATEG	ORIZATIO	Proje	ect No: <u>TA 4876-PAK</u>
			=				
Department/Division	a: Pakistan A: (ADB TA	- Power Dis No. 4876-I	PAK)	nnanceme	Int MEE Pr	oject	Date: Jul-07
Lending Modality:	Project Lo Program Sector Lo Financial Multi-Trar	ban Loan an Intermedia Johe Finang	[] [] [] tion Loan/E	Hybrid I Emerge SDP Lo quity Inve (MEE)	_oan ncy Loan an stment		
Other Project Types	: Grant	[]	JFPR	[]	GEF	[]	Other []
Coverage:	Country	[×]	Regional		[]	Inter-re	gional []
Project:	Detailed o Detailed I	lesign befo Design com	re loan neg pleted duri	otiations ng implerr	entation		[] [×]
Processing Events (PPTA Fact Finding: Loan Fact Finding: MRM: Appraisal: Ext. Subproject No:	tentative schedule) ar	nd dates: 8 to 200,63	Due Dilig PSCCM Due Dilig	gence befo : gence afte	ore PSCCN r PSCCM:	л:	
Subproject Name: Location/Province: Tranche No:	Extension of nine 13 IESCO,Punjab/Fede 1	ral Capital	Stations by a	adding 13	/2640 MVA	A transform	iers.
Brief Description: Power demand in th months, while the ex- planned to extend th will be carried out wi nor they will affect a	e service areas of the disting power transfor- lese grid stations by a lithin the existing bour my private assets or ii Indigapous Booplag	esenine Gri mation sys adding new nds of these ncomes.	d Stations h tem are una 13/26/40M e grid statio	nas increa able to me VA transfe n. No add	sed rapidly et those do ormers. Th itional land	/, especiall emands. T le propose d acquisitic	y in the summer herefore IESCO has d extension works n will be necessary,
B. Identification of Impact in Indigenous	Peoples (IPs) or Ethnic	s in Subpro Minorities	oject Area				
(EMs)	, , , , , , , , , , , , , , , , , , ,		Yes	No	Not Known	Remarks o	r Identified Problems (i
Are there IP or EM grou location?	ps present within the sub	project		×		All three Ex located in the Punjab/Fed are no indig	tension Subprojects are ne settled Districts of eral Capital where there jenous people found.
Do they maintain distinc that make them vulnerba	tive customs or economic ale to hardship?	activities		×		Not applica	ble - see above
Will the subproject restr and make them particula the subproject?	ict their economic and so alry vulnerable in the cont	cial acitivity ext of the		×		Not applica	ble - see above
Will the subproject chan integrity?	ge their socio-economic	and cultural		×		Not applica	ble - see above
Will the subproject disru	upt community life?			×		other featur subproject	tes associated with the that could affect
Will the subproject posit lifestyle or social securit	tively affect their health, e y status?	ducation,		×		Not applica	ble - see above
Will the subproject nega lifestyle or social securit	atively affect their health, e y status?	education,		×		Not applica	ble - see above
Will the subproject alter knowledge, preclude cus customary institutions?	or undermine the recogn stomary behaviours or un	ition of their dermine		×		Not applica	ble - see above
In case of no disruption whole, will there be loss and other fixed assets o indigenous households?	of indigenous community of housing, strip of land, wned or controlled by ind	r life as a crops, trees ividual		×		There are n other featur subproject f additional la any people.	o transmission lines or es associated with the that could require and acquisition or affect
C. Anticipated Sub	project Impacts on	Indigenous	s Peoples	itcome			Anticipated Negative (
1. Reduced disruptions	to power supply to	Broad scale	benefits to h	ealth and ed	lucation sect	tors,	Anticipated Negative C
receiving community, im	proved and stabilized	possibility of	f improved an	d increased	livelihood op	pportunities,	None
power supply power supply security for households D. Decision on Categorization D. Decision on Categorization Categorization Status: Previous Category New [X] Recategorization After reviewing the information above, the Mission leader and social development specialist agree that the [] Should be categorized as an A subproject, an Indigenous Peoples Development Plan (IPDP) is required, [] Should be categorized as an B subproject, a specific action favourable to IPs/EMs is required and [X] Should be categorized as a C subproject, no IPDP or specific action is required. Project Team Comments: As none of the Subprojects included in this Power Distribution Enhancement MFE Project have been							
Subproject preparation/i LARP. Proposed by:	mplementation any indieg	jnous people	and impact tl	nere upon is	noticed, a II	PDP section	will be included in the
	Project Team Leader					Date.	
	Social Development Spe	ecialist				Date:	
Checked by:						Date:	
	RSES Social Developme	ent Safeguar	ds Specialist			<u></u>	
Endorsed by:						Data	
	Director, RSES					Date:	
Approved by:							
	Chief Compliance Office	ər				Date:	
	,						

	Pakistan - Power Di	stribution E	nhancem	ent MFF Pr	oject	Date	: Jul-C
Department/Division:	(ADB TA No. 4876- Infrastructure Divisio	PAK) on, Central	and West	t Asia Depa	rtment	_	
ending Modelity:	Project Loan	r 1	Hybrid	Loan			
Lending Modality.	Program Loan	[]	Emerg	ency Loan		[]	
	Sector Loan Financial Intermedia	[] ition Loan/B	SDP L Equity Inv	oan estment		[]	
	Multi-Tranche Finan	cing Facilit	y (MFF)			[×]	
Other Project Types:	Grant []	JEPR	r 1	GEE	r 1	Other	r 1
Siller Project Pypes.		01110		02.		ound	
Coverage:	Country [X]	Regional		[]	Inter-re	əgional	[]
Project:	Detailed design befo	ore loan neg	otiations				[]
	Detailed Design com	pleted duri	ng implei	mentation			[×]
Processing Events (tentative :	schedule) and dates:						
PPTA Fact Finding:		Due Dili	gence be	fore PSCCI	И:		
MRM:		Due Dili	gence aft	er PSCCM:			
Appraisal:							
Ext. Subproject No: 189.194.	.197.201.198 to 200.6	3					
Subproject Name: Extensio	n of nine 132kV Grid S	Stations by	adding 13	3/2640 MVA	transform	ners.	
Location/Province: IESCO,F Tranche No:	1						
Brief Description:							
Power demand in the service months, while the existing poy	areas of thesenine Gri wer transformation sys	id Stations	has incre able to m	ased rapidly eet those d	/, especia emands	lly in the su Therefore I	ımmer ESCO ha
planned to extend these grid s	stations by adding new	13/26/40	IVA trans	formers. Th	e propose	ed extensio	n works
will be carried out within the e nor they will affect any private	xisting bounds of thes assets or incomes	e grid statio	on. No ad	ditional lan	d acquisiti	ion will be r	necessary
B. Screening Questions for	Resettlement Catego	orization					
Probable Involuntary Resettleme	ent Effects	Yes	No	Not Known	Remarks		
					Constructi new 13/20	on of Found 6/40 MVA T	ations for t ransforme
		~			Cables a	nd extension	of Cont
are project molude any physica		Â		1	existing bo	ounds of eac	h of the g
				1	station; no needed.	additional l	and acquir
				1	Constructi	on of Found	ations for t
				1	new 13/20 Cables a	6/40 MVA T nd extension	ransforme
Joes the project include upgrading physical facilities?	or rehabilitation of existing	×		1	Room will	be carried o	our within t
				1	station; no	ands of eac additional l	and acquir
				+	needed.		
Are any project effects likely to lead assets, resource use or incomes/liv	to loss of housing, other elihoods?		×	1	No additio	nal land acqu	isition requ
Is land acquisition likely to be neces	ssary?		×	1	No additio	nal land acqu	isition requ
Is the site for land acquisition know	n?		×		Not applic:	able	
known?	a suge of the land		×		Not applic:	able	
Will easements be utilized within an	n existing right-of-way		×		Not applic:	able	
Are there non-titled people who live the site or within the right-of-way?	or earn their livelihood at		×		Not applic:	able	
Will there be loss of housing?	4-2		×		Not applic:	able	
Will there be loss of agricultural pid Will there be loss of crops, trees, a	nd fixed assets?		×		Not application	able	
Will there be loss of businesses or	enterprise?		×		Not applic:	able	
Will there be loss of incomes and li Will people lose access to facilities	services or natural		×		Not applic:	able	
resources?	, services, or natural		×		Not applic:	able	
If involuntary resettlement impacts :	are expected:		×		Not applic:	able	
Are local laws and regulations	compatible with		×		Not applic	able	
Involuntary Resettlement polic	y? ernment sciencies be		~		Hot applied	able	
required to deal with land acqu	uisition?		×		Not applic:	able	
Are there sufficient skilled stat	If in the executing agency implementation?		×		Not applic:	able	
ion reseatement planning and i	ling interventions required		×		Not applic:	able	
Are training and capacity build	and implementation?						
Are training and capacity build prior to resettlement planning and							
Are training and capacity build prior to resettlement planning a	Persons						
C. Information on Affected	Persons	t will be off	octod by	the subproi	net?		
Are training and capacity build prior to resettlement planning and prior to resettlement planning : C. Information on Affected I Any estimate of the likely num No [] Yes	Persons ber of households tha [] If yes, app	it will be aff proximately	ected by how mar	the subproj זע?	ect?	None	
Are training and capacity build prior to resettlement planning. C. Information on Affected I Any estimate of the likely num No [] Yes	Persons ber of households tha [] If yes, app	t will be aff proximately	ected by how mar	the subproj 1y?	ect?	None	
Are training and capacity built prior to resettlement planning CC. Information on Affected Any estimate of the likely num No [] Yes Are any of them poor, female No [] Yes	Persons 1ber of households tha [] If yes, app -headed households, c [] If yes, brit	t will be aff proximately or vulnerabl efly describ	ected by how mar e to pove e their sit	the subproj vy? rty risks? uation:	ect?	None Not Appli	cable
Are training and capacity build prior to resettlement planning C. Information on Affected I Any estimate of the likely num No [] Yes Are any of them poor, female- No [] Yes	Persons her of households tha [] If yes, app -headed households, c [] If yes, brid	it will be aff proximately or vulnerabl efly describ	ected by how mar e to pove e their sit	the subproj אר? rty risks? uation:	ect?	None Not Appli	cable
Are training and capacity build prior to resettlement planning C. Information on Affected I Any estimate of the likely num No [] Yes Are any of them poor, female- No [] Yes Are any APs from indigenous	Persons her of households tha [] If yes, app -headed households, c [] If yes, brid or ethnic minority grou	ut will be aff proximately or vulnerabl efly describ ups?	ected by ⁻ how mar e to pove e their sit No	the subproj vy? rty risks? uation: []	ect? Yes	<u>None</u> Not Appli	cable
Are training and capacity build prior to resettlement planning. C. Information on Affected 1 Any estimate of the likely num No [] Yes Are any of them poor, female No [] Yes Are any APs from indigenous If yes, briefly describe:	Persons her of households tha [] If yes, app -headed households, c [] If yes, brid or ethnic minority grou	nt will be aff proximately or vulnerabl efly describ ups?	ected by how mar e to pove e their sit No	the subproj vy? rty risks? uation: []	ect? Yes	None Not Appli	cable
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Are training and capacity build prior to resettlement planning C. Information on Affected No [] Yes Are any of them poor, female No [] Yes Are any APs from indigenous fir yes, briefly describe: D. Involuntary Resettlement After reviewing the informatio After reviewing the informatio After reviewing the informatio I. Project Category A, signifi [] Category B, non-si [] Category C, no res [] Additional informati [] Category C, no res [] Additional informatio I. Project Category C, no res [] Category C, no res [] Category C, no res [] Category C, no res [] Category C, no res [] Additional informatio After Resettlement Fram <i>The project LARF has be</i> [X] Subproject Short/F Note: A draft RF/RP disclosed to AF A satisfactory RF/RP is requir Proposed by: Resettlem Checked by: RESE Son	Persons ber of households tha [] If yes, app -headed households, c [] If yes, bri or ethnic minority gro t Category n above, the project te d Resettlement Impact, nor tettlement impact, nor ant resettlement impact, nor black proceediment/Resettlem int support is required for Sector, Sector de ework (RF) en prepared by PEPC; ull Land Acquisition ar - Sa and endorsed by the included as a core app red before Appraisal. am Leader ent/Social Development Safeguar	It will be aff proximately or vulnerable affy describ ups? New am leader i am	ected by how mar e to pove e their sit No [X] and social irements settleme hort Reset report is settleme to par Resettleme to par Resettl	the subproj y? try risks? uation: [] I developm nt Plan is ru required se gatherec ticipate in F nent Frame m/Project I D/SCOS ar bis (LARPs) s required b	Ves Recatege ant/resett aquired an is required at Findir work (RF) coans, Er d submitt before the A. Date: Date: Date: Date:	None Not Appli	cable cable [] cialist leader. II ent Plan Loans an
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Are training and capacity build prior to resettlement planning C. Information on Affected To resettlement planning C. Information on Affected To any of them poor, female No [] Yes Are any of them poor, female No [] Yes Are any APs from indigenous If yes, briefly describe: D. Involuntary Resettlement After reviewing the informatio 1. Project Category A signific [] Category A signific [] Category A signific [] Category A signific [] Category A signific [] Category C, no res [] Additional informatio [] Category C, no res [] Additional informate [] Category C, no res [] Additional informate [] Category C, no res [] Additional requirements the project LARF has be [×] Subproject Short/F Note: A draft RF/RP disclosed to AF A satisfactory RF/RP should be Resettlem Checked by: RESES So Endorsed by: Director, F	Persons ber of households tha [] If yes, app -headed households, c [] If yes, bri or ethnic minority gro t Category n above, the project te d Resettlement Impact, nor ant resettlement Impact, and pant resettlement impact, and y B/G evelopment/Resettlem int support is required for Sector, Sector de lework (RF) Ps and endorsed by the included as a core app red before Appraisal. am Leader ent/Social Development Safeguar tSES	It will be aff proximately or vulnerable affy describ ups? New am leader uning Require ining g Require ining Require ining Require ining Require ining Requi	ected by ' how mar e to pove e their sit No [X] and social irements settleme hort Reset report is and is to l ist to par Resettleme t Progra t Progra t de faft Ri agency is e draft Ri	the subproj y? try risks? uation: I developm I developm tillement Pi required be gatherec ticipate in F nent Frame m/Project I <i>DISCOS ar</i> DISCOS ar DISCOS ar NProject I DISCOS ar DISCOS a	Ves Recatege ent/resettl aquired an is requ l by the pr act Findir work (RF) coans, Er d submitt before the . Date: Date: Date: Date: Date:	None Not Appli	cable cable [] cialist leader. I ent Plan Loans an
C. Information on Affected I Are training and capacity build prior to resettlement planning and Are training and capacity build prior to resettlement planning of C. Information on Affected I Any estimate of the likely num No [] Yes Are any APs from indigenous (] Are any APs from indigenous (] Category A. signific (] Category C. no res (] Additional informat (] Category C. no res (] Additional informat (] Category C. no res (] Social D (] Category (]	Persons Persons If yes, application Persons If yes, application If yes, application If yes, brive or ethnic minority ground if Category It	It will be aff proximately proximately fill describ ups? New am leader i ming Requ tot, a full R ming Requ sesettlement operate sesettl	ected by how mar e to pove e their sit No [X] and social irements settleme hort Rese ist to par Resettleme t Prograi r of Eight ment Plar agency i e draft R	the subproj y? try risks? uation: [] I developm I developm ttlement Pl required se gatherec ticipate in F required to m/Project I D/SCOS ar is (LARPs) s required to RP for MRN	Yes Recatego	None Not Appli I I Not Appli I	cable cable

Appendix 5: Sub Projects Details and Rapid Environmental Assessment (REA) Checklist

132KV CHAK SAWARI G/S Geographical coordinates:

	N 33 ⁰ 15.163'	E 73 ⁰ 48.74'	
S.NO	NAME OF SETTLEMENT	DISTANCE FROM G/S (Km)	DIRECTION FROM G/S
1	Mangla Reservior	5	SW
2	Sawari	2.7	SW
3	New Kalial	4.25	SW
4	Machiari	1.3	SW
5	Dhangde	2.7	SW

132KV TAXILA G/S Geographical coordinates:

N 34⁰46 222' E 72⁰48 571'

	N 04 40.222		
S.NO	NAME OF SETTLEMENT	DISTANCE FROM G/S (Km)	DIRECTION FROM G/S
1	Wah Cantt	3.5	W
2	Wah Cantt R.S	2	SW
3	Sukho	2.3	SE
4	Tofkian	2.75	NE
5	Mohra Maliaran	1.8	SE

132KV DINA G/S Geographical coordinates:

	N 33 ⁰ 2.5'	E 73 ⁰ 36.346'	
S.NO	NAME OF SETTLEMENT	DISTANCE FROM G/S (Km)	DIRECTION FROM G/S
1	Railway Station	2.05	ES
2	Hadala	0.35	ES
3	New Jhang	1.1	NE
4	Khokhar	1.3	ES
5	Mukhian	2.4	SW

132KV ATTOCK G/S Geographical coordinates:

N 33⁰46.331' E 72⁰18.603'

		E 12 10.000	
S.NO	NAME OF SETTLEMENT	DISTANCE FROM G/S (Km)	DIRECTION FROM G/S
1	Dispensary	3.65	NE
2	Railway Station (R.S)	4.35	NE
3	Campbellpore	5.75	NE
4	Shakar Dara	1.85	NE
5	Dhok Haji Ahmed	1.25	SW

132KV JATLI G/S Geographical coordinates:

N 33 ⁰ 12.635 E 73 ⁰ 6.225'							
S.NO	NAME OF SETTLEMENT	DISTANCE FROM G/S (Km)	DIRECTION FROM G/S				
1	Police Station	0.3	E				
2	Jatli	1	ES				
3	Shaikhpur	3	SW				
4	Dhak Kashmirian	2.95	NE				
5	Bher Ratial	1	NE				

Pakistan: Distribution Enhancement Project – K Rata-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		х	
MANGROVE		х	
ESTUARINE		х	
BUFFER ZONE OF PROTECTED AREA		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		x	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		х	
 noise and vibration due to blasting and other civil works? 		Х	
 dislocation or involuntary resettlement of people 		х	

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Pakistan: Distribution Enhancement Project –Taxila-IESCO 132 kV					
intry/Project Title:	Sub-project -194				
tor Division:					
A. PROJECT SIT	REENING QUESTIONS	Yes	No	REMARKS	
IS THE PROJECT , OF THE FOLLOWI AREAS?	AREA ADJACENT TO OR WITHIN ANY NG ENVIRONMENTALLY SENSITIVE	,			
CULTURAL HER	ITAGE SITE		х		
PROTECTED A	REA		х		
WETLAND			x		
 MANGROVE 			х		
 ESTUARINE 			х		
BUFFER ZONE	OF PROTECTED AREA		x		
 SPECIAL AREA 	FOR PROTECTING BIODIVERSITY		х		
B. POTENTIAL E					
WILL THE FROJEC	7 CAUSE	_	v		
 encroachment of landscape and 	n historical/cultural areas, disfiguration dincreased waste generation?		^		
 encroachment or protected areas 	n precious ecosystem (e.g. sensitive or)?		х		
 alteration of sur- crossed by road streams affected construction site 	ace water hydrology of waterways s and resulting in increased sediment in d by increased soil erosion at the ?		x		
 damage to sens construction of s 	itive coastal/marine habitats by submarine cables?		x		
 deterioration of sanitary wastes chemicals used 	surface water quality due to silt runoff, from worker-based camps and in construction?		x		
 increased local cutting and filling 	air pollution due to rock crushing, g?		x		
 chemical pollution vegetation for contract 	on resulting from chemical clearing of onstruction site?		х		
 noise and vibrat works? 	ion due to blasting and other civil		x		
 dislocation or in 	voluntary resettlement of people		х		

Pakistan: Distribution Enhancement Project – G Khan-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		х	
MANGROVE		х	
ESTUARINE		х	
BUFFER ZONE OF PROTECTED AREA		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		x	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		х	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		х	
 noise and vibration due to blasting and other civil works? 		х	
dislocation or involuntary resettlement of people		Х	

Pakistan: Distribution Enhancement Project – Attock-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		х	
MANGROVE		х	
ESTUARINE		х	
BUFFER ZONE OF PROTECTED AREA		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		x	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		х	
 noise and vibration due to blasting and other civil works? 		х	
 dislocation or involuntary resettlement of people 		х	

Pakistan: Distribution Enhancement Project – Dina-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		х	
MANGROVE		х	
ESTUARINE		х	
 BUFFER ZONE OF PROTECTED AREA 		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		х	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		Х	
 noise and vibration due to blasting and other civil works? 		х	
 dislocation or involuntary resettlement of people 		х	

Pakistan: Distribution Enhancement Project – Jatli-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		х	
MANGROVE		х	
ESTUARINE		х	
 BUFFER ZONE OF PROTECTED AREA 		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		x	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		х	
 noise and vibration due to blasting and other civil works? 		х	
dislocation or involuntary resettlement of people		х	

Pakistan: Distribution Enhancement Project - C Swari-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		x	
MANGROVE		Х	
ESTUARINE		х	
BUFFER ZONE OF PROTECTED AREA		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		Х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		х	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		х	
 noise and vibration due to blasting and other civil works? 		Х	
 dislocation or involuntary resettlement of people 		х	

Pakistan: Distribution Enhancement Project – F 6-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		х	
MANGROVE		х	
ESTUARINE		х	
BUFFER ZONE OF PROTECTED AREA		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		x	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		Х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		x	
 noise and vibration due to blasting and other civil works? 		х	
 dislocation or involuntary resettlement of people 		х	

Pakistan: Distribution Enhancement Project –Mirpur-IESCO 132 kV

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
CULTURAL HERITAGE SITE		х	
PROTECTED AREA		х	
WETLAND		x	
MANGROVE		х	
ESTUARINE		х	
BUFFER ZONE OF PROTECTED AREA		х	
SPECIAL AREA FOR PROTECTING BIODIVERSITY		х	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE			
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 		х	
 encroachment on precious ecosystem (e.g. sensitive or protected areas)? 		Х	
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		x	
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		х	
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction? 		Х	
 increased local air pollution due to rock crushing, cutting and filling? 		х	
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		х	
 noise and vibration due to blasting and other civil works? 		х	
 dislocation or involuntary resettlement of people 		х	

132KV F-6/1 ISLAMABAD G/S Geographical coordinates:

N 33⁰43.777' E 73⁰4.548'

S.NO	NAME OF SETTLEMENT	DISTANCE FROM G/S (Km)	DIRECTION FROM G/S
1	Hospital	1.45	ES
2	T.V Station	1.35	NE
3	National Assembly	2	E
4	Australian Embassy	5	NE
5	Annual Fair	2.5	NE
APPENDIX 9: SAMPLE GENERIC FEASIBILITY REPORT (INSTALLATION OF CAPACITORS)

Final

Feasibility Summary submitted to the Asian Development Bank by the Pakistan Electric Power Company under Power Distribution Enhancement Project PPTA 4876-PAK

Tranche1

Installation of Capacitors for power factor improvement

Sub-project Numbers

HESCO 122, IESCO 124, LESCO 120, MEPCO 121, PESCO 125, QESCO 126

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SUBPROJECT DESCRIPTION

- 1. These subprojects are about installing capacitors on the distribution networks of six of the eight DISCOs in Pakistan. The purpose of installing capacitors is to reduce the maximum demand placed on the distribution network and hence reduce distribution system losses.
- 2. FESCO and GEPCO are not requesting funding from ADB for the installation of capacitors, as they already have funding in place.
- 3. Each of the subprojects covered by this feasibility study will be further subdivided into lower level schemes located at multiple sites across the licensed areas of six of the DISCOs in Pakistan. For various reasons, it is not possible at this early stage to project the precise locations of all of these schemes. The DISCOs do not have all of the information prepared, and cannot reasonably do so in advance of the approval of this Facility.
- 4. There will be two types of scheme. First there will be those located at existing substations and totally contained within the existing boundary fences, with no expected resettlement or environmental issues. Second will be the more localised installations that are located on existing 11kV networks and mounted on or adjacent to existing overhead line supports.
- 5. The demand on the networks in Pakistan is generally of a poor power factor⁶, resulting in unnecessarily high losses. The tariff structure does not encourage end user customers to install their own power factor correction equipment. The result is that the collective customers' power factor combined with the natural power factor of an extensive overhead line network leaves the distribution systems with an overall low power factor, which in turn contributes to excessive losses. Some of the DISCOs have already installed capacitors at priority locations and expect to carry out significantly more. Others have yet to start their programmes.
- 6. Power factor may be corrected by installing power factor correction equipment (in this case capacitors) at a number of locations. The ideal location to address the impact of poor power factor on customers' installations is on the installation itself. This requires the co-operation of, and some capital outlay by the customer, which is unlikely to be forthcoming in the absence of an incentivising tariff structure.
- 7. Other options are to place capacitors on the distribution network, at practicable locations, ideally close to customers' demand. It is these individual locations that will have to be determined following a survey of customers' demand and power factor on a feeder by feeder basis. In some instances where there are many customer installations, all with a low power factor, it may be more appropriate to install a capacitor on the 11kV or 132kV busbars at grid substations. Under this feasibility study the options of installing a small capacitor along an 11kV network and a larger capacitor at a grid substation are reviewed.

ANALYSIS

8. Ideally in an alternating current power system the power factor of the demand would be unity. This means that all current flowing through the system would result in useful power being supplied to the customer, and the MVA⁷ supplied into the system would all be

⁶ Power factor is the term used in power engineering as a measure of the useful power available to customers from the total requirements of the system (excluding losses). It is maximised at a value of 1, and any degradation from unity reduces the saleable power output from the system for a given input. Its value is determined by the cosine of the angle between the voltage and current phasors in the alternating current system.

⁷ MVA (Megavolt amperes) is the product of system voltage and current flowing in the system.

converted to power in megawatts (MW)⁸ available for sale to customers. The current, and hence MVA, flowing in the system for a given demand in megawatts (MW), increases as the power factor decreases, increasing system losses. The distribution system variable losses are proportional to the square of the current flowing.

- 9. Take as an example 1MW of demand being supplied at a power factor of 0.85, and then corrected to 0.95 by the installation of a capacitor.
- 10. The figure below demonstrates, in simplified form, the relationship between useful power (MW), reactive power requirement (MVAr)⁹ of the load and the system and the impact this has on the total MVA supplied to the power system. Also shown is the effect of reducing the MVAr requirements by the introduction of power factor correction equipment, improving the power factor from 0.85 to 0.95 and hence reducing the current flowing in the system.



- 11. In the example quoted if the useful power component required by the customer(s) is 1MW, then the MVA required to deliver that 1MW at unity power factor is 1MVA, at a power factor of 0.95 is 1.053MVA, and at 0.85 power factor is 1.176MVA.
- 12. Taking into account that system variable losses are proportional to the square of the current, the distribution system losses at 0.95 power factor are increased by 10.8% of the unity power factor base level losses and at 0.85 power factor by 38.4% of the unity power factor base level losses. Power factor seldom drops below 0.75, but at this level losses would be increased above the unity power factor figure by 77%.
- 13. Assuming that distribution system losses amount to at least 4% (a prudent estimate) of the energy supplied the benefit in loss reduction gained by improving power factor from 0.85 to 0.95 is 27.6% of 4% or 1.1% of energy supplied.
- 14. This 1.1% of energy supplied equates to a payment for the purchase of non -saleable energy to the system of 11kW of demand with the 1MW demand on full load. Assuming a load factor of 60%, gives a loss load factor of 0.458 under the widely accepted formula of:

```
Loss Load factor =0.2 * Load Factor+ 0.8*Load Factor<sup>2</sup>
```

15. The avoidance of purchasing that portion of energy input which converts to system losses delivers an annual financial saving. In the example used a saving of 39976 kWh of energy results in an annual financial saving of \$2398 using the average purchase price of 6 cents per kWh.

⁸ Demand measured in MW is the useful power available for sale to customers. It is the product of system voltage and the "useful" component of current flowing.

⁹ MVAr (Megavolt amperes reactive) is the requirement of the power system and of demand to maintain voltage levels within given limits. It is generally not a useful saleable product to a customer. It is the product of system voltage and the "non useful" component of the current flowing.

16. Development of this base case of a 1MW demand to the practical level of standard available equipment and using a capacitor of 450kVAr rating applied to an 11kV circuit the formula:

 $MVAr = MW (tan \emptyset_1 - tan \emptyset_2)$

(where $ø_1$ is the original power factor angle and $ø_2$ is the angle after power factor correction)

determines that using the standard 450kVAr capacitor a demand of 1MW with a power factor of 0.80, for example, can be improved to a power factor of 0.95, whilst a demand of 1.5 MW with a power factor of 0.85 can be improved to a power factor of 0.95, in each case with some capacity for demand growth.

- 17. The annual savings in these cases amount to \$3949 and \$3598 respectively.
- 18. The estimated cost of installing a 450kVAr capacitor is, at a maximum, \$5000. Ongoing O&M costs are negligible.
- 19. The tables in Appendix A show in green the power factor improvements that can be achieved by installing a 450kVAr capacitor on system demands of 0.5, 1.0.1.5 and 2MW. To achieve the improvements shown in red in the tables an additional 450kVAr capacitor would be required, which would increase the capital cost by an estimated factor of 1.8.
- 20. International best practice normally expects a power factor in the range between 0.95 and unity. At power factors above 0.95 the financial return of installing correction equipment is unlikely to be adequate to justify proceeding. Below this level of power factor a case can be normally be made to justify the installation of correction equipment.
- 21. A typical 11kV feeder in Pakistan could be supplying a peak demand of 8MW and running at a power factor of around 0.8, and in these cases benefits are there to be taken. The actual benefits available at any location will be subject to a number of variables including demand, load factor, and the improvement available. Financial Analysis
- 22. The financial analysis is based solely upon the expected capital cost of installing capacitors, and the expected reduction in system losses. System losses convert to financial savings for the DISCO by avoidance of purchase costs for the energy saved. The financial benefit is achieved by the avoided purchase of energy, hence the average purchase price of energy has been used in the benefit calculations. No allowance has been made in any financial projections for ongoing O&M costs in the basic 450kVAr 11kV units since for this equipment the cost is negligible. For larger units based at substations with elaborate control gear an allowance has been made for ongoing O&M.
- 23. The benefits in FIRR, calculated on an assumed 30 year life of the equipment (which aligns with the DISCOs depreciation period) vary significantly depending upon location from but are generally expected to exceed WACC, with potential opportunities for payback within one year in some extreme cases. As the installation of capacitors is justified purely on financial and economic grounds there should be no reason for a scheme to go ahead if it does not deliver an adequate financial benefit. Most of the DISCOs' have stated in their proposals that they will address only those locations where the existing power factor is below 0.95.
- 24. The tables in Appendix B develop the achievable results in Appendix A for demands of 0.5,1.0,1.5 and 2.0 MW and convert these to annual savings based on avoided system losses and further develop each case to an FIRR.

25. The analysis has also been carried out for the installation of a 1.5MVar capacitor at a substation, on a feeder assumed to be providing 8MW. This shows more modest rates of return, due the significantly higher capital cost. This is also shown in Appendix B

LAND ACQUISITION AND RESETTLEMENT FRAMEWORK (LARF)

- 26. The LARF that covers the Power Distribution Enhancement Project is based on Pakistani Law governing land acquisition and fully complies with ADB's Policy on Involuntary Resettlement. As Pakistan's Land Acquisition Act (LAA) is unclear on how rehabilitation is to be achieved and in practice the provision of rehabilitation is left to ad hoc arrangements taken by local governments and specific project proponents, the LARF clarifies these issues by providing; (i) compensation at replacement cost of all items, (ii) the rehabilitation of informal settlers, and (iii) the provision of subsidies or allowances for affected people (APs) that may be relocated, suffer business losses, or may otherwise be severely affected.
- 27. The provisions and principles adopted in the LARF, and reflected in any LARPs that are required, will supersede the provisions of the LAA. The due diligence and LARP prepared for subprojects in the tranche1, and to be used for subsequent tranches, are based on the principles and entitlements set out in the project's approved Land Acquisition and Resettlement Framework (LARF).

THE SUBPROJECT

28. The sub project for installation of capacitors is expected to have no impact on the community, as it is contained either within existing, fenced, substation compounds for the larger schemes or on existing overhead line supports for the smaller units on 11kV feeders. Normal precautions for reducing annoyance or inconvenience to neighbours during the installation period (expected to be one or two day tasks for schemes outside substation perimeter fences) will need to be observed.

SCOPE OF LAND ACQUISITION & RESETTLEMENT IMPACTS

29. No land acquisition is required for any scheme under this subproject and no resettlement will be required. Thus, no Land Acquisition and Resettlement Plan (LARP) is considered necessary, and hence, no Due Diligence Report is prepared for this subproject.

INDIGENOUS PEOPLE ISSUES

- 30. This sub project has no impact on indigenous people, therefore neither an IPDP nor special action is required for this subproject.
- 31. The subproject is expected to provide no additional skilled or unskilled jobs.

PARTICIPATORY LAND ACQUISITION PROCESS

32. The LARF has been disclosed according to ADB's public communications policy.

GRIEVANCE MECHANISM

33. There is a grievance process established to deal with any issues or concerns raised on any aspect of the LARF or compensation process. The verbal or written grievances of AHs will be heard by the district level Land Acquisition Coordinating Committees, which will be established to assist DISCOs implement the LARP.

TOTAL COST OF RESETTLEMENT PLAN

34. No resettlement costs are expected to be associated with this subproject.

ENVIRONMENTAL ASSESSMENT REQUIREMENTS

- 35. Individual schemes within these subprojects are expected to have no detrimental environmental impact due to their location and the nature of work involved. However, under the laws of Pakistan an initial environmental examination (IEE) is required for all work at 11kV and above. A review of the need for EIA/IEE submission is therefore required by the relevant environmental protection authority in this case the Punjab Environmental Protection Agency. As the proposed subprojects will be located across the entire country they could fall under the jurisdiction of all of the provincial Environmental Protection Agencies (EPA).
- 36. The larger schemes will be located within existing substation sites, already owned and operated by the DISCOs with no requirement to extend existing boundary fences, or otherwise encroach on neighbouring land. Smaller schemes will be located on existing distribution network supports and appear as additional physically small items of plant. Feasibility studies demonstrate that overall there will be a reduction in unproductive electrical energy generated which will have cumulative environmental benefit.
- 37. There will be no ongoing detrimental effect on wildlife, trees or other natural features. The proposed subproject elements will not cause any changes to the existing hydrological regime nor will it affect the local communities' day-to-day life.
- 38. The potential construction impacts can be minimized by observing professional standards of workmanship, compliance with internationally expected Health and Safety Standards and international best practice in terms of protection of the public from dangers associated with site works. Construction phase environmental impacts and residual impacts should be negligible and well below acceptable thresholds.
- 39. No equipment containing PCB will be purchased under these subprojects¹⁰. Schemes in existing substations will require the installation of circuit breakers that will use either or vacuum or sulphur hexafluoride (SF6) gas arc extinction technology. This presents no additional hazard or risk, existing waste management arrangements will be augmented by a waste management plan to be developed in the design phase of the MFF tranche 2 to assure environmentally acceptable disposal of any waste from new equipment installation and operation or disposal of redundant equipment containing SF6 gas or mineral insulating oil.

ENVIRONMENTAL MANAGEMENT PLAN AND INSTITUTIONAL REQUIREMENTS

- 40. The Implementing Agencies (DISCOs) will notify provincial EPAs and obtain approvals of the environmental clearance in the form of "No Objection Certificate" (NOC) on a generic basis prior to the commencement of construction. DISCOs will also comply with any other regulatory requirements that may arise from other government agencies.
- 41. DISCOs have engineering and support staff, but no specific capacity or qualified personnel in the environmental field. To handle its environmental responsibilities for this

¹⁰ Historically some manufacturers of power factor correction equipment have provided polychlorinated biphenyl (PCB) filled equipment, with its associated detrimental health risks and long term removal issues.

and other subprojects DISCOs will allocate dedicated people to ensure the environmental assessment requirements of the subproject are delivered as required by the provincial EPAs.

42. The subprojects will have no adverse environmental (see Table 6:Rapid Environmental Assessment (REA) Checklist) impacts due to the nature of the works. Based on the review conducted to date no Initial Environmental Examination is required.

Conclusion

43. Subject to professional project management at implementation, the proposed project is technically justified, financially and economically viable and have no adverse social or resettlement impact. It will deliver ongoing cumulative environmental benefit

Implementation and Audit Trail

- 44. By nature, this subproject is not restricted to a single site for which a detailed subproject analysis can be delivered, an environmental impact study be made or social issues easily reviewed. It is all too easy with programs on this scale for the initial capital expenditure to be made and the focus of delivery lost such that no benefits are actually achieved.
- 45. The individual schemes within the subproject (numbering hundreds) will require individual planning, appraisal, delivery and sign-off in accordance with a simple manageable process. Only by this approach can there be confidence, through a robust audit trail, that the facility remains on track, is disbursed for its intended purpose and the available benefits are realized.
- 46. To ensure the prudent application of this element of the Facility for its intended purpose the following approach to implementation will be applied.
- 47. A pre-authorization form will be completed for each individual scheme, detailing precisely the location, the expected benefits in terms of power factor improvement, the expected project expenditure and the target completion date. This form will be authorized prior to the commencement of work on the scheme.
- 48. The allocation of costs to the scheme and hence the sub project must be supported by an adequate approach to job costing and allocation of time and material expenses to the job, to enable actual costs to be identified.
- 49. On completion the project sheet, with confirmed costs and completion dates will be signed off by the original authorizing officer.
- 50. Any scheme with costs that deviate by more than plus or minus 10% must have an explanation included before sign off.
- 51. Completed sheets will be retained for the duration of the Facility and held available for the auditors appointed by the DISCO to carry out random sampling to the satisfaction of ADB.
- 52. A random selection of project completion reports may be selected by ADB for post investment appraisal.
- 53. A sample suitable pre-authorization from is included in Appendix C to this feasibility study.
- 54. A Rapid Environmental Checklist, also to be completed for each scheme is included as Appendix D.

Appendix A: Power factor improvements achievable with standard 450kVAr capacitor

0.5 MW Demand										
Tan		1.333	1.169	1.020	0.882	0.750	0.620	0.484	0.329	0.000
pf		0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
Angle (rad)		0.927	0.863	0.795	0.723	0.644	0.555	0.451	0.318	0.000
MVA		0.833	0.769	0.714	0.667	0.625	0.588	0.556	0.526	0.500
MVA ²		0.694	0.592	0.510	0.444	0.391	0.346	0.309	0.277	0.250
			-		•	•		•		
Pf improvement	То	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
 From										
0.6		Y	Y	Y	Y	Y	Y	Y	Ν	Ν
0.65	-		Y	Y	Y	Y	Y	Y	Y	N
0.7				Y	Y	Y	Y	Y	Y	N
0.75					Y	Y	Y	Y	Y	Y
0.8						Y	Y	Y	Y	Y
0.85							Y	Y	Y	Y
0.9								Y	Y	Y
0.95									Y	Y
1										Y
1MW Demand										
Tan		1.333	1.169	1.020	0.882	0.750	0.620	0.484	0.329	0.000
pf		0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
Angle (rad)		0.927	0.863	0.795	0.723	0.644	0.555	0.451	0.318	0.000
MVA		1.667	1.538	1.429	1.333	1.250	1.176	1.111	1.053	1.000
MVA ²		2 778	2 367	2 041	1 778	1 563	1 384	1 235	1 108	1 000
101 0 / 1		2.110	2.007	2.071	1.775	1.000	1.00-	1.200	1.100	1.000
Pf improvement	То	0.6	0.65	07	0 75	0.8	0.85	0.9	0.95	1.0
From		<u> </u>	0.02	~· ·	0	~ ·-	0.01	~ ·-	0.02	
0.6		V	V	V	N	N	N	N	N	N
0.65			V	V	V	V	N	N	N	N
0.00				V	V	v	V	N	N	N
0.75					v	V	Y	V	N	N
0.10						Y	Y	Y	Y	N
0.85							Y	Y	Y	N
0.9								Y	Y	N
0.95									Y	Y
1									•	Y

Power Factor Improvement achievable using standard 450kVAr capacitor

1.5 MW Demand										
Tan		1.333	1.169	1.020	0.882	0.750	0.620	0.484	0.329	0.000
pf		0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
Angle (rad)		0.927	0.863	0.795	0.723	0.644	0.555	0.451	0.318	0.000
MVA		2.500	2.308	2.143	2.000	1.875	1.765	1.667	1.579	1.500
MVA ²		6.250	5.325	4.592	4.000	3.516	3.114	2.778	2.493	2.250
Pf improvement	То	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
From										
0.6		Y	Y	Ν	Ν	Ν	Ν	Ν	Ν	Ν
0.65			Y	Y	Y	Ν	Ν	Ν	Ν	Ν
0.7				Y	Y	Y	Ν	Ν	Ν	Ν
0.75					Y	Y	Y	Ν	Ν	Ν
0.8						Y	Y	Y	Ν	Ν
0.85							Y	Y	Y	Ν
0.9								Y	Y	Ν
0.95									Y	Ν
1										Y
2 MW Demand										
2 MW Demand Tan		1.333	1.169	1.020	0.882	0.750	0.620	0.484	0.329	0.000
2 MW Demand Tan pf		1.333 0.600	1.169 0.650	1.020 0.700	0.882 0.750	0.750 0.800	0.620 0.850	0.484 0.900	0.329 0.950	0.000 1.000
2 MW Demand Tan pf Angle (rad)		1.333 0.600 0.927	1.169 0.650 0.863	1.020 0.700 0.795	0.882 0.750 0.723	0.750 0.800 0.644	0.620 0.850 0.555	0.484 0.900 0.451	0.329 0.950 0.318	0.000 1.000 0.000
2 MW Demand Tan pf Angle (rad) MVA		1.333 0.600 0.927 3.333	1.169 0.650 0.863 3.077	1.020 0.700 0.795 2.857	0.882 0.750 0.723 2.667	0.750 0.800 0.644 2.500	0.620 0.850 0.555 2.353	0.484 0.900 0.451 2.222	0.329 0.950 0.318 2.105	0.000 1.000 0.000 2.000
2 MW Demand Tan pf Angle (rad) MVA MVA ²		1.333 0.600 0.927 3.333 11.111	1.169 0.650 0.863 3.077 9.467	1.020 0.700 0.795 2.857 8.163	0.882 0.750 0.723 2.667 7.111	0.750 0.800 0.644 2.500 6.250	0.620 0.850 0.555 2.353 5.536	0.484 0.900 0.451 2.222 4.938	0.329 0.950 0.318 2.105 4.432	0.000 1.000 0.000 2.000 4.000
2 MW Demand Tan pf Angle (rad) MVA MVA ²		1.333 0.600 0.927 3.333 11.111	1.169 0.650 0.863 3.077 9.467	1.020 0.700 0.795 2.857 8.163	0.882 0.750 0.723 2.667 7.111	0.750 0.800 0.644 2.500 6.250	0.620 0.850 0.555 2.353 5.536	0.484 0.900 0.451 2.222 4.938	0.329 0.950 0.318 2.105 4.432	0.000 1.000 0.000 2.000 4.000
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement	То	1.333 0.600 0.927 3.333 11.111 0.6	1.169 0.650 0.863 3.077 9.467 0.65	1.020 0.700 0.795 2.857 8.163 0.7	0.882 0.750 0.723 2.667 7.111 0.75	0.750 0.800 0.644 2.500 6.250 0.8	0.620 0.850 0.555 2.353 5.536 0.85	0.484 0.900 0.451 2.222 4.938	0.329 0.950 0.318 2.105 4.432 0.95	0.000 1.000 0.000 2.000 4.000
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement From	То	1.333 0.600 0.927 3.333 11.111 0.6	1.169 0.650 0.863 3.077 9.467 0.65	1.020 0.700 0.795 2.857 8.163 0.7	0.882 0.750 0.723 2.667 7.111 0.75	0.750 0.800 0.644 2.500 6.250 0.8	0.620 0.850 0.555 2.353 5.536 0.85	0.484 0.900 0.451 2.222 4.938 0.9	0.329 0.950 0.318 2.105 4.432 0.95	0.000 1.000 0.000 2.000 4.000 1.0
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement From 0.6	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u>	1.169 0.650 0.863 3.077 9.467 <u>0.65</u>	1.020 0.700 0.795 2.857 8.163 <u>0.7</u>	0.882 0.750 0.723 2.667 7.111 0.75	0.750 0.800 0.644 2.500 6.250 0.8	0.620 0.850 0.555 2.353 5.536 0.85	0.484 0.900 0.451 2.222 4.938 0.9	0.329 0.950 0.318 2.105 4.432 0.95	0.000 1.000 2.000 4.000 <u>1.0</u>
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement From 0.6 0.65	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u>	1.169 0.650 0.863 3.077 9.467 0.65 Y Y	1.020 0.700 0.795 2.857 8.163 0.7 N Y	0.882 0.750 0.723 2.667 7.111 0.75 N N	0.750 0.800 0.644 2.500 6.250 0.8 N N	0.620 0.850 0.555 2.353 5.536 0.85 N	0.484 0.900 0.451 2.222 4.938 0.9	0.329 0.950 0.318 2.105 4.432 0.95 N N	0.000 1.000 2.000 4.000 <u>1.0</u> N
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement <i>From</i> 0.6 0.65 0.7	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u>	1.169 0.650 0.863 3.077 9.467 <u>0.65</u> Y Y	1.020 0.700 0.795 2.857 8.163 0.7 N Y Y	0.882 0.750 0.723 2.667 7.111 0.75 N N N Y	0.750 0.800 0.644 2.500 6.250 0.8 N N N	0.620 0.850 0.555 2.353 5.536 0.85 N N N	0.484 0.900 0.451 2.222 4.938 0.9	0.329 0.950 0.318 2.105 4.432 0.95 N N N	0.000 1.000 2.000 4.000 <u>1.0</u> N N N
2 MW Demand Tan pf Angle (rad) MVA MVA ² <i>Pf improvement</i> <i>From</i> 0.6 0.65 0.7 0.75	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u> Y	1.169 0.650 0.863 3.077 9.467 <u>0.65</u> Y Y	1.020 0.700 0.795 2.857 8.163 <u>0.7</u> N Y Y	0.882 0.750 0.723 2.667 7.111 0.75 N N N Y Y	0.750 0.800 0.644 2.500 6.250 0.8 N N N N Y	0.620 0.850 0.555 2.353 5.536 0.85 N N N N	0.484 0.900 0.451 2.222 4.938 0.9	0.329 0.950 0.318 2.105 4.432 0.95 N N N N	0.000 1.000 2.000 4.000 <u>1.0</u> N N N N
2 MW Demand Tan pf Angle (rad) MVA MVA ² <i>Pf improvement</i> <i>From</i> 0.6 0.65 0.7 0.75 0.8	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u> Y	1.169 0.650 0.863 3.077 9.467 <u>0.65</u> Y Y	1.020 0.700 0.795 2.857 8.163 0.7 N Y Y	0.882 0.750 0.723 2.667 7.111 0.75 N N N Y Y	0.750 0.800 0.644 2.500 6.250 0.8 N N N N N Y Y Y	0.620 0.850 0.555 2.353 5.536 0.85 N N N N N Y	0.484 0.900 0.451 2.222 4.938 0.9 N N N N N	0.329 0.950 0.318 2.105 4.432 0.95 N N N N N N	0.000 1.000 2.000 4.000 <u>1.0</u> N N N N N
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement From 0.6 0.65 0.7 0.75 0.8 0.85	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u>	1.169 0.650 0.863 3.077 9.467 <u>0.65</u> Y Y	1.020 0.700 0.795 2.857 8.163 <u>0.7</u> N Y Y	0.882 0.750 0.723 2.667 7.111 0.75 N N N Y Y	0.750 0.800 0.644 2.500 6.250 0.8 N N N N Y Y	0.620 0.850 0.555 2.353 5.536 0.85 N N N N N N Y Y	0.484 0.900 0.451 2.222 4.938 0.9 N N N N N N N N Y	0.329 0.950 0.318 2.105 4.432 0.95 N N N N N N N N N	0.000 1.000 2.000 4.000 <u>1.0</u> N N N N N N N
2 MW Demand Tan pf Angle (rad) MVA MVA ² Pf improvement From 0.6 0.65 0.7 0.75 0.8 0.85 0.9	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u>	1.169 0.650 0.863 3.077 9.467 <u>0.65</u> Y	1.020 0.700 0.795 2.857 8.163 <u>0.7</u> N Y Y	0.882 0.750 0.723 2.667 7.111 0.75 N N N Y Y	0.750 0.800 0.644 2.500 6.250 0.8 N N N N Y Y	0.620 0.850 0.555 2.353 5.536 0.85 N N N N N N N Y Y	0.484 0.900 0.451 2.222 4.938 0.9 N N N N N N N N N N Y Y	0.329 0.950 0.318 2.105 4.432 0.95 N N N N N N N N N N Y	0.000 1.000 2.000 4.000 <u>1.0</u> N N N N N N N N N
2 MW Demand Tan pf Angle (rad) MVA MVA ² <i>Pf improvement</i> <i>From</i> 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95	То	1.333 0.600 0.927 3.333 11.111 <u>0.6</u>	1.169 0.650 0.863 3.077 9.467 <u>0.65</u> Y	1.020 0.700 0.795 2.857 8.163 <u>0.7</u> N Y	0.882 0.750 0.723 2.667 7.111 0.75 N N Y Y	0.750 0.800 0.644 2.500 6.250 0.8 N N N N Y Y	0.620 0.850 0.555 2.353 5.536 0.85 N N N N N N Y Y	0.484 0.900 0.451 2.222 4.938 0.9 N N N N N N N N N Y Y	0.329 0.950 0.318 2.105 4.432 0.95 N N N N N N N N N N N Y Y	0.000 1.000 2.000 4.000 1.0 N N N N N N N N N N N N N N

Appendix B: Benefits achieved by installing capacitors for power factor correction

Tan 1.333 1.169 1.020 0.882 0.750 0.620 0.484 0.329 0.00 pf 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 Angle (rad) 0.927 0.863 0.795 0.723 0.644 0.555 0.451 0.318 0.00 MVA 0.833 0.769 0.714 0.667 0.625 0.588 0.556 0.526 0.50 MVA 0.833 0.769 0.714 0.667 0.625 0.588 0.556 0.526 0.50 MVA ² 0.694 0.592 0.510 0.444 0.391 0.346 0.309 0.277 0.25 pf improvement To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0.65 0.65 0.700 0.750 0.800 0.850 0.900 0.950 1.00
pf 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 Angle (rad) 0.927 0.863 0.795 0.723 0.644 0.555 0.451 0.318 0.00 MVA 0.833 0.769 0.714 0.667 0.625 0.588 0.556 0.526 0.50 pf improvement achievable To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0.65 0.760 0.750 0.800 0.850 0.900 0.950 1.00
Angle (rad) 0.927 0.863 0.795 0.723 0.644 0.555 0.451 0.318 0.00 MVA 0.833 0.769 0.714 0.667 0.625 0.588 0.556 0.526 0.50 MVA ² 0.694 0.592 0.510 0.444 0.391 0.346 0.309 0.277 0.25 pf improvement achievable To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0.65 0.65 0.700 0.750 0.800 0.850 0.900 0.950 1.00
MVA 0.833 0.769 0.714 0.667 0.625 0.588 0.556 0.526 0.50 MVA ² 0.694 0.592 0.510 0.444 0.391 0.346 0.309 0.277 0.25 pf improvement achievable To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0.65 0.65 0.700 0.750 0.800 0.850 0.900 0.950 1.00
MVA 0.000 0.740 0.007 0.000 0
pf improvement achievable To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0.65 0.700 0.750 0.800 0.850 0.900 0.950 1.00
achievable To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0.65 0.900 0.950 1.00 0.900 0.950 1.00
From 0.6 0.65
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
% increase in base
losses avoided To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00
From
0.6 0.00 17.36 36.11 56.25 77.78 100.69 125.00
0.65 0.00 15.98 33.14 51.48 71.01 91.72 113.61
0.7 0.00 14.80 30.61 47.45 65.31 84.18
0.75 0.00 13.78 28.44 44.00 60.44 77.7
0.8 0.00 12.89 26.56 41.02 56.2
0.85 0.00 12.11 24.91 38.4
0.9 0.00 11.42 23.4
0.95 0.00 10.8
1 0.0
Annual savings (\$) To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00
From
0.6 0 836 1739 2708 3745 4848 6018
0.75 0 663 1369 2118 2910 374
0.8 0 621 1279 1975 270
0.85 0 583 1199 184
0.85 0 583 1199 184 0.9 0 550 112
0.85 0 583 1199 184 0.9 0 550 112 0.95 0 52
0.85 0.9 0.95 0.95 0 550 112 0.95
0.85 0.9 0.95 1 FIRR To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00
0.85 0 583 1199 184 0.9 0 550 112 0.95 0 52 1 To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From
0.85 0.9 0.95 1 FIRR To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0 17% 35% 54% 75% 97% 120%
0.85 0.95 0.95 1 FIRR To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0 17% 35% 54% 75% 97% 120% 0.65 0 15% 32% 50% 68% 88% 109%
0 583 1199 184 0.9 0.95 1 FIRR To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0.6 0 17% 35% 54% 75% 97% 120% 0.65 0 15% 32% 50% 68% 88% 109% 0.7 0 14% 29% 46% 63% 81%
0.85 0 583 1199 184 0.9 0 550 112 0.95 0 552 0 52 1 1 1 0 550 10 FIRR To 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.00 From 0 17% 35% 54% 75% 97% 120% 100 0.65 0 15% 32% 50% 68% 88% 109% 100% 0.7 0 14% 29% 46% 63% 81% 109% 0.75 0 0 13% 27% 42% 58% 75%
0.85 0 583 1199 184 0.9 0 550 112 0.95 0 552 0 52 1 1 1 0 0 52 1 1 1 0 0 0 0 1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0
0.85 0 583 1199 184 0.9 0 550 112 0.95 0 550 12 0 510 0 52 1 1 0 0.00 0.00 1 1 1 0 0.00 0.00 1 1 1 0 0.00 0.00 0.00 0.00 0.00 1 1 1 1 1 1 1 0 0.00<
0.85 0 583 1199 184 0.9 0 550 112 0.95 0 550 12 0 550 12 0 52 1 1 1 0 0 0 52 1 1 1 0 0 0 0 10 0 FIRR 1 1 0 0 0 0 0 0 10 0 10 0 10 0 10

0.5 MW Demand

	1									0
1.0 MW Demand Capital cost of 450kVAr (Capacitor		USD	5000						
Tan pf Angle (rad) MVA MVA ² pf improvement	То	1.333 0.600 0.927 1.667 2.778 0.600	1.169 0.650 0.863 1.538 2.367 0.650	1.020 0.700 0.795 1.429 2.041 0.700	0.882 0.750 0.723 1.333 1.778 0.750	0.750 0.800 0.644 1.250 1.563 0.800	0.620 0.850 0.555 1.176 1.384 0.850	0.484 0.900 0.451 1.111 1.235 0.900	0.329 0.950 0.318 1.053 1.108 0.950	0.000 1.000 0.000 1.000 1.000 1.000
From 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95										
¹ I % increase in base losses avoided From	То	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95 1		0.00	17.36 0.00	36.11 15.98 0.00	33.14 14.80 0.00	51.48 30.61 13.78 0.00	47.45 28.44 12.89 0.00	44.00 26.56 12.11 0.00	41.02 24.91 11.42 0.00	10.80 0.00
Annual savings (\$)		0	1672 0	3477.1 1538.4 0	3190.7 1424.7 0	4956.94 2947.65 1326.66 0	4568.9 2738.9 1241.2 0	4236.8 2557.7 1166.1 0	3949.4 2398.9 1099.6 0	1040.3 0
FIRR		0	33% 0	70% 31% 0	64% 28% 0%	99% 59% 27% 0%	91% 55% 25% 0%	85% 51% 23% 0%	79% 48% 22% 0	21% 0

Appendix C: Sample subproject scheme control sheet

Peshawar Electric Supply Company
Capacitor Installation Subproject No. 125 under ADB Funding
Individual Scheme Authorization
Scheme Title
Scheme Number 125 /
Location:
Grid Substation
Feeder Name
Point on network for capacitor installation
Technical details.
1. Power factor before installation of capacitor:
2. Demand on substation / circuit:
3. Rating of capacitor to be installed:
4. Expected power factor after installation of capacitor:
Cost an Implementation details
5. Expected savings:
i. Peak demand saving
ii. Annual energy saving
iii. Cost of energy saved
6. Scheme Capital Cost: i) Authorizedii) Actual
7. Completion date: i) Authorizedii) Actualiii)
8. Comments (continue overleaf if required)
Scheme Prepared bydate
Scheme Authorized bydate

Scheme Completed by......date.....date.....date.....

Appendix D: Rapid Environmental Assessment (REA) Checklist

Country/Project Title:	Pakistan : Power Distribution	Enhan	icemer	nt Project
Sector Division:	Sub-project Capacitor Instal	lation		
SCREENIN	IG QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING				
IS THE PROJECT AREA ANY OF THE FOLLOWIN SENSITIVE AREAS?	ADJACENT TO OR WITHIN NG ENVIRONMENTALLY			
CULTURAL HERITAGE	E SITE		х	
PROTECTED AREA			х	
WETLAND			х	
MANGROVE			х	
ESTUARINE			х	
BUFFER ZONE OF PR	ROTECTED AREA		х	
SPECIAL AREA FOR BIODIVERSITY	PROTECTING		х	
B POTENTIAL ENVIR	ONMENTAL IMPACTS			
WILL THE PROJECT CA	USE:			
encroachment on histe disfiguration of landsc generation?	orical/cultural areas, ape and increased waste		х	
encroachment on precession encroachment on precession encroachment on protected	cious ecosystem (e.g. areas)?		х	
alteration of surface w crossed by roads and sediment in streams a erosion at the constru-	ater hydrology of waterways resulting in increased ffected by increased soil ction site?		x	
damage to sensitive c construction of subma	oastal/marine habitats by rine cables?		х	
deterioration of surfac runoff, sanitary wastes and chemicals used in	e water quality due to silt s from worker-based camps a construction?		х	
increased local air pol cutting and filling?	lution due to rock crushing,		х	
chemical pollution rest of vegetation for const	ulting from chemical clearing truction site?		х	
noise and vibration du works?	e to blasting and other civil		х	

Rapid Environmental Assessment (REA) Checklist - continued

dislocation or involuntary resettlement of people	х	
social conflicts relating to inconveniences in living conditions where construction interferes with pre- existing roads?	x	
hazardous driving conditions where construction interferes with pre-existing roads?	х	
poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	x	
creation of temporary breeding habitats for mosquito vectors of disease?	х	
dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?	x	
environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	x	
facilitation of access to protected areas in case corridors traverse protected areas?	х	
accident risks associated with maintenance of lines and related facilities?	х	
health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salination?	x	
disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?	х	

APPENDIX 10: COMPLETE LIST OF FEASIBILITY REPORTS

- A. Feasibility Study FESCO STG Extensions
- B. Feasibility Study FESCO STG Augmentations
- C. Feasibility Study HESCO STG Extensions
- D. Feasibility Study HESCO STG Augmentations
- E. Feasibility Study IESCO STG Extensions
- F. Feasibility Study IESCO STG Augmentations
- G. Feasibility Study LESCO STG Extensions
- H. Feasibility Study LESCO STG Augmentations
- I. Feasibility Study MEPCO STG Extensions
- J. Feasibility Study MEPCO STG Augmentations
- K. Feasibility Study PESCO STG Extensions
- L. Feasibility Study PESCO STG Augmentations
- M. Feasibility Study QESCO STG Extensions
- N. Feasibility Study QESCO STG Augmentations
- O. Feasibility Study for Fateh Pur (GEPCO)
- P. Feasibility Study for Lar (MEPCO)
- Q. Feasibility Study for Shadun Lund (MEPCO)
- R. Feasibility Study for Fazil Pur (MEPCO)
- S. Feasibility Study for Karak (PESCO)
- T. Feasibility Study for Ali Zai (QESCO)
- U. Feasibility Study for Kanak (QESCO)
- V. Generic Feasibility Study Capacitor Installation
- W. Generic Feasibility Study Minor System Extension
- X. Generic Feasibility Study Major System Extension
- Y. Feasibility Study Report for Sukh Chayn (LESCO)

All of the above feasibility reports were submitted to ADB electronically as first drafts during July 2007 and have since been upgraded to final versions.

APPENDIX 11: SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

Environmental Assessment Report

Summary Initial Environmental Examination Project Number: TA 4876 ADB Jan 2008

Proposed Multitranche Financing Facility Pakistan: Power Distribution Enhancement TA 4876 PAK

CURRENCY EQUIVALENTS

(as of January 2008)

Currency Unit Pakistan Rupee/s (Re/Rp) \$1.00 = RS60

ABBREVIATIONS

ADB	—	Asian Development Bank
COI	_	Corridor of Influence
CSP	_	Country Strategy Program
DOF	_	Department of Forests
DFO	_	Divisional Forest Officer
DGS	_	distribution grid substation
DISCO	_	electricity distribution company
DX	_	distribution transformer
DGL	_	distribution network transmission line
DIZ	_	Direct Impact Zone
EA	_	Environment Assessment
EARF	_	Environment Assessment Review Framework
EIA	_	Environment Impact Assessment
EMP	_	Environmental Management Plan
FESCO		Faisalabad Electricity Supply Company Limited
GDP	_	Gross Domestic Product
GEPCO		Guiranwalla Electricity Supply Company Limited
GIS	_	Gas Insulated Switchgear
HESCO		Hyderabad Electricity Supply Company Limited
IESCO		Islamabad Electricity Supply Company Limited
IEE	_	initial environmental examination
LESCO	_	Lahore Electricity Supply Company Limited
Lea	_	equivalent sound pressure level
MEPCO	_	Multan Electric Power Company Limited
MFF	_	multitranche financing facility
MPL	_	maximum permissible level
NEQS	_	National Environmental Quality Standards
NGO	_	Non Governmental Organization
NTDC	-	National Transmission and Dispatch Company
PC	_	public consultation
PEPA	_	Provincial Environmental Protection Agency
PEPAct	_	Pakistan Environment Protection Act 1997 (as amended)
PEPCO	_	Pakistan Electric Power Company
PESCO		Peshawar Electricity Supply Company Limited
PFR	_	Project Financing Request
PPMS	_	Project Performance Monitoring System
OFSCO		Quetta Electricity Supply Company Limited
RFA	_	Rapid Environmental Assessment
ROW	_	right-of-way
SIA	_	Social Impact Assessment
SIEE	_	summary initial environmental examination
SR	_	Sensitive Receiver
TOR	_	Terms of Reference

WEIGHTS AND MEASURES

dB(A)	_
Ha	_
Km	_
m ³	_

decibels measured in the audible noise bands

Hectare

Kilometer

cubic meter

CONTENTS

MAP

APPENDICES

- 1. Tranche 1 subprojects
- Environmental Management Plan (matrix) including Monitoring Plan & Costs. Typical public consultation for a Tranche 1 subproject 2.
- 3.
- Environmental Assessment Review Framework 4.

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1. INTRODUCTION

- 1. This document is the summary initial environmental examination (SIEE) for the upgrading and expansion of various distribution grid sub stations (DGS) and distribution lines (DGL) under Tranche 1 of the Asian Development Bank (ADB) project, Power Distribution Enhancement Multitranche Finance Facility (PDE-MFF). The Government of Pakistan (the Government, the borrower) has requested the Asian Development Bank (ADB) to finance the proposed PDE-MFF that will eventually encompass more sites in all jurisdictions of all DISCOs in many provinces in future tranches.
- 2. This SIEE presents the results and conclusions of environmental assessments for first one hundred and nineteen (119) subprojects that form Tranche 1 (T1, Appendix 1) in the proposed expansion and enhancement programme. This SIEE is submitted to ADB by the Pakistan Electric Power Company (PEPCO) for and on behalf of the eight independent power distribution companies (DISCOS) following work carried out under TA4876. The T1 subprojects are considered for urgent improvement under the PDEMFF and under ADB requirements initial environmental examinations (IEEs) have been carried out for all T1 subprojects.¹¹¹² This SIEE summarises the assessments in the IEEs produced for all sites in Tranche 1. The IEE reports that have been used to complete this SIEE are summarized in Table 1. Those reports and other available information may be disclosed by ADB, if necessary. The T1 sites were tentatively classified as Category B in accordance with ADB's Environmental Assessment Guidelines; therefore IEEs are prepared for each site. Environmental assessments will also be prepared in due course for the remaining subprojects in future tranches that will also be classified and subject to environmental assessment in due course in line with the EARF.
- 3. The environmental regulations of the Government categorize development projects into two schedules according to their anticipated potential environmental impact. The proponents of projects that have reasonably foreseeable qualitative and quantitative impacts are required to submit an IEE for their respective projects (Schedule I). Proponents of projects that have more adverse environmental impact (Schedule II) are required to submit an environmental impact assessment (EIA) to the respective provincial Environmental Protection Agency (EPA). Distribution lines of 11ky and below and large distribution projects require IEE (Schedule I). [Distribution lines and grid substations are included under energy projects and EIA is required by the Government for all projects involving distribution lines of more than 11kv and for grid substations (Schedule II)]. Augmentation of facilities within existing substations is not listed as requiring environmental assessment. However in response to an environmental framework submitted by NTDC to the Pakistan EPA¹³ it has been clarified that all proponents must follow section 12 of the Pakistan Environmental Protection Act for all projects and furthermore that only for augmentation projects by following the environmental framework, the required procedures under section 12 would be completed. Pakistan EPA has also assumed that all proponents will consult with the relevant provincial EPAs (PEPA) and follow their advice. In 2006 Puniab EPA requested disclosure of the scope and extent of each subprojects. As such all subprojects will be disclosed to the relevant provincial EPA.

¹¹ Initial reconnaissance and REA carried out by consultants under ADB guidelines in June 2007 indicated that all the T1 sub-projects will be Category B. Initial project classification Category is B. Most construction impacts will be only local and there are no potentially significant environmental impacts associated with Tranche 1 sub-project construction or operation.

¹² Environmental Assessment Guidelines (ADB May 2003).

¹³ Letter dated 29th June 2007 – Ref 2(1)2004-W/KCP-DD from Pak EPA Sajjad Hussein Talpur, Dy Director (EIA/Mont) to NTDC, Muhammad Tahir Khan, Project Director PPTA, NTDC, WAPDA House, Islamabad.

An Environmental Assessment and Review Framework (EARF) is also prepared to select, assess, monitor, and manage the potential environmental impacts of any subprojects in future tranches.

4. This SIEE is based on (i) information, data and preliminary assessments in the draft Initial Environmental Examination reports received from the consultants during 2007. The Initial Environmental Examination reports will be submitted to Provincial Environmental Protection Agencies (PEPA) in order to obtain approval to construct the facilities. The IEEs are to be prepared in line with the Government's regulations on environmental impact assessment (PEPAct) and will also comply with ADB's *Environmental Assessment Guidelines 2003*.

2. DESCRIPTION OF THE PROJECT

- 5. The standards and conditions of the power distribution system in Pakistan are inadequate to meet rapidly growing demand for electrical power. This situation limits national development and economic growth. To cope with the constraints, the existing power distribution infrastructure has to be improved and upgraded. The overall contribution of power infrastructure also requires institutional arrangements and capacity that support strategic management of the sector, and planning and management of investments. Overall the proposed PDEMFF Project has been designed to address both investment and institutional aspects in the electrical power sector.
- 6. The Tranche 1 subprojects can be broadly separated into two groups. Group 1 has one hundred and eleven subprojects (Appendix 1) that involve the improvement of facilities and equipment within existing DGS boundaries. The Group 1 subprojects should not require any work or impacts outside the substations and no land acquisition is involved. These Group 1 subprojects essentially add an extra transformer or augment capacity in an existing substation by replacing a transformer. Subprojects that will add a transformer are also referred to as *extension* projects in the feasibility studies (FS). *Augmentation* projects will replace an existing transformer with one of a higher capacity in an existing substation. The FS sometimes also refer to these augmentation subprojects as "increase transformer capacity" or "ITC" (Table 1).
- 7. Group 2 has eight subprojects (Appendix 1) that involve the either construction of new grid substations (DGS) on a new site (e.g. Lar MEPCO) with accompanying connection to the grid or construction of new 132kv grid substations within the boundaries of an existing 66kV substation (e.g. Shadan Lund MEPCO). In either case there will be construction of new connecting distribution lines to the network (DGL). Enhancement or augmentation within an existing DGS may therefore also be included with a DGL subproject. Impacts from Group 2 subprojects are potentially greater than Group 1. Although the impacts are not insurmountable, Group 2 subprojects will require work outside the substations and impacts are likely on some land where mitigation measures or other compensation will be required. In some cases access will be required to the right-of-way (ROW) that can accommodate the new distribution line and towers or poles. The designs for the Group 1 and Group 2 subprojects are sufficiently complete (January 2008) to permit initial environmental examination. The designs for the Tranche 2 (T2) and later subprojects will be developed under project support components in due course.

DISCO	Subprojects	Coverage of IEE Reports in Brief	Report	Km of Line
FESCO	13 sites	Adding transformers and ITC	IEE E&A	
GEPCO	Fateh Pur	Substation Upgrade 66-132kV	IEE S/S and line	1
GEPCO	0 sites	Adding transformers and ITC		
HESCO	10 sites	Adding transformers and ITC	IEE E&A	
IESCO	25 sites	Adding transformers and ITC	IEE E&A	
LESCO	Sukh Chayn Multan Road	New S/S (s/s only, in out line by LESCO)	IEE S/S and line	7
LESCO	29 sites	Adding transformers and ITC	IEE E&A	
MEPCO	Lar	New S/S and in out,Multan-bahawalnagar,d/c	IEE S/S and line	1
MEPCO	Shadan Lund	Substation Upgrade 66-132kV and in out.	IEE S/S and line	3
MEPCO	Fazil Pur	Substation Upgrade 66-132kV and in out	IEE S/S and line	1
MEPCO	13 Sites	Adding transformers and ITC	IEE E&A	
PESCO	Karak	Adding transformers and ITC	IEE S/S and line	11
PESCO	15 sites	Adding transformers and ITC	IEE E&A	
QESCO	Alizai	Substation Upgrade 66-132kV	IEE S/S and line	10
QESCO	Kanak	Substation Upgrade 66-132kV	IEE S/S and line	5
QESCO	7 sites	Adding transformers and ITC	IEE E&A	

Table 1: List of IEEs of Subprojects for Tranche 1 Used to Complete this SIEE

Source: TA4876 consultants. Lengths of the proposed distribution lines are approximate. E&A = extension and augmentation. ITC Increase transformer capacity.

A. FESCO Subprojects

8. **FESCO Extension and Augmentation Subprojects**. The Faisalabad Electricity Supply Company (FESCO) has identified thirteen extension and augmentation subprojects (Table 1). The extension and augmentation projects and all are within existing substations sites in the FESCO jurisdiction. There are seven extension subprojects that will add an additional transformer. There are six augmentation subprojects that will replace an existing transformer with a new one with increased capacity (Appendix 1). One subproject at Lalian is already under construction by FESCO and an additional transformer will be added under Tranche 1.

B. GEPCO Subprojects

- 9. The Gujaranwala Electric Power Company (GEPCO) has identified one new substation and line subproject. There are no extension and augmentation projects for GEPCO in the first Tranche.
- 10. **Fateh Pur**. The new substation is at Fateh Pur, Gujaranwala. The subproject will be the DGS and DGL. The DGS will require the extension or upgrading of the existing 66 kV DGS into a 132 kV DGS. The scope of work includes addition of 2X 26 MVA, 132/11kV power transformers and allied equipment and buildings The SP also requires a connection to the grid comprising 17.4 km of 132 kV DGL to be carried on about 63 towers. Therefore the distribution line component of the project (as well as the 11kV distribution network) are an integral part of the subproject and have been studied together in the present IEE in line with ADB Guidelines.²

C. HESCO Subprojects

11. **HESCO Extension and Augmentation Subprojects**. The Hyderabad Electricity Supply Company (HESCO) has identified ten extension and augmentation subprojects (Table 1). The extension and augmentation projects and all are within existing substations sites in the HESCO jurisdiction. There are three extension subprojects that will add an additional transformer. There are seven augmentation subprojects that will replace an existing transformer with a new one with increased capacity (Appendix 1).

D. IESCO Subprojects

12. **IESCO Extension and Augmentation Subprojects.** The Islamabad Electricity Supply Company (IESCO) has identified twenty five extension and augmentation subprojects (Table 1). The extension and augmentation projects and all are within existing substations sites in the IESCO jurisdiction. There are five extension subprojects that will add an additional transformer. There are twenty augmentation subprojects that will replace an existing transformer with a new one with increased capacity (Appendix 1).

E. LESCO Subprojects

- 13. The Lahore Electricity Supply Company (LESCO) has identified twenty nine extension and augmentation subprojects (Table 1) and one new substation subproject. The extension and augmentation projects are all within existing substations around Lahore.
- 14. **Sukh Chayn**. The new substation is at Sukh Chayn Gardens a new residential development south of Lahore in the new suburbs near Thokar Niaz Baig. The land for the construction of the new DGS has been set aside at the northern edge of the development near the canal. The developers of Sukh Chayn Gardens have cordoned off the area. There will be a requirement to connect to the network but the construction of the in-out connecting transmission line and towers (DGL) is not included in the MFF Tranche 1 but the alignment propose has been inspected and assessed in line with ADB guidelines. The DGL will be constructed along the canal from the northern portion of the development. Based on observation there is a sufficiently wide unimpeded strip of Government land along the canal to accommodate about twenty towers for the 6.5km of DGL that will connect to the grid.
- 15. **LESCO Extension and Augmentation Subprojects**. The twenty nine (29) extension and augmentation projects and all are within existing substations sites in the LESCO jurisdiction. There are five (5) extension subprojects that will add an additional transformer. There are twenty four (24) augmentation subprojects that will replace an existing transformer with a new one that has a greater capacity (Appendix 1).

F. MEPCO Subprojects

- 16. The Multan Electric Power Company (MEPCO) has identified sixteen subprojects including thirteen (13) extension and augmentation subprojects (Table 1) and three (3) new substation and/or line subprojects. The extension and augmentation projects are spread out around sites within the MEPCO jurisdiction (Appendix 1).
- 17. **Fazil Pur**. Fazil Pur is about 150 km south west of Multan and 20 km north of Rajanpur on the main A55 Indus Highway, to the east of the Dera Ghazi Kahn Canal. The existing 66kv substation at Fazil Pur will be refitted to 132kV standard within the existing 66kv substation boundary. The new line will be carried on towers for about 1.1km and will come from the north side of the existing substation to two towers that will carry the line to the north to avoid villages. At about 300m north the line will turn west for about 750m to connect to the 132kV Rajanpur–Jampur DGL. Five new towers and about 1100m of line

will be required to connect to the Rajanpur–Jampur DGL line which is about 750m to the west. The line will cross cultivated fields, the Dera Ghazi Kahn Canal and the existing Fazil Pur Kot Addu 66kV line. The line will pass well away from residential and other buildings. The towers can be located just outside the substation boundary and on agricultural land in between and joined into the existing 132kV line.

- 18. Lar. The land for the new substation at Lar is is owned by MEPCO and is former agricultural land adjacent to the east side of the main A5 Multan Bahawalpur highway. Two new towers and about 300m of line will be required to connect to the 132kV Multan Bahawalpur transmission line which is immediately to the east. There are isolated residential buildings, cultivated fields and orchards in the vicinity. However due to the short length of line required one tower can be located just outside the proposed substation boundary and the other joined into the existing 132kV line. The line will pass over some land that was formerly cultivated. The land for the construction of the new DGS is owned by MEPCO.
- 19. **Shadan Lund**. Shadan Lund town is about 50km north west of Multan and to the east of the Dera Ghazi Kahn Canal on the main A55 Indus Highway. The existing 66kv substation at Shadan Lund will be refitted to 132kV standard within the existing 66kv substation boundary with ransformes provided by MEPCO. The new line will come from the south side of the existing substation to three towers that will carry the line first to the south and east to avoid the main villages that are outside the substation to the north. At about 600m east and beyond the existing Shadan Lund Kot Addu 66kV line towers the line will turn north for 3.5km across agricultural land. Thirteen new towers and about 1400m of line will be required to connect to the 132kV Kapco Taunsa transmission line which is about 3km to the north. The line will cross cultivated fields and pass well away from residential and other buildings in Shadan Lund town. The towers can be located just outside the substation boundary and on agricultural land in between to the junction with the existing 132kV line.
- 20. **MEPCO Extension and Augmentation Subprojects**. The thirteen (13) extension and augmentation projects and all are within existing substations sites in the MEPCO jurisdiction. There are seven (7) extension subprojects that will add an additional transformer. There are six (6) augmentation subprojects that will replace an existing transformer with a new one with increased capacity (Appendix 1).

G. PESCO Subprojects

- 21. The Peshawar Electric Supply Company (PESCO) has identified sixteen subprojects including fifteen (15) extension and augmentation subprojects (Table 1) and one (1) new substation and line subprojects. The extension and augmentation projects are spread out around sites within the MEPCO jurisdiction (Appendix 1).
- 22. **PESCO Karak**. The land for the new substation at Karak subproject will be located in District Karak NWFP. The transmission line will require 56 towers and 14 km of 132 kv in/out conductor to connect to the Kohat Banu 132kv transmission line. The nearest settlement is Karak Town and the villages of Sultan Abad and Rahmat Abad. On average the alignment that has bee studied line is about 150 to 200 meters away from the nearest houses and other places of human settlement.
- 23. **PESCO Extension and Augmentation Subprojects**. The Peshawar Electricity Supply Company (PESCO) has identified fifteen (15) extension and augmentation subprojects (Table 1) and all are within existing substations sites in the PESCO jurisdiction. There are eleven (11) extension subprojects that will add an additional transformer. There are four

(4) augmentation subprojects that will replace an existing transformer with a new one with increased capacity (Appendix 1).

H. **QEPCO Subprojects**

- 24. The Quette Electric supply Company (QESCO) has identified nine (9) subprojects including seven (7) extension and augmentation subprojects (Table 1) and two (2) new substation and line subprojects. The extension and augmentation projects are spread out around sites within the QESCO jurisdiction (Appendix 1).
- 25. **QESCO Alizai.** The Alizai DGS is on the main road from Huramzai to Alizai in the District of Pishin, Balochistan. The subproject will involve installation of one 26MVa 132/11kV power transformer and allied equipment at the existing Alizai DGS as well as construction of about 10km of a new 132kV DGL involving erection of about 35 towers. The existing 66kV line will be subsequently disconnected from the network after the new installations are operational.
- 26. QESCO Kanak. The Kanak DGS is about 55km from Quetta City on the Quetta Noshki Road near Derangar village. The subproject will involve installation of one 26MVa 132/11kV power transformer and allied equipment within the existing DGS. QESCO intends to construct 132kv distribution line connecting the existing grid station at Kanak to the 132 kV Quetta Mastung transmission line. The Kanak subproject will involve the installation of about 5km of in/out double conductor 132kn dual circuit transmission line on about 16 towers to connect to the existing Quttea Mastung Line.
- 27. **QESCO Extension and Augmentation Subprojects**. The Quetta Electricity Supply Company (QESCO) has identified seven extension and augmentation subprojects (Table 1). The extension and augmentation projects and all are within existing substations sites in the QETTA jurisdiction. There are six (6) extension subprojects that will add an additional transformer. There are two subprojects that will replace an existing transformer with a new one with increased capacity. The Kalat project is both augmentation and extension. (Appendix 1).
- 28. Other Line Extension and Capacitor Installation Subprojects. In addition to the above substation and line based subprojects there are also several other proposals for line extensions and installation of additional capacitors. The locations of these other subprojects has not yet (as of 30 Jan 2008) been defined for Tranche 1 but will be firmed up during ADB Appraisal mission period.
- 29. The Tranche 1 subprojects are expected to be completed by mid-end 2009.

3. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Meteorology and Climate

30. The climate is semi-arid and sub-tropical continental with low rainfall, low humidity, long hot summers, and short mild winters. The summer season is hot and dry except for the rainy months. May and June are the hottest and driest months of the season. The mean maximum temperature ranges from 40°C to 42°C. The area generally frost free except for December and January. The winter season starts from November and lasts until February. The average maximum and minimum temperature recorded during the month of January is about usually 20°C and 6°C respectively.

31. Monsoon usually starts in the first week of July the average annual rainfall about 625mm. Most of the rainfall comes during monsoon period i.e. July and August. The country receives about two thirds of the rainfall during monsoon, when a large proportion of the rain occurs in heavy showers and storms of high intensity. Climate should have very little bearing on the implementation of the subprojects.

2. Topography, Geology, and Soils

32. The subproject areas for LESCO, MEPCO GEPCO and FESCO in the Punjab area are all situated on an ancient river terraces. Soils are classified as loamy, silty-loamy, and silty¹⁴. The subproject areas for PESCO, QUESCO and HESCO are in the more arid areas with deep and well drained soils in the plains and gravelly aprons bordering the mountains and plains. IESCO is predominantly urban area with little exposed soil. Soil type should have very little bearing on the implementation of the subprojects.

3. Surface and Groundwater

- 33. The proximity of the subprojects to natural water courses varies greatly. There are no natural rivers very any of the subproject areas for subprojects 15 to 18 in the Punjab area.
- 34. The only natural streams, which cross the district, are the Satluj and Ravi, which form its Southern and Northern boundaries. The Ravi has the longer course then the Satluj but is a much smaller river but the volume of water in the flood season has decreased during the last 50 years.
- 35. A typical important primary irrigation channel is the Sukh aur khushki Bais, which forms the boundary not only between the Northern and Southern thesils of the district. The irrigation system bases on the Ravi and Satluj.
- 36. Several secondary and tertiary canals support the agricultural area of the sub-project areas permanently with irrigation water. Water-user associations control and regulate the delivery of the irrigation water to the farms.
- 37. Some shallow wells were observed during the field visits that must be protected during construction. However surface and groundwater should not be significantly affected by the implementation of the subprojects.

B. Biological Environment

1. Agriculture

- 38. Agriculture dominates the regional economy. Rural Punjab is a fertile area with canal irrigation and productive crops. The yields are high.
- 39. The sub-project areas are situated on level plains on ancient river terraces. The good soil structure has high productivity and potential for diverse farming. The soils have a wide range of crop adaptability and can be maintained in a highly productive state with modern management practices.
- 40. As of 2002/3, no soil salinity is reported, although ground-water sources show brackish waters, which are partly not suitable for drinking and irrigation purposes¹⁵. An earlier inventory from 1981 showed strongly saline soils.

¹⁴ WAPDA/IWASRI (2004): National Drainage Programme – Soil Salinity Survey of Lower Bari Doab Canal Command. – Lahore, 160p.

¹⁵ Reported by farmers on the sub-project site during public consultation. The actual groundwater table was estimated to be 5m to 6m below ground level.

41. There is little unproductive land around the subproject areas. No forests/woodland areas are reported or observed.

2. Fauna and Flora

- 42. Whereas there are some valuable ecological resources and protected sites in Punjab the reported data in the IEEs, for the sites identified for subprojects, does not include any rare or endangered species.
- 43. Much of the indigenous wildlife has been driven away due to agriculture and urbanization. The remaining animals are common species which are adapted to scavenging (jackals, foxes, hares and wild pigs). Common birds found in some of the areas near some projects include egrets, pond herons, common kingfishers and sandpipers. Other species associated with the human settlements include white-cheeked bulbul, doves, house sparrow, starling and house crow. The common crane is also found in the winter. There are also common reptiles. The district is an important ground for fishing with professional fishermen all along the Chenab River but there is little fishing in the areas near the projects.

C. Social-Cultural Environment

1. Human Issues and Life Quality

- 44. Common ailments include eczema, gastroenteritis, Acute Respiratory Infection (ARI), malnutrition and anemia. Health care is also provided by government dispensaries and private practitioners. For serious ailments patients visit hospitals and private clinics near the subproject areas.
- 45. Most families live in brick and cement houses. Structures made completely or partially of wood and mud bricks are less common these days in the study areas.
- 46. Main occupational groups are daily wage laborers, farmers—primarily owner-cultivators and tenants—and factory workers. A small proportion is employed by the government.
- 47. Rice and wheat are the main crops grown in the area. An acre of land yields approximately 1,400kg of rice and 1,200kg of wheat. The rice can be export quality.
- 48. A detailed description of the socioeconomic environment of the study area is given in the Summary Social Impact Assessment report for the project.

2. Cultural and Historical Sites

49. There were no sites of cultural significance found very close to the Tranche 1 study areas. There are shrines nearby in some villages where people are fed daily. The larger grid substation residential colonies sometimes have their own dedicated mosque within the substation boundary wall next to the residential colony.

4. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Environmental Impact Associated with Planning, Location and Design

50. The environmental impacts associated with one hundred and eleven of the one hundred and nineteen subproject locations in Tranche 1 will be insignificant as they only involve extension and augmentation of equipment within existing DGS. There are eight subproject locations which also involve new construction of DGS and/or DGL and in these cases the potential for some significant impacts is greater due to the need to construct on some new

land or to traverse active agricultural land to construct the DGL. The subprojects have been located in order to avoid unnecessary problems as far as possible at the design stage and all Tranche 1 subprojects are generally located in appropriate areas. Although land is generally fully utilized for agricultural or urban purposes in many subproject areas, there are also some suitable disturbed areas, poor or underutilized agricultural areas and other Government land available for the proposed DGS sites and DGL routes. In Tranche 1 DGL have been relocated and in some cases diverted over longer routes to avoid impacts on local villages and other sensitive receivers as far as possible. The site selection criteria are included in the EARF for the Tranche 2 sites.

- 51. In order to comply with best international practice and ADB guidelines all the new equipment will not contain PCB or other hazardous or persistent polluting chemicals. Therefore in procurement documents it always shall be specified that transformers, transformer oil and other equipment are to be free from PCB and other petroleum fractions that may be injurious to environment or equipment. Although to date it has not been possible to identify any PCB containing equipment in the sites so far investigated, it is required that a plan will be made by all DISCOs to gradually phase out any isolated remaining items of existing equipment with transformer oil, breaker oil or other equipment that may contain PCB and this shall be done as soon as practicable.
- 52. Best international practice and ADB guidelines will also require that all new switchgear or other gas insulated equipment will not contain CFCs or other ozone depleting halons. Industry standard SF6 switchgear is however likely to be the preferred type of gas insulated switchgear and selected SF6 equipment should have a nominal leakage and replacement rate of less than1% per year.
- 53. The current grid substation layouts do not include any dedicated drainage or secondary containment to control residual oil spills. In order to comply with best international practice to prevent contamination of soil, groundwater and surface water all the new substations will be designed to include dedicated surface drainage and secondary containment to control residual oil spills from installation, maintenance or decommissioning. The secondary containment (bunding) will seal the surface with concrete and be of sufficient capacity to hold 110% of the contents of the bunded equipment in the even of a catastrophic failure with loss of all transformer oil. This is not necessarily an unlikely event in Pakistan where some power distribution facilities have been the target of bomb attacks in 2007. The EMP includes and recommends that an integrated approach be introduced to waste management for materials such as surface soils that have become contaminated with residual oils from maintenance activites.

B. Environmental Impact of Construction Activities - Mitigation Measures

1. Physical Environment

- a. Soil
- 54. The designated subproject areas will be cleared prior to construction. Total land clearing will involve only about 100m² for each tower. A few hectares of land will also be required for the DGS at various locations. The land for the substation sites and tower bases is generally quite arid farmland and no major soil erosion problems are expected. However the following soil erosion control measures will be provided during and after construction to minimize the possibility of loss of useful soil resources:
 - (i) The contractor shall stockpile 30cm of topsoil for reuse in landscaping after construction.

- (ii) The contractor will be required to balance the amount of cutting and filling to reduce the need to store excavated materials for a long time before reusing them. Stockpiles should be covered to prevent runoff (and dust).
- (iii) Spoil materials shall be reused wherever possible within the project or on nearby projects and shall not be dumped on the agricultural land, near streams channels, or near other water bodies. Bituminous or cement wastes should not arise in any significant quantity.
- (iv) The contractor shall replace topsoil in landscaping after construction and as near to the source as reasonably practicable.

b. Air Quality

- 55. Earthworks and site formation activities and general foundation works will contribute to increasing dust during construction. The following mitigation measures are needed to control dust to acceptable levels:
 - (i) Dust suppression should be undertaken at sites where the surface soil is exposed and where cement and aggregate mixing is undertaken.
 - (ii) Haul roads or access paths to construction areas should be cleared of topsoil (stockpiled as above) and maintained and damped down in dry weather by watering regularly. Twice daily watering of exposed soil and stockpiles should take place for works within 50m of sensitive receivers such as schools, hospitals and residences.
 - (iii) Construction materials (sand, gravel, and rocks) waste and spoil materials shall be transported by trucks covered with tarpaulins to control dust.
 - (iv) Storage on site should be minimized. Materials should be brought to site as needed.
 - (v) Prefabrication of concrete structures off site should be utilized wherever practicable.
- 56. It is possible that that the project might still result in some dust emissions even after implementing the mitigation measures given above. However, the impact of those residual emissions is not expected to be significant because they will be for a very short duration.
- 57. There is ample distance between all sites and the sensitive receivers for the dispersion of exhaust emissions from construction plant and no significant air quality impacts should arise from those sources.

c. Noise

- 58. Most of the proposed locations in Tranche 1 will be too remote from noise sensitive receivers to create construction noise nuisances. However impacts from the construction may cause significant impacts for a short duration and this SIEE must also prepare for potential impacts from subprojects in future tranches which have yet to be identified. Therefore the detailed designs for all T1 and future subprojects shall include an assessment of cumulative impacts from all construction activities to ensure no unacceptable nuisances arise.
- 59. In the construction stages all powered mechanical equipment (PME, e.g. excavators, drills, stone crushers, concrete mixers) shall be silenced and only PME shall be used which will generate low levels of noise. However, if several machines have to be operated at the same time, their combined noise level could constitute a disturbance. To minimize

this impact, the following mitigation measures will be adopted at all subproject sites during construction.

- 60. The following mitigation measures will be adopted to mitigate the noise impact caused by project activities:
 - (*i*) Local communities will be informed of all construction activities in advance.
 - (ii) Horn-blowing will be prohibited. Construction equipment will be properly maintained, tuned, and provided with mufflers and located so as to minimize noise levels.
 - (iii) The general rule will be that "No construction will be undertaken during the night time."
 - (iv) Construction equipment will only be operated in the construction site during the day unless it is established through monitoring that the noise levels at the nearest sensitive receivers is within acceptable standards to operate at other times.
- 61. After implementing the mitigation measures given above the residual risk of the noise generated by project will be insignificant. Noise from PME will be monitored in order to check that acceptable levels are maintained to identify the need to take corrective measures, if complaints arise.
 - (i) In any residential area, the noise level at the noise sensitive receivers should be limited at 45 decibels measured in the audible noise bands (dBA) during night (from 9PM to 6AM) and 65dBA during daytime.
 - (ii) For nearby schools, the contractor will discuss with the school principals the agreed time for operating the construction machines.

d. Groundwater

62. No significant effect on groundwater is expected from construction or operation at the Tranche 1 subprojects. However, construction works should not use the groundwater without prior permission from the local water authority.

e. Surface Water

- 63. The main concerns about surface water conditions during construction are related to construction run-off from unprotected cleared areas, spillage and leakage from storage sites and machines, and domestic sewage from the temporary camps for workers. To address these concerns, the following mitigation measures will be adopted:
 - No storage for toxic, hazardous, and harmful construction materials (e.g., asphalt, acidic and caustic substances, and petroleum products) will be near water bodies. Storage areas will be maintained with stored materials checked regularly to control leakage and spillage.
 - (ii) To avoid contamination from fuel and lubricants on site, all vehicle and equipment used during construction will be properly maintained and refueled off site. Generators and compressors etc, will be located over metal drip trays or shall have integral drip trays.
 - (iii) Waste petroleum products will be collected, stored, and sold to registered collectors/recyclers.
 - (iv) If temporary worker camps are needed a sewage collection system for will be properly designed and all the toilet facilities will at least empty to septic tanks that are maintained and emptied in accordance to a defined schedule. Alternatively

portable toilet facilities for temporary storage and treatment will be established in the construction camps.

- (v) Temporary drainage will be established at the base of slopes or embankments leading to water bodies including any nearby irrigation channels and designed so that runoff will not enter water bodies direct and drainage from construction areas will be filtered at least by sand catchpits or by passing through vegetated areas to settle sediments.
- (vi) Proper temporary diversion of any local irrigation channels must be constructed before any irrigation flows are interrupted.

f. Waste Management

64. Waste management plans (WMP) will be drawn up at the project planning stage of each subproject to ensure that waste disposal measures will be undertaken to reuse and recycle all materials wherever possible minimize the generation of waste. WMPs will be prepared for all subproject packages as part of the environmental management plan to ensure that the waste generated during the construction is disposed in an environment-friendly manner. With the proper implementation of an appropriate waste disposal plan, there will be no residual risk due to improper waste disposal.

2. Ecological Environment

- 65. The subprojects identified for Tranche 1 will not be located within national parks or wildlife sanctuaries or any of the critical areas published by Pakistan EPA on their website. Neither do any of the Tranche 1 subprojects affect any land near monuments of cultural or historical importance.
- 66. The clearing of any forest resources will not be required as the land required for the Tranche 1 subprojects is essentially agricultural or urban and does not have high ecological value although the land will need to be cleared of vegetation for construction.
- 67. To minimize the impact associated with cutting down solitary trees during construction, trees should be transplanted where possible or replaced as soon as possible to develop a greenbelt or landscaping around or within the subprojects, such as has already been practiced in some of the LESCO an MEPCO substations. New trees and any transplanted specimens must be maintained, fertilized and watered often so that they survive.
- 68. It is recommended that planting of 3 new trees for each one cut be required in line with international standards for landscape and tree mitigation measures. The layouts of the Tranche 1 subprojects should be designed to ensure the least disturbance to natural species, particularly old and large specimen trees and any special or valuable trees connected with religious rites.
- 69. To minimize impacts on fauna and flora, the following mitigation measures will be adopted:
 - (i) The boundary of the site shall be defined by a 2m high fence.
 - (ii) Trees will be transplanted or replaced on a basis of 3 trees replaced for every tree removed.
 - (iii) No temporary worker camps will be allowed off the construction site in any area.

C. Environmental Impact of Operation - Mitigation Measures

1. Physical Environment

a. Air Quality

- 70. It is not likely that the subprojects will give rise to any significant accumulations of air emissions in the operational stage. The SF6 switchgear should be monitored to ensure that topping up of SF6 is below 1% by volume per year far all items. Leaking equipment should be withdrawn from services as leakage will indicate faulty and possible unsafe operating conditions for the network. There is ample distance between all sites and the sensitive receivers for the dispersion of any minor leaks of residual SF6
- 71. No significant effect on groundwater is expected from construction or operation at the Tranche 1 subprojects. However, construction works should not use the groundwater without prior permission from the local water author

b. Noise

- 72. The equipment that will be in use and the fact that the proposed locations in Tranche 1 are remote from noise sensitive receivers means that noise will not be sufficient to create operational noise nuisances. However impacts from the operation of some Transformers and the SVC may cause significant impacts and this SIEE must also prepare for potential impacts from subprojects in future tranches which have yet to be identified. Therefore the detailed designs for all T1 and future subprojects shall include an assessment of cumulative impacts from all new and old operational equipment to ensure no unacceptable cumulative nuisances arise in the operational stage.
- 73. It is recommended that the following mitigation measures will be adopted to mitigate the noise impact caused by project activities: (i) Installed equipment will be commissioned and designed and operated to be no louder than 70dBA (measured at 15m from source or at the site boundary) in operation and (ii) a brick or masonry wall (with a mass of greater than 10kg/m²) as a noise barrier or other means of noise abatement, will be constructed around the transformers and SVC to attenuate the noise to acceptable levels at the sensitive receivers and prevent disturbance and nuisance.
- 74. After implementing the mitigation measures given above the residual risk of the noise generated by project will be insignificant.

c. Groundwater and Surface Water

75. No significant effect on groundwater or surface water is expected from operation at the Tranche 1 subprojects. However, secondary containment should be included in the designs for all new substation transformers and for transformer oil storage areas to prevent residual contamination from essential maintenance and decommissioning activities.

d. Waste Management

76. Waste management plans (WMP) should be drawn up for each subproject substation to ensure that measures will be undertaken to reuse and recycle all equipment and oil wherever possible and minimize the generation of waste. WMPs shall to ensure that any residual oily waste and other contaminated waste generated in that operational phase is disposed in line with provincial EPA and local authority requirements. With the proper implementation of an appropriate waste disposal plan, there will be no residual risk due to improper waste disposal.

2. Ecological Environment

- 77. The subprojects identified for Tranche 1 will not be located within national parks or wildlife sanctuaries or any of the critical areas published by Pakistan EPA on their website. Neither do any of the Tranche 1 subprojects affect any land near monuments of cultural or historical importance.
- 78. The clearing of any forest resources will not be required as the land required for the Tranche 1 subprojects is essentially agricultural or urban and does not have high ecological value although the land will need to be cleared of vegetation for construction.

D. Cumulative Environmental Impact Associated with the Project Locations

- 79. There should be no significant adverse cumulative impacts expected from the subprojects in Tranche 1. These subprojects are scattered amongst the eight DISCOs and are therefore separated by significant distances. The layouts of the Tranche 1 substation subprojects include a 2m high boundary wall of about 2m and are therefore generally designed to ensure the least disturbance to surrounding environs.
- 80. Whereas there are few adverse cumulative impacts from the projects the improvement in the power system in Pakistan will potentially lead to growing industrial and commercial activities that may indirectly lead to additional pollution. It is not possible to quantify these impacts at this stage but the statutory provisions under the Pakistan Environmental Protection Act cover pollution control tat may require improvements in resources for enforcement and better institutional arrangements and capacity to support strategic management of pollution control in the long term.

5. INSTITUTIONAL REQUIREMENTS, ENVIRONMENTAL MONITORING PLAN

A. Institutional Requirements

- 81. Prior to implementation of the subproject packages each DISCO will need to comply with several environmental requirements. This will include disclosure of the subprojects and endorsement of the environmental assessments required by the Government through submission to the Pakistan Environmental Protection Agency (PEPA) at the provincial level. DISCOs will have responsibility to ensure the implementation of all mitigation measures and other recommendations in the environmental assessments (IEE/EIA) for each of the respective subprojects. If a formal IEE/EIA is conducted under the PEPA requirements, each DISCO must accept the conditions stipulated by PEPA for implementation during construction and operation and obtain written confirmation of compliance from PEPA that the conditions are complied with, before the subprojects in future tranches are in Appendix 4.
- 82. The DISCOS will need to confirm that all local statutory requirements and byelaws have been complied with and that contractors have appropriate and valid permits where necessary.
- 83. Whereas no protected antiquities were identified in proximity to the subproject sites, each DISCO shall also ensure no activity is undertaken in the proximity antiquities and report any archaeological discovery to the Department of Archaeology.

- 84. No reserved forests are in the vicinity of the proposed subprojects, however compliance with the Forestry Act 1927 will need to be achieved in the event that such areas are identified near other subproject packages in Tranche 2.
- 85. Wildlife protection ordinances at the federal and provincial level (e.g., Punjab Wildlife Protection Ordinance, 1972) empower government to declare areas for protection of wildlife and control activities within in these areas. Whereas no activities are currently planned in such areas for the Tranche 1 subproject packages, compliance will need to be achieved in the event that such areas are identified in or near other subproject packages in Tranche 2.
- 86. Because of the similar nature of the works for each subproject the EMPs will also be similar. In this SIEE a generic EMP (Attachment 2) has been provided based on the designs for the subprojects identified so far for Tranche 1. At a later stage it will be necessary to review this summary EMP and prescribe any additional detailed mitigation measures for all aspects of each subproject in the construction and operational stages. The actions described in the EMP(s) shall be fully and properly carried out, in accordance with the time frame(s) set out in the EMP, or as required by PEPA as conditions for compliance with PEPAct.
- 87. An environmental and social unit will be set up in each DISCO to oversee and provide quality control for the IEE/EIA and EMP implementation. The staff in the environmental unit will need orientation for environmental assessment and will provide training and resources and environmental management of all subprojects in all tranches as well as working towards improving environmental awareness at all levels of DISCOs in the medium to long term.
- 88. For this Project, the project implementation unit in each DISCO will have at least one dedicated environmental officer to address environmental concerns. The environmental officer will ensure that each subproject has a full suite of environmental clearances IEE/EIA and EMP as necessary before construction commences and also follow up to help implement the subproject EMP.
- 89. Overall implementation of the EMP will become DISCO responsibility. Other parties to be involved in implementing the EMP are as follows:
 - (i) **Contractors:** responsible for implementing all measures required to mitigate environmental impacts during construction;
 - (ii) **Government agencies:** such as provincial environmental agencies, and bureaus, at the local level, will be responsible for monitoring the implementation of environmental conditions related to subprojects in their areas.
 - (iii) **DISCO Boards of Directors:** responsible to ensure that sufficient resources are allocated in advance to allow the appropriate time to process the environmental assessments and to implement all construction and operational mitigation measures required to mitigate environmental impacts.

B. Training and Monitoring

90. Several government agencies and private sector parties will be involved in implementing the EMP (Appendix 2). Therefore induction training workshops should be designed and conducted by the environmental officer to suit managerial as well as the working level staff as personnel are brought into the subproject tranches. The environmental training workshops shall continue throughout the MFF construction programme in all tranches and

refresher courses shall be carried out over the lifetime of the MFF as staff turnover necessitates.

- 91. As the projects proceed the workshops will disseminate the monitoring results to the workforce, focus attention on the implementation of the EMPs and facilitate remedial actions, if unexpected environmental impacts occur. The EMPs should be regarded as working documents which present plans for the minimum requirement of environmental management, action, monitoring and auditing envisaged at the design stage. These requirements may be modified and increased in response to circumstances as the project proceeds and in response to changing environmental requirements.
- 92. It is also recommended that in order to achieve harmonization between the approach in all DISCOs that workshops or coordinating and monitoring meetings (at say six monthly intervals) be inaugurated between the environmental cells of the DISCOs as the Tranche 1 MFF is rolled out. In this way the dedicated environmental officers can discuss and address environmental concerns with mutual support. The environmental officers can then aim to ensure a common approach to the environmental clearance necessary before construction commences.
- 93. The monitoring plan (Appendix 2) was designed based on the Tranche 1 subprojects. During the preconstruction period, the monitoring activities will focus on (i) checking the contractor's bidding documents, particularly to ensure that all necessary environmental requirements have been included; and (ii) checking that the contract documents' references to environmental mitigation measures requirements have been incorporated as part of contractor's assignment. During the construction period, the monitoring activities will focus on ensuring that environmental mitigation measures are implemented, and some performance indicators will be monitored to record subproject environmental performance and to guide any remedial action to address unexpected impacts. Monitoring activities during project operation will focus on recording compliance with design standards at commissioning, environmental performance and proposing remedial actions to address unexpected impacts.

C. Environmental Assessment of Subprojects

- 94. The subprojects (in Tranche 2) will be prepared in due course and will first be categorized to determine the appropriate level of environmental assessment. The detailed Environmental Assessment Review Framework procedure is presented in Appendix 4. The salient features of the environmental assessment requirement for the follow-up subprojects are as follows:
 - (i) An IEE will be prepared for all subprojects.
 - (ii) Subprojects will be categorized following REA to determine the need for IEE/EIA under ADB guidelines and also PEPAct requirements. Any subprojects that are Category A or B sensitive will be conducted in a timely manner to ensure that the SIEE/SEIA and EMP can made public 120 days prior to the submission of the PFR.
 - (iii) The IEE Studies will be undertaken prior to the submission of the PFR (by DISCO environmental officers with support from or consultants as necessary). DISCO will provide funding and resources to scrutinize the IEE studies.
 - (iv) No subproject will be located in a designated critically sensitive areas, environmentally sensitive areas or areas for protection of wildlife declared under the PEPAct or any other statutory instruments.
- (v) Aside from submitting the IEE and SIEE to the relevant authorities as part of the Government's requirements for environmental clearance, the IEE and SIEE will also be submitted to ADB for review and approval.
- (vi) Only subprojects that meet all the Government's environmental requirements and in receipt of clearance certification will be funded by the MFF.
- (vii) The results of all environmental impact assessments reports and certificates should be kept orderly as part of the project documentation made available for public scrutiny, if required.

6. PUBLIC CONSULTATION AND DISCLOSURE

- 95. Public consultation was conducted in July and August 2007 for the Tranche 1 subprojects. The meetings were conducted near the substations and in villages along the proposed line subprojects and with other relevant government agencies at the local level. The consultations were carried out with individuals, community leaders and village administration and at local and civil administration levels. Formal and informal methods of consultation were adopted. The consulted stakeholders included local residents, business owners, community leaders and local officials.
- 96. The consultation was designed to inform the parties consulted about the proposed Project and to identify their concerns. The site visits and consultation focused on informing the public and officials about the subprojects and the potential environmental impacts. Consultation sought to determine the major areas of environmental concern or problems considered by the local stakeholders to be important. The findings of public consultation were considered in identifying the mitigation measures and alternatives. Local support for the subproject was almost unanimous and local employment opportunities are expected by most of the consulted parties. Appendix 3 provides an example the consultation conducted on 06 July 2007 in Shahdan Lund, MEPCO. The IEE reports on the various subprojects have provided documentation of individual consultation, as relevant, associated with the MFF Tranche subprojects.

7. FINDINGS AND RECOMMENDATIONS

- 97. Primary and secondary data were used to assess the environmental impacts. The potential environmental impacts were assessed in a comprehensive manner. The IEE reports on the various subprojects have provided a picture of potential environmental impacts associated with the MFF Tranche 1 and suitable mitigation measures have been recommended (Appendix 2). In the event that any design details are changed for the locations or scope of any subproject the respective environmental assessment and EMP shall be reviewed. Likewise IEEs will need to be carried out for the subprojects in Tranche 2 and further tranches.
- 98. The Tranche 1 subprojects considered to date offer robust options for the enhancement of the power distribution system and are conceptually well designed and located from the environmental, legal, and socioeconomic points of view. Environmental impacts associated with all the subprojects will need to be properly mitigated, and existing institutional arrangements are available. Additional human and financial resources will be required to progress and achieve necessary statutory compliance and environmental clearance certification for the subprojects that also require environmental assessment under the environmental laws of Pakistan.
- 99. Whereas most anticipated environmental impacts related to the subprojects will take place during the construction phases there are few potential cumulative impacts during

operation which require environmental monitoring and auditing. However environmental reporting is nevertheless recommended to be included in the monthly progress reports throughout the construction phase and immediately prior to commissioning of subprojects. The implementation of the environmental mitigation measures during the construction period can be assigned to the contractors providing they are included in contracts and the operational mitigation measures must be taken up by the DISCO during and after commissioning for the lifetime of the subprojects. Contractors and management must have policies and workable strategies to mitigate the environmental impacts which can be put into practice on site.

- 100. It is likely that contractors may need environmental awareness training and the DISCO must also make provisions to develop an environmentally orientated culture from the respective Board levels down and from the working level up in order to encourage the penetration of environmental awareness in the DISCOs at all levels and in so doing to aim to facilitate management of environmental responsibilities, proactively. It has been recommended that an environmental and social unit be created in each DISCO with at least one graduate environmental officer to handle all necessary statutory environmental permitting and clearances for all subprojects in Tranche 1 and the remaining tranches. Two DISCOs (LESCO and MEPCO) have already appointed their environmental officers. In the short term the environmental officers will ensure environmental requirements are included in contracts and supervise implementation of all the required environmental mitigation in the construction and operation of the subprojects. This capability could be used to extend environmental awareness throughout DISCOs in the medium to long term. DISCOs will need to develop robust environmental policies and the environmental officer would also train management and staff at all levels throughout the DISCOs on how to discharge environmental obligations consistently. The responsibilities for the implementation of mitigation measures and the parities responsible must be clearly defined in contracts and agreements and the implementation by various parties must be monitored by an environmental supervising (checking) consultant. A direct reporting mechanism from the environmental supervising consultant to the environmental officer and DISCOs management needs to be established, with a mechanism to address unexpected environmental impacts, as contingencies.
- 101. This SIEE, including the EMP, should be used as a basis for an environmental compliance program in a regular programme of environmental monitoring and auditing. In addition, any conditions included as part of the environmental compliance from the Government should also be included as a basis for the environmental monitoring and compliance program. Therefore, continued monitoring of (i) the implementation of mitigation measures, (ii) the implementation of the conditions of environmental compliance and (iii) the environmental impact related to the operation of the MFF subprojects should be carried out and reported at least quarterly as part of the project performance report and be-annually to ADB.

8. CONCLUSION

102. The IEE reports for the subproject packages have assessed the main potential environmental impacts forming Tranche 1 of the MFF. The IEE reports are presently based on the conceptual designs and locations and the DISCOs will implement schedules of mitigation measures and monitoring program provided in each of the IEE reports (including Environmental Management Plans and Monitoring Plans) at the implementation stage. With these measures in place environmental impacts identified by the study should be manageable and will not result in any residual impacts which are above accepted

environmental standards. No further or additional impacts assessment is considered necessary at this point.

103. Environmental assessment will be required for all the follow-up subprojects in future tranches when feasibility studies have been completed and the locations and design details are available. DISCOs will adopt the review procedure as required in the Environmental Assessment Review Framework (Appendix 4) and will have adequate capacity by then to implement the EARF as required under the MFF.

TRANCHE 1 SUBPROJECTS ADDING TRANSFORMER CAPACITY AND NEW LINES

DISCO	Sub project No.	Project Name	Brief Description	Site Visit Date	Report	Km of line
FESCO			Add 26M\/A transformer	S		
FESCO	39	Kud Lathi	Add 26MVA transformer			
FESCO	40	Jhang-II	Add 26MVA transformer			
FESCO	41	Goira	Add 26MVA transformer			
FESCO	153	Sardar Pur Noon	Add 26MVA transformer			
FESCO	43	Wanbachran	Add 26MVA transformer			
FESCO	44	H.B.Shah	Add 26MVA transformer		IEE E&A	
FESCO	45	Old Thermal Faisalabad	ITC 26-40MVA			
FESCO	46	Chiniot Road Faisalabad	ITC 26-40MVA			
FESCO	47	Sammandari Rd Faisalabad	ITC 26-40MVA			
FESCO	48	Narwala Road Faisalabad	ITC 26-40MVA			
FESCO	49	Factory Area Faisalabad	ITC 26-40MVA			
FESCO	50	Ludewala	ITC 13-26MVA			
GEPCO	156	Fateh Pur	Substation Upgrade 66-132kV		IEE S/S	10
HESCO	5	Jaccobabad	ITC 13-26MVA			
HESCO	166	Badin	Add 13 MVA transformer			
HESCO	167	Thari Mirwash	Add 13 MVA transformer			
HESCO	168	Dokri	Add 13 MVA transformer			
HESCO	169	Nabisar	ITC 6-13MVA			
HESCO	170	Gambat	ITC 13-26MVA		IEE E&A	
HESCO	171	T A Yar	ITC 13-26MVA			
HESCO	172	T. Adam	ITC 13-26MVA			
HESCO	173	Sukkur Site	ITC 13-26MVA			
HESCO	174	Deharki	ITC 13-26MVA			
IESCO	89	Zero Point	ITC 26-40MVA			
IESCO	190	Rawal	ITC 26-40MVA			
IESCO	191	Islamabad I – 8	ITC 26-40MVA			
IESCO	67	Islamabad F- 11	ITC 26-40MVA			
IESCO	53	Islamabad H – 11	ITC 26-40MVA			
IESCO	192	Pir Wadhai	ITC 26-40MVA			
IESCO	193	Kahuta City	ITC 13-26MVA			
IESCO	189	Khoi Ratta	Add 13MVA transformer			
IESCO	56	КТМ	ITC 26-40MVA			
IESCO	194	Taxila	Add 26MVA transformer			
IESCO	195	Faqirabad	ITC 13-26MVA			
IESCO	196	Margalla	ITC 13-26MVA		IEE E&A	
IESCO	201	Attock	ITC 13-26MVA			
IESCO	202	Gujar Khan	Add 26MVA transformer			
IESCO	198	Dina	ITC 13-26MVA			
IESCO	199	Jatli	ITC 13-26MVA			
IESCO	200	Chak Sawari	ITC 13-26MVA		ļ	
IESCO	200	Chakwal	ITC 26-40MVA		ļ	
IESCO	63	Taimoor Shaheed (F-6)	Add 40MVA transformer			
IESCO	203	Kamalabad	ITC 26-40MVA			

DISCO	Sub project No.	Project Name	Brief Description	Site Visit Date	Report	Km of line
IESCO	204	Rawalnindi Cantt	ITC 26-40M\/A			
IESCO	204	Mangla Right Bank	ITC 13-26MVA		-	
IESCO	205	Mangla Left Bank	ITC 13-26MVA			
		Devrela Ket	ITC 13-26M\/A			
	007		Add 26MVA transformer			
LESCO	153	Sukh Chan Multan Poad	New S/S (s/s only in out line by LESCO)	S	IEE S/S	(7)
LESCO	0	Chung		-		~ /
LESCO	10	Bhai Pheru	Add 26MVA transformer	S	-	
LESCO	10	Bhikki	Add 26MVA transformer	-	-	
LESCO	12	Rustam	Add 26MVA transformer			
LESCO	13	Shamkey	Add 26MVA transformer		-	
LESCO	15	Wan Radha Ram (Habibabad)	ITC 13-26MVA		_	
LESCO	16	Pattoki	ITC 13-26MVA		-	
LESCO	17	Allama lobal Town	ITC 26-40MVA	S	-	
LESCO	18	Said Pur	ITC 26-40MVA		-	
LESCO	19	Chah Miran	ITC 26-40MVA			
LESCO	20	Defence	ITC 26-40MVA	S		
LESCO	21	Ellehabad	ITC 13-26MVA			
LESCO	22	Renala Khurd	ITC 13-26MVA			
LESCO	23	Fateh Garh	ITC 26-40MVA	S	-	
LESCO	24	Garden Town	ITC 26-40MVA	S	-	
LESCO	25	Gulshan-e-Ravi	ITC 26-40MVA	S	-	
LESCO	26	Johar Town	ITC 26-40MVA	S	IEE E&A	
LESCO	27	Kasur	ITC 26-40MVA			
LESCO	28	Mcload Road	ITC 26-40MVA			
LESCO	29	Model Town	ITC 26-40MVA	S		
LESCO	30	Old Kot Lakhpat (OKLP)	ITC 26-40MVA	S		
LESCO	31	Okara City-I	ITC 26-40MVA			
LESCO	32	Rehman Park	ITC 26-40MVA	S		
LESCO	33	Shadman	ITC 26-40MVA	S		
LESCO	34	Shahdara New	ITC 26-40MVA			
LESCO	35	Town Ship	ITC 26-40MVA	S		
LESCO	36	Badami Bagh	ITC 26-40MVA			
LESCO	37	Qartaba	ITC 26-40MVA			
LESCO	38	Bhogiwal	ITC 13-26MVA			
MEPCO	83	Lar	in out, Multan-Bahawalnagar, d/c	S	IEE S/S	<1
MEPCO	158	Shadan Lund	in out, Tansa Rd-Khanewl Add 26MVA DX	S	IEE S/S	4
MEPCO	165	Fazil Pur	in-out Jampur-Rajanpur d/c	S	IEE S/S	1
MEPCO	85	Bahawalnagar	Add transformer			
MEPCO	86	Bahawalpur 220 kV	Add transformer		-	
MEPCO	88	Chistian	Add transformer			
MEPCO	112	Gujrat South	Add transformer		IEE E&A	
MEPCO	157	Khan Pur	Add 26MVA transformer		-	
MEPCO	159	Shujabad	Add 26MVA transformer	S	-	
MEPCO	160	Bonga Hayat	Add 26MVA transformer			



DISCO	Sub project No.	Project Name	Brief Description	Site Visit Date	Report	Km of line
MEPCO	161	Rajan Pur	Add 26MVA transformer			
MEPCO	162	Feroza	Add 26MVA transformer			
MEPCO	163	Sama Satta	Add 26MVA transformer	S		
MEPCO	164	Liaqat Pur	Add 26MVA transformer			
PESCO		Karak	Substation and line 132kV	S	IEE S/S	14
PESCO	68	Shabqadar	Add 26MVA transformer			
PESCO	69	D.I.Khan	ITC 13-26MVA			
PESCO	72	Dalazak	Add 26MVA transformer			
PESCO	73	Peshawar Cant.	Add 26MVA transformer			
PESCO	74	Jhangaria	Add 26MVA transformer			
PESCO	75	Thima Garha	Add 26MVA transformer			
PESCO	76	Battal	Add 26MVA transformer		IEE A&A	
PESCO	77	Hattar	Add 26MVA transformer			
PESCO	176	Gadoon Amazai	Add 26MVA transformer			
PESCO	177	Jalala	ITC 13-26MVA			
PESCO	178	Mardan II	ITC 13-26MVA			
PESCO	179	Chakdara	ITC 13-26MVA			
PESCO	180	Khawaza Khela	ITC 13-26MVA			
PESCO	181	Rehman Baba	Add 26MVA transformer			
PESCO	182	Prova	Add 26MVA transformer			
QESCO		Alizai	Substation and line 132kV	S	IEE S/S	10
QESCO		Kanak	Substation and line 132kV	S	IEE S/S	5
QESCO	109	Kalat	ITC 13-26MVA+Add 26MVA transformer			
QESCO	110	Mastung	Add 26MVA transformer			
QESCO	113	Nal	Add 13 MVA transformer			
QESCO	183	Musferpur	Add 26MVA transformer		IEE A&A	
QESCO	184	Sariab	Add 26MVA transformer			
QESCO	185	Barkham	Add 26MVA transformer			
QESCO	187	Rakni	Add 26MVA transformer			

MEPCO: Hota is still under consideration as the land issue is being discussed and may be resolved

SUMMARY ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan – Matrix July 2007 (to be reviewed with PFR before commencement of each tranche).

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
DESIGN STAGE						
1. Contract clauses	Ensure requirements and recommendations of environmental assessment are included in the contracts.	 Include EMP Matrix in tender documentation and make contractors responsible to implement mitigation measures by reference to EIA/IEE in contract. Include preparation of EMP review and method statement WM plan, TD and EC Plan in contract as a payment milestone(s). Require environmental accident checklist and a list of controlled chemicals / substances to be included in the contractor's work method statement and tender documentation. 	 During tender preparation. No later than pre- qualification or tender negotiations In bidding documents as evaluation criteria. 	Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA.	DISCO ESU with the design consultant	DISCO ESU and CSC (if any).
2. Procurement	Ensure environmentally responsible procurement.	 Require in procurement specifications that transformers, transformer oil and other equipment are to be free from PCB and other petroleum fractions that may be injurious to environment or equipment. Require new switchgear to be free from CFCs in procurement specifications. SF6 gas insulated equipment to be effectively leak free with nominal SF6 top up less than 1% per year. 	During tender preparation. No later than pre- qualification or tender negotiations.	Tender negotiations	DISCO ESU with the design consultant	DISCO ESU and CSC (if any).
3. Waste disposal	Ensure adequate disposal options for all waste including transformer oil, residually contaminated soils, scrap metal.	 Create waste management policy and plan to identify sufficient locations for, storage and reuse of transformers and recycling of breaker oils and disposal of transformer oil, residually contaminated soils and scrap metal "cradle to grave". Include in contracts for unit rates for re-measurement for disposal. After agreement with local authority, designate disposal sites in the contract and cost unit disposal rates accordingly. 	1.Prior to detailed design stage no later than pre-qualification or tender negotiations 2. Include in contract.	DISCO ESU. Locations approved by EPA and DISCO and local waste disposal authorities.	DISCO ESU and EPA with the design consultant.	DISCO ESU and CSC
4. Hazardous waste disposal	To ensure responsible disposal of hazardous waste in line with best practice.	1. Waste management plan to identify any remaining PCB containing equipment to be replaced and appropriate method for disposal.	During tender preparation.	All DISCO substations.	DISCO ESU with the Design Consultant	DISCO
5. Prevent spills & contamination.	To prevent spills, contamination of soil groundwater and surface water.	 Design of adequate secondary containment facilities in new substations to include concrete bases with bunding to prevent contamination from a major catastrophic failure and residual contamination from installation, maintenance and 	During design stage. Before tender prequalification.	 All new and upgraded substations and where new transformers. Where augmentation of 	DISCO ESU with the Design Consultant	DISCO

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		 decommissioning. Review design of existing transformer and oil treatment location to aim to improve secondary containment facilities, concrete bases and bunding if retrofitting is technically feasible and will provide benefits at reasonable cost. Design all transformers to be located over bunds to comply with best international practice so that transformer oil and other residual contamination does not run to ground and can be captured for controlled disposal. (commence designs in new substations). Integrate proposals with waste management policy and plan to identify sufficient locations for, storage and disposal of transformer oil and residually contaminated surface water or soil "cradle to grave". Include in contracts for unit rates for construction of bunds and new style drainage requirements. In consultation with EPA identify designate residual oil disposal sites in each DISCO and design disposal accordingly. 		transformers requires significant civil works that can accommodate required improvements.		
6. Hydrological Impacts	To minimize hydrological and drainage impacts during construction.	1. Design of adequate major and minor culverts facilities to be integrated in design to avoid effects on hydrological flow in areas where it is sensitive, such as water courses or bridges and culverts.	During design stage. Before the commencement of construction activities	If lines or substation are relocated near water courses, culverts or bridges in the design stage reports	DISCO ESU with the Design Consultant	DISCO
7. Temporary drainage and erosion control	Include mitigation in preliminary designs for erosion control and temporary drainage.	 Identify locations where drainage or irrigation crossing RoW may be affected by works. Include protection works in contract as a payment milestone(s). 	During designing stage no later than pre- qualification or tender negotiations.	Locations based on drainage or irrigation crossing RoW near DGS.	DISCO ESU and design consultant.	DISCO ESU and CSC
8. Noise	Ensure cumulative noise impacts are acceptable in construction and operational phase.	 Conduct detailed acoustic assessment for all residential, school, (other sensitive structures) within 50m of DGS and line. If noise at sensitive receiver exceeds the permissible limit, the construction activities should be mitigated, monitored and controlled. If noise at sensitive receiver will exceeds the permissible limit in operational phase the design to include acoustic mitigation (noise barrier or relocation of noisy equipment) and monitoring. 	 During detailed design stage. No later than pre-qualification or tender negotiations. Include acoustic specification in the contract. 	Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA.	DISCO ESU with the design consultant	DISCO ESU and CSC (if any).
9. Social Impacts	To ensure that the adverse impacts due to	 DISCO to prefer to select a site that will not affect any local public in property or house such that no additional land is 	Commence as early as possible and complete	Affected Families will be compensated by DISCO	DISCO ESU / LACs	ADB and External

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
	constructing lines over private land, property acquisition and resettlement are mitigated according to the LARP.	 required. Social preparation completed. LARP etc. (if required) in place IN CASE UNFORSEEN ADDITIONAL LAND IS REQUIRED. Acquisition of lands completed to minimize the uncertainty of people. Completed implementation of LARP and LARCs to provide compensation and assistance to the APs. All the payments / entitlements are paid according to the Entitlement Matrix, prepared according to the LARP. All the impacts identified by the EIA are incorporated in to the project as well as the LARP and relevant entitlements included into the Entitlement Matrix. 	one month before the construction of the GSS and all the included structures, the APs to be given sufficient time with compensation money and to resettle satisfactorily.	through the concerned District Revenue Department and Land Acquisition Collectors.		Monitors
CONSTRUCTION STAGE						
Hydrology And Drainage Aspects	To ensure the proper implementation of any requirements mentioned in EPA conditions of approval letter in relation to hydrology of the project.	 Consideration of weather conditions when particular construction activities are undertaken. Limitations on excavation depths in use of recharge areas for material exploitation or spoil disposal. Use of landscaping as an integrated component of construction activity as an erosion control measure. Minimizing the removal of vegetative cover as much as possible and providing for it s restoration where construction sites have been cleared of such areas. 	Prepare a thorough drainage management plan to be approved by CSC one month prior to a commencement of construction Proper timetable prepared in consideration with the climatic conditions of the area, the different construction activities mentioned here to be guided.	 Locations of each construction activity to be listed by the CSC engineer. Special locations are identified on the site by the contractor to minimize disturbances. A list of locations of irrigation channels / drains to be compiled and included in the contract. 	1. Contractor supervised by CSC or to actively supervise and enforce.	DISCO ESU
2. Orientation for Contractor, and Workers	To ensure that the CSC contractor and workers understand and have the capacity to ensure the environmental requirements and implementation of mitigation measures.	 DISCO ESU environmental specialist to monitor and progress all environmental statutory and recommended obligations. Conduct special briefing for managers and / or on-site training for the contractors and workers on the environmental requirement of the project. Record attendance and achievement test for contractors site agents. Agreement on critical areas to be considered and necessary mitigation measures, among all parties who are involved in 	Induction course for all site agents and above including <u>all relevant</u> <u>DISCO</u> staff / new project staff before commencement of work. At early stages of construction for all	All staff members in all categories. Monthly induction and six month refresher course as necessary until contractor complies.	DISCO ESU, Contractor and the CSC and record details.	DISCO & CSC to observe and record success.

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		project activities. 4. Continuous progress review and refresher sessions to be followed.	construction employees as far as reasonably practicable.			
3. Water quality	To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. Ensure adverse impacts on water quality caused by construction activities are minimized.	 Compile temporary drainage management plan one month before commencement of works. 1. Proper installation of temporary drainage and erosion control before works within 50m of water bodies. 2. Proper maintenance and management construction of TD and EC measures, including training of operators and other workers to avoid pollution of water bodies by the considerate operation of construction machinery and equipment. 3. Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures >50m away from water bodies. 4. Proper disposal of solid waste from construction activities. 5. Cover the construction material and spoil stockpiles with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies. 6. Topsoil stripped material shall not be stored where natural drainage will be disrupted. 7. Borrow sites (if required) should not be close to sources of drinking water. 	1 month prior to construction.	1. 50m from water bodies 2. Relevant locations to be determined in the detailed project design.	 Contractor (DISCO ESU & CSC to enforce). Contractor has to check water quality and report to DISCO. CSC supervises implementation activities. 	DISCO review results
4. Air quality	To minimize dust effectively and avoid complaints due to the airborne particulate matter released to the atmosphere.	 CONTROL ALL DUSTY MATERIALS AT SOURCE. 1. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations.(Relevant regulations are in the Motor vehicles fitness rules and Highway Act). 2. Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions. 3. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions. 4. Vehicles transporting soil, sand and other construction materials shall be covered. Limitations to speeds of such vehicles necessary. Transport through densely populated area should be avoided. 5. To plan to minimize the dust within the vicinity of orchards and fruit farms. 6. Spraying of bare areas with water. 7. Concrete plants. to be controlled in line with statutory 	During all construction.	 Construction sites within 100m of sensitive receivers. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works. 	Contractor should maintain acceptable standard CSC to supervise activities.	DISCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		requirements should not be close to sensitive receptors.				
5. Ground Vibration	To minimize ground vibrations during construction.	 Review requirements for piling and use of powered mechanical equipment within 100m of SRs. Review conditions of buildings and conduct public consultation with SRs to establish less sensitive time for works involving piling and schedule works accordingly. Non-percussive piling methods to be used wherever practicable. Percussive piling shall be conducted in daylight hours. Hammer- type percussive pile driving operations shall not be allowed at night time. 	1 month prior to construction.	 Construction sites within 100m of sensitive receivers. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works. 	Contractor should maintain the acceptable standards CSC to supervise relevant activities.	DISCO ESU / CSC
6. Noise	To minimize noise increases during construction.	 Review requirements for use of powered mechanical equipment within 100m of SRs. Conduct public consultation with SRs to establish less sensitive time for works and schedule works accordingly. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations and with effective silencing apparatus to minimize noise. Heavy equipment shall be operated only in daylight hours. Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise. Well-maintained haulage trucks will be used with speed controls. Contractor shall take adequate measures to minimize noise nuisance in the vicinity of construction sites by way of adopting available acoustic methods. 	1 month prior to construction.	 Construction sites within 100m of sensitive receivers. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works. 	Contractor should maintain the acceptable standards CSC to supervise relevant activities.	DISCO ESU / CSC
7. Soil Erosion / Surface Run-off	Prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. To minimize soil erosion due to the construction activities of towers, stringing of conductors and creation of access	 SCHEDULE WORKS IN SENSITIVE AREAS (e.g. NEAR RIVERS) FOR DRY SEASON 1. In the short-term, temporary drainage and erosion control plan to be presented with tender. Temporary drainage and erosion control plan one month before commencement of works to protect all areas susceptible to erosion. (Permanent drainage works shall be in the final design). 2. Installation of TD and EC before works construction within 50m of water bodies. 3. Clearing of green surface cover to be minimized during site preparation. 5. Meaningful water quality monitoring up and downstream at any 	1 month prior to construction because the area can be subject to unseasonable heavy rain Plan before and during construction (cut and fill, land reclamation etc.) while considering the climatic conditions.	 Locations based on history of flooding problems indicated by local authorities . A list of sensitive areas during construction to be prepared by the detail design consultant in consideration with the cut and fill, land reclamation, borrow areas etc. Locations of all rivers, 	Contractor and CSC	DISCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
	tracks for project vehicles.	 tower site during construction within a river or stream bed. Rapid reporting and feedback to CSC. 5. Back-fill should be compacted properly in accordance with DISCO design standards and graded to original contours where possible. 6. Cut areas should be treated against flow acceleration while filled areas should be carefully designed to avoid improper drainage. 7. Stockpiles should not be formed within such distances behind excavated or natural slopes that would reduce the stability of the slopes or cause slippage. 8. Measures shall be taken to prevent ponds of surface water and scouring of slopes. Newly eroded channels shall be backfilled and restored to natural contours. 9. Contractor should arrange to monitor and adjust working and adopt suitable measures to minimize soil erosion during the construction period. Contractor's TD and EC plan should be endorsed and monitored by CSC after consulting with concerned. authorities. 10. Replanting trees to be done before the site is vacated and handed back to DISCO with appropriate trees (other vegetation cover as appropriate) to ensure interception of rainwater and the deceleration of surface run-off. 		streams, culverts, irrigation channels, roads and highways.		
8. Exploitation, Handling, Transportation and Storage of Construction materials	To minimize disruption and contamination of the surroundings, minimize and or avoid adverse environ-mental impacts arising out of construction material exploitation, handling, transportation and storage by using sources that comply with EPA license conditions	 (consider also for future trances if civil works) 1. Use only EPA licensed sites for raw materials in order to minimize adverse environmental impacts. 2. Measures to be taken in line with any EPA license conditions, recommendations and approval to be applied to the subproject activities using the licensed source including: (i) Conditions that apply for selecting sites for material exploitation. (ii) Conditions that apply to timing and use of roads for material transport. (iii) Conditions that apply for maintenance of vehicles used in material transport or construction. (iv) Conditions that apply for selection of sites for material storage. (v) Conditions that apply for aggregate production. (vi) Conditions that apply for handling hazardous or dangerous 	month prior to starting of works. Update monthly.	 List of borrow areas to be prepared with tender stage contractor's method statement and updated one month prior to construction. List of routes of transport of construction material is to be prepared for the contract and agreed one month prior to construction. Map of locations of storage is prepared by the contractor. 	Contractor and CSC to agree format of reporting	DISCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		materials such as oil, lubricants and toxic chemicals.				
9.Construction Waste Disposal	Minimize the impacts from the disposal of construction waste.	 Waste management plan to be submitted to the CSC and approved by DISCO ESU one month prior to starting of works. WMP shall estimate the amounts and types of construction waste to be generated by the project. Investigating whether the waste can be reused in the project or by other interested parties without any residual environmental impact. Identifying potential safe disposal sites close to the project, or those designated sites in the contract. Investigating the environmental conditions of the disposal sites and recommendation of most suitable and safest sites. Piling up of loose material should be done in segregated areas to arrest washing out of soil. Debris shall not be left where it may be carried by water to down stream flood plains, dams, lagoons or other water bodies. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations. Oily wastes must not be burned. Disposal location to be agreed with local authorities/EPA. Waste breaker insulating oil to be recycled, reconditioned, or reused at DISCO's facility. Machinery should be properly maintained to minimize oil spill during the construction. Machinery should be maintained in a dedicated area over drip trays to avoid soil contamination from residual oil spill during maintenance. Solid wastes should be disposed at an approved solid waste facility and not by open burning which is illegal and contrary to approved solid waste facility and not by open burning which is illegal and contrary to 	One month prior to starting of works. Update monthly One month prior to starting of works. Update monthly	1.Dumping: A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement (in W M Plan)	1.Contractor 2-11. CSC and DISCO ESU should supervise and take action to ensure that contractor's complete relevant activities according to EIA / IEE / EMP requirement & NEQS.	DISCO/ CSC
10. Work Camp Operation and Location (if required)	To ensure that the operation of work camps does not adversely affect the surrounding environment and residents in the area.	 Identify location of work camps in consultation with local authorities. The location shall be subject to approval by the DISCO. If possible, camps shall not be located near settlements or near drinking water supply intakes. Cutting of trees shall not b permitted and removal of vegetation shall be minimized. Water and sanitary facilities (at least pit latrines) shall be provided for employees. Worker camp and latrine sites to be 	UPDATE Once a month	Location Map is prepared by the Contractor.	Contractor	DISCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		 backfilled and marked upon vacation of the sites. 4. Solid waste and sewage shall be managed according to the national and local regulations. As a rule, solid waste must not be dumped, buried or burned at or near the project site, but shall be disposed of to the nearest sanitary landfill or site having complied with the necessary permits of local authority permission. 5. The Contractor shall organize and maintain a waste separation, collection and transport system. 6. The Contractor shall document that all liquid and solid hazardous and non-hazardous waste are separated, collected and disposed of according to the given requirements and regulations. 7. At the conclusion of the project, all debris and waste shall be removed. All temporary structures, including office buildings, shelters and toilets shall be planted with suitable vegetation. 9.DISCO and Construction Supervising Consultant shall inspect and report that the camp has been vacated and restored to preproject conditions. 				
11. Loss of Trees and Vegetation Cover of the Areas for Towers and Temporary Work- space	To avoid negative impacts due to removing of landmark, sentinel and specimen trees as well as green vegetation and surface cover.	 Tree location and condition survey to be completed one month before tender. The route for the distribution line should be selected so as to prevent the loss or damage to any orchard trees or other trees. Use of higher towers to be preferred to avoid trees cutting. Clearing of green surface vegetation cover for construction, borrow of soil for development, cutting trees and other important vegetation during construction should be minimized by careful alignment. Written technical Justification for tree felling included in tree survey. At completion all debris and waste shall be removed and not burned. The contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes outside immediate work areas. Trees shall not be cut for fuel or works timber. Land holders will be paid compensation for their standing trees in accordance with prevailing market rates (LARP). The land holders will be allowed to salvage the wood of the affected trees 	Route design and site identification (1 & 2) during design stage and other matters during construction of relevant activities	Tree survey to be completed one month before tender at relevant Locations with a Map to be compiled prior to tender by the design consultant / DISCO ESU during detailed design and CSC to update as necessary.	Design consultant, Contractor and CSC	DISCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		 The contractor will plant three (3) suitable new trees outside the 30 meter corridor of the transmission line in lieu of one (1) tree removed. Landscaping and road verges to be re-installed on completion. Compensatory planting of trees/shrubs/ornamental plants (at a rate of 3:1) in line with best international practice. After work completion all temporary structures, including office buildings, shelters and toilets shall be removed. 				
12. Safety Precautions for the Workers	To ensure safety of workers	 Providing induction safety training for all staff adequate warning signs in health and safety matters, and require the workers to use the provided safety equipment. Providing workers with skull guard or hard hat and hard toe shoes. 	Prior to commencement and during construction	Location to be identified by the CSC with contractor.	Contractor and CSC	DISCO/ CSC
13. Traffic Condition	Minimize disturbance of vehicular traffic and pedestrians during haulage of construction materials and equipment.	 Submit temporary haul and access routes plan one month prior to start of works. Routes in vicinity of schools and hospitals to be avoided. 	Prior to and throughout the construction.	The most important locations to be identified and listed. Relevant plans of the Contractor on traffic arrangements to be made available.	Contractor and CSC	DISCO ESU / CSC
14 Impact on Wetlands (if relevant).	To ensure that damage to river ecosystems and wetlands and its ecosystem is minimized during construction.	 Erection of towers in the wetlands, will be avoided as far as possible. However, at places where realignment of the distribution is unavoidable, towers with maximum span will be used to minimize the impacts. Avoid disposal of wash water, solid waste and discarded packing etc. on wetlands. Piling up of loose material should be done in segregated areas to arrest washing out of soil. In addition, these materials should not be tipped or stockpiled near wetlands. Residual concrete from works should not be dumped close to wetlands. Avoid temporary structures or stockpiling within banks of river and on wetlands. - Special measures will be adopted to minimize impacts on the wild birds, such as avoiding construction activities during the critical periods of breeding and feeding. Staff working on the project should be given clear orders, not to shoot, snare or trap any bird (MANDATORY). 	Prior to and during Construction	Taunsa wetland (Ramser Site) is located 85 km from the project site.	Contractor and CSC	DISCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
		 Schedule construction for April to July and September to November to avoid the monsoons and periods of mass migration of birds from Central Asia to the plains of Sindh and their return journey (December to March). Construction activities confined to small areas to minimize impacts and encourage migratory birds to settle as normal. Contractor will prevent the workers from hunting and fishing for water birds and fish resources, etc Food and fuel to be bought by contractor at local villages too boost local income. 				
15.Social Impacts	To ensure minimum impacts from construction labour force. on public health.	 Potential for spread of vector borne and communicable diseases from labour camps shall be avoided (worker awareness orientation and appropriate sanitation should be maintained). Complaints of the people on construction nuisance / damage close to ROW to be considered and responded to promptly. Contractor should make alternative arrangements to avoid local community impacts. 	Complaints of public to be solved as soon as possible	All subprojects all tranches	Contractor and the CSC	DISCO/ CSC
16. Institutional Strengthening and Capacity Building	To ensure that DISCO officials are trained to understand and to appreciate EMP	Capacity building activities were taken by Environmental Officer in Tranche 1. Environmental Management Unit (EMU) was setup with in DISCO under Director Operations in Tranche 1. Development of strengthening plan for the EMU should be taken up with resources.	Initiate preconstruction and continue beyond project completion.	Awareness training for all management and senior staff in DISCO at senior engineer and above in PMU and related units.	DISCO ESU	DISCO & ADB
OPERATIONAL STAGE						
1. Air Quality	Minimize air quality impacts	No significant Impacts Tranche 1.Monitor designs and plans for all future tranches.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU
2.Noise	Minimize noise impacts	No significant Impacts Tranche 1. Acoustic designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU
3. Waste disposal	Minimize improper waste disposal	Continue waste management arrangements in operational phase of all subprojects and DISCO activities.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU
3. Compensatory tree planting	Maintain survival of trees planted	Employ landscaping contractor to monitor, water and feed replacement saplings and replace dead specimens as necessary.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU
4.Land slides and soil erosion	Avoid landslips and loss of productive land	No significant Impacts in Tranche 1. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU
5. Water quality	Minimize water quality impacts	No significant Impacts in Tranche 1. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU
6 Crops and vegetation	Monitor impacts from maintaining tree	Track growth of large trees under the conductors.	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp imp MM	Resp mon MM
	clearance under transmission lines					
7. Social safety Impacts	Ensure no encroachments / construction under the transmission line. No violation of clearance spaces.	Necessary signboards with limits of height clearances to be placed all along the line. Identify and prevent any illegal encroachments under the DGLs	Operational phase	all subprojects in future tranches	DISCO	DISCO ESU

LARP = Land acquisition and resettlement plan. AP = Affected Persons. LAC = Local Authority Council. TD = Temporary drainage. EC = Erosion control. WM = waste management. CSC = Construction supervision consultant or equivalent. TXL = Transmission line. GSS = Grid substation NEQS = National Environmental Quality Standards.

No.	Environmental Monitoring Tasks ¹⁶	Implementation Responsibility	Implementation Schedule
1	Design Phase		·
1.1	Audit project bidding documents to ensure IEE and EMP is included	DISCO through project implementation unit	Prior to issue of bidding documents.
1.2	Monitor final site selection process and final alignment selection process and its environmental compliance with EMP	DISCO with the assistance of an external environmental consultant	Prior to DISCO approval of contractor's detailed alignment survey.
1.3	Review the implementation of the Land Acquisition Plan and expropriation, including considerations concerning vulnerable groups among land-owners, farmers, and farm workers	DISCO with the assistance of an external environmental consultant	Prior to DISCO approval of contractor's detailed alignment survey.
1.4	Monitor contractor's detailed project design to ensure relevant environmental mitigation measures in EMP have been included	DISCO with assistance of project implementation unit	Prior to DISCO approval of contractor's detailed alignment survey.
1.5	Monitor the thorough implementation of detailed Environmental Guidelines for Construction Works, including procurement, management, works, closing operations	DISCO with the assistance of an external environmental consultant	Prior to DISCO approval of contractor's detailed designs.
1.6	Review the management plan for mineral construction materials and waste management	DISCO with the assistance of an external environmental consultant	Prior to DISCO approval of contractor's detailed designs.
1.7	Audit detailed designs of facilities and installations to ensure standard environmental safeguards/ mitigation measures (as identified in EMP) have been included	DISCO with assistance of project implementation unit	Prior to DISCO approval of contractor's detailed designs.
1.8	Review landscape design plan, including compensatory planting	DISCO with the assistance of an external environmental consultant	Prior to DISCO approval of contractor's detailed designs.
1.9	Monitor the performance of environmental training and briefings and of the environmental awareness of project staff and DISCO	DISCO with the assistance of an external environmental consultant	Continuous throughout the entire project period.
2	Construction Phase		
2.1	Regular (monthly) monitoring and reporting (quarterly) of contractor's compliance with	DISCO with assistance of project implementation unit	Continuous throughout construction period.

¹⁶ Monitoring of issues related to compensation of landowners for land acquisition and loss of production, etc. are addressed in the Resettlement Action Plan.

No.	Environmental Monitoring Tasks ¹⁶	Implementation Responsibility	Implementation Schedule
	contractual environmental mitigation measures		
2.2	Monitoring of the implementation of the Landscape Design Plan	DISCO with the assistance of an external environmental consultant	During the last phase of construction works
2.3	Commissioning phase monitoring of as built equipment versus environmental performance criteria	DISCO	At commissioning
3	Operation and Maintenance Phase		
3.1	Observations during routine maintenance inspections of facilities and distribution lines rows. Inspections will include monitoring implementation of operational mitigation measures versus environmental criteria specified in EMP, waste management and operational noise.	DISCO	As per DISCO inspection schedules
3.2	Monitoring of the implementation of the Landscape Design Plan	DISCO with the assistance of an external environmental consultant	Twice per year for three years of operation.
3.3	Monitoring decommissioning of other plant required for installation of MFF funded components and waste disposal	DISCO	During the life of the project

Table A3: Summary of Estimated Costs for EMP Implementation for Tran	che 1
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Item	Sub Item per DISCO	Estimated Total Costs	Estimated Total Cost
		[PRS]#	[USD]#
Staffing, audit and monitoring	1 person for 2 years	1,200,000	19,900
Monitoring activities	As detailed under EMP	5,000,000	83,000
Mitigation measures	As prescribed under EMP and IEE	8,000,000	132,800
Transport	1 dedicated vehicle 2 years	1,000,000	16,600
Contingency	3% contingency	456,000	7,600
Total		15,656,000*	259,900

tentative costs

* per disco

TYPICAL SUMMARY OF PUBLIC CONSULTATION (SHAHDAN LUND MEPCO)

No.	Town	Name	Participants	Address	Date	Issues Raised/Concerns Expressed/Suggestions and Requests	Measures Proposed	Action Taken/ Proposed
1	Shahdan Lund	Moulavi Usman	Moulvi	Shahdan Lund	06-July	He supports the up gradation and expansion, as he expects more reliable supply of electricity.		
2	Shahdan Lund	Abdur Rashid	Barber	Shahdan Lund	06-July	He is fed up of load-shedding, and expects uninterrupted electricity by the construction of GSS.		
4	Shahdan Lund	Ahmad	Taylee	Shahdan Lund	06-July	No Comments		
5	Shahdan Lund	Ismail	Cobler	Shahdan Lund	06-July	Fair and prompt payment should be made to land owners for damage to crops and trees where the new towers will be installed.	MEPCO should make sure that the process of compensation is fair.	Compensation for crops and trees damaged should be paid according to ADB and national guidelines.
7	Shahdan Lund	Usman	Cobler	Shahdan Lund	06-July	He thinks the GSS project will assist in development of area and help the poor.		
8	Shahdan Lund	Muhammad Khalid	Factory Labor	Shahdan Lund	06-July	He wanted the project should offer casual labour opportunities to them, and expected improved electricity to help business	Skilled and un-skilled employment should be preferred to local people	MEPCO should employ locals for skilled / un-skilled jobs on priority.
9	Shahdan Lund	Muhammad Nadeem	Student	Shahdan Lund	06-July	He is also fed up of load-shedding, and expects the up gradation of GSS to improve the supply of electricity. He requested that the route of the new lines should be kept away from houses.	The new line should be laid along uninhabited area as far as possible	MEPCO should discourage and educate people not to construct houses under power lines.
10	Shahdan Lund	Qadir Baksh	Teacher	Shahdan Lund	06-July	Improved supply of electricity will allow farmers to use electric motors and turbines to supplement irrigation water, to help the local crops of gram, wheat and cotton. The use of diesel peter engines is expensive.		
11	Shahdan Lund	Ahmad Baksh	Teacher	Shahdan Lund	06-July	Load-shedding is more in villages, and affects all spheres of life, including schools. The GSS project should improve the situation in Shahdan Lund area.		

No.	Town	Name	Participants	Address	Date	Issues Raised/Concerns Expressed/Suggestions and Requests	Measures Proposed	Action Taken/ Proposed
12	Shahdan Lund	Abdur Rashid	Barber	Shahdan Lund	06-July	He thinks shortage of electricity is affecting everybody, especially business.		
13	Basti Tali wala	Muhammad Naeem Laghari	Tractor Driver	Basti Tali Wala	06-July	He supports the project. No other comments.		
14	Basti Tali wala	Haleema Mai	House Wife	Basti Tali wala	06-July	The project should offer job opportunities to local people of the village.	Skilled and un-skilled employment should be preferred to local people	MEPCO should employ locals for skilled / un-skilled jobs on priority.
15	Basti Tali wala	Amna Bibi	House Wife	Basti Tali wala	06-July	Prolonged load shedding in the summer is a nuisance. She hoped the new GSS will improve the situation.		
16	Basti Tali wala	Bashiran Bibi	House Wife	Basti Tali wala	06-July	No comment / suggestion		
17	Basti Tali wala	Fatima Bibi	House Wife	Basti Tali wala	06-July	No comment		
18	Shahdan Lund	Bhrawan	House Wife	Shahdan Lund	06-July	No comment / suggestion		
19	Shahdan Lund	Hajran Bibi	House Wife	Shahdan Lund	06-July	The existing lines are passing close to our roofs, and are a source of danger. The new lines should be kept away from the villages.	The new line should be laid along uninhabited area as far as possible	MEPCO should discourage and educate people not to construct houses under power lines.
20	Shahdan Lund	Jannatan bibi	House Wife	Shahdan Lund	06-July	No comment / suggestion		
21	Shahdan Lund	Zuhran bibi	House Wife	Shahdan Lund	06-July	The project should offer job opportunities to men of the village.	Skilled and un-skilled employment should be preferred to local people	MEPCO should employ locals for skilled / un-skilled jobs on priority.
22	Shahdan Lund	Sakina Bibi	House Wfie	Shahdan Lund	06-July	No comment / suggestion.		

Source: Consultants

BPI BRITISH POWER

ENVIRONMENTAL ASSESSMENT AND REVIEW FRAMEWORK

A. Development Activities Requiring Environmental Assessment and Review

The Government of Pakistan (the Government) has requested the Asian Development Bank (ADB) to provide a multi-tranche financing facility (MFF) to facilitate investments in power distribution and development of networks of the eight independent distribution companies (DISCOs) to distribute power to end user consumers. The MFF funding from ADB is expected to be released in stages (tranches). The Power Distribution Enhancement (PDE) Investment Program is part of the Government's long term energy security strategy. The proposed ADB intervention will finance new investments in PDE and assist capacity building of sector related agencies. The investment program will cover necessary PDE development activities in all distribution networks of the eight independent distribution companies (DISCOs) who distribute power to the end user/consumers of Pakistan. The development activities include additional and replacement transformers, distribution line extensions, new and replacement distribution lines, additional substations, transformer protection and other non network activities such as automatic meter reading, construction equipment, computerized accounting. New distribution lines to and from various network facilities and some of the above activities will also be included in the later tranches.

Under the MFF loan procedures of ADB, implementation of safeguards is to be achieved by environmental assessment of every subproject to be undertaken following *ADB Environment Policy (2002)* and *ADB Environmental Assessment Guidelines (2003)*. Power distribution enhancement and development type projects, that are limited to expansion of already developed facilities, have typically been classified as Category B.

The Government's regulations, the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations (2000) also categorize development projects into two schedules according to their potential environmental impact. The proponents of projects that have reasonably foreseeable impacts are required to submit an IEE for their respective projects (Schedule I). Projects that have more adverse environmental impact (Schedule II) are required to submit an environmental impact assessment (EIA) to the respective provincial Environmental Protection Agency (EPA). Distribution lines and substations are included under energy projects and IEE is required for distribution lines less than 11kv and large distribution projects (Schedule I). EIA is required by the Government for all projects involving distribution lines of 11kv and above and for grid substations (Schedule II). Expansion of facilities within existing substations is not scheduled as requiring environmental assessment. However disclosure of the scope and extent of each subproject to the relevant provincial EPA is recommended.

The first batch of investments (Tranche 1), with more than one hundred (100) subprojects, is dominated by replacement and installation of additional transformers and other equipment in existing substations, additional substations and connecting distribution lines as improvement and development of power distribution. Environmental assessments have been carried out for each subproject. Initial Environmental Examinations (IEEs) have been carried out following ADB's *Environment Policy 2002* and *Environmental Assessment*

Guidelines 2003 and the Government's environmental assessment regulations and guidelines, and a summary IEE (SIEE) with environmental management plan (EMP) and a monitoring budget is prepared for Tranche 1's subprojects.

This Environmental Assessment and Review Framework (EARF) has been prepared for the additional subprojects that will arise in the subsequent tranches, as required by ADB. The EARF identifies the broad scope of the MFF and outlines the policy, procedures and institutional requirements for preparing subsequent sub-projects under the MFF loan. The EA is Pakistan Electricity Planning (PEPCO). The Implementing Agency (IA) for each of the future subprojects will be the DISCO for that area. The DISCOs will be responsible for preparing environmental assessments (and implementing EMPs for subprojects as outlined in this framework) that must be submitted to ADB for review and approval prior to finalization of contracts or commencement of work. This EARF shall apply to all subprojects under the MFF so as to ensure that the environmental impacts are appropriately addressed and mitigated to acceptable levels.

Each subproject will undergo environmental assessment after categorisation and focus on the most significant issues. An SIEE for the tranche will be conducted after identifying the categories of the additional subprojects but before the PFR is submitted. Where a subproject requires an IEE at least one public consultation will be conducted with local community and potentially affected people. IEE will be approved before commencement of detailed design while IEE results will be communicated to the local community before commencement of construction. Any subprojects that are categorised "A" will require full environmental impact assessment (EIA) and will include two rounds of public consultation. The second consultation will be conducted after the draft EIA is prepared which include the EMP. A summary EIA (SEIA) will be made available to the general public at least 120 days before the subproject approval by ADB. Similar procedure will also apply to Category "B Sensitive" subprojects, with an IEE and SIEE (including an EMP) as required.

The Framework of Environmental Assessment on power extensions and augmentation subprojects, prepared and submitted to the Pakistan EPA, after hearings with provincial EPAs, has received a response. It has been clarified that all proponents must follow section 12 of the Pakistan Environmental Protection Act for all projects and furthermore that, only for augmentation projects, by following the Framework of Environmental Assessment the required procedures under section 12 will be met. Pakistan EPA has also assumed that all proponents will consult with the relevant provincial EPAs (PEPA) and follow their advice. It is noted that in 2006 Punjab EPA requested disclosure of the scope and extent of each subproject in order that the Director General of PEPA can determine if additional land is required and the need for IEE or EIA.

B. Environmental Criteria for Additional Subproject Selection

Potential adverse environmental impacts associated with PDE projects can be avoided or minimized through careful location, design, and route selection. Specific environmental criteria for subproject selection are:

(i) Potential environmental impacts associated with the subprojects will be minimized by realignment or selection of alternative sites or routes as preferred alternative.

- (ii) The subprojects should not disturb any cultural heritage designated by the Government or by international agencies such as UNESCO, and shall avoid any monuments of cultural or historical importance.
- (iii) The future subprojects will not be located within or near the core zone of any protected areas such as national parks, nature reserves, or wildlife sanctuaries as designated by EPA.
- (iv) An environmental management plan (EMP) with adequate implementation and monitoring budget will be developed for each subproject.
- (v) Clearing of any existing forest resources will be avoided if possible, and where unavoidable will be minimized and compensatory planting included in the EMP and budget for each subproject.
- (vi) The environmental assessment of the subprojects will be conducted according to *ADB's Environment Policy 2002* and *ADB Environmental Assessment Guidelines 2003*, the Government's environmental assessment regulations and guidelines, and the Environmental Assessment Review Framework (EARF).
- (vii) The subprojects shall only involve activities that follow Government's laws and regulations.

C. Responsibilities/Authorities of Various Agencies

The DISCOs as IAs will be solely responsible for the implementation of the entire environmental assessment and review procedures for selecting additional subprojects. This will include, but not be limited to, ensuring that the subproject selection criteria are strictly adhered to, that preparation of IEEs/SIEE or EIA/SEIA will be carried out in a timely and adequate manner, environmental monitoring and institutional requirements will be fully met while meaningful public consultations will be carried out satisfactorily. The IAs will submit the categorization checklist, IEE/SIEEs and EIA/SEIAs, and monitoring reports to ADB for review.

Prior to the submission of the PFR for a Trance of subprojects the IAs will:

(i) Prepare an environmental screening checklist to classify the subprojects in each Tranche.

(ii) Prepare the terms of reference for environmental consultants to conduct environmental assessments, prepare environmental assessments, IEE/EIA reports including an EMP, and SIEE/SEIA for public disclosure

(iii) Ensure that adequate public consultation has been undertaken with affected groups and local NGOs, review the environmental assessments and submit the IEE/EIAs, EMPs, SIEE/SEIA documents to ADB.

Prior to the commencement of civil works for a subprojects in a Tranche the IAs will:

(i) Submit the IEE/EIAs for regulatory approval of the relevant provincial environmental protection agency and obtain approval, e.g., environmental clearance, Non-Objection Certificate (NOC), forest clearance, and water board clearance as per the regulatory requirements of the Government.¹

(ii) Ensure that all regulatory clearances for the subproject that are obtained from the relevant Government authorities are submitted promptly to ADB

(iii) Ensure that the required mitigation measures during construction or the EMP are included in the bidding document of the subproject and that the all bidding contractors have access to the EIA/IEE and EMP.

During the implementation of civil works for a subprojects in a Tranche the IAs will:

(i) Ensure that an environmental management plan, including all proposed mitigation measures and monitoring programs, are properly implemented.

(ii) Monitor the implementation of EMP and present its monitoring report.

(iii) In case unpredicted environmental impacts occur during project implementation, inform ADB, review the EMP with the contractor, and implement alternative environmental mitigation program.

iv) In case a subproject changes in scope, inform ADB and reconfirm the environmental classification, determine whether a supplementary IEE or EIA study is required with ADB, and carry out the study.

(v) Submit the requisite reports on social and environmental compliance and implementing the Environmental Management Plan (EMP) as required by the Pakistan EPA and ADB.

(vi) Ensure that ADB be given access to undertake environmental due diligence for all subprojects. However, the IA shall have the main responsibility for undertaking environmental due diligence and monitoring of all the subprojects. The due diligence report as well as monitoring reports on EMP implementation will be systematically prepared and be available to the public, if requested.

ADB will be responsible for regular review and timely approval of subproject checklists and IEE/SIEEs and EIA/SEIAs. Technical guidance will be provided by ADB to the DISCO as needed. ADB will also be responsible for reviewing regular monitoring reports and officially disclosing the environmental assessments for selected subprojects on the ADB website.

During the MFF ADB will:

(i) Review environmental assessment reports as a basis for subproject and Tranche approvals.

(ii) Publicly disclose the SIEE and SEIA for category B sensitive and A subprojects, respectively, 120days before Tranche Approval via ADB websites

(iii) Monitor the EMP implementation and due diligence as part of MFF reviews.

(iv) Provide assistance to IAs, if required, in carrying out its responsibilities and for building capacity for safeguard compliance.

(v) Facilitate the required consultations with project affected groups and local NGOs, and to ensure that the borrower or project sponsor provides relevant information on the project's environmental issues in a form and language(s) accessible to those being consulted.

D. Environmental Assessment and Review Procedures of Additional Subprojects

1. Application of Selection Criteria

Any additional subproject not meeting the criteria listed above will not be put forward for consideration or inclusion under the MFF tranches. The environmental assessment of the subprojects will be conducted by the IA prior to the submission of the PFR for subsequent tranches and in line with the requirements of the FFA. A final check on conformity with the selection criteria will be made at the submission of detailed IEEs of additional subprojects for ADB's clearance.

2. Environmental Classification

Environmental categorization using the Rapid Environmental Assessment checklist approach in compliance with the ADB *Environmental Assessment Guidelines* will be applied to all subprojects.

3. Preparation of Detailed Design

Detailed design work for each additional subproject will include and follow the recommendations of the environmental assessments. The DISCOs will include the requirements of the EMP and IEE/EIAs in the bid documents and ensure the detailed designs include such requirements before contracts are finalized. Where modifications to designs are incorporated at a later stage, the requirements of the EMP and IEE/EIAs will also be included. Certification to ADB that the detailed designs comply with IEE/EIAs (including EMP) recommendations will be required before contracts can be signed and made effective. The DISCOs shall also allocate sufficient resources to create and operate an Environmental and Social Cell to monitor the environmental assessment process for all subprojects under the MFF.

4. Preparation of Construction Contracts

Early in the implementation period, model construction contracts will be prepared incorporating general environmental safeguards and practices. Specific, individual contracts will be based on the model contracts, but will also be checked by the DISCOs to ensure that all special or particular safeguard requirements and mitigation measures, recommended in the IEE/EIA (including EMP) for the particular additional subproject, are all incorporated within the contract. The DISCO shall also allocate sufficient resources to the Environmental and Social Cell to monitor and undertake the environmental mitigation measures of all construction contracts under the MFF.

5. Monitoring During the Construction Period

Monitoring during construction will be the responsibility of the DISCO's. Monitoring will relate to compliance with construction contracts, the state and health of the nearby environmental resources, and the effectiveness of mitigation measures. Reporting will be to the relevant provincial or federal EPA on a regular basis (at least quarterly) and to ADB semi-annually.

6. Monitoring of Subproject Operations

It is desirable to formulate the EMP in such a way so as to minimize recurrent responsibilities and costs. However in circumstances where staff, expertise and finances are limited, some aspects of additional subproject design may require continuous monitoring to guard against negative environmental impacts. Reporting will be to the relevant provincial or federal EPA on a quarterly basis and to ADB semi-annually.

Monitoring of issues related to compensation of landowners for land acquisition and loss of production, etc. are separately addressed in the Resettlement Action Plan.

E. Public Disclosure

In disclosing the environmental document to the public, (i) PEPCO is responsible for ensuring that all environmental assessment documentation, including the environmental due diligence and monitoring reports, are properly and systematically kept as part of an PEPCO /DISCO project-specific record; (ii) all environmental documents are subject to public disclosure, and therefore may be made available to public; (iii) for category-A and B-sensitive subprojects, the SEIA/SIEE will be publicly disclosed through ADB's websites 120 days before civil works start, while the SEIA/SIEE be reviewed by ADB prior to disclosure; and (iv) DISCOs will ensure that public consultations, particularly with project affected persons, are undertaken adequately during the IEE/EIA process for any future subprojects.

PEPCO will ensure that each of the DISCOSs plans and establishes Social and Environmental Cells. The Cell will ensure that the environmental assessment and review framework is strictly implemented. Environment consultants will be hired, under the guidance of the staff of the Cell and ADB to (i) prepare IEEs and EIAs for the follow-up subprojects and (ii) supervise the implementation of mitigation measures and monitoring programs as part of the EMP. The responsibility for preparing the monitoring report on EMP implementing will rest with the staff of this Social and Environmental Cell. The project costs for Tranche 1 have incorporated a budget and resource needed to (i) implement the environmental review and screening procedure, (ii) undertake the IEE/EIA studies for the followup subprojects,(iii) undertake environmental mitigation measures as required and (iv) monitor the implementation of EMPs. Discussion on medium and long term capacity building assistance to the Social and Environmental Cell will be undertaken annually.

Annex 1 summarizes an environmental management plan in matrix form that will apply to future subprojects. Additional requirements may be necessary for some sub-projects. The matrix is developed on the basis of environmental assessment for the Tranche 1 subprojects. The mitigation measures for the additional subprojects will be developed in the spirit of the principles agreed upon in this EMP. However the EMP for all subprojects will be a working document and any unanticipated consequence(s) of the project will be documented in the regular quarterly reports while environmental mitigation measures will be modified to take account of unexpected impacts as necessary, throughout the implementation period.

Environmental monitoring will consist of regular systematic checking that the above-mentioned environmental management measures have been implemented effectively during each stage of the project. Table 1 presents the summary

Power Distribution Enhancement MFF Project – Pakistan monitoring plan for the Project. Table 2 presents the indicative estimated costs for

EMP implementation of the Tranche 1 subprojects.

Environmental Monitoring Tasks Implementation Implementation Responsibility Schedule **PRE Construction Phase** Audit project bidding documents to ensure **DISCO** through project Prior to issue of bidding IEE/EIA and EMP is included. implementation unit documents. Monitor contractor's detailed alignment survey **DISCO** with assistance Prior to DISCO approval to ensure relevant environmental mitigation of project of contractor's detailed measures in EMP have been included. implementation unit alignment survey. **DISCO** with assistance Audit detailed designs of Facilities to ensure Prior to DISCO approval of contractor's detailed standard environmental safeguards/mitigation of project implementation unit measures (as identified in EMP) have been desians. included. **Construction Phase** Regular monitoring and Reporting of **DISCO** with assistance Continuous throughout contractor's compliance with contractual construction period. of project environmental mitigation measures. implementation unit **Operation and Maintenance Phase** Observations during routine maintenance DISCO As per DISCO inspection inspections of facilities and distribution lines schedules ROWs. Inspections will include monitoring implementation status of mitigation measures specified in EMP.

Table 1: Summary Environmental Monitoring Plan

Note: Monitoring of issues related to compensation of landowners for land acquisition and loss of production, etc. are addressed in the Resettlement Action Plan.

F. Institutional Arrangements

The implementing agency for the Project will be DISCO. An Environment Officer shall be in post for the duration of the MFF loan and shall report directly to the head of the region of DISCO, who will be accountable and responsible for implementation of the EMP. The dedicated Environmental Officer to coordinate consistently the implementation of the EMP in all subprojects.

The Environmental Officer shall also be responsible for coordinating and supervising environmental monitoring, quality control, and writing the quarterly progress reports on implementation of the EMP. The implementation of EMP shall commence immediately upon commencement of the construction. The Environmental Officer will therefore be designated at least one month before and released for duty before the loan becomes effective. DISCOs will further ensure the release of resources for environmental management and that monitoring budgets are made available for timely EMP implementation.



ltem	Sub Item	Total Cost (\$)
Monitoring activities	As detailed under EMP	_
Mitigation measures	As prescribed under EMP and IEE	_
Independent audit and monitoring agencies	As described above	
Contingency	3% contingency	-
Total		—

Table 2: Summary of Estimated Costs for EMP Implementation

G. Disclosure, Consultation and Grievances

The EMP (as part of the IEE) prepared for additional sub projects will be translated into local language(s) and made available to the public. Public disclosure and a complaints contact person in each of the DISCOs will be set up for each of the subproject locations to address all concerns and grievances of the local communities and affected parties. A responsible official from region/corporate office will represent DISCO and will be responsible to disseminate information about the expected performance the contractor. The contact person will meet with local communities if requested or as required.

H. Monitoring and Evaluation

The EMP will have both internal and external monitoring. The Environmental Officer at the local level will be responsible for internal monitoring of the EMP implementation, and will forward quarterly progress reports to DISCO. The reports will contain progress made in EMP implementation with particular attention to compliance with the principles and matrix set out in the EMP. The DISCO will submit semi-annual monitoring report to ADB.

APPENDIX 12: LAND ACQUISITION & RESETTLEMENT FRAMEWORK

Power Distribution Enhancement

Multi-Tranche Financing Facility (MFF)

(ADB TA No. 4876-PAK)

LAND ACQUISITION AND RESETTLEMENT FRAMEWORK (LARF)

February 2008

GOVERNMENT OF PAKISTAN

Pakistan Electric Power Company (PEPCO)

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ABBREVIATIONS

ADB	Asian Development Bank
AF	Affected Family
АН	Affected Household
AP	Affected Person
BOR	Board of Revenue (Provincial)
CAS	Compulsory (Land) Acquisition Surcharge (Covernment: 15%: Companies: 25%)
CRO	Computity Recod Organization
	(Dower) Distribution Companies (of Dekisten), including
DISCUS	(Power) Distribution Companies (of Pakistan), including.
PEPCO	Pakistan Electric Power Company (Lanore. Coordinates Power Generation,
	ransmission and Distribution to Eight DISCOS)
FESCO	Faisalabad Electric Supply Company
GEPCO	Gujranwala Electric Power Company
HESCO	Hyderabad Electric Supply Company
IESCO	Islamabad Electric Supply Company
LESCO	Lahore Electric Supply Company
MEPCO	Multan Electric Power Company
PESCO	Peshawar Electric Supply Company
QESCO	Quetta Electric Supply Company
DDR	Due Diligence Report
DOR	District Officer (Revenue) (see also LAC)
EA	Executing Agency (PEPCO)
EIA	Environmental Impact Assessment
EMA	External Monitoring Agency (Consultant)
EPA	Environmental Protection Agency (Pakistan/Provincial)
FFA	Framework Financing Agreement
FY	Fiscal Year
GRC	Grievance Redress Committee
	Implementing Agency (Each DISCO in its respective area)
	Indigenous Development Framework
	Indigenous Peoples Development Plan
	Indigenous reopies Development rian
	Multi Transha Financian Facility
	Multi-Iranche Financing Facility
LAA	Land Acquisition Act, 1894 (amended)
LAC	Land Acquisition Collector (see also DOR)
LAR	Land Acquisition and Resettlement
LARF	Land Acquisition and Resettlement Framework
LARP	Land Acquisition and Resettlement Plan
LARU	Land Acquisition and Resettlement Unit (PEPCO/DISCOs)
kV	Killo-Volt (Unit of Power/Electricity)
NEPRA	National Electric Power Regulating Authority
NGO	Non-Governmental Organization
NRP	National Resettlement Policy of Pakistan (Not Yet Approved)
NTDC	National Transmission and Dispatch Company
NWFP	North-West Frontier Province
Pⅅ	Planning and Development Department (Provincial)
PBR	Provincial Boards of Revenue (NWFP, Puniab, Sindh and Balochistan)
PEPCO	Pakistan Electric Power Company (Lahore: Coordinates Power Generation.
	Transmission and Distribution to Fight DISCOs)
PMU	Project/Program Management Unit (PEPCO/DISCOs)
PPTA	Project Preparatory Technical Assistance (ADB)
SDC	Social Development Cell
ТА	Technical Assistance (Project Prenaration Grant - PPTA)
	Water and Province Development Authority

DEFINITION OF TERMS

Beneficiary Community - All persons and households situated within the governmentowned or acquired property who voluntarily seek to avail and be part of The Facility and represented by a community association that is duly recognized by the community residents, accredited by the local government, and legally registered with the appropriate institutions.

Compensation - Payment in cash or in kind of the replacement cost of the acquired assets.

Entitlement - Range of measures comprising compensation, income restoration, transfer assistance, income substitution, and relocation which are due to affected people, depending on the nature of their losses, to restore their economic and social base.

Host population - Community residing near the area where a project beneficiaries propose to voluntarily resettle as part of the subproject.

Improvements - Structures constructed (dwelling unit, fence, waiting sheds, animal pens, utilities, community facilities, stores, warehouses, etc.) and crops/plants planted by the person, household, institution, or organization.

Land Acquisition - The process whereby a person is compelled by a government agency to alienate all or part of the land a person owns or possesses to the ownership and possession of the government agency for public purpose in return for a consideration.

Affected Person/People - Any person affected by Project-related changes in use of land, water, natural resources, or income losses.

Affected Family - All members of a household residing under one roof and operating as a single economic unit, who are adversely affected by a project, or any of its components. It may consist of a single nuclear family or an extended family group.

Rehabilitation - Compensatory measures provided under the Policy Framework on involuntary resettlement other than payment of the replacement cost of acquired assets.

Relocation - the physical relocation of a AP/AF from her/his pre-Project place of residence.

Replacement Cost - The value determined to be fair compensation for land based on its productive potential, the replacement cost of houses and structures (current fair market price of building materials and labor without depreciation or deductions for salvaged building material), and the market value of residential land, crops, trees, and other commodities.

Resettlement - All measures taken to mitigate any and all adverse impacts of a project on AP's property and/or livelihood, including compensation, relocation (where relevant), and rehabilitation of the damaged/removed infrastructure and installations.

LAND ACQUISITION AND RESETTLEMENT FRAMEWORK (LARF)

A. INTRODUCTION

- This Resettlement Framework (LARF) for the Power Distribution Enhancement Multi-1. Tranche Financing Facility (MFF), Pakistan (The Facility) has been prepared by the Pakistan Electric Power Company (PEPCO) and endorsed by all the eight Distribution Companies (DISCO) participating in The Facility, for providing guidance in the preparation and implementation of Land Acquisition and Resettlement (LAR) tasks for the power distribution subprojects in a fashion fitting the ADB Policy on Involuntary Resettlement and LAR conditionalities for the Multi-tranche Finacing Facility (MFF). The LARF sets out the objectives, principles, eligibility criteria for affected people (APs), entitlements, legal and institutional framework, modes of compensation and rehabilitation, participation and consultation procedures and grievance redress mechanisms which will be employed to compensate, resettle and rehabilitate living standards of APs. The LARF also sets out the steps for preparation of LAR Plans (LARP) for the power distribution enhancement subprojects under all the eight DISCOs. This LARF is fully endorsed by PEPCO, all the eight DISCOs, Provincial Boards of Revenue (PBR) and by the concerned Provincial and District governments in the Program areas, and hereby seeks counter-endorsement of ADB.
- 2. The Facility will be financed by ADB through a Multi-*Tranche* Financing Facility (MFF or the Facility) including three *tranches*, each covering a number of subprojects. The Facility appraisal includes the appraisal of the first MFF *tranche* which involves subprojects targeting the expansion of existing grid stations through addition of transformers, construction of new grid stations, and installation of 132kV or 66kV transmission lines of various lengths. Based on the ADB operational policies regulating MFF proceedings all subprojects within a proposed *tranche* will have to be fully prepared. This will include, for subprojects entailing LAR, full LAR documentation, including if needed Land Acquisition and Resettlement Plans (LARPs)¹⁷.
- 3. Prior to MFF appraisal this LARF will be translated into Urdu, distributed (in English and Urdu) to the respective DISCOs and subproject's Field Offices as a public document available to the AP communities upon request, and will be posted on the ADB website.

B. LAR PROCESSING REQUIREMENTS

- 4. Based on ADB policy and practice the appraisal of the MFF and each specific *tranche* and the approval of the implementation of subprojects under a *tranche* will require the preparation of a number of documents as follows:
 - a Land Acquisition and Resettlement Framework (LARF) for the whole financial facility and applicable to all subprojects. The LARF will be reviewed, if necessary updated, and resubmitted for ADB and Government approval as a condition to approve each new *tranche* under the Facility.
 - (ii) an Initial Poverty and Social Assessment (IPSA) initially for the whole Project and if necessary for each of the subsequent *tranches*, indicating whether LAR impacts are likely to occur, type of impacts, likely magnitude, and whether there may be Indigenous Peoples (IP) affected; and

¹⁷ It should be noted that, in fact, only part of the subprojects under this MFF will require LAR as some of the grid stations and transformers will be installed within existing grid station areas or on land already owned by the respective Discos. However, all the new transmission lines will require LARPs mainly crop compensation.
- (iii) if in a specific project under a tranche LAR is needed, either a LAR Due Diligence Report (DDR) or a Land Acquisition and Resettlement Plan (LARP) based on detailed design. The DDR, to be prepared in cases where the ADB policy on involuntary resettlement will not be triggered (see below), will provide detailed information on how land has been acquired. The LARP, to be prepared when instead the ADB policy on involuntary resettlement will apply, will include detailed compensation and administration budgets, institutional arrangements, implementation schedules relating to the compensation and and relocation/rehabilitation processes prior to the initiation of civil and installation works.
- 5. As detailed in the *ADB Handbook on Resettlement: A Guide to Good Practice (1998),* the content and complexity of a LARP varies depending on the degree of severity caused by a subproject. When impacts are considered *severe* [i.e., > 200 affected people (AP) or about 50 affected families (AFs) to be resettled or suffering >10% income losses], a subproject will be classified as Category "A", for which a Full LARP will be prepared (Annex A). On the other hand, when losses are not *severe* [<200 AP or about 50 AFs to be resettled or suffering <10% income losses], a subproject will be classified as Category "A", for which a Full LARP will be prepared (Annex A). On the other hand, when losses are not *severe* [<200 AP or about 50 AFs to be resettled or suffering <10% income losses], a subproject will be classified as Category "B", for which only a Short LARP will need to be prepared (Annex B), and the subprojects with no resettlement impacts expected will be tagged as Category "C" Subprojects for which the ADB's prescribed Forms for IR and IP Categorizations (Annexes C & D) will be filled out and attached to the subproject documents for seeking ADB approval and financing.
- 6. Based on ADB policy and practice, the appraisal of the MFF and each specific *tranche* and the approval of the implementation of subprojects under a *tranche* will be based on the following LAR-related conditionalities:
 - (i) MFF and first tranche appraisal: Conditional to the preparation of: (a) a LARF for the whole MFF acceptable to ADB and (b) separate LARPs/DDRs for all subprojects requiring LAR included the first tranche.
 - (ii) Following tranches appraisal: Conditional to: (a.) review/update of the LARF (if necessary), and (b.) preparation of a LARP/DDR consistent with the revised LARF for each project requiring LAR.
 - (iii) **Provision of notice to proceed to the subproject contractors:** Conditional to the full implementation of the LARP for each relevant subproject. Such a condition will be clearly spelled out in the text of the civil works contract, including satisfactory rehabilitation of all the private, communal and public infrastructure that may be damaged during the course of the subproject implementation.
- 7. To fit the above requirements PEPCO in consultation with all the eight DISCOs has (i) prepared: this LARF; (ii) fully designed all subprojects under *tranche 1*; and (iii) prepared 1 Short LARP + DDR for one subproject; 6 Short LARPs for other 6 subprojects and 1 DDRs for one final subproject.

C. EXPECTED PROJECT IMPACTS

- 8. Impacts on land and assets, resettlement, and income rehabilitation needs vary according to the type of infrastructure built under The Facility, namely: (i) new grid stations/substations; (ii) secondary transmission lines (STL) and (iii) distribution lines (DL).
 - (i) **Grid Stations/substations.** In the case of new grid stations and substations under the Secondary Transmission Grid (STG) component of The Facility new land <u>may have to be acquired.</u> In such a case this will be done according to

various modalities which in some cases may trigger the ADB resettlement policy and the right of eminent domain.(see below D).

- (ii) Secondary Transmission/Medium voltage Distribution Lines (33 kV and above). In the case of Lines 33kV and above land <u>may have to be acquired</u> when tower bases permanently affect land. For urban/rural residentialcommercial land this will be always the case while for rural/agricultural land this will be so when access and cultivation under a new tower will not be possible. Beside land acquisition, the construction of towers and TLs may require the acquisition of houses and will require rehabilitation for income losses due to impacts on businesses, crops or tree losses.
- (iii) Medium Voltage Distribution Lines (up to 11 kV). In the case of Lines (up to 11kV) land will not have to be acquired since these are small lines built on small poles which are commonly sited in public land along roads before entering the plot of the final beneficiary who requested the line extension and pays for it. In order to ensure that this will always be the case The loan agreement includes a covenant stating that lines up to 11 kV requiring land acquisition or negatively affecting land under private use are not eligible under the Facility.

D. LAND ACQUISITION MODALITIES AND APPLICATION OF THE ADB INVOLUNTARY RESETTLEMENT POLICY

- 9. All the eight DISCOs being the community service organizations supplying power for public use, have already adopted well established modes to acquire the land needed to build their power distribution enhancement projects. These modes include:
 - (i) **Voluntary provision (donations) of unoccupied land** for the installation of a grid station by the community requesting linkage to the power grid, such as planned housing development schemes and industrial estates;
 - (ii) Acquisition of unoccupied Government owned land against a negotiated price;
 - (iii) Free Purchase of unoccupied land on the market from a willing seller at a negotiated price; and,
 - (iv) Involuntary land acquisition under Land Acquisition Act, 1894 (amended), through the concerned Provincial Board of Revenue (BOR) and/or the concerned District's Land Acquisition Collector (LAC). This is always the last options, when all the first three options are not feasible, as this option often involves: (i) adverse impacts on affected persons/families and communities; (ii) high costs; (iii) lengthy procedures; and, (iv) processing delays.
- 10. Of the above, modes 1, 2, and 3 are adopted for the acquisition of land for facilities that do not imply the right of eminent domain nor trigger the ADB policy on Involuntary Resettlement. These facilities are essentially grid stations that do not need a specific construction place. Mode 4, on the contrary, implies the ultimate possibility of land expropriation and is subjected to the full preparation and implementation of LARPs as required by the ADB policy. Mode 4 is the only viable approach for the acquisition of land for a station that needs to be located in one specific place, and for the acquisition of land related to transmission lines.
- 11. Based on the above, ADB will approve the selection of projects with land acquired under Mode 1, 2, and 3 without the preparation of a LARP and based only on a Land Acquisition Due-Diligence Document (LADDD) clearly documenting:
 - (i) identity and legitimate property (title) of the previous owner;
 - (ii) market value of plot and proof of purchase with amount value paid for it;

- (iii) the fully voluntary nature of the sale or donation through signatures, and
- (iv) that the acquired plot is not rented, encroached, encumbered, or with liens.
- 12. In case of projects involving land acquisition to be carried out under method 4 or even under the other methods when the plots to be acquired are rented out or occupied by encroachers, ADB will approve project implementation only if a LARP as defined below is prepared and fully carried out before the implementation of the subproject.
- 13. Box 1 summarizes the above.

Box 1: Land Acquisition Options and Application of the LARF

	Modality	Status/Use of Land	Land Transfer to DISCO	Documentary
				Requirement
0	No Land acquisition	Within the bounds of existing grid	No transfer	ADB's IR & IP
		station, with no expansion		Categorization Forms
1	Voluntary land donation	(a) Vacant plot without legal/illegal users	Transfer of land to DISCO	LARDDR
	by company/community	(b) Plot with Legal or Illegal users	based on donation agreement	Short/Full LARP
2	Public land purchase	(a) Vacant plot without legal/illegal users	Transfer of land to DISCO	LARDDR
		(b) Plot with Legal or Illegal users	based on agreed price	Short/Full LARP
3	Free Purchase of Land	(a)Titled plot without legal/illegal users	Transfer of land against a	LARDDR
	on the market.	(b) Titled plot with legal/illegal users	mutually agreed land price	Short/Full LARP
4	Involuntary land	Owned/Possessed by Private	Transfer of land to DISCO for	Short/Full LARP
	acquisition under	Landowners (legal or Illegal).	cash compensation to affected	
	eminent domain	Likely in case of transmission lines.	persons (AP) through LAC	

E. LARP PREPARATION AND IMPLEMENTATION

14. LARP preparation activities will be initiated as part of the preparation of each *tranche* appraisal. Following the completion of detailed design each LARP will be reviewed and if necessary updated prior to its implementation. The design and supervision Consultant will have both international and local LAR capacity sufficient to cover all LAR planning and implementation needs for the first three year of the *tranche* implementation. ADB will provide capacity to the Pakistan Resident Mission in Islamabad for the review and approval of Category "B" Short LARPs and Category "C" (No Impact) IR and IP Categorization Forms. However, the Category "A" Full LARPs will be reviewed and approved by the Regional Department at ADB headquarters in Manila.

F. INDIGENOUS PEOPLES AND VULNERABLE GROUPS

- 15. If the IPSA undertaken for each subproject shows that there exist Indigenous Peoples (IP) who are likely to be negatively affected, special attention will need to be given to identify and address their special compensation, rehabilitation and/or developmental needs. The general approach on IP issues for The Facility has been defined in the Indigenous Peoples Development Framework (IPDF) prepared by PEPCO as a condition to The Facility appraisal. Based on the IPDF when a subproject will cause impacts on IPs the preparation of either an IPDP or a 'special action' included in the LARP will be required.
- 16. For what concerns LAR, the LARPs prepared and implemented in Tribal areas will surely have to be adapted to the specific administrative situations in those areas and to the features of local society and land administration which are radically different from those of mainstream society. As long as the impacts of a subproject are limited to LAR effects affecting single social units the adaptation work to be done will essentially be the production of a culturally sensitive LARP. However, if the subproject causes impacts that negatively affect broad communities and have systemic effects on livelihoods and cultural systems, a self-standing IPDP inclusive of specific budgets and schedules will have to be prepared and implemented.

17. Special attention will also be given to identifying and addressing the needs of disadvantaged groups such as the landless, the poor, female-headed households, the elderly and the disabled, through measures included in the resettlement plan to try and improve (over and above cash compensations and restoration of) their livelihoods.

G. LEGAL AND POLICY BACKGROUND

G.1. Policy Provisions, Eligibility and Entitlements

18. For what concerns matters of land acquisition relative to subprojects requiring the application of the right of eminent domain, LAR will be regulated by different bodies of law, in particular the Land Acquisition Act (LAA) of 1984 covering land acquisition for stations and towers in urban areas and the Telegraphic Act of 1885 covering the construction of towers in rural areas. The Katch Abadi Act of 1997 will cover the rehabilitation of affected squatters.

G.2 Pakistan's Law and Regulations on Land Acquisition and Resettlement

a. Land Acquisition Act, 1894

- 19. With the exception of impacts caused by poles and towers for public utilities land acquisition in Pakistan is regulated by the Land Acquisition Act, 1894 (LAA) with its successive amendments is the main law regulating land acquisition for public purpose. The LAA has been variously interpreted by local governments, and some province has augmented the LAA by issuing provincial legislations. The LAA and its Implementation Rules require that following an impacts assessment/valuation effort, land and crops are compensated in cash at market rate to titled landowners and registered land tenants/users, respectively. The LAA mandates that land valuation is to be based on the latest three years average registered land sale rates, though, in several recent cases the median rate over the past year, or even the current rates, have been applied. Due to widespread land under-valuation by the Revenue Department, current market rates are now frequently used with an added 15% Compulsory Acquisition Surcharge as provided in the LAA.
- 20. Based on the LAA, only legal owners and tenants registered with the Land Revenue Department or possessing formal lease agreements, are eligible for compensation or livelihood support. The rights of the non-titled are however addressed under the 1986 Punjab Jinnah Abadis for Non-proprietors in Rural Areas Act which recognize to squatters the right to receive rehabilitation in form of a replacement plot. It is to be noted that this right has been sometimes extended in practice to include some form of rehabilitation in cash or in forms different from land. Projects such as Chotiari Dam, Ghazi Barotha Hydropower, and National Highways Improvement, have awarded compensation and assistance to unregistered tenants and other forms of AH (sharecroppers/squatters).
- 21. It is also noted that the LAA does not automatically mandate for specific rehabilitation/assistance provisions benefiting the poor, vulnerable groups, or severely affected AHs, nor it automatically provides for rehabilitation of income/livelihood losses or resettlement costs. This however it is often done in many projects in form of ad hoc arrangements based on negotiations between a specific EA and the AHs.
- 22. As noted above, there are exceptions to the rule and the law is broadly interpreted at provincial level depending on operational requirements, local needs, and socio-economic circumstances. Recourse is often taken to ad hoc arrangements, agreements and understandings for resettlement in difficult situations. The above is also influenced by the fact that an amendment of the LAA has been considered necessary by the Ministry of Environment. Accordingly, a National Resettlement Policy and a Resettlement Ordinance have been drafted to broaden LAA provisions and current practices so as to widen the

scope of eligibility, but both these documents are still awaiting Government approval for implementation.

b. Telegraph Act (TA), 1885

- 23. In case of impacts caused by poles and towers for public facilities and transmission lines land acquisition is not regulated by the LAA but instead by the Telegraph Act, 1885 (amended in 1975). The TA has been adopted by the DISCOS for the construction and maintenance of transmission/distribution lines. The TA was conceived in the British era for telegraphic poles and then was passed to post-independence Pakistan with a broader application covering also electric poles and towers. The original provision of this law was that the land occupied by telegraph poles was not to be compensated (only crops destroyed during the erection of the pole were compensated). This was based on the logic that a pole, covering only a negligible land area, does not cause substantial impacts to land users. This however is no longer the case once the same provision is extended to transmission towers.
- 24. The Telegraph Act (section 11) confers powers on the DISCOS to enter private lands and (section 10) construct/maintain electric poles and lines without the need to acquire the land affected and paying compensation for it. However sub-section 10 (d), provides that a DISCO is required to avoid causing unnecessary damages to the affected land and associated assets. Finally section 16 provides that if any such damage occurs (i.e. damages to crops, irrigation facilities, land quality or land income) The Facility proponent has to provide just compensation for the damages caused.
- 25. To accommodate the APs needs under this Program the DISCOs have ageed to apply the Telegraphic act liberally by: (i) compensating at market rates all land occupied by towers in urban areas; (ii) by avoiding land impacts in rural areas through the use of towers with sufficient vertical clearance to allow the continuation of unrestricted farming and animal grazing, and (iii) if the construction of such towers is impossible, by compensating the land occupied by tower bases land also in rural areas. In addition the DISCOs will compensate by default all crops expected to be affected by the 3 major DL construction phases: (i) construction of tower bases; (ii) tower erection; and (iii) stringing.

c. The Katchi Abadi Act (KAA) of 1987

26. The Katchi Abadi Act (KAA) covers the urban squatters rehabilitation rights by providing plots in public resettlement areas or cash assistance. Based on the KAA the DISCOs will provide rehabilitation compensation to eventual squatters/encroachers affected by The Facility.

G.3 ADB's Involuntary Resettlement Policy

- 27. The ADB Policy on Involuntary Resettlement is based on the following principles:
 - Involuntary resettlement is to be avoided or at least minimized.
 - Compensation must ensure the maintenance of the AHs' pre-project living standards.
 - Compensation is required for any AH who as a result of a project has their access to, or use of, land restricted.
 - AHs should be fully informed and consulted on LAR compensation options.
 - AHs' socio-cultural institutions should be supported/ used as much as possible.
 - Compensation will be carried out with equal consideration of women and men.
 - Lack of formal legal land title should not be a hindrance to rehabilitation.

- Particular attention should be paid to households headed by women and other vulnerable groups, such as indigenous people and ethnic minorities, and appropriate assistance should be provided to help them improve their status.
- LAR should be conceived and executed as a part of a subproject, and the full costs of compensation should be included in project costs and benefits.
- Compensation/rehabilitation assistance will be paid prior to ground leveling and demolition.

G.4 Comparison of Land Acquisition Act and ADB Resettlement Policy

28. Table 1 below outlines the differences between Pakistani Law and ADB policy.



Pakistan's Land Acquisition & Telegraph Acts	ADB Involuntary Resettlement Policy
Land compensation only for titled landowners or holders of customary rights.	Lack of title should not be a bar to compensation and/or rehabilitation. Non-title-holders are to be rehabilitated.
Crop losses compensation provided only to registered landowners and lease/sharecrop tenants (Non-registered are often deprived).	Crop compensation are provided to landowners and sharecrop/lease tenants according to their shares whether they are registered or not
Tree losses are compensated on the basis of officially fixed rates by the Forest and Horticulture departments	Tree losses are compensated according to actual worth of Affected trees based on market rates.
Land valuation based on the median registered land transfer rate over the previous 3 years.	Land valuation is to be based on current replacement (open market) value.
Structures valuation based on official rates, with depreciation deducted from the structure gross value.	Valuation of built-up structures is based on current market value/cost of new construction of the structure
Land Acquisition Collector (LAC) or District Judge (in case of the Telegraph act) are the final authorities to decide disputes and address complaints regarding quantification and assessment of compensation for the affected lands and other assets	Complaints and grievances are resolved informally through community participation in the Grievance Redress Committees (GRC), local governments, NGO and/or local-level community based organizations
The Telegraph act (TA) provides that land for tower construction or under a transmission line is not to be acquired or compensated as long as the land's permanent productive potential is not affected. Under the TA therefore only temporary impacts on crops are compensated.	Based on ADB policy all land impacts are to be compensated. As urban/residential-commercial land is affected both if a tower provides clearance or not, the TA provisions have been modified for this project so as to address damages that a tower causes to plots with real estate value. For this project urban and commercial or residential plots wether urban or rural will be fully acquired and compensated at market rates. The same will happen in case of rural/agricultural land when the land under a tower is no longer usable or access o it is restricted.

Box 2: Pakistan and ADB Land Acquisition Policies

G. 5 Remedial Measures to Bridge the Gap

29. In principle, Pakistan Law and ADB Policy adhere not only to the objective of AH compensation, but also to that of AH rehabilitation. However, Pakistan law is unclear on how rehabilitation is to be achieved and in practice the provision of rehabilitation is left to ad hoc arrangements of local governments and project proponents. To clarify these issues and reconcile gaps between Pakistani Laws and ADB Policy, MEPCO will comply with the LARF prepared for the program, ensuring compensation at replacement cost for all items affected, the rehabilitation of informal settlers, and the provision of subsidies or allowances for any AHs that may be relocated, suffer business losses, or who may be severely affected.

G.6 Land Classification

- 30. In terms of application of the LARF prepared for the program, identifying the type of land affected is an important step in determining whether land is to be compensated or not. According to the LARF, the land classification, as well as, land use will be the basis for identifying the affected lands. They are: (i) urban versus rural lands; and, (ii) residential/commercial versus agricultural lands.
- 31. Urban or residential/commercial land affected by tower construction both in rural and urban areas will be considered as acquired permanently and land compensation will be paid to the affected households. Agricultural land in rural areas, instead, will not be considered as permanently affected as long as permanent cultivation and access remains possible under a tower and therefore will not be acquired and compensated. However, when land under a tower become un-accessible agricultural /rural land will be considered as permanently affected and as such acquired and compensated.
- 32. For The Facility Urban and Rural areas will be identified based on the official records of the board of revenue.

33. Also for The Facility residential, commercial and agricultural plots will be identified based on the classification provided by district revenue records or based on the actual use of the affected land prior to the entitlements cut-off date. In case of discordance between revenue records and actual use the latter will prevail.

H. COMPENSATION ELIGIBILITY AND ENTITLEMENTS FOR THE FACILITY

34. LAR tasks based on the principle of eminent domain will be implemented according to a compensation eligibility and entitlements framework in line with both Pakistani law/regulation and ADB Policy. A summary entitlements matrix is provided in Box 2, next page.

H.1 Eligibility

- 35. APs entitled for compensation or, at least provisions for rehabilitation assistance under The Facility are:
 - All APs losing land whether covered by legal title/traditional land rights or without any legal/traditional status;
 - Tenants and sharecroppers whether registered or not;
 - Owners of buildings, crops, plants, or other objects attached to the land, irrespective of their legal status;
 - APs losing business, income, and salaries;
 - Rehabilitation all affected private, communal and/or public infrastructure to their original status and usage levels.

Box 3: Compensation Eligibility and Entitlements Matrix				
Asset	Specification	Affected People	Compensation Entitlements	
Land permanently acquired for sub- station	Donated/bought on the open market 2. Acquired via right of eminent domain	Land owners	 if donated or voluntarily sold ADB Policy is not triggered If acquired via exercise of the right of eminent domain land will be compensated at full market value. 	
Arable Land temporarily affected by construction of	Access is not restricted and existing or current land use will remain unchanged by the construction of towers and	Farmer, Titleholder	No land compensation provided that land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below	
towers or TL.		Leaseholder (registered or not)	No land compensation provided that the land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below	
	transmission line	Sharecroppers (registered or not)	Compensation, in cash or kind, for all damaged crops/trees as per item below	
		Squatters	Compensation, in cash, for all damaged crops/trees as per item below	
		Farmer, Titleholder	Land for land compensation with plots of equal value and productivity to the plots lost; or cash for affected land at replacement cost based on market value plus 15% compulsory acquisition surcharge and free of taxes, registration, and transfer costs	
Arable Land where	All adverse effects on land use independent of severity of impact	Leaseholder (registered or not)	Renewal of lease in plots of equal value/productivity of plots lost, or Cash equivalent to market value of gross yield of affected land for the remaining lease years (up to a maximum of 3 years).	
tower/TL		Sharecroppers (registered or not)	Cash compensation equal to market value of lost harvest share once (temporary impact) or twice (permanent impact)	
construction restricts access or		Agricultural workers	Cash indemnity equal to salary (including portions in kind) for remaining part of agricultural year.	
agnetiturar use.		Squatters	1 rehabilitation allowance equal to market value of 1 gross harvest (additional to crop compensation) for land use loss.	
	Additional for severe impacts (>10% of land loss)	Farmer, Titleholder Leaseholder	1 severe impact allowance equal to market value of gross harvest of affected land for 1 year (inclusive of winter and summer crop and additional to standard crop compensation)	
		Sharecroppers (registered or not)	1 severe impact allowance equal to market value of harvest share (additional to standard crop compensation)	
		Squatters	1 severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crops and additional to standard crop compensation)	
Residential/ Commercial Land affected by	Future usage of the land will get restricted permanently	Titleholder	Land for land through provision of plots comparable in value/location to plot lost; or cash for affected land at full replacement cost free of taxes, registration, transfer costs plus 15% compulsory acquisition surcharge.	
towers/ TL		Renter,Leaseholder	1-3 months allowance based on current monthly rent	
Houses and Structures	Affected houses /structures will be demolished	Squatters relevantAHs/ squatters	Relocation in a public resettlement area or a self-relocation allowance Cash compensation at replacement rate for affected structure/other fixed assets free of salvaged materials, depreciation transaction costs. For partial impacts full cash assistance to restore structure	
Crops	Crops affected (damaged/lost)	All Ahs/ squatters	<u>1. Tower impacts</u> : Crop compensation in cash at full market rate based on actual impact for a maximum of 3 harvests <u>2. Line corridor stringing</u> : cash compensation at market rate of 1 harvest.	
Trees	Trees removed	All Ahs/ squatters	Cash compensation shall reflect income replacement	
Business Employment	loss of business or employment	All AH/ squatters	Owner: (i) Cash compensation equal to 1 year income, if loss permanent; (ii) cash compensation for the period of business interruption, if loss is temporary. Worker/employee: lost wages indemnity for the business interruption period up to 3 months	
Relocation	Transport, Transition costs	All AHs so affected	Provision of sufficient allowance to cover transport expenses and livelihood expenses for one month.	
Community	structures & installations	concerned community	Rehabilitation/substitution of affected structures/utilities (i.e. mosques, roads, schools etc.	
Vulnerable AH		AH below poverty	Employment priority in project-related jobs.	

36. Compensation eligibility will be limited by a cut-off date to be set for each subproject on the day of the beginning of the impact assessment and inventory taking exercise in field. APs who settle in the affected areas after the cut-off date will not be eligible for any such compensation or assistance. They, however will be given sufficient advance notice to request to vacate the premises and dismantle affected structures prior to subproject implementation. Their dismantled structures will not be confiscated and they will not have to pay any fine or sanction. Forced eviction will only be considered after all other efforts are exhausted with sufficient time intervals, so as not to effect subproject implementation.

H.2 Compensation Entitlements Compensation Entitlements

- 37. Entitlement provisions for AHs affected by restricted access to, or use of, land, and income losses and rehabilitation subsidies will include provisions for such land losses, house and buildings losses, crops and trees losses, a relocation subsidy, and a business losses allowance based on tax declarations and/or lump sums. These entitlements are detailed below:
 - Agricultural land impacts will be compensated based on whether an AH's access to, or use of, their land is restricted. For AHs whose access to, and use of agricultural land is not restricted i.e. they can continue to cultivate the land, compensation will be for removed or damaged crops and trees. For AHs whose access to, and use of, agricultural land is restricted i.e. they cannot continue to cultivate the land, compensation will be at replacement value in: (i) cash at current market rates plus a 15% compulsory acquisition surcharge, or (ii) through replacement land equal in value/productivity to the plot lost. When >10% of an AH income or agricultural land is affected, AHs (owners, leaseholders and sharecroppers) will get an additional allowance for severe impacts equal to the market value of a year's gross yield of the land lost (inclusive of both winter and summer harvest). Eventual transaction taxes/fees will be paid by MEPCO or waived by the local governments. Market rates will be assessed through a survey of prevalent land prices in subproject areas. The assessment will be carried out by local government financing institutions.
 - Residential/commercial land will be compensated at replacement value either (i) in form of land for land or, (ii) cash at current market rates free of deductions for transaction costs. Renters/leaseholders will receive an allowance corresponding to a 3 months rent.
 - Houses, buildings, structures will be compensated in cash at replacement cost free of depreciation, salvaged materials, and transaction costs deductions. The compensation for houses/buildings will include the cost of lost water and electricity connections.
 - Crops: Cash compensation at current market rates for the harvest actually lost up to 3 harvests being as it may be winter or summer crop for areas affected by towers; 1 harvest being as it may summer or winter crop for land affected by line stringing. Compensation will be paid both to landowners and tenants based on their specific sharecropping agreements.
 - Trees: Cash compensation shall reflect income replacement (see below).
 - Business workers and employees: Indemnity for lost wages for the period of business interruption up to a maximum of 3 months.
 - Businesses: compensation for permanent business losses will be in cash for a 1year income based on tax declaration or, if unavailable, based on the official minimum salary; compensation for temporary business will be cash covering the

income of the interruption period based on tax declaration or, unavailable, official minimum salary.

- Agricultural land leaseholders, sharecroppers, and workers: Where the access to, or use of, the land is restricted; Affected leaseholders will receive either a renewal of the lease in other plots or cash corresponding to the yearly yield of land lost for the remaining years of the lease up to a maximum of 3 years. Sharecroppers will receive their share of harvest at market rates (if impact is temporary) plus 1 additional crop compensation (if the land is lost permanently).
- Agricultural workers, with contracts to be interrupted, will get an indemnity in cash corresponding to their salary in cash and kind for the remaining part of the agricultural year (inclusive of both winter and summer crop).
- Relocation subsidy: AHs forced to relocate will receive a relocation subsidy sufficient to cover transport costs and living expenses for 1 month.
- House renters: House renters who have leased a house for residential purposes will be provided with a cash grant of 3 months' rent at the prevailing market rate in the area and will be assisted in identifying alternative accommodation.
- Community structures and public utilities: Will be fully replaced or rehabilitated so as to satisfy their pre-project functions.
- Vulnerable people livelihood: Vulnerable people (AHs below the poverty line) will be given priority in employment in project-related jobs.

H.3 Assessment of Compensation Unit Values

- 38. The methodology for assessing unit compensation values of the different items is described as follows:
 - (i) Land shall be valued at replacement cost based on a survey of land sales in the period immediately before or after the impact survey.
 - (ii) Houses will be valued at replacement value based on cost of (new) construction materials, type of construction, labor, transport and other construction costs.
 - (iii) Seasonal/annual crops will be valued at net market rates at the farm gate for the first year crop. In the eventuality that more than one year's compensation is due to the APs if the crops after the first will be compensated at gross market value.
 - (iv) Perennial crops (fruit and wood trees) will be valued based on age and productivity category (a. seedling; b. not yet productive; c. productive). Productive trees will be valued at gross market value of one year's income multiplied by the number of years needed to grow a new tree with the productive potential of the lost tree.

I. PROVISION OF LAND FOR LAND COMPENSATION

39. When Land for land is the chosen land compensation option (such an option is envisaged in particular when the APs are squatters), the LARP will locate on map the replacement plots and will identify the associated technical features (service roads, drainage, sanitation, water supply and electricity facilities to be provided) and relative site-preparation costs. The relocation will be carried out keeping in view the socio-cultural and religious profiles of both APs and host communities and by minimizing as much as possible the distance of new plots from the old ones.

J. GENDER IMPACT AND MITIGATION MEASURES

- 40. In general about one half of the total affected population is composed by women. Women absolve important economic roles in project areas and engage in a very wide range of income making activities in the agricultural and marketing sector. The Facility will pay particular attention to ensure that women are the recipients of the compensation pertaining to their activities and to ensure that women who are household heads are clearly listed as beneficiaries of compensation and rehabilitation proceedings under the loan. In order to ensure the above the following actions will be considered:
 - Include women in the impact enumerators;
 - Conduct gender-disaggregated AP censuses to pinpoint how many women are likely to be affected by a subproject and establish their pre-Project conditions;
 - Include women as major participants in the consultation processes;
 - Emphasize effect of LAR impacts on women in monitoring and evaluation of LARP;
 - Giving access to women and poor households to skills training and assistance for new employment opportunities;
 - Jointly register land use rights in the names of husband and wife in instances where households are allocated alternative agricultural and/or residential land;
 - Follow participation and consultation strategies that encourage the involvement of women, ethnic minorities and poor households in resettlement planning and implementation;
 - Pay Attention to complaints and grievances lodged by women, ethnic minorities and poor households;
 - Give access of women and poor households to project related employment opportunities; and,
 - Include Women government officials in the coordinating committees established to facilitate LARP preparation and implementation.

K. PUBLIC PARTICIPATION AND DOCUMENTS DISCLOSURE

- 41. Provincial, district, *tehsil*, and village officials will be informed about a subproject, and their assistance will be solicited in the conduct of the inventory of affected assets and the census of APs. Also, prior to the finalization of the LARPs, and its submission to the DISCO, the APs will be thoroughly informed on the results of the census and inventory of impacts, and their preferences on compensation and/or other resettlement assistance will be given due consideration. The processes and mechanisms ensuring the active involvement of APs and other stakeholders will be detailed in the LARPs which will also include an appendix with date, list of participants, and minutes of consultation meetings.
- 42. The LARF will be made available, both in English and Urdu languages, to the APs at the relevant PIU office, once subprojects are identified and prepared. The English versions of both LARF and all Subproject LARPs will be disclosed on ADB website after the same are is endorsed by PEPCO and/or respective DISCOS, prior to contract signing and LARP implementation, and kept at PEPCO and DISCO offices as a public document accessible to all stakeholders especially the APs. Each LARP will be summarized into a pamphlet form, containing information on all necessary items,

especially the compensation eligibility and entitlement provisions, translated into Urdu and distributed to all the AP/AF/AHs.

L. INSTITUTIONAL ARRANGEMENTS

L.1 DISCOs

- 43. The DISCOs as Implementing Agencies (IAs) will have direct LARP preparation, implementation and financing responsibility of LAR tasks and cross-agency coordination. Within the DISCOs all day-to-day LAR tasks will be managed by a Social Development Cell (SDC), which will organize and internally monitor LARP preparation/implementation (including surveys, asset valuation, public consultation), cross-agency coordination, and LARP approval. In implementing these tasks the SDC will be assisted by:
 - (i) A **Resettlement Specialists team** to be hired under the Supervision Consultants which will assist in LAR planning, implementation, internal M & E and training of DISCOs and the concerned district governments in line with the requirements of the ADB resettlement policy;
 - (ii) A **local NGO and impact assessment/valuation team** will be hired to provide assistance in on-site LARP preparation, for carrying out surveys, base-line information gathering, and/or AP consultation and public relations;
 - (iii) An **independent agency** will be hired to conduct periodic external monitoring and evaluation, or third party validation of implementation of LARP activities

L.2 District Governments

44. District governments have jurisdiction for land administration, valuation and acquisition. At the Provincial level these functions rest on the Board of Revenue while at District level they rest on the District Collector Office (DCO) and within the DCO on the Land Acquisition Collector (LAC). A number of minor agents, most notably the *Patwari*, (the land records keeper), carry out specific roles such as titles identification and verification (see Figure 1). Functions pertaining to compensation of assets different from land (i.e buildings and crops) or income rehabilitation also fall on the local governments, more specifically on the relevant District Department.



Figure 1: Organogram of District Land Acquisition Collector (LAC) Office



L.3 Other Agencies and Institutions

45. ADB clearance of category "B" LARPs and category "C" (No Impacts: IR & IP categorization forms) subprojects will be provided either by an ADB Resettlement Specialist hired at the ADB's Pakistan Resident Mission (PRM) in Islamabad, or by a third party organization with LAR capacity chosen by ADB. Category "A" projects will be cleared at ADB Headquarters in Manila, Philippines. In addition, the Federal and the concerned Provincial Environmental Protection Agencies (EPAs) may also approve the LARF and the subsequent LARPs, as part of their Environmental Impact Assessment (EIA) exercise in their respective jurisdictions, on behalf of the Federal/Provincial Governments.

L.4 Coordination Initiatives

- 46. The various agencies and actors above identified need to be carefully coordinated so as to obtain effective, smooth and timely AP compensation and LARP implementation. To this end a LAC will be directly assigned to the DISCO and 3 coordination/consultation committees will be established at the top and the bottom levels of the LAR process¹⁸: The organograms of the three committees are presented in Figures 2 to 4.
 - (i) A LAR Steering Committee (LSC) at Provincial level including the: (i) Chief Executives of the respective DISCO; (ii) Provincial Chairman, Planning and Development Department, or Additional Chief Secretary; (iii) Chairman, Provincial Board of Revenue; (iv) Provincial Director General, EPA; and, (v) Project Director, PMU (Figure 2). The committee will meet periodically to ensure proper and timely formation of Advisory Committees at the concerned districts, and to facilitate LARP approval and implementation processes.

¹⁸ The administration of tribal areas is radically different from that of settled districts, which has been assumed as model in this LARF. For subprojects in tribal areas the local government is represented by the Political Agent and his deputies and local communities are represented by tribal jirgas, and/or the officially recognized Maliks. LARP for subprojects in tribal areas will have an organization setting fitting local specificities.





(ii) A LAR Coordination Committee (LCC) to be formed in each relevant district to provide a coordinating node for the preparation and implementation of LARPs (in particular execution of surveys, valuation of assets, AP consultation, and local approval of LARP provisions). The committee formation will be initiated by the PMU and will include representatives of PIU, LARU, DCO and DOR of the concerned districts, *Tehsildar/s* and *Nazim/s* of the Union Council/s representing the APs (Figure 3).

Figure 3: Organogram of LAR Coordination Committee



(iii) A Grievance Redressal Commitee (GRC): inclusive of a representative of the PIU and LARU, Union Council Nazim/s, and Resettlement Specialist (Consultant) or local NGOs/CBOs (Figure 4). This group to be organized at the beginning of project implementation in a District by the *Nazim*'s office under request by PMU, will be triggered by a grievance lodged at the level of the District. The GRC will hear the complaint, and if found justified will support its lodging at the PMU.





M. COMPLAINTS AND GRIEVANCES

- 47. A grievance mechanism will be available to allow an AP appealing any disagreeable decision, practice or activity arising from land or other assets compensation. APs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, and time of compensation. Care will always be taken to prevent grievances rather than going through a redressal process. This can be obtained through careful LAR design and implementation, by ensuring full participation and consultation with the APs, and by establishing extensive communication and coordination between the community, the PMU, the LAC and local governments in general.
- 48. As finances will move differently for land compensation and for compensation for other items or rehabilitation (in the first case compensation funds will move from the concerned DISCO through the District Land Acquisition Collector (LAC) office to the APs, while in the second case the funds will go directly from the DISCO to the APs), Complaint and Grievances will be addressed through two different processes as described in the following Box 4:

Box 4: GRIEVANCE RESOLUTION PROCESS¹⁹

Land/crops compensation issues	Project/other items compensation issues
1. First, complaints resolution will be attempted at	1. First, complaints resolution will be attempted at
village level through the involvement of the LARU,	village level through the involvement of the LARU,
NGO and informal mediators.	NGO and informal mediators.
2. If still unsettled, a grievance can then be lodged to	2. If still unsettled, a grievance can be lodged to the
the LAC who has 30 days to decide on the case.	PIU/LARU, which will have 30 days to respond.
3. If no solution is reached a grievance can be	3. If no solution is reached a grievance can be lodged
lodged with support of the GRC to the PMU. The AP	with support of the GRC to the PMU. The AP must
must lodge the complaint within 1 month of lodging	lodge the complaint within 1 month of lodging the
the original complaint and must produce documents	original complaint and must produce documents
supporting his/her claim. The PMU will provide a	supporting his/her claim. The PMU will provide the
decision within 21 days of registering the complaint.	decision within 21 days of registering the complaint.
The PMU decision must comply with this LARF.	The PMU decision must comply with this LARF.
4. Should the grievance redressing system fail to	4. Should the grievance redressing system fail to
satisfy the AP, they can pursue further action by	satisfy the AP, they can pursue further action by
submitting their case to the appropriate court of law	submitting their case to the appropriate court of law as
as per the process set out in Sections 18 to 22 of the	per the process set out in Sections 18 to 22 of the
LAA (1894, amended).	LAA (1894, amended).

N. MONITORING AND EVALUATION

49. LAR tasks under The Facility will be subjected to both internal and external monitoring. Internal monitoring will be conducted by PMU, assisted by the Design and Supervision Consultant, External monitoring will be assigned to an External Monitoring Agency (EMA) to be hired by PMU, and approved by ADB. The EMA will be chosen among the local consultants. ADB will prepare the terms of reference (TOR) for the EMAs before the LARP implementation has begun.

N.1 Internal Monitoring

- 50. Internal monitoring will be carried out routinely by the PMU Their results will be communicated to ADB through the quarterly project implementation reports. Indicators for the internal monitoring will be those related to process and immediate outputs and results. This information will be collected directly from the field and reported monthly to the PMU to assess the progress and results of LARP implementation, and to adjust the work Program, if necessary. The monthly reports will be quarterly consolidated in the standard supervision reports to ADB. Specific monitoring benchmarks will be:
 - (i) Information campaign and consultation with APs;
 - (ii) Status of land acquisition and payments on land compensation;
 - (iii) Compensation for affected structures (SBEs, etc.) and other assets;
 - (iv) Relocation of APs;
 - (v) Payments for loss of income;
 - (vi) Selection and distribution of replacement land areas; and
 - (vii) Income restoration activities
- 51. The above information will be collected by the SDC which is responsible for monitoring the day-to-day resettlement activities of a subproject through the following instruments:

¹⁹ In case of subprojects in tribal areas the process will instead include: (stage 2) appeal to the deputy political agent; (stage 3) appeal to the Political agent through the Jirga, and (stage 4) appeal to the court.

- (i) review of census information for all APs;
- (ii) consultation and informal interviews with APs;
- (iii) in-depth case studies;
- (iv) sample survey of APs;
- (v) key informant interviews; and
- (vi) community public meetings.

N.2 External Monitoring

- 52. External monitoring will be carried out twice a year, and its results communicated to the PMU and ADB through semi-annual reports. Subprojects whose implementation time frame will be under six months will be monitored only once. Indicators for External Monitoring tasks will include:
 - (i) Review/verify internal monitoring reports prepared by LARU and its field offices;
 - (ii) Review the socio-economic baseline census information of pre-displaced persons;
 - (iii) Identification and selection of impact indicators;
 - (iv) Impact assessment through formal and informal surveys with the affected persons;
 - (v) Consultation with APs, officials, community leaders for preparing review report; and
 - (vi) Assess the resettlement efficiency, effectiveness, impact and sustainability, drawing lessons for future resettlement policy formulation and planning.
- 53. The EMA will also assess the status of project affected vulnerable groups such as female-headed households, disabled/elderly and families below the poverty line. The following will be considered as the basis for indicators in monitoring and evaluation of a subproject.
 - (i) Socio-economic conditions of the APs in the post-resettlement period;
 - (ii) Communications and reactions from APs on entitlements, compensation, options, alternative developments and relocation timetables etc.;
 - (iii) Changes in housing and income levels;
 - (iv) Rehabilitation of Small businesses and informal settlers;
 - (v) Valuation of property;
 - (vi) Grievance procedures;
 - (vii) Disbursement of compensation; and
 - (viii) Level of satisfaction of APs in the post resettlement period.
- 54. The EMA will carry out a post-implementation evaluation of the LARP about a year after completion of its implementation. The compelling reason for this study is to find out if the objectives of the LARP have been attained or not. The benchmark data of socioeconomic survey of severely affected APs conducted during the preparation of the LARP will be used to compare the pre and post project conditions. The EMA will recommend appropriate supplemental assistance for the APs should the outcome of the study show that the objectives of the LARP have not been attained.

O. TRAINING IN LARP IMPLEMENTATION

- 55. All concerned staff both at PMU and field level involved in the land acquisition and resettlement activities, including DD/LARP, officials of local government, and NGO staff will undergo a week-long orientation and training in ADB resettlement policy and management. The training will be provided by the international specialist under the supervision contract and will cover the following topics:
 - (i) Principles and procedures of land acquisition;
 - (ii) Public consultation and participation;
 - (iii) Entitlements and compensation & assistance disbursement mechanisms;
 - (iv) Grievance redress; and
 - (v) Monitoring of resettlement operations.

P. RESETTLEMENT BUDGET AND FINANCING

- 56. All LAR preparation and implementation costs, including cost of compensation and LAR administration, will be considered an integral part of Project cos and will be provided by the relevant DISCO as counterpart financing funds. Each LARP will include a budget section indicating (i) unit compensation rates for all affected items and allowances, (ii) methodology followed for the computation of unit compensation rates, and (iii) a cost table for all compensation expenses including administrative costs and contingencies.
- 57. Finances for compensation, allowances, and administration of LARP preparation and implementation will be provided by the relevant DISCO as counterpart funds. Costs for external monitoring tasks can be allocated under the loan. In order to ensure that sufficient funds are available for LAR tasks, the local governments will have to allocate 100% of the cost of compensation at replacement cost and expected allowances estimated in each LARP plus 5% of contingencies before LARP implementation.
- 58. The DISCOs will be responsible for the timely allocation of the funds needed to implement the LARPs. Allocations will be reviewed twice a year based on the budgetary requirements indicated by the LARPs.
- 59. As per the flow of LAR finances it is noted that the budget for land and crop compensation will be disbursed by the concerned DISCOs to the District LAC office which in turn, through the LAC will disburse the compensation to the APs. For what concerns compensation funds for other items such as structures (houses, shops, etc.), house restoration, shops/businesses, employment, income loss, etc. will go directly from the concerned DISCOs to the APs.

Q. LARP PREPARATION AND IMPLEMENTATION PROCESS

60. Based on experience it is expected that in Pakistan the implementation of a LARP of category "A" may take up to one year. A local non-government organization (NGO) will be hired by the concerned DISCO (PMU) to assist in the LARP implementation process. The concerned DISCO will establish and announce the cut-off-date based on the date of census for the proposed subproject based on the eligibility criteria defined in this LARF. The APs of affected structures/assets (houses, shops/businesses, etc.) will be paid their due compensations at least three months (90 days) prior to demolition of the structures from the corridor of impact. This time will allow them to dismantle and remove all salvageable material for rebuilding of houses and re-establishment of businesses.

- 61. However, the concerned DISCO reserves the right of demolishing such unauthorized structures without paying any compensation simply by serving a notice of eviction for a maximum of two weeks, provided it gets established that those structures were constructed on the active RoW after the "cut-off" date. Any grievance or objection will be referred to the relevant DISCOO through the GRC.
- 62. The basic LAR-related steps for the preparation and implementation of *tranches* and, within *tranches*, subprojects are summarized in Box 5, below. The Process combines in a single sequence steps required by the LAA and by ADB policy.

C t a	Action	Deeneneihiliter
Step		Responsibility
Α	TRANCHE PREPARATION	
1	Subprojects identification	PMU/Consultants
2	Review and update of PF	LARU/Consultants
3	Preparation of IPSA indicating for a specific subproject if LAR is needed. If so, a	LARU/consultants
	scheduled action plan detailing LARP tasks to be assigned to LARU, consultants,	
	local government, and NGO is established and the formation of coordination	
	committees at subproject level is initiated.	
В	LARP PREPARATION	
1	Proposal to Revenue Department with Brief Description of subproject including LAR.	EA
2	Publication of Notice expressing the intend to Acquire Land under Section 4 of LAA.	Revenue Department
3	Prepare impacts/AP surveys forms, train impact assessment and valuation teams,	LARU/Consultants
	and establish coordination with relevant local government agencies.	
4	Verify land records in affected areas, update cadastral maps and carry out impacts	Loc. Gov;
	and valuation surveys;	LARU/consultants
5	Check surveys and, if necessary, request additional fieldwork to improve them.	Consultants
6	Conduct public consultations and negotiations.	LARU/Loc.Gov./
		Consultants/NGO
7	Integrate base-line on impacts and the results of consultations and negotiations into the LARP.	LARU/Consultants
8	Submission of LARP to PMU, local governments and then to the Ministry of	LARU/Loc. Gov/
	Environment (MOE) for approval. After this the LARPs are sent to ADB for approval.	EPA//MOE/ADB
С	LARP IMPLEMENTATION	
1	LARP disclosure: Distribution of LARP and information pamphlets in Urdu in the	LARU/Loc.Gov./ADB
	affected communities; posting of LARP in English on the ADB website	
2	Approval of Contract awards	ADB
3	Distribution of Relocation Notices to APs	PMU, LARU
4	Award of Cheques for Land Compensation	PMU/LARU/LAC/AP
5	Award of Cheques for other Compensation & Assistance/ Rehabilitation	PMU/LARU/PIU/AP
5	Demolishing/ Relocation of Affected Structures/Assets	LARU, NGO
6	Review of LARP Implementation.	PMU/LARU/ADB/NGO
7	IF LARP Implementation satisfactory, Notice to proceed for Civil works is issued	ADB/PMU
D	POST-IMPLEMENTATION TASKS	
1	Independent evaluation of LARP Program.	EMA
E	CYCLICAL/CONTINUOUS TASKS	
1	Internal monitoring. Quarterly reporting on LAR to ADB	PMU
2	External Monitoring. Semi-annual reporting to ADB	EMA/PMU
3	Grievances Redressal/Law Suites	LARU/PMU/LAC/
		GRC/COURT
4	Inter-agency coordination and Communication with AP	PMU/LARU/LAC/Loc.
		Gov.

Box 5: LaR Task PROCESS

ANNEX A: STANDARD LARP OUTLINE

1. LAR Issues for the Scheme

This chapter describes the scheme activities and items requiring LAR; alternative options, if any, considered to minimize land acquisition and its effects; and why remaining effects are unavoidable.

2. Scope of Land Acquisition and Resettlement

This chapter describes the preparation of the impacts (who carried it out and when it was initiated) and provides a full assessment of each type of impact and a census of affected peoples as described in the CPFPG. The chapter also includes a description of the methodology followed to determine unit-compensation rates for each affected item and subsidy/allowance.

3. Objectives, Policy Framework, and Entitlements

Based on the CPFPG, this chapter outlines the eligibility and compensation framework for the scheme.

4. Consultation and Grievance Redress Participation

This chapter summarizes procedures for redress of grievances by people affected described in CPFGP and describes the consultation/participation process and grievance redress that occurred in the subproject at hand.

5. Compensation, Relocation, and Income Restoration

This chapter outlines the income restoration measures to be implemented.

6. Institutional Framework

This chapter outlines the institutional arrangements for the scheme based on this CPFPG. It includes the following issues: responsibilities for main tasks and for planning, negotiating, consulting, approving, coordinating, implementing, financing, monitoring, and evaluating land acquisition and resettlement.

7. Resettlement Budget and Financing

This chapter provides the unit compensation rate for each affected item and assesses the LAR budget for the scheme. The LAR budget will include land acquisition and eventual land acquisition costs, amounts due for crop compensation and for the subsidies and allowances, monitoring and evaluation costs, and administrative costs and will be adjusted for inflation and applicable taxes.

8. Implementation Schedule

This chapter provides a time schedule showing the LAR process and linking LAR tasks with civil works implementation.

9. Monitoring and Evaluation

This chapter specifies arrangements for routine and independent monitoring and evaluation activities.

ANNEX B: OUTLINE FOR A SHORT RESETTLEMENT PLAN

A. Introduction

- 1. Brief description of the subproject (provide map of Project area/s)
- 2. Types of impacts (summary description of acquisition and other assets)

B. Description of Affected Persons

- 1. Description of APs including their spatial distribution
- 2. Gender-disaggregated socioeconomic characteristics of Project AFs
 - Total number of families affected by the subproject
 - Employment types and major sources of income
 - Tenure status (land and house/structures)
 - Affected land and assets: areas, types of structures, and conditions
- 3. Categories and numbers of affected households by type and degree of impacts
 - Affected households with loss of entire holdings are required to relocate
 - Affected households with loss of partial holdings and not required to relocate
 - Tenants, landless laborers, informal settlers, etc. affected by the subproject
 - Affected households with loss of incomes and employment

C. Compensation and Policy Entitlement Criteria

- 1. Elements of compensation policy: objectives and entitlement criteria
- 2. Compensation entitlements for each category of APs
- 3. Other assistance (transport allowance, rehabilitation assistance, etc.)

D. Cost Estimates and Budget

• Aggregate costs for each type of asset loss and implementation arrangements

E. Public Participation, Consultation, and Grievance Resolution

- 1. Consultation with stakeholders at the different stages of the subproject
- 2. Existing and Project-specific mechanisms for grievance resolution procedures

F. Organizational Set-up

 Organizational structure of the unit/division within the local government at the district level that is responsible for management, supervision, and implementation of LAR

G. Implementation Schedule

- 1. Implementation schedule for land acquisition and compensation for each component of the subproject, including description of different activities and their sequence
- 2. Timetable for implementation of different land/asset acquisition activities in relation to the subproject.

APPENDIX 13: SAMPLE LAND ACQUISITION & RESETTLEMENT PLAN

ISLAMIC REPUBLIC OF PAKISTAN

Power Distribution Enhancement Program

ADB MFF Tranche 1 Subproject No. <u>208-Q</u>

Alizai 132 kV Double Circuit Transmission Line

Short Land Acquisition and Resettlement Plan

Quetta Electric Supply Company (QESCO) GOVERNMENT OF PAKISTAN

March 2008

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Abbreviations

ADB	Asian Development Bank
ADB TA	ADB Technical Assistance (Grant for Project preparation)
AHs	Affected households
APs	Affected persons
CBC	Citizen Community Board
CBP	Community Based Organization
DMS	Detailed Measurement Survey
DOR	District Officer Revenues
EMA	External Monitoring Agency
ft	foot / feet (3.28 ft = 1 m)
GRC	Grievance Redress Committee
IMO	Independent monitoring organization
IPDF	Indigenous Peoples Development Framework
IPDP	Indigenous Peoples Development Plan
IPP	Independent Power Producer (Private Sector Power Generation entity)
KAA	Katchi Abadis Act. 1987.
kanal	unit of land measurement: 1 kanal = 20 marlas (8 kanal = 1 acre)
km	kilometer
kV	kilo-Volt
LAA	Land Acquisition Act, 1894 (amended)
LAC	Land Acquisition Collector
LARF	Land Acquisition and Resettlement Framework
LARP	Land Acquisition and Resettlement Plan
m	meter
marla	smallest unit of land measurement: 1 marla = 272.25 ft ² (= 25.31 m ²)
MOWP	Ministry of Power and Water
MRM	Management Review Meeting
NGO	Non-governmental organization
PEPCO	Pakistan Electric Power Company
PD	Project Director
PIB	Public Information Booklet
PPTA	Project Preparatory Technical Assistance
QESCO	Quetta Electric Supply Company
RFS	Resettlement field survey
ROW	Right-of-way
Rs.	Pakistani rupees (currency): Rs. 60.90 = US\$1.00
SDC	Social Development Cell (QESCO)
ТА	Telegraph Act, 1885 (amended 1975)
TL	Transmission Line
TOR	Terms of Reference
WAPDA	Water and Power Development Authority

Definition of Terms Affected persons (APs)

Affected persons (APs)	mean all the people affected by the project through land acquisition, relocation, or loss of incomes and includes any person, household (sometimes referred to as affected households [AHs]), firms, or public or private institutions. APs therefore include; i) persons affected directly by the safety corridor, right-of-way, tower or pole foundations or construction work area; (ii) persons whose agricultural land or other productive assets such as trees or crops are Affected; (iii) persons whose businesses are Affected and who might experience loss of income due to the project impact; (iv) persons who lose work/employment as a result of project impact; and (v) people who lose access to community resources/property as a result of the project.
Compensation	means payment in cash or kind for an asset to be acquired or affected by a project at replacement cost at current market value.
Cut-off-date	means the date after which people will NOT be considered eligible for compensation i.e. they are not included in the list of AHs as defined by the census. Normally, the cut-off date is the date of the detailed measurement survey.
Encroachers	mean those people who move into the project area after the cut-off date and are therefore not eligible for compensation or other rehabilitation measures provided by the project.
Entitlement	means the range of measures comprising cash or kind compensation, relocation cost, income rehabilitation assistance, transfer assistance, income substitution, and relocation which are due to /business restoration which are due to AHs, depending on the type and degree nature of their losses, to restore their social and economic base.
Inventory of losses	means the pre-appraisal inventory of assets as a preliminary record of Affected or lost assets.
Land acquisition	means the process whereby a person is compelled by a public agency to alienate all or part of the land s/he owns or possesses, to the ownership and possession of that agency, for public purposes, in return for fair compensation.
Non-titled	means those who have no recognizable rights or claims to the land that they are occupying and includes people using private or state land without permission, permit or grant i.e. those people without legal title to land and/or structures occupied or used by them. ADB's policy explicitly states that such people cannot be denied compensation.
Poor	means those falling below the official national poverty line (equivalent to 2,350 calories per day) of Rs 848.79 per person per month (2004).
Replacement cost	means the method of valuing assets to replace the loss at current market value, or its nearest equivalent, and is the amount of cash or kind needed to replace an asset in its existing condition, without deduction of transaction costs or for any material salvaged.
Sharecropper	means the same as tenant cultivator or tenant farmer, and is a person who cultivates land they do not own for an agreed proportion of the crop or harvest.
Significant impact	means 200 people or more will experience major impacts, which are defined as; (i) being physically displaced from housing, or (ii) losing ten per cent or more of their productive assets (income generating).
Vulnerable	means any people who might suffer disproportionately or face the risk of being marginalized from the effects of resettlement and includes; (i) female- headed households with dependents; (ii) disabled household heads; (iii) poor households (within the meaning given previously); (iv) landless; (v) elderly households with no means of support; (vi) households without security of tenure; (vii) ethnic minorities; and (viii) marginal farmers (with landholdings of five acres or less).

Executive Summary

- The Subproject: The new Alizai 132kV transmission line subproject has been prepared by the Quetta Electricity Supply Company (QESCO) to provide the Alizai grid station with additional power. The subproject will involve the construction of a double circuit 132 kV transmission line to be linked from the Alizai-Hurumzai 132 kV transmission line to Alizai substation to upgrade its existing capacity from 66 kV to 132 kV. The subproject is located in Pishin district of Baluchistan province.
- 2. The new 132 kV double circuit transmission line will pass through the lands of six villages in Pishin district, and result in a total of 16.1 ha of crops being affected. Of this cropped area 0.9 ha is a tube-well irrigated grape orchard and 15.2 ha rainfed area is under wheat cultivation. There are no trees, either wood or fruit, within the transmission line corridor that require removal. The subproject will affect the crops of 12 households (AHs), with a population of 186 persons (APs). In accordance with this non-significant impact, this <u>short</u> land acquisition and resettlement plan (LARP) has been prepared. Compensation and rehabilitation for the impacts will be provided in accordance to the following matrix (Table 1).

Asset	Specification	Affected People	Compensation Entitlements
Land permanently acquired for sub- station	 Donated/bought on the open market Acquired via right of eminent domain 	Land owners	If donated or voluntarily sold ADB Policy is not triggered If acquired via exercise of the right of eminent domain land will be compensated at fill market value.
Arable Land temporarily affected by construction of	Arable Land Access is not emporarily restricted and existing or current onstruction of land use will remain owers or TL. unchanged by the construction of towers and transmission line	Farmer, Titleholder	No land compensation provided that land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below
towers or TL.		Leaseholder (registered or not)	No land compensation provided that the land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below
		Sharecroppers (registered or not)	Compensation, in cash or kind, for all damaged crops/trees as per item below
		Squatters	Compensation, in cash, for all damaged crops/trees as per item below
		Farmer, Titleholder	Land for land compensation with plots of equal value and productivity to the plots lost; or cash for affected land at replacement cost based on market value plus 15% compulsory acquisition surcharge and free of taxes, registration, and transfer costs
Arable Land where	All adverse effects on land use independent of	Leaseholder (registered or not)	Renewal of lease in plots of equal value/productivity of plots lost, or Cash equivalent to market value of gross yield of affected land for the remaining lease years (up to a maximum of 3 years).
construction	sevency of impact	Sharecroppers (registered or not)	Cash compensation equal to market value of lost harvest share once (temporary impact) or twice (permanent impact)
agricultural use.		Agricultural workers	Cash indemnity equal to salary (including portions in kind) for remaining part of agricultural year.
		Squatters	1 rehabilitation allowance equal to market value of 1 gross harvest (additional to crop compensation) for land use loss.
	Additional for severe impacts (>10% of land loss)	Farmer, Titleholder Leaseholder	1 severe impact allowance equal to market value of gross harvest of affected land for 1 year (inclusive of winter and summer crop and additional to standard crop compensation)
		Sharecroppers (registered or not)	1 severe impact allowance equal to market value of harvest share (additional to standard crop compensation)
		Squatters	1 severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crops and additional to standard crop compensation)
Residential/	Future usage of the		
Commercial	lland will get restricted	litleholder	Land for land through provision of plots comparable in

Table 1: Compensation Eligibility and Entitlements Matrix

Asset	Specification	Affected People	Compensation Entitlements
			replacement cost free of taxes, registration, transfer costs plus 15% compulsory acquisition surcharge.
Land affected by	permanently	Renter, Leaseholder	1-3 months allowance based on current monthly rent
IOWEIS/ TE		Squatters	Relocation in a public resettlement area or a self-relocation allowance
Houses and Structures	Affected houses /structures will be demolished	Relevant AHs/ squatters	Cash compensation at replacement rate for affected structure/other fixed assets free of salvaged materials, depreciation or transaction costs. For partial impacts full cash assistance to restore remaining structure.
Crops	Crops affected (damaged/lost)	All AHs/ squatters	Tower impacts: Cash compensation at current market rate based on actual impact for a maximum of 3 harvests (for this subproject, however, 1 harvest is expected to be sufficient) Line corridor stringing: cash compensation at current market rate for 1 harvest.
Trees	Trees removed	All AHs/ squatters	Cash compensation shall reflect income replacement
Business Employment	loss of business or employment	All AH/ squatters	Owner: (i) Cash compensation equal to 1 year income, if loss permanent; (ii) cash compensation for the period of business interruption, if loss is temporary. Worker/employee: lost wages indemnity for the business interruption period up to a 3 months maximum.
Relocation	Transport, transition costs	All AHs so affected	Provision of sufficient allowance to cover transport expenses and livelihood expenses for one month.
Community	structures & installations	concerned community	Rehabilitation/substitution of affected structures/utilities (i.e. mosques, roads, schools etc.
Vulnerable AH		AH below poverty	Employment priority in project-related jobs.

- 3. Significance of Impact. As there will be no restriction of access to, or use of, land, there will be no permanent effects. The disturbance to land will be temporary and will create loss of less than 10% of each AH's crops. No houses or shops nor any community structures will be affected. Therefore the resettlement impact is minor or non-significant.
- 4. Indigenous People Issues. Each of the twelve AHs are Muslim and ethnically Baluch. There are neither tribal nor minority people amongst the 12 AHs. The ADB's *Policy on Indigenous People*, as specified in the Indigenous Peoples Development Framework (IPDF) prepared by QESCO for this program is not triggered, and therefore neither an IPDP nor special action is required for this subproject.
- 5. Participatory Land Acquisition Process. The program's LARF has been translated into Urdu and disclosed according to ADB's public communications policy, it has also been uploaded to ADB's website. For the preparation of this LARP, consultation has been undertaken, on behalf of QESCO, through a series of meetings with the local government agencies, AHs, as well as wider community group meetings of both men and women. The resettlement field survey (including inventory, census and consultation) was a participatory process, with the head of household assisting in the identification and calculation of losses. Further consultation will be required during LARP implementation.
- 6. Grievance Mechanism. There is also a process established to deal with any issues or concerns raised on any aspect of the LARP or compensation process. The verbal or written grievances of AHs will be heard by the district level Land Acquisition Coordinating Committees, which will assist the QESCO implement the LARP.
- 7. Cost of Plan. The budget has been established using the rates derived through consultation with the affected communities and the local markets in the Pishin and Quetta districts. The costs for compensation of crops and grapes, technical assistance and external monitoring (including 10% administration charges and 10% contingency) has been estimated at Rs. 4.27 million (US\$ 70,168).

1. INTRODUCTION

1.1 Background

- 1. The Government of Pakistan has requested financing from Asian Development Bank (ADB) for implementing a Power Distribution Enhancement Program (the Program) to be executed through a Multi-tranche Financial Facility (MFF), divided into 3 tranches, with the Ministry of Water and Power as the Executing Agency (EA) and the Distribution Companies (DISCOs), in this case the QESCO, as the Implementing Agency (IA). Each tranche will constitute a project which, in turn, will be divided into several subprojects for the construction/upgrading of sub-stations and transmission and distribution lines.
- 2. This Land Acquisition and Resettlement Plan (LARP) for the Alizai transmission line subproject, a 13.4 km long 132 kV incoming/outgoing transmission line, is one of the subprojects included by QESCO in the first tranche of the program. The LARP has been prepared by QESCO to fit the Land Acquisition and Resettlement Framework (LARF) prepared for the program as a whole. As such the subproject will comply with the following land acquisition and resettlement (LAR)-related conditions:
 - The signing of contracts awards for the subproject's civil works will be contingent to the preparation of this LARP fitting the LARF and relevant ADB policies; and,
 - ADB issuance of notice to proceed for the implementation of the subproject's civil works will be contingent to the full implementation of the compensation and rehabilitation programs detailed in this LARP.
- 3. Based on ADB's Operation Manual Section F2/OP & BP (2006) for projects in which resettlement impacts are considered significant i.e. > 200 people are resettled or will lose 10% or more of their income generating assets are classified as category "A" and a full LARP is required. Projects which will create minor or non-significant impacts i.e. < 200 people will be resettled or experience a loss of <10% of income generating assets a subproject is classified as category "B" and only a short LARP is to be prepared.</p>
- 4. The number of households affected (AHs) by the subproject is 12, and total population of affected people (AP) is population 186, the impacts on each of the households is minor (temporary restrictions on use of land and loss of crops) and none of the AHs will lose 10% or more of their income generating assets. Therefore, this <u>short</u> LARP has been prepared by QESCO for this subproject.
- The following sections of this LARP detail: (i) principles and eligibility/entitlement criteria for compensation or rehabilitation of AHs; (ii) LARP institutional organization; (iii) the various LARP implementation mechanisms (information disclosure, participation and consultation, grievance redress and monitoring); and, (iv) time schedules and budgets.

1.2 Description of the Subproject

- 6. The existing Alizai 66 kV grid station is currently supplying electricity to Pishin and neighboring districts. In order to meet the increased demand this new line is necessary to upgrade the capacity of the grid station and enhance electricity transmission in the area.
- 7. The Alizai TL subproject involves the construction of a 13.419 km 132 kV transmission line located in Pishin district (Baluchistan province) and will be implemented by QESCO. The subproject will involve the construction of a double circuit transmission line to be linked from the existing Alizai-Hurumzai 132 kV transmission line to upgraded Alizai grid station. The new transmission line will be 13.46 km long, and it

will consist of 49 towers. The right-of-way (corridor of impact) of this transmission line will be 30 m wide.

2. PROJECT COMPENSATION AND REHABILITATION FRAMEWORK

8. This section compares the Pakistani laws and regulations on land acquisition and resettlement with the requirements of the ADB Policy on Involuntary Resettlement and details summarizes the main components of the policy framework prepared specifically for the project to ensure that ADB's Policy on Involuntary Resettlement is complied with (refer to Section 2.4).

2.1 Policy Provisions, Eligibility and Entitlements

9. For what concerns matters of land acquisition relative to subprojects requiring the application of the right of eminent domain, LAR will be regulated by different bodies of law, in particular the Land Acquisition Act (LAA) of 1984 covering land acquisition for stations and towers in urban areas and the Telegraphic Act of 1885 covering the construction of towers in rural areas. The Katch Abadis Act of 1987 will cover the rehabilitation of affected squatters.

a. Land Acquisition Act, 1894 (LAA)

- 10. With the exception of impacts caused by poles and towers for public utilities land acquisition in Pakistan is regulated by the Land Acquisition Act, 1894 (LAA) with its successive amendments is the main law regulating land acquisition for public purpose. The LAA has been variously interpreted by local governments, and some province has augmented the LAA by issuing provincial legislations. The LAA and its Implementation Rules require that following an impacts assessment/valuation effort, land and crops are compensated in cash at market rate to titled landowners, and registered land tenants/ users, respectively. The LAA mandates that land valuation is to be based on the latest three years average registered land sale rates, though, in several recent cases the median rate over the past year, or even the current rates, have been applied. Due to widespread land under-valuation by the Revenue Department, current market rates are now frequently used with an added 15% Compulsory Acquisition Surcharge as provided in the LAA.
- 11. Based on the LAA, only legal owners and tenants registered with the Land Revenue Department or possessing formal lease agreements, are eligible for compensation or livelihood support. The rights of the non-titled are however addressed under the 1986 Punjab Jinnah Abadis for Non-proprietors in Rural Areas Act which recognize to squatters the right to receive rehabilitation in form of a replacement plot. It is to be noted that this right has been sometimes extended in practice to include some form of rehabilitation in cash or in forms different from land. Projects such as the Chotiari Dam, Ghazi Barotha Hydropower, and National Highways Improvement, have awarded compensation and assistance to unregistered tenants and other forms of AH (sharecroppers/squatters).
- 12. It is also noted that the LAA does not automatically mandate for specific rehabilitation/assistance provisions benefiting the poor, vulnerable groups, or severely affected AHs, nor it automatically provides for rehabilitation of income/livelihood losses or resettlement costs. This however it is often done in many projects in form of ad hoc arrangements based on negotiations between a specific EA and the AHs.
- 13. As noted above, there are exceptions to the rule and the law is broadly interpreted at provincial level depending on operational requirements, local needs, and socioeconomic circumstances. Recourse is often taken to ad hoc arrangements, agreements and understandings for resettlement in difficult situations. The above is also influenced by the fact that an amendment of the LAA has been considered

necessary by the Ministry of Environment. Accordingly, a National Resettlement Policy and a Resettlement Ordinance have been drafted to broaden LAA provisions and current practices so as to widen the scope of eligibility, but both these documents are still awaiting Government approval for implementation.

b. Telegraph Act, 1885 (TA)

- 14. In case of impacts caused by the poles and towers for public facilities and transmission lines land acquisition is not regulated by the LAA but instead by the Telegraph Act, 1885 (amended in 1975). The TA has been adopted by the QESCO for the construction and maintenance of transmission/distribution lines. The TA was conceived in the British era for telegraphic poles and then was passed to post-independence Pakistan with a broader application covering also electric poles and towers. The original provision of this law was that the land occupied by telegraph poles was not to be compensated (only crops destroyed during the erection of the pole were compensated). This was based on the logic that a pole, covering only a negligible land area, does not cause substantial impacts to land users. This however is no longer the case once the same provision is extended to transmission towers.
- 15. The Telegraph Act (section 11) confers powers on the QESCO to enter private lands and (section 10) construct/maintain electric poles and lines without the need to acquire the land affected and paying compensation for it. However sub-section 10 (d), provides that the QESCO is required to avoid causing unnecessary damages to the affected land and associated assets. Finally section 16 provides that if any such damage occurs (i.e. damages to crops, irrigation facilities, land quality or land income) the project proponent has to provide just compensation for the damages caused.
- 16. To accommodate the APs needs under this Program the QESCO have agreed to apply the Telegraph Act liberally by: (i) compensating at market rates all land occupied by towers in urban areas; (ii) by avoiding land impacts in rural areas through the use of towers with sufficient vertical clearance to allow the continuation of unrestricted farming and animal grazing, and (iii) if the construction of such towers is impossible, by compensating the land occupied by tower bases land also in rural areas. In addition QESCO will compensate by default all crops expected to be affected by the 3 major DL construction phases: (i) construction of tower bases; (ii) tower erection; and (iii) stringing.

c. Katchi Abadis Act, 1987 (KAA)

17. The Katchi Abadis Act (KAA) covers the urban squatters rehabilitation rights by providing plots in public resettlement areas or cash assistance. Based on the KAA, QESCO will provide rehabilitation compensation to eventual squatters/encroachers affected by the project.

2.2 ADB's Involuntary Resettlement Policy

- 18. The ADB *Policy on Involuntary Resettlement* is based on the following principles:
 - Involuntary resettlement is to be avoided or at least minimized.
 - Compensation must ensure the maintenance of the AHs' pre-project living standards.
 - Compensation is required for any AH who as a result of a project has their access to, or use of, land restricted.
 - AHs should be fully informed and consulted on LAR compensation options.
 - AHs' socio-cultural institutions should be supported/ used as much as possible.
 - Compensation will be paid with equal consideration of women and men.

- Lack of formal legal land title should not be a hindrance to rehabilitation.
- Particular attention should be paid to households headed by women and other vulnerable groups, such as indigenous people and ethnic minorities, and appropriate assistance should be provided to help them improve their status.
- LAR should be conceived and executed as a part of the project, and the full costs of compensation should be included in project costs and benefits.
- Compensation/rehabilitation assistance will be paid prior to ground leveling and demolition.

2.3 Comparison of Land Acquisition Act and ADB Resettlement Policy

19. Table 2.1 below outlines the differences between Pakistani Law and ADB policy.

Pakistan's Land Acquisition & Telegraph Acts	ADB Involuntary Resettlement Policy
Land compensation only for titled landowners or holders of customary rights.	Lack of title should not be a bar to compensation and/or rehabilitation. Non-title-holders are to be rehabilitated.
Crop losses compensation provided only to registered landowners and lease/sharecrop tenants (Non-registered are often deprived).	Crop compensation are provided to landowners and sharecrop/lease tenants according to their shares whether they are registered or not
Tree losses are compensated on the basis of officially fixed rates by the Forest and Horticulture departments	Tree losses are compensated according to actual worth of Affected trees based on market rates.
Land valuation based on the median registered land transfer rate over the previous 3 years.	Land valuation is to be based on current replacement (open market) value.
Structures valuation based on official rates, with depreciation deducted from the structure gross value.	Valuation of built-up structures is based on current market value/cost of new construction of the structure
Land Acquisition Collector (LAC) or District Judge (in case of the Telegraph act) are the final authorities to decide disputes and address complaints regarding quantification and assessment of compensation for the affected lands and other assets	Complaints and grievances are resolved informally through community participation in the Grievance Redress Committees (GRC), local governments, NGO and/or local-level community based organizations
The Telegraph act (TA) provides that land for tower construction or under a transmission line is not to be acquired or compensated as long as the land's permanent productive potential is not affected. Under the TA therefore only temporary impacts on crops are compensated.	Based on ADB policy all land impacts are to be compensated. As urban/residential-commercial land is affected both if a tower provides clearance or not, the TA provisions have been modified for this project so as to address damages that a tower causes to plots with real estate value. For this project urban and commercial or residential plots wether urban or rural will be fully acquired and compensated at market rates. The same will happen in case of rural/agricultural land when the land under a tower is no longer usable or access o it is restricted.

Table 2.1: Pakistan and ADB Land Acquisition Policies

2.4 Remedial Measures to Bridge the Gap

20. In principle, Pakistan Law and ADB Policy adhere not only to the objective of AH compensation, but also to that of AH rehabilitation. However, Pakistan law is unclear on how rehabilitation is to be achieved and in practice the provision of rehabilitation is left to ad hoc arrangements of local governments and project proponents. To clarify these issues and reconcile gaps between Pakistani Laws and ADB Policy, the QESCO will comply with the LARF prepared for the program, ensuring compensation at replacement cost for all items affected, the rehabilitation of informal settlers, and the provision of subsidies or allowances for any AHs that may be relocated, suffer business losses, or who may be severely affected.

2.5 Land Classification

- 21. In terms of application of the LARF prepared for the program, identifying the type of land affected is an important step in determining whether land is to be compensated or not. According to the LARF, the land classification, as well as, land use will be the basis for identifying the affected lands. They are: (i) urban versus rural lands; and, (ii) residential/commercial versus agricultural lands.
- 22. Urban or residential/commercial land affected by tower construction both in rural and urban areas will be considered as acquired permanently and land compensation will be paid to the affected households. Agricultural land in rural areas, instead, will not be considered as permanently affected as long as permanent cultivation and access remains possible under a tower and therefore will not be acquired and compensated. However, when land under a tower become un-accessible agricultural land will be considered as permanently affected and as such acquired and compensated.
- 23. For the Project Urban and Rural areas will be identified based board of revenue records. Also for the Project residential, commercial and agricultural plots will be identified based on the classification provided by district revenue records or based on the actual use of the affected land prior to the entitlements cut-off date. In case of discordance between revenue records and actual use the latter will prevail.

2.6 LAR Approaches for the Subproject

2.6.1 Towers and Distribution Lines

24. As specified in the LARF, the construction of Towers and Distribution lines will have to be carried based on the exercise of the right of Eminent Domain and will trigger the application of the ADB policy on Involuntary Resettlement. Impacts reparation for these items under the subproject will be carried out based on the compensation eligibility and entitlements framework presented in the next sections of this chapter.

2.7 Compensation Eligibility and Entitlements for the Project

25. Land acquisition tasks under the program, and for this QESCO subproject, will be implemented according to a compensation eligibility and entitlements framework in line with both Pakistan's law/regulation and the ADB Policy. A summary entitlements matrix is provided in Table 2.3, below.

Table 2.3: Compensation Eligibility and Entitlements Matrix			
Asset	Specification	Affected People	Compensation Entitlements
Land permanently acquired for sub- station	 Donated/bought on the open market Acquired via right of eminent domain 	Land owners	If donated or voluntarily sold ADB Policy is not triggered If acquired via exercise of the right of eminent domain land will be compensated at fill market value.
Arable Land temporarily affected by construction of towers or TL.	Access is not restricted and existing or current land use will remain unchanged by the construction of towers and transmission line	Farmer, Titleholder	No land compensation provided that land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below
		Leaseholder (registered or not)	No land compensation provided that the land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below
		Sharecroppers (registered or not)	Compensation, in cash or kind, for all damaged crops/trees as per item below
		Squatters	Compensation, in cash, for all damaged crops/trees as per item below
Arable Land where	All adverse effects on land use independent of severity of impact	Farmer, Titleholder	Land for land compensation with plots of equal value and productivity to the plots lost; or cash for affected land at replacement cost based on market value plus 15% compulsory acquisition surcharge and free of taxes, registration, and transfer costs
		Leaseholder (registered or not)	Renewal of lease in plots of equal value/productivity of plots lost, or Cash equivalent to market value of gross yield of affected land for the remaining lease years (up to a maximum of 3 years).
tower/TL construction restricts		Sharecroppers (registered or not)	Cash compensation equal to market value of lost harvest share once (temporary impact) or twice (permanent impact)
access or agricultural use.		Agricultural workers	Cash indemnity equal to salary (including portions in kind) for remaining part of agricultural year.
		Squatters	1 rehabilitation allowance equal to market value of 1 gross harvest (additional to crop compensation) for land use loss.
	Additional for severe impacts (>10% of land loss)	Farmer, Titleholder Leaseholder	1 severe impact allowance equal to market value of gross harvest of affected land for 1 year (inclusive of winter and summer crop and additional to standard crop compensation)
		Sharecroppers (registered or not)	1 severe impact allowance equal to market value of harvest share (additional to standard crop compensation)
		Squatters	1 severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crops and additional to standard crop compensation)
Residential/ Commercial Land affected by towers/ TL	Future usage of the land will get restricted permanently	Titleholder	Land for land through provision of plots comparable in value/location to plot lost; or cash for affected land at full replacement cost free of taxes, registration, transfer costs plus 15% compulsory acquisition surcharge.
		Renter, Leaseholder	1-3 months allowance based on current monthly rent
		Squatters	allowance
Houses and Structures	Affected houses /structures will be demolished	Relevant AHs/ squatters	Cash compensation at replacement rate for affected structure/other fixed assets free of salvaged materials, depreciation or transaction costs. For partial impacts full cash assistance to restore remaining structure.
Crops	Crops affected (damaged/lost)	All AHs/ squatters	<u>Tower impacts</u> : Cash compensation at current market rate based on actual impact for a maximum of 3 harvests (for this subproject, however, 1 harvest is expected to be sufficient) <u>Line corridor stringing</u> : cash compensation at current market rate for 1 harvest.
Trees	Trees removed	All AHs/ squatters	Cash compensation shall reflect income replacement
Business Employment	loss of business or employment	All AH/ squatters	Owner: (i) Cash compensation equal to 1 year income, if loss permanent; (ii) cash compensation for the period of business interruption, if loss is temporary. Worker/employee: lost wages indemnity for the business interruption period up to a 3 months maximum.
Relocation	Transport, transition costs	All AHs so affected	Provision of sufficient allowance to cover transport expenses and livelihood expenses for one month.
Community	structures & installations	concerned community	Rehabilitation/substitution of affected structures/utilities (i.e. mosques, roads, schools etc.
Vulnerable AH		AH below poverty	Employment priority in project-related jobs.

2.7 Eligibility

- 26. The AHs entitled to compensation and/or rehabilitation under the program are:
 - All AHs affected by restricted access to, or use of, land whether they have legal title/traditional land rights or not;
 - Tenants and sharecroppers whether registered or not;
 - Owners of buildings, crops, plants or other assets attached to land; and
 - AHs losing business, income, and salaries.
- 27. Compensation eligibility will be limited by a cut-off date to be set for each subproject on the stating day of the AH census and impact assessment. AHs who settle in the affected areas the cut-off date will not be eligible for compensation. They will, however be given sufficient advance notice, requested to vacate premises and dismantle affected structures prior to project implementation. Their dismantled structures will not be confiscated and they will not pay any fine or sanction. Forced eviction will only be considered all other efforts are exhausted.
- 28. <u>Cut-off Date</u>: Compensation eligibility will be limited by a cut-off date fixed by the QESCO is <u>27th August, 2007</u> for this 132 kV double circuit transmission line subproject, which was the last day of the AH Census and Impact Assessment fieldwork. AHs that settle in the affected areas and/or make changes in the land use patterns this cut-off date will not be eligible for compensation. They will, however, be given sufficient advance notice requesting them to vacate premises/corridor and dismantle affected structures and/or other establishments (if any) prior to project implementation.
- 29. They will be allowed to reuse their salvaged material for free and they will not be asked to pay any fine for making those change. Forced eviction will only be considered all other efforts are exhausted.

2.8 Compensation Entitlements

- 30. Entitlement provisions for AHs affected by restricted access to, or use of, land, and income losses and rehabilitation subsidies will include provisions for such land losses, house and buildings losses, crops and trees losses, a relocation subsidy, and a business losses allowance based on tax declarations and/or lump sums. These entitlements are detailed below:
 - Agricultural land impacts will be compensated based on whether an AH's access to, or use of, their land is restricted. For AHs whose access to, and use of agricultural land is not restricted i.e. they can continue to cultivate the land, compensation will be for removed or damaged crops and trees. For AHs whose access to, and use of, agricultural land is restricted i.e. they cannot continue to cultivate the land, compensation will be at replacement value in: (i) cash at current market rates plus a 15% compulsory acquisition surcharge, or (ii) through replacement land equal in value/productivity to the plot lost. When >10% of an AH income or agricultural land is affected, AHs (owners, leaseholders and sharecroppers) will get an additional allowance for severe impacts equal to the market value of a year's gross yield of the land lost (inclusive of both winter and summer harvest). Eventual transaction taxes/fees will be paid by QESCO or waived by the local governments. Market rates will be assessed through a survey of prevalent land prices in subproject areas. The assessment will be carried out by local government financing institutions.
 - **Residential/commercial** land will be compensated at replacement value either (i) in form of land for land or, (ii) cash at current market rates free of deductions for transaction costs. Renters/leaseholders will receive an allowance corresponding to a 3 months rent.
- Houses, buildings and structures will be compensated in cash at replacement cost free of depreciation, salvaged materials, and transaction costs deductions. The compensation for houses/buildings will include the cost of lost water and electricity connections.
- **Crops:** Cash compensation at current market rate for the harvest actually lost up to 3 harvests being as it may be winter or summer crop (for crops affected by towers); 1 harvest being as it may be summer or winter crop (for crops affected by the line stringing). It is expected that for this project only 1 harvest compensation for the towers will be sufficient. Compensation will be paid both to the landowners and tenants based on specific sharecropping agreements.
- **Trees:** Cash compensation shall reflect income replacement (see below).
- **Business workers and employees:** Indemnity for lost wages for the period of business interruption up to a maximum of 3 months.
- **Businesses:** compensation for permanent business losses will be in cash for a 1-year income based on tax declaration or, if unavailable, based on the official minimum salary; compensation for temporary business will be cash covering the income of the interruption period based on tax declaration or, unavailable, official minimum salary.
- Agricultural land leaseholders, sharecroppers, and workers: Where the access to, or use of, the land is restricted; Affected leaseholders will receive either a renewal of the lease in other plots or cash corresponding to the yearly yield of land lost for the remaining years of lease up to a maximum of 3 years. Sharecroppers will receive due share of harvest at market rates (for temporary impact) plus 1 additional crop compensation (for permanent impact).
- **Agricultural workers**, with contracts to be interrupted, will get an indemnity in cash corresponding to their salary in cash and kind for the remaining part of the agricultural year (inclusive of both winter and summer crop).
- **Relocation subsidy:** AHs forced to relocate will receive a relocation subsidy sufficient to cover transport costs and living expenses for 1 month.
- **House renters:** House renters who have leased a house for residential purposes will be provided with a cash grant of 3 months' rent at the prevailing market rate and will be assisted in identifying alternative accommodation.
- **Community structures and public utilities:** Will be fully replaced or rehabilitated so as to satisfy their pre-project functions.
- **Vulnerable people livelihood:** Vulnerable people (AHs below the poverty line) will be given priority in employment in project-related jobs.

2.9 Assessment of Compensation Unit Values

- 31. The methodology for assessing unit values of different items is as follows:
 - Land to be valued at replacement cost based on land sales survey during the year before impact survey. No deductions for taxes/transaction costs will be applied.
 - Houses/buildings will be valued at replacement value based on cost of materials, type of construction, labor, transport and other construction costs. No deductions will be applied for depreciation, salvaged materials and transaction costs
 - Annual crops will be valued at net market rates at the farm gate for the first year crop. In the eventuality that more than one-year compensation is due to the AHs the crops after the first will be compensated at gross market value.

• Fruit trees will be valued based on age category (a. seedling; b. not yet productive; c. productive). Productive trees will be valued at gross market value of one year income multiplied by the number of years needed to grow a new tree with the productive potential of the lost tree.

3. ASSESSMENT OF IMPACTS

3.1 Resettlement Field Survey

- 32. As a general strategy, the identification and layout of the site and a technical drawing showing line profile with complete tower spotting have been made as pre-requisites for carrying out the Resettlement Field Surveys (RFS). When both the documents are available, the resettlement survey team along with the original technical surveyor proceeds to the field. The RFS involved impact assessment by quantifying and costing the affected lands and crops through a participatory approach, socio-economic data on Ahs, and consultation with men and women of AHs and affected communities.²⁰
- 33. The resettlement survey team, comprising one resettlement specialist, one male and one female field surveyors, along with the technical surveyor conducted the fieldwork in Kanak 132kV transmission line subproject area from 18th to 27th of August, 2007. Thus, <u>27th August, 2007</u> has been fixed as the cut-off-date for this subproject. No subsequent changes made in land use pattern or construction of any structure will be entertained for any compensation or assistance under this subproject.

3.2 Minimization of Impacts

- 34. The QESCO usually takes all possible steps to safeguard against and minimize the likely adverse impacts on the local communities in the design and implementation of its power distribution enhancement subprojects, involving construction of substations and transmission lines. Accordingly, the following specific actions were applied to avoid and minimize the likely resettlement impacts of this Alizai 132 kV double circuit transmission line subproject:
 - The alignment of the transmission line was altered slightly at a number of places to avoid both the compact housing areas and scattered farm-houses. Accordingly, of the total 49 towers, 11 towers have been designed as angular towers and the remaining 38 towers as straight towers.
- 35. As a result, no buildings or farming enterprises (i.e., poultry farms, fruit, tube-wells, etc.) are affected. The transmission lines traverse throughout the open lands, including private agricultural lands where only the agricultural crops will be affected by the subproject execution.

3.3 Impacts of the Subproject

3.3.1 General Description

- 36. The Alizai subproject comprises the construction of a 13.46 km long 132 kV double circuit transmission line. The new transmission line will traverse mostly barren land (23.75 ha or 59%) and the remaining section of the line will cross barani (rainfed) cultivated land (16.13 ha or 41%) as well as a a tube-well irrigated grapes orchard, and a very small area of government land (0.49 ha or 1%), as shown in Table 3.1. No land will be acquired permanently but the construction and stringing works will affect wheat crop and grape vines within the 30m wide corridor (see Appendix 1: Working Tables).
- 37. The new transmission line under his subproject will consist of a total of 49 towers (11 angular and 38 straight towers) and is divided into five sections by affected villages:
 - <u>Section A</u>: Hurum Zai village 2.616 km, with 10 towers;

²⁰ Socioeconomic survey findings are presented in Section 4 and Consultations and Disclosure in Section 6.

- <u>Section B</u>: Nawakili village 2.556 km, with 9 towers;
- <u>Section C</u>: Haji Zai village 1.050 km, with 4 towers;
- <u>Section D</u>: Gangal Zai village 3.146 km, with 11 towers;
- Section E: Samar Zai village 3.06 km, with 11 towers; and
- <u>Section F</u>: Ali Zai village 0.991 km, with 4 towers.

Length of Line by Type of Land (m)					
Line by Village	Cultivated Land (Private)	Uncultivated Land (Private)	Uncultivated (Govt.)	Total Length	Village (%)
(A) Hurum Zai	1,446	1,134	36	2,616	19.49
(B) Nawakili	851	1,684	21	2,556	19.05
(C) Haji Zai	640	392	18	1,050	7.82
(D) Gangal Zai	1,180	1,959	7	3,146	23.44
(E) Samar Zai	960	2,088	12	3,060	22.80
(F) Ali Zai	300	659	32	991	7.39
Total	5,377	7,916	126	13,419	100.00
Land %	40	59	1	100.00	

Table 3.1: Transmission Line by Type of Land Traversed

38. Of the 16.13 ha of cultivated land, an area of 0.9 ha is a grapevine orchard and the remainder (15.23 ha) is cropland area, cultivated once a year with wheat crop in the *Rabi* season (winter-spring). The land is left fallow during the *Kharif* season (summer-autumn) for having no summer monsoon rainfalls in the area. Thus, the subproject's impact assessment has been made on the basis of wheat crop loss and for the grapevine orchard on the basis of three years production.

- 39. The area under this transmission line is mostly *barani* (un-irrigated/rainfed) and only one crop of wheat is cultivated in a year. The farmland under and around the towers will be affected temporarily by the loss of wheat and grape crops during the 3-tier process of tower construction, namely: (i) construction of foundations, (ii) erection of towers, and (iii) stringing of power cables. This whole process is expected to be completed in a total period of 11 to 12 months (see Chapter 9: Time Schedule), starting in March 2009 and ending at the latest in December 2009.
- 40. Wheat crop is usually sown in the area in December and harvested in May, the next year. The affected farmers will lose one wheat crop during that period, and they will be paid compensation for one crop. In contrast, the grape farmers will also lose one harvest of grapes during the summer season of 2009. But as the grapevines begin fruiting in third year of age, the loss or damage of grapevines will require replanting of the vines after the completion of the construction and installation works and the farmers will have no harvest for the next two years, at least. Thus, irrespective of the loss or damage caused by the towers or the line, three crop compensations will be paid to the affected grape farmers.

41. There are no trees, wood or fruit trees, within the designed line corridor which will need to be removed.

3.3.2 Impacts of Towers

- 42. As specified in Section 2, the strategy for the compensation of land affected by tower construction will be different for urban/residential land and rural (agricultural) land. In the case of urban or residential land the land under the tower will be considered as being permanently affected and therefore it will be acquired and compensated in full. In the case of agricultural land, as long as towers provide sufficient clearance to allow crop cultivation, the land will be considered as temporarily affected and therefore will not be acquired nor compensated.
- 43. The construction of towers on agricultural land will require compensation for crops lost under the tower and also in a small perimeter surrounding it. The area included in this perimeter has been assessed to be 900 m² for a 132 kV tower. Crop cultivation within the 30m wide corridor can continue after the stringing of lines has taken place. During stringing operations it is expected that one harvest will be lost. Thus, seventeen towers will require temporarily a total of 15,300m² (1.53 ha) of lands. As a result, a total of twelve AHs will be affected by the construction of 17 towers (Table 3.2)

Transmission Line by	No. of	No. of	Affected Crop Area		
Village	AHs	Towers	m²	ha	
(A) Hurum Zai	3	4	3,600	0.36	
(B) Nawakili	2	3	2,700	0.27	
(C) Haji Zai	1	2	1,800	0.18	
(D) Gangal Zai	4	4	3,600	0.36	
(E) Samar Zai	1	3	2,700	0.27	
(F) Ali Zai	1	1	900	0.09	
Totals	12	17	15,300	1.53	

 Table 3.2: Temporary Resettlement Impacts of the Towers

3.3.3 Impacts of Transmission Line

- 44. The sections of the transmission lines falling in-between the towers (TL Corridor) will cause damage or loss of crops in farmlands by the stringing of power cables. This final activity is usually carried out rapidly at one stretch of time and will be completed in non cropping season but to avoid the complications a one-time compensation for wheat crop has been provided in the budget and will be paid if required to the affected farmers. But three compensations will be paid for the damage or loss of the grapevines, for the reason explained in sub-section 3.3.1, above. No built-up structures (including private houses, farm-houses, shops, and community buildings, graveyards, etc.) will be affected by this subproject, and thus, no compensation and/or financial assistance will need to be paid to anybody in the Subproject area.
- 45. The following two tables (Table 3.3 and 3.4) show the total of length of the corridor (excluding lands under the towers) is 11.949 km, with a total affected area of 35.85 ha. Of the total corridor some 4.8 km and 14.601 ha (40.7%) is private farmland and 7.1 km and 21.246 ha (59.26 %) is uncultivated land (both private and government). As a result, twelve AHs will be affected temporarily during the stringing activity, and will be paid a one-time compensation for the loss of their crops. The AHs also affected by tower installation will also be paid compensation for two-crops (for the land under the towers).

	Length of C	Corridor (m)	Affected Area (m ²)	
Transmission Line by Village	Private Farmland	Uncultivated Govt/Pvt Land	Private Farmland	Uncultivated Govt/Pvt Land
(A) Hurum Zai	1,326	990	39,780	29,700
(B) Nawakili	761	1,525	22,830	45,750
(C) Haji Zai	580	350	17,400	10,500
(D) Gangal Zai	1,060	1,756	31,800	52,680
(E) Samar Zai	870	1,860	26,100	55,800
(F) Ali Zai	270	601	8,100	18,030
Total	4,867	7,082	146,010	212,460

Table 3.3: Temporary Impacts of TL Corridor* by Type of Land

* The 30m wide strip of land falling in-between the towers (excl. 900m² plots under each tower).

Table 3.4: Temporary Impacts of TL Corridor* on Private Farmlands

		Total	Affected Crop Area		
Transmission Line by Village	No. of AHs	Length (m)	m²	ha	
(A) Hurum Zai	3	1,326	39,780	3.978	
(B) Nawakili	2	761	22,830	2.283	
(C) Haji Zai	1	580	17,400	1.740	
(D) Gangal Zai	4	1,060	31,800	3.180	
(E) Samar Zai	1	870	26,100	2.610	
(F) Ali Zai	1	270	8,100	0.810	
Total:	12	4,867	146,010	14.601	

* The 30m wide strip of land falling in-between the towers (excl. 900m² plots under each tower).

3.3.4 Other Impacts and Impact Summary

46. Overall, a total of twelve farming households will be affected by the construction of the new 132kV transmission line. All 12 AHs will be affected by both by the construction and erection of towers and stringing activity, as shown in Table 3.5.

	Affected Crops (ha)						
Transmission Line by	Private Land			Government Land			
, mage	Total	Tower	Corridor	Total	Tower	Corridor	
(A) Hurum Zai	4.338	0.36	3.978	0.0	0.0	0.0	
(B) Nawakili	2.553	0.27	2.283	0.0	0.0	0.0	
(C) Haji Zai	1.920	0.18	1.740	0.0	0.0	0.0	
(D) Gangal Zai	3.540	0.36	3.180	0.0	0.0	0.0	
(E) Samar Zai	2.880	0.27	2.610	0.0	0.0	0.0	
(F) Ali Zai	0.900	0.09	0.810	0.0	0.0	0.0	
Total	16.131	1.53	14.601	0.0	0.0	0.0	

Table 3.5: Total Area of Affected Land

47. As noted above the farmers cultivate only wheat crop in *Rabi* season, and thus, the 12 AHs will be compensated for the loss of only one crop, and 2 AHs among them will also be compensated for the loss of grape vines. For the 2 AHs with grape vines affected will receive compensation equal to the current value of produce for three

years, as the newly planted grape vines will take three years to mature and produce grapes.

- 48. No wood or fruit trees will require removal form the transmission line corridor, and thus, no tree compensation will be applicable to this subproject.
- 49. Besides the loss of crops and the grape orchard, no houses or other built-up structure will be affected by the subproject. Similarly, there are no community property resources (land or structures), nor any business activities will be affected by the construction of the towers and/or stringing of transmission line cables.

3.4 Affected Households

3.4.1 General

50. Construction of 13.42 km long 132 kV transmission line will traverse mainly uncultivated land in Pishin district (Baluchistan province). A total of twelve AHs will be experience temporary disturbance of land and crop losses (Table 3.6). All twelve of the AHs are affected by both the towers and stringing of the transmission line.

				No. of AHs			
Transmission Line by Village	Length of Line (m)	Total No. of Towers	Towers + TL Corridor	TL Corridor only	Total		
(A) Hurum Zai	2,616	10	3	-	3		
(B) Nawakili	2,556	09	2	-	2		
(C) Haji Zai	1,050	04	1	-	1		
(D) Gangal Zai	3,146	11	4	-	4		
(E) Samar Zai	3,060	11	1	-	1		
(F) Ali Zai	991	04	1	-	1		
Total	13,419	49	12	-	12		
Percentage	-	-	100	0.00	100.0		

 Table 3.6: Affected Households by Towers and Corridor

3.4.2 Significance of Impacts

- 51. The impact of loss of crops will be minor or non-significant for each of the AHs. The AHs cultivate large farms and the area to be affected by the subproject are the least fertile (Barani or un-irrigated). The individual impact of the losses in each case is less than 10% of the AH's total crop (Table 3.7).
- 52. The transmission line and towers will affect only wheat crops and a grape orchard, and none of AHs will be impacted by permanent land loss or restricted access to, or use of, their farmland. The overall crop loss impact is minor as it ranges between 3.08% to 8.28% and an average of 6.04%. The loss is less than 10% of total crop area for each AH, as shown in Table 3.7.
- 53. Moreover, none of the 12 AHs are vulnerable (or include individually vulnerable people), in that none of the AHs were found to be headed by an elderly or disabled person, and none of the households are headed by women. Their incomes are such

that they are above the national poverty line (as described in the following section). The AHs live in a joint/extended family system which also serves as a safety net against external economic shocks. Finally, the overall community impact (village level) will also be minor.

Transmission	No. of	Proportion of Crop Loss (%)			
Line by Village	AHs	Minimum	Maximum	Average	
(A) Hurum Zai	3	6.89	8.13	7.37	
(B) Nawakili	2	5.71	7.87	6.79	
(C) Haji Zai	1	5.93	5.93	5.93	
(D) Gangal Zai	4	3.08	5.13	3.88	
(E) Samar Zai	1	8.28	8.28	8.28	
(F) Ali Zai	1	7.14	7.14	7.14	
Overall Total	12	3.08	8.28	6.04	

 Table 3.7: Proportion of Crop Loss by Affected Households

4. SOCIO-ECONOMIC PROFILE OF AFFECTED HOUSEHOLDS

4.1 Resettlement Field Survey Methodology

- 54. After obtaining the pre-requisite location maps, field layout and profile drawings, revenue records and in-field assistance of a technical surveyor, intensive fieldwork was carried out for preparing this Short LARP. The RFS, including a 100% census of AHs and community consultation (see Section 6 and Appendix 2 for list of participants) was undertaken between 18th and 27th August 2007.
- 55. The RFS involved taking field measurements, quantification and costing of the affected assets with participation of heads of AHs and the community. The enumeration of AHs included questions about their socio-economic characteristics in order to obtain necessary information for context of the losses and impacts. Community consultations were held at a number of villages all along the transmission line with small groups of men and women, separately, belonging mostly to the affected households. (See Section 6 for details and Appendix 2 for the list of the participants).

4.2 General Information on Affected Households

- 56. The incoming/outgoing transmission line is located in Pishin district of Baluchistan province. There are 12 AHs with a total population of 186 APs impacted by losses of crop (including grapes). The AHs will be affected through temporary land disturbance as a result of tower installation and stringing of the lines as well as loss of crops. The numbers of AHs impacted by the various activities and the assessment of those impacts has already been provided in Section 3.
- 57. All the 12 AHs are Sunni Muslim by faith and ethnically Pushtoon (Pathan) and Syed (descendants of Prophet Mohammad, PBUH). They all speak Pushto language.

Transmission Line by Village	No. of AHs	Total Affected Population
(A) Hurum Zai	3	40
(B) Nawakili	2	26
(C) Haji Zai	1	25
(D) Gangal Zai	4	58
(E) Samar Zai	1	16
(F) Ali Zai	1	21
Total	12	186

|--|

4.2.1 Indigenous People

58. None of the AHs are tribal or minority and all the affected land is held in private ownership (i.e. no tribal or communal ownership). Therefore the standard provisions of the LARF and this LARP are sufficient to ensure an effective compensation process, and the requirements of ADB *Policy on Indigenous People* are complied with. The ADB's policy, as specified in the Indigenous Peoples Development Framework (IPDF) prepared for the Program is not triggered, and therefore neither an IPDP nor special action is required for this subproject.

4.2.2 Ethnicity of Affected Households

59. In terms of social ethnic groups the AHs belong to two major castes; 9 AHs are Pushtoon (75%) and 3 AHs are Syed (25%) as shown in Table 4.2, below.

Transmission Line by Village	Social group(Number of House Holds)				
Transmission Line by Village	Pushtoon	Syed	Total		
(A) Hurum Zai	2	1	3		
(B) Nawakili	1	1	2		
(C) Haji Zai	1	-	1		
(D) Gangal Zai	3	1	4		
(E) Samar Zai	1	-	1		
(F) Ali Zai	1	-	1		
Total	9	3	12		
Percentage (%):	75	25	100		

 Table 4.2: Social Group of Affected Households

4.3 Data on Heads of Affected Households

- 60. All heads of the AHs are male, nine of the twelve heads of AHs are married, and three are widowed. In all the cases of married household heads the spouse lives in the same household (i.e. none are separated). In terms of age, the heads of AHs belong to three age groups; seven household heads are between the ages of 41 and 60 years old, four household heads are between 61 and 75 years old, and one belongs to the 36 to 40 year age group.
- 61. In terms of literacy and education, nine of the household heads stated they are literate (can read and write in both Pushto and Urdu languages), and three of them recorded they are illiterate (can read Quran, but cannot read and write in Pushto or Urdu). Out of the nine literate household heads, four are informally educated and can only read and write in Pushto and Urdu, two heads of household have a primary education, two household heads have a secondary education, and one has obtained a college level educational degree and is a high school teacher.

4.4 Data on Affected Households

62. Households in the subproject area are large, with an average size of 15.5 people per household, indicating a dominant trend towards joint and extended family system. The smallest household is made up of 12 persons and the largest household consists of 25 people (Table 4.3).

Transmission Line by	No. of	Household size (No. of APs)			
Village	AHs	Minimum	Maximum	Average	
(A) Hurum Zai	3	12	15	13.3	
(B) Nawakili	2	12	14	13.0	
(C) Haji Zai	1	25	25	25.0	
(D) Gangal Zai	4	12	17	14.5	
(E) Samar Zai	1	16	16	16.0	
(F) Ali Zai	1	21	21	21.0	
Total	12	12	25	15.5	

 Table 4.3: Size of Affected Households

63. Tables 4.4 and 4.5 provide details on household by age and gender compositions. Table 4.4 shows that there are slightly more females than males in the overall AP population. As seen in Table 4.5, adults (54%) and older adults (6%) make up nearly two-thirds of the overall AP population, youth account for 15%, and children (15 years and younger) account for a quarter of the AP population.

Transmission Line by		Total Number of Persons			
Village	No. AHs	Male	Female	Total	
(A) Hurum Zai	3	17	23	40	
(B) Nawakili	2	11	15	26	
(C) Haji Zai	1	13	12	25	
(D) Gangal Zai	4	27	31	58	
(E) Samar Zai	1	07	09	16	
(F) Ali Zai	1	13	08	21	
Total	12	88	98	186	

Table 4.4: Gender Composition of Affected Households

	Age in	Total Number of Persons			
Age Group	Years	Male	Female	Total No.	%
Children	Up to 15	21	25	46	24.7
Youth	16 – 25	13	15	28	15.1
Adults	26 - 60	48	53	101	54.3
Older adults	Above 60	06	05	11	05.9
Total	All Ages	88	98	186	100.0

64. In respect of housing, none of the AHs live in simple dwellings (constructed of thatch, sack, bamboo, clay or earth). All RFS participants stated that they live in houses constructed of brick and concrete, and some even large concrete houses.

4.5 Livelihood, Incomes and Poverty Level

65. As all AHs rely on farming for at least part of their income, the tenure of agricultural land is an important factor in terms of security and sustainability of livelihood. Among



the AHs, all survey participants stated they are the registered land owners. There are no sharecroppers, no households that rent or lease agricultural land, and no squatters amongst the AHs. Table 4.6 shows the farm size of AHs is relatively large, with an average of 22.8 ha and a range from 12.4 ha to 34.8 ha

Transmission Line by	No. of	Farm Size (ha)			
Village	AHs	Minimum	Maximum	Average	
(A) Hurum Zai	3	17.60	22.40	19.47	
(B) Nawakili	2	14.60	24.60	19.60	
(C) Haji Zai	1	32.40	32.40	32.40	
(D) Gangal Zai	4	12.40	32.60	24.15	
(E) Samar Zai	1	34.80	34.80	34.80	
(F) Ali Zai	1	12.60	12.60	12.60	
Total	12	12.40	34.80	22.83	

Table 4.6: Farm Size of Affected Households

66. According to Table 4.7 and 4.8, there are more males than females engaged in livelihoods (80% compared with 20%), and agriculture is the sector than accounts for the largest proportion of working APs. Waged employment accounts for 27% of engaged APs and snall business and trade accounts for 20% of the APs who earn a livelihood. Men outnumber women in each of the sectors.

Income	Number of Af	Sector		
Sector	Male	Female	Total	(%)
Agriculture	14	2	16	53.33
Business	5	1	06	20.00
Employment	5	3	08	26.67
Total	24	6	30	100.00
Gender %	80.00	20.00	100.00	

Table 4.7: Livelihood Type by Gender and Sector

Table 4.8 shows that the largest proportion of a household's income is derived from agriculture (81%), followed by waged employment (11%) and small business and trade (9%). In all cases men earn more than females working in the same sector.

Income	Average In	Sector		
Sector	Male Female Total		(%)	
Agriculture	3836.4	97.4	3933.8	81.01
Business	370.1	58.6	428.7	8.83
Employment	327.9	165.8	493.7	10.16
Total	4534.4	321.8	4856.2	100.00
Gender %	93.37	6.63	100.00	

Table 4.8: Income by Sector and Gend

68. In Pakistan the poverty line is estimated to be 849 Rs per person per month, based on the data provided in the RFS census there are no AHs that fall on or below the poverty line. Average per capita monthly incomes are Rs 1,925, with a minimum of 924 Rs/person/month and a maximum of 9,821 Rs/person/month.

Transmission Line by	No. of	Monthly Per Capita Income (Rs.)			
Village	AHs	Minimum	Maximum	Average	
(A) Hurum Zai	3	1,071	1,149	1,177	
(B) Nawakili	2	1,337	1,475	1,406	
(C) Haji Zai	1	1,086	1,086	1,086	
(D) Gangal Zai	4	924	1,436	1,102	
(E) Samar Zai	1	1,440	1,440	1,440	
(F) Ali Zai	1	9,821	9,821	9,821	
Total	12	924	9,821	1,925	

4.6 Literacy

69. Table 4.10 shows an overall literacy rate of the affected population as 36.5%, with the literacy of male APs being 1.5 times higher than that of female APs (44% vs. 29%).

	Total Number of Persons				
Literacy Lever	Male	Female	Total		
Total Number	88	98	186		
Literate Persons (No.)	39	29	68		
lliterate Persons (No.)	49	69	118		
Literacy Rate (%)	44.32	29.59	36.56		

Table 4.10: Literacy by Age and Gender of APs

5. INSTITUTIONAL ARRANGEMENTS

70. The compensation and rehabilitation program described in this LARP involves a number of agencies including; QESCO as the implementing agency, the Baluchistan Board of Revenue, the Ministry of Environment, NGOs, Provincial Government, and the District Government of Pishin, as detailed below.

5.1 Quetta Electric Power Company (QESCO)

- 71. The QESCO has overall responsibility for the preparation, implementation and financing of all tasks set out in this LARP as well as inter-agency coordination. Within QESCO day-to-day LAR tasks will be handled by a Social Development Cell (SDC), which will organize and internally monitor LARP preparation/implementation (including surveys, asset valuation, public consultation), cross-agency coordination, and LARP approval. In implementing these tasks the SDC will be assisted by:
 - A Resettlement Specialists team to be hired under the Project Supervision Consultants which will assist in LAR planning, implementation, internal M & E and training of QESCO and the concerned district governments in line with the requirements of the ADB resettlement policy;
 - (ii) A **local impact assessment/valuation team** will be hired to provide assistance in on-site LARP preparation, for carrying out surveys, base-line information gathering, and/or AP consultation and public relations;
 - (iii) An **independent agency** will be hired to conduct periodic external monitoring and evaluation, or third party validation of implementation of LARP activities

5.2 District Government

72. District government of Plushin has jurisdiction for land administration, valuation and acquisition. At the Provincial level these functions rest on the Board of Revenue while at District level they rest on the District Coordination Office (DCO) and within the DCO on the Land Acquisition Collector (LAC). A number of minor agents, most notably the *Patwari*, (the land records keeper), carry out specific roles such as titles identification and verification (see Figure 5.1). Functions pertaining to compensation of assets different from land (i.e., buildings and crops) or income rehabilitation also fall on the local governments, more specifically on the relevant district department.

Figure 5.1: Organization of District Land Acquisition Collector Office



5.3 Other Agencies and Institutions

- 73. As various agencies will need to be carefully coordinated so as to obtain effective, smooth and timely LARP implementation, a land acquisition steering committee (LASC) will be directly assigned to QESCO by the Board of Revenue and district level coordination committees. The LASC will be established at provincial level and will include QESCO's General Manager; Additional Chief Secretary; Chairman of Board of Revenue; Director General EPA; and, Project Director, QESCO (Figure 5.2 below).
- 74. The LASC will meet periodically to ensure proper and timely formation of the district level coordination committees to facilitate the LARP approval and implementation processes.

Figure 5.2: Organization of Land Acquisition Steering Committee



75. A Land Acquisition Coordination Committee (LACC) will be formed in Peshawar to assist with the updating and implementation of the LARP (in particular execution of surveys, valuation of assets, AH consultation, and local approval of LARP provisions). The committee formation will be initiated by QESCO and will include representatives of QESCO (PIU and SDC), Tehsildars of the concerned districts, Naib Zilla Nazim, and Union Council Nazims representing the AHs (see Figure 5.3 below).

Figure 5.3: Organization of Land Acquisition Coordination Committee



- 76. One of the areas where LCC functions will be to offer the affected communities with a channel and a support group for addressing complaints and grievances. In this function the LCC will hear the complaint, and if found justified will support its lodging at the QESCO, and as further described in Section 7.
- 77. This LARP will require review and clearance by the Environmental Protection Agency (EPA) as part of Government's Environmental Impact Assessment (EIA) approval procedures, as well as approval by ADB.

5.4 Responsibility for Internal and External Monitoring

78. Land acquisition tasks under the project will be subjected to both internal and external monitoring. Internal monitoring will be conducted by QESCO, assisted by the design and supervision consultant. External monitoring responsibilities will be assigned to an external monitoring agency (EMA: a Consultant to be engaged by QESCO according to the Terms of Reference (TOR) that have been approved by ADB.²¹ This aspect of the LARP implementation has been further elaborated in Chapter 10.

6. CONSULTATION AND DISCLOSURE

6.1 Consultation Undertaken for the LARP

- 79. The consultative process undertaken for the preparation of the LARP has included not only AHs, but also representatives of local governments in the subproject area, and members of local people's organizations (e.g., CBCs, women's organizations, peasant worker's organizations). Special attention was paid to identifying whether there were any vulnerable people amongst the APs, the conclusion is that there are not.
- 80. Consultation with stakeholders at the different stages of the subproject is required by ADB's *Policy on Involuntary Resettlement* and as provided for in the Program's LARF. To start with, consultations with the AHs were conducted during the participatory RFS. The communities' and especially the AHs' responses to the proposed subproject were found to be positive.
- 81. Along with the participatory RFS and interviewing of AHs, semi-structured discussions aiming at community awareness and consultations regarding the project's likely impacts were also held with the small groups of men and women, including AHs, along the proposed transmission line. A total of eight group discussions and consultation sessions were held with four groups of men and four groups of women at four villages along the proposed alignment of the new Alizai 132 kV transmission line, wherein a total number of 71 persons (36 men and 35 women) had participated (see Table 6.1 below, and Appendix 2 List of Participants).

	Number of Groups			Number of Participants		
Village	Men	Women	Total	Men	Women	Total
Hurum Zai	1	1	2	10	10	20
Nawakili	1	1	2	08	08	16
Gangal Zai	1	1	2	09	07	16
Ali Zai	1	1	2	09	10	19
Total	4	4	8	36	35	71

 Table 6.1: Participants in Group Discussions and Consultations

82. The affected communities' concerns and suggestions have been incorporated into subproject design and will be implemented as an integral part of subproject activities. The major concerns shown by the representatives of the AHs and villages were about the adequacy and timeliness of compensation payments as well as safety measures to

²¹ Terms of Reference for External Monitoring are provided in Appendix 4.

be taken during the construction of the towers and stringing of the transmission lines. In response, QESCO will make sure that the crop compensation amounts are assessed justly and paid to the AHs, at least, fifteen days, and prior to the temporary use of land before starting the civil works.

- 83. The local communities' responses (awareness, perceptions and preferences) to the Alizai transmission line subproject and resettlement related matters are summarized as follows:
 - This subproject is necessary under the current local conditions.
 - Crop and tree compensation should be fair and timely.
 - Local labor should be used during the construction work.

6.2 Compensation Options Discussed

- 84. In addition to the focus group discussions and consultative meetings described above, the survey included a questionnaire with several questions regarding AHs' preferences for compensation and rehabilitation options. This information has been and will be used to assist in determining the support measures required by AHs.
- 85. The first compensation priority of all AHs is for cash, rather than land or a combination of cash and land. When asked why they preferred cash compensation, almost all the AHs stated the reason was to assist with daily living expenses as they will loose their livelihood in the shape of crops, and some were interested in starting small business.
- 86. In summary, the compensation and resettlement options discussed and agreed upon during the consultation meetings included:
 - Relocation not applicable; and
 - Assistance not applicable.

6.3 LARP Disclosure

- 87. An English version of the program's LARF has already been uploaded to ADB's website and an Urdu version has been made available through QESCO's headquarters and PIU in the Subproject area.
- 88. In line with ADB's public communications policy, this LARP in English will also be posted on the ADB website, while its translation in Urdu will be disclosed to the AHs at the Alizai PIU office and posted on the ADB website.
- 89. In addition, a public information booklet in Urdu, summarizing compensation provisions will be sent to all AHs (a draft booklet in English has been prepared as provided in Appendix 3).

7. GRIEVANCE REDRESS PROCESS

- 90. A grievance mechanism will be available to allow an AH appealing any disagreeable decision, practice or activity arising from land or other assets compensation. AHs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, and time of compensation.
- 91. Care will always be taken to prevent grievances rather than going through a redress process. This can be obtained through careful LAR design and implementation, by ensuring full participation and consultation with the AHs, and by establishing extensive communication and coordination between the community, the QESCO, the LAC and local governments in general.
- 92. As finances will move differently for (i) land (for land use or access impacts) and (ii) other items compensation or rehabilitation (in the first case funds will move from QESCO through the District Collector Office to the AHs, while in the second funds will

go directly from QESCO to the AHs. The complaint and grievances will be addressed through two different processes as described in Table 7.1.

Land & Crop Compensation Issues	Other Compensation or Project Issues			
1. First, complaints resolution will be attempted at village level through the involvement of the SDC, district government, and/or informal mediators.	1. First, complaints resolution will be attempted at village level through the involvement of the SDC, district government, and/or informal mediators.			
2. If still unsettled, a grievance can then be lodged to the LAC who has 30 days to decide on the case.	2. If still unsettled, a grievance can be lodged to the PIU/SDC, which will have 30 days to respond.			
3. If no solution was reached a grievance can be lodged with support of the LCC to the PMU. The AH must lodge the complaint within 1 month of lodging the original complaint with the LAC and must produce documents supporting his/her claim. The PMU will provide the decision within 21 days of registering the complaint. The QESCO's decision must be in compliance with this LARF provisions.	3. If no solution was reached a grievance can be lodged with support of the LCC to the PMU. The AH must lodge the complaint within 1 month of lodging the original complaint with the LAC and must produce documents supporting his/her claim. The PMU will provide the decision within 21 days of registering the complaint. The PMU decision must be in compliance with this LARF provisions.			
4. Should the grievance redress system fail to satisfy the AH, they can further submit their case to the appropriate court of law as per the process set out in Sections 18 to 22 of the LAA (1894).	4. Should the grievance redress system fail to satisfy the AH, they can further submit their case to the appropriate court of law as per the process set out in Sections 18 to 22 of the LAA (1894).			

Table 7.1: Grievance Resolution Process

8. BUDGET FOR LAND AND ASSET ACQUISITION

8.1 Basis for Compensation

- 93. Compensation for projects requiring land acquisition can often differ between the borrower and ADB (and other providers of official development assistance). To comply with ADB's *Policy on Involuntary Resettlement*, rates used to compensate for lost land and assets must be at replacement values, to "at least" restoring people's livelihoods and ensuring that people Affected by a project are not left worse off.
- 94. According to the project's LARF, replacement cost is the amount of cash or kind needed to replace an asset in its existing or better condition, and is the value determined as compensation for the current market price without depreciation or deduction of the costs of any transaction or for any material salvaged. The processes for establishing the rates used for this subproject followed the methodology set out in the project's LARF.

8.2 Determining the Rates for Compensation

- 95. Based on the foregoing requirements and the LARF provisions, basic annual crop compensation was valued at net farm-gate market rates. If additional crops compensation is due it will be calculated at market value minus the value of inputs.
- 96. The valuation survey registered recent crop sale at market and was based on AP and community consultation. The price survey results are provided in the following two tables (Tables 8.1 and 8.2).



· · · ·					
Affected Crop Net Income (Rs.) From Wheat			heat		
	Per Acre	Per Hectare	Per Sq. Meter		
Minimum	5,250.00	12,967.50	1.30		
Maximum	6,510.00	16,079.70	1.61		
Average	5,880.00	14,523.60	1.45		

 Table 8.1: Rate/Price for Crops in Subproject Area

97. For the valuation of the grapes orchards current crop sales at market price and was based on AP and community consultation (including relevant local government agencies). For the grapes orchards, the 2 AHs will be compensated equal to three years production value. After the survey following rates were determined.

Table 8.2:	Rate/Price fo	r Grape	Orchards	in Subr	project Area
			••••••		

Affected Crop	Net Income (Rs.) From Grapes/ Year										
Anected Crop	Per Acre	Per Hectare	Per Sq. Meter								
Minimum	312,500.00	771,875.00	77.19								
Maximum	271,000.00	669,370.00	66.94								
Average	291,750.00	720,622.50	72.06								

98. Based on the current market rates, as provided in the above two tables, compensation amounts for the affected wheat and grape crops were assessed as shown in the following Table 8.3.

Table 8.3:	Compensation	Assessed for	Affected Wheat	and Grape	Crops (Alizai)
------------	--------------	--------------	-----------------------	-----------	----------------

Name of Affected Crop	Affected Area (m ²)	Market Rate (Rs./ m ²)	No. of Crop Compensation s	Compensation Amount (Rs.)
Wheat	152,310	1.45	1	220,850
Grapes	9,000	72.06	3	1,945,620
Total	161,310		-	2,166,470

8.3 Budget for Land and Asset Acquisition

- 99. This LARP includes the cost of compensation, rehabilitation and other restoration/ assistance entitlements of 12 private AHs, with a breakdown by crops and other associated costs. The cost estimate has been based on the rates derived through consultation and survey as described in Section 8.2. The rates for compensation and cash entitlements for rehabilitation as well as allowances payable to AHs will be adjusted annually, based on the actual annual inflation rate. QESCO, with the LACs, will determine the annual inflation rates and adjust all cash entitlements.
- 100. Compensation for wheat crop and grapes orchards is Rs. 2.17 million.
- 101. The administrative charges have been estimated as 10% of the total of compensation for assets, and allowances. These charges are to cover the costs of implementing the plan (producing and distributing the PIB, holding individual and group consultations and public meetings as required, verifying the Census Survey, revising the LARP if required (to reflect any minor changes), organizing and arranging for the compensation payments through the LACs), and internal monitoring of the plan and its implementation.
- 102. A contingency of 10% of the subtotal of the administrative charges has been included in the cost estimate.

- 103. Funds for compensation and implementation of the LARP will be from the Government (counterpart funds) via QESCO, budgetary requirements for economic restoration, as part of resettlement budget will also come from the counterpart funds and shall be identified as allowances. The EMA will be financed as a project loan cost as a component of the project support fund.
- 104. As shown in Table 8.4, the total cost of LARP implementation on this Alizai 132 kV double circuit transmission line subproject will be Rs. 4.27 million Rs (US\$ 70,168).

No.	Resettlement Activity	No.	Unit	Rs./Unit	Total Rs.
А.	Asset Compensation	-	-	-	2,166,470
A.1	Grape Orchard (3 Yearly Compensations)	9,000	m2	72.06	1,945,620
A.2	Crops: Wheat (1 Crop Compensation)	152,310	m2	1.45	220,850
В.	Other Activities	-	-	-	1,501,638
B.1	Rehabilitation of Affected Lands/Structures	161,310	m²	1.25	201,638
B.2	Resettlement Specialist (implementation)	3.00	pers/mo	300,000	900,000
B.3	External monitoring (LARP activities)	1.00	pers/mo	300,000	300,000
B.4	Training of QESCO staff (incl. materials)	1.00	lumpsum	100,000	100,000
C.	Administration Costs (10% of A)	0.10	lumpsum	2,166,470	216,647
D.	Subtotal (A+B+C)	-	-	-	3,884,754
E.	Contingency (10% of D)	0.10	lumpsum	3,884,754	388,475
	Total Amount (Pak. Rupees):	-	-	-	4,273,229
	Total Amount (US Dollars*):	-	-	-	70,168

 Table 8.4: Estimated Resettlement Cost of Alizai Transmission Line Subproject

* US\$ <u>1.00</u> = Rs. <u>60.90</u>.

9. IMPLEMENTATION SCHEDULE

- 105. The overall program will be implemented over a five year period with the first tranche of subprojects scheduled to commence upon loan approval. Implementation of resettlement and related activities will take place after the project supervision consultant has mobilized, who will assist QESCO in all LAR activities, as presented in Table 9.1.
- 106. Civil works contractors will not be issued a notice of possession of site for any section of construction works unless the QESCO has (i) satisfactorily completed, in accordance with the approved LARP, and made all compensation payments, and (ii) ensured that the rehabilitation assistance is in place and the area required for civil works is free of all encumbrances. The LARP implementation schedule, shown below, envisages the following sequence of activities.

Table 9.1: Implementation Schedule (Alizai, QESCO)

		Respo	nsibility				Ye a	ar 20	07							Y	/ea	ar 2	200)8									•	Yea	ar 2	200	9				
	LARP Activity/Task	Primary	Second ary	М	J	J	А	A S	С	1	D	J	F	М	A	Μ	1	J	J	А	S	0	Ν	D	J	F	M	A	N N	N.	J	J	А	s	0	Ν	D
	Land Acquisition & Resettlement		Consult																																		1
	Framework	QESCO	ant																																		l
	Indigenous People Development		Consult																																		ł
	Framework	QESCO	ant																																		
	Survey & Design of Transmission Line (TL)	QESCO	-																																		
	Site Demarcation of Affected Lands (TL)	QESCO	-																																		
	Resettlement Field Survey of Alizai	QESCO	Consult ant																																		
	Draft Land Acquisition and Resettlement Plan	QESCO	Consult ant																																		
ion	LARP Revision (if necessary)	QESCO	Consult ant																																		
ration	Disclosure of LARF & LARP on ADB Website	ADB	Consult ant																																		
Prepa	LARP Disclosure - Brochure in Urdu	QESCO	Consult ant												_																						
	Mobilize project supervision consultant	Govt	QESCO																	I	-																
	LARP revision (if necessary)	QESC O	SDC/R S																																		
ation	Information dissemination to Affected People	QESCO	SDC/R S																			_															
ement	Adjust compensation rates for inflation	QESC O	SDC/R S																																		
Imple	Submit revised LARP / Approval by EPA/ADB	QESCO	Govt/A DB																																		
	Award of Contracts for Civil Works	QESCO	Contrac tor																																		
	Grievance Redress Process	QESC O	SDC/R S																			*	*	*	*						*	*				*	*

		Respo	nsibility			١	′ear	200)7							Y	ear	· 20	80(Ye	ear	200)9				
	LARP Activity/Task	Primary	Second ary	М	J	J	А	s	0	Ν	D	J	F	М	А	М	J	J	А	s	0	Ν	D	J	F	М	А	М	J	J	А	s	0	Ν	D
	Delivery of compensation prior to	QESC	SDC/R																																
	start of Work	0	S																																
	Final payment of crop compensation	QESCO	SDC/R S																				I												
	Internal Monitoring of LARP Implementation	QESC O	SDC/R S																		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Possession of land for starting works	QESC O	SDC/R S																																
uction	Contractor mobilized to start work	Contrac tor	Consult ant																																
Constr	Commencement of Civil Works	Contrac tor	Consult ant																						1		_		_	_	-	-			
	External M & E of LARP Implementation	EMA	QESCO																				*	*	*	*	*	*	*	*	*	*	*	*	*

10. MONITORING AND EVALUATION

- 107. Monitoring and Evaluation (M&E) are critical activities in involuntary resettlement caused by various infrastructure development projects, like this Power Distribution Enhancement project. Monitoring involves periodic checking to ascertain whether activities are progressing as per schedule while evaluation is essentially a summing up, at the end of the project, assessment of actual achievement in comparison to those aimed at during the implementation. The LARP implementation will be monitore5d both internally as well as externally.
- 108. The QESCO through SDC will be responsible for internal monitoring. The Resettlement Specialist will provide necessary technical assistance in implementing and monitoring the resettlement activities. In addition, a part-time Consultant will be hired for independent external monitoring and evaluation of the resettlement activities.

10.1 Internal Monitoring

- 109. The Short LARP includes indicators and benchmarks for achievement of the objectives under the resettlement program, which can be categorized as follows:
 - Process indicators, which include project inputs, expenditures, staff deployment;
 - Output indicators are results in terms of numbers of Affected persons compensated for their Affected assets (land, crops and/or trees), and,
 - Impact indicators related to the long-term effect of the project on people's lives in the project-Affected area.
- 110. The first two types of indicators, related to process and immediate outputs and results, will be monitored internally by SDC. This information will be collected from the project site and assimilated in the form of a monthly progress report to assess the progress and results of LARP implementation, and adjust the work program, where necessary, in case of any delays or problems.
- 111. Specific activities under LARP implementation to be monitored are the following:
 - Information campaign and consultation with AHs on a continued basis;
 - Status of land acquisition/purchase and payments of crop and tree compensations;
 - Status of restoration of damaged community infrastructure (water pipelines, irrigation channels / watercourses, drains, roads, streets, etc.)
 - Grievances redress activities
- 112. The SDC will be responsible for monitoring the day-to-day resettlement activities of the subproject. The socio-economic census and land acquisition data will provide the necessary benchmark for field level monitoring, to be carried out through:
 - Review of IOL/Census information for all AHs;
 - Consultation and informal interviews with AHs;
 - In-depth case studies;
 - Informal sample survey of AHs;
 - Key informant interviews; and
 - Community public meetings.

113. A performance data sheet will be developed to monitor the project at the field level. Quarterly reports will be received from the field offices and LAC/GSC will be responsible for overall project level monitoring.

10.2 External Monitoring

- 114. As mentioned earlier, an individual consultant, a consulting firm will be engaged on part-time basis to carry out independent monitoring and evaluation of the LARP implementation (see TOR in Appendix 4). Considering the short duration of this subproject, the independent evaluation will be undertaken on intermittent basis and a one-time final report will be prepared and submitted to ADB and QESCO for review and approval, and further action, if needed. The Consultant will be selected by the QESCO, with advice and concurrence of ADB. S/he will review the status of the resettlement implementation in light of the targets, budget and duration that had been laid down in this short LARP. The key tasks during external monitoring include:
 - Review and verify internal monitoring reports prepared by SDC;
 - Identification and selection of impact indicators;
 - Impact assessment through formal & informal surveys with the Affected persons;
 - Assessment of adequacy and effectiveness of information disclosure, consultation and grievance mechanism.
 - Consultation with the AHs, QESCO and Govt. officials, community leaders for review report; and
 - Assessment of the resettlement efficiency, impact and sustainability, and drawing lessons for future resettlement policy formulation and planning.

10.3 Indicators for Monitoring and Evaluation

- 115. The following will be considered as the basis for indicators in monitoring and evaluation of the subproject's LARP:
 - Socio-economic conditions of the AHs in the post-resettlement period;
 - Communications and reactions from AHs on entitlements, compensation, options, alternative developments and relocation timetables etc.;
 - Changes in housing and income levels;
 - Valuation of property;
 - Grievance procedures;
 - Disbursement of compensation; and
 - Level of satisfaction of AHs in the post resettlement period.

10.4 Resettlement Database

116. All information concerning resettlement issues related to land acquisition, socioeconomic information of the acquired land; inventory of crop and tree losses by individual AHs, compensation and entitlements and payments will be collected by SDC and the Consultants through their concerned field offices and computerized by the SDC, QESCO. This database will form the basis of information for implementation, monitoring and reporting purposes and facilitate efficient resettlement management.

10.5 Reporting Requirements

117. The SDC responsible for supervision and implementation of LARP will prepare monthly progress reports on resettlement activities and submit them to ADB for review.

The Resettlement Specialist will also monitor LARP implementation independently and submit quarterly reports to the QESCO and ADB. These quarterly reports will also highlight the bottlenecks and recommend ways and means to improve such problematic situations. The external Consultant will submit a one-time review report directly to ADB and determine whether or not resettlement goals have been achieved, more importantly whether livelihoods and living standards have been restored/enhanced and recommend ways and ways improvements. S/he will also provide a copy of the same report to the QESCO Headquarters for information and successive action.

APPENDICES

Appendix 1 – Working Tables

Appendix 2 – List of People Consulted for LARP

Appendix 3 – Draft Public Information Brochure

Appendix 4 – Terms of Reference for External Monitoring Consultant

Appendix 1: Working Tables

Table: A.1 Crops Affected by Alizai 132 kV Double Circuit Transmission Line Subproject (QESCO)

		Name of	Parent	Crops/ C	Drchards (Ha	ctares)
	Name of Affected Farmer			Total		
No.	(HHH)	Village/Hamlet	Village	Area	Wheat	Grapes
Alizai :			1			
1	Malik Samad	Alizai	Alizai	1.31	1.31	-
2	Haji Khairo	Alizai	Alizai	1.21	1.21	-
3	Mohammad Koa	Alizai	Alizai	1.82	1.82	-
	Sub Total			4.34	4.34	-
	Persentage			100.00	100.00	-
Nawakili	<u>:</u>					
4	Haji Abdullah	Nawakili	Nawakili	1.15	1.15	-
5	Saraj Naimatulla	Nawakili	Nawakili	1.40	1.40	-
	Sub Total			2.55	2.55	-
	Persentage			100.00	100.00	-
Hajizai:						
6	Haji Ali Muhammad	Hajizai	Hajizai	1.92	1.92	-
	Sub Total			1.92	1.92	-
	Persentage			100.00	100.00	-
Gangalza	ai :	1				
7	Haji Shah Muhamad	Gangalzai	Gangalzai	1.134	1.134	-
8	Haji Bar Muhammad	Gangalzai	Gangalzai	0.636	0.636	-

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9	Sayed Shugrai	Gangalzai	Gangalzai	1.005	1.005	-
10	Haji Allah Dad	Gangalzai	Gangalzai	0.765	0.77	-
	Sub Total			3.54	3.54	-
	Persentage			100.00	100.00	-
Samarza	i:					
11	Haji Niaz Muhammad	Samarzai	Samarzai	2.88	2.88	-
	Sub Total	2.88	2.88	-		
	Persentage	100.00	100.00	_		
Alizai :						
12	Dr. Asadullah	Alizai	Alizai	0.90	-	0.90
Sub Tota	al			0.90	-	0.90
Persenta	ge		100.00	-	100.00	
Total			16.13	15.23	0.90	
Persenta	ge			100.00	94.42	5.58

Tabl	e A-2: List of Affected Farmers by	New Towers an	d Transmis	sion Line f	or Alizai 13	2kV TL Su	b-project (Q	ESCO)		
		Name of	Parent		Tower (3	0mx30m)	T. Line (3	0m Wide)	Total Affe	cted Area
No.	Name of Affected Farmer (HHH)	Village/Hamlet	Village	Tower No.	Number	Area (m2)	Length (m)	Area (m2)	Sq. Meters	Hectares
Aliza	ai :	U U								
1	Malik Samad	Alizai	Alizai	6	1	900	405.00	12,150	13,050	1.31
2	Haji Khairo	Alizai	Alizai	7	1	900	374.00	11,220	12,120	1.21
3	Mohammad Koa	Alizai	Alizai	8 - 9	2	1800	547.00	16,410	18,210	1.82
	Sub Total				4	3600	1326	39780	43380	4.338
Naw	akili :	Г	Γ		1 1			[Γ	
4	Haji Abdullah	Nawakili	Nawakili	17	1	900	353.00	10,590	11,490	1.15
5	Saraj Naimatulla	Nawakili	Nawakili	18 - 19	2	1800	408.00	12,240	14,040	1.40
	Sub Total				3	2700	761	22830	25530	2.553
Hajiz	ai:	l			1					
6	Haji Ali Muhammad	Hajizai	Hajizai	20 - 21	2	1800	580.00	17,400	19,200	1.92
	Sub Total				2	1800	580	17400	19200	1.92
Gan	galzai :				1					1
7	Haji Shah Muhamad	Gangalzai	Gangalzai	31	1	900	348.00	10,440	11,340	1.13
8	Haji Bar Muhammad	Gangalzai	Gangalzai	32	1	900	182.00	5,460	6,360	0.64
9	Sayed Shugrai	Gangalzai	Gangalzai	33	1	900	305.00	9,150	10,050	1.01
10	Haji Allah Dad	Gangalzai	Gangalzai	34	1	900	225.00	6,750	7,650	0.77
	Sub Total	. <u> </u>			4	3600	1060	31800	35400	3.54



Sam	Samarzai :												
11	Haji Niaz Muhammad	Samarzai	Samarzai	35 - 37	3	2700	870.00	26,100	28,800	2.88			
	Sub Total				3	2700	870	26100	28800	2.88			
Aliza	ai :												
12	Dr. Asadullah	Alizai	Alizai	48	1	900	270.00	8,100	9,000	0.90			
	Sub Total			1	900	270	8100	9000	0.90				
	Total			17	15300	4867	146010	161310	16.131				



Appendix 2: List of Participants in Consultation Sessions	
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Men's Groups				Women's Groups			
No.	Name	Status	AH	No.	Name	Status	AH
Village 1: Alizai				Village 1: A	lizai		
Group 1: 20 July 2007			Group 1: 20 Jully 2007				
1	Malik Kadeem	Landowner	AH	1	Noor Sahiba	House-Wife	AH
2	Abdul Hadi	Landowner	AH	2	Shaheena Bibi	House-Wife	AH
3	Malik Samad	Landowner	AH	3	Gul Bano	Teacher	AH
4	Mohammed Koa	Landowner	AH	4	Ruqia	House-Wife	-
5	Sahoon	Landowner	AH	5	Gul Rukh	Student	AH
6	Hai Baz Khan	Landowner	AH	6	Hasseba bibi	House-Wife	AH
7	Haji Abdul Karim	Business	-	7	Reshma Khatoon	House-Wife	AH
8	Jamal Din	Shopkeeper	-	8	Shugrai	Teacher	-
9	Mian Rang	Lease Tenant	AH	9	Gulnaz Bibi	House-Wife	AH
10	Mohammed Usman	Teacher	-	10	Ghulam Roqia	House-Wife	-
	Village 2: Nawa	akilli		Village 2: Nawakilli			
	Group 2: 22 July	y 2007			Group 2: 22 Ju	lly 2007	
11	Haji Niaz Mohammed	Landowner	AH	11	Ghulam Roqia	House-Wife	AH
12	Haji Sadiq	Landowner	AH	12	Hifza Bibi	House-Wife	AH
13	Haji Abdul Manan	Landowner	AH	13	Mahnaz Bibi	House-Wife	-
14	Wahedullah	Labourer	-	14	Rehana	Student	-
15	Haji Wahan	Landowner	AH	15	Zarqoon Bibi	House-Wife	AH
16	Mohammed Ismail	Landowner	AH	16	Afsar Begum	House-Wife	AH
17	Habibullah	Shopkeeper	-	17	Maryam Bibi	Tailor + HW	-
18	Haji Zakria	Labour	-	18	Raheema	House-Wife	AH
Village 3: Gangal Zai				Village 3: Gan	gal Zai		
Group 3: 23 July 2007				Group 3: 23 Ju	ly 2007		
19	Ghulam Mustafa	Landowner	AH	19	Shanzay	Teacher	-
20	Haji Abdul Razzaq	Landowner	AH	20	Gulelala	House-Wife	AH
21	Haji Sharif	Landowner	AH	21	Sofia Bibi	House-Wife	-
22	Gulab Khan	Landowner	AH	22	Noshina	House-Wife	AH
23	Mohammed Zaman	Teacher	-	23	Shahelala	House-Wife	AH
24	Haji Naimatuulah	Sharecropper	AH	24	Mahetab	House-Wife	AH
25	Ali Mohammed	Student	-	25	Saima Bibi	House-Wife	AH
26	Mohammed Ahmed	Labour	-		Village 4: Al	i Zai	
27	Haji Mohammed Mobin	Landowner	AH	Group 4: 24 July 2007			
Village 4: Ali Zai			26	Roshanay	House-Wife	AH	
	Group 4: 23 July	2007	1	27	Sharbano	House-Wife	AH
28	Agha Shamsullah	Landowner	AH	28	Shamsa Bibi	House-Wife	-
29	Haji Niaz Mohammed	Landowner	AH	29	Kazil Bash	House-Wife	AH
30	Haji Mahmood	Landowner	AH	30	Shahpara Bibi	Student	-
31	Abdul Karim	Lease Tenant	-	31	Kulsoom Bibi	Teacher	-
32	Haji Allahdad	Landowner	AH	32	Mahjabeen	Student	AH
33	Haji Shah Mohammed	Landowner	AH	33	Shah Khatoon	House-Wife	AH
34	Haji Abdul Qahar	Lease Tenant	-	34	Mah Rukh	Student	-
35	Muhammed Hussain	Shopkeeper	-	35	Wishma	House-Wife	-
36	Mohammed Mumtaz	Teacher	-	-	-	-	-

Appendix 3: Draft Public Information Brochure (Alizai, QESCO)

Power Distribution Enhancement Program New Alizai 132 kV Transmission Line

Quetta Electric Supply Company (QESCO) Government of Pakistan

March 2008

Land Acquisition and Resettlement Impacts Compensation/Rehabilitation: Information Booklet

A. GENERAL

- 1. The Quetta Electricity Supply Company (QESCO) is intending to take a loan from the Asian Development Bank (ADB) to implement the Power Distribution Enhancement Program (PTEP) aiming at upgrading and extending the transmission network to expanding the capacity and coverage of the network. The project will be implemented over five to six years, and will include a number of tranches or groups of subprojects.
- 2. In first tranche Alizai is on of the two subprojects (132 kV Transmission Line Subproject) that required transmission lines and the installation of the towers for these will require land acquisition, and the stringing of their lines will mean that crops and trees will be damaged.
- 3. . The New Alizai 132 kV Transmission Line Subproject will supply additional power from Quetta-Pishin 132 kv transmission line to the existing Alizai Grid Station at Alizai, to enhance its capacity.
- 4. The subproject will be implemented in the area starting in the start of the 2008 and will affect crops and trees in your communities. To compensate and/or rehabilitate these losses the provisions of relevant Pakistan laws and of the ADB Policy on Involuntary Resettlement will be adopted. This has included the preparation of a Land Acquisition and Resettlement Framework (LARF) setting out the basic compensation/rehabilitation provisions for the Land Acquisition and Resettlement Plan (LARP) providing data on impacts and Affected households and indicating in detail how the impacts will be compensated or rehabilitated has been prepared for each subproject that requires temporary disturbance to land and subsequent compensation for crops and trees.
- 5. Both the LARF and the LARP in Urdu language will be available for perusal to anyone interested at the Project Implementation Unit in Pishin district. This booklet summarizing the provisions of the LARF and the LARP for the New Alizai 132 kV Transmission Line Subproject is given to all the families whose land, trees and crops and incomes are affected by this subproject. The objective of this booklet is to inform them of the essential compensation and rehabilitation policy for the New Alizai 132kV Double Circuit Transmission Line Subproject and of a number of basic issues relative to the implementation of the compensation and rehabilitation program.



B. PRINCIPLES FOR COMPENSATION AND/OR REHABILITATION OF AFFECTED FAMILIES

- 6. Principles for the compensation/rehabilitation of Affected people (AHs) by the New Alizai132 kV Double Circuit Transmission Line Subproject are:
 - (1) Land acquisition will be avoided and acquisition will only occur where access to, or use of, an AH's land is affected;
 - (2) Compensation will guarantee the maintenance of the AHs pre-project living standards;
 - (3) AHs will be fully informed/consulted on compensation options;
 - (4) AHs' socio-cultural institutions will be supported and used;
 - (5) Land acquisition provisions will equally apply to women and men;
 - (6) Lack of formal title will not impede rehabilitation of families losing land;
 - (7) Particular attention will be paid to women-headed households and vulnerable groups;
 - (8) Land acquisition budgets will be included in project costs; and
 - (9) Compensation will be fully provided prior to ground leveling/demolition.

C. COMPENSATION AND REHABILITATION ELIGIBILITY AND ENTITLEMENTS

7. All families residing in affected areas and holding affected assets or incomes before the eligibility cut-off date for the project <u>27th August 2007</u> (the date of the end of the impact survey) will be entitled to compensation and/or rehabilitation for their losses. This provision includes legal owners, sharecroppers and leaseholders and squatters as detailed in table 1 below.



Asset	Specification	Affected People	Compensation Entitlements
Land permanently acquired for sub- station	 Donated/bought on the open market Acquired via right of eminent domain 	Land owners	If donated or voluntarily sold ADB Policy is not triggered If acquired via exercise of the right of eminent domain land will be compensated at fill market value.
Arable Land temporarily affected by construction of	Access is not restricted and existing or current land use will remain unchanged by the construction of towers and transmission line	Farmer, Titleholder	No land compensation provided that land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below
towers or TL.		Leaseholder (registered or not)	No land compensation provided that the land is rehabilitated/restored to former quality following completion of works. Compensation, in cash, for all damaged crops and trees as per item below
		Sharecroppers (registered or not)	Compensation, in cash or kind, for all damaged crops/trees as per item below
		Squatters	Compensation, in cash, for all damaged crops/trees as per item below
	All adverse effects on land use independent of severity of impact	Farmer, Titleholder	Land for land compensation with plots of equal value and productivity to the plots lost; or cash for affected land at replacement cost based on market value plus 15% compulsory acquisition surcharge and free of taxes, registration, and transfer costs
Arable Land where		Leaseholder (registered or not)	Renewal of lease in plots of equal value/productivity of plots lost, or Cash equivalent to market value of gross yield of affected land for the remaining lease years (up to a maximum of 3 years).
construction		Sharecroppers	Cash compensation equal to market value of lost harvest
restricts access or agricultural use.		Agricultural workers	Cash indemnity equal to salary (including portions in kind) for remaining part of agricultural year.
		Squatters	1 rehabilitation allowance equal to market value of 1 gross harvest (additional to crop compensation) for land use loss.
		Farmer,	1 severe impact allowance equal to market value of gross
	Additional for severe impacts (>10% of land loss)	Titleholder	harvest of affected land for 1 year (inclusive of winter and
		Sharecronners	summer crop and additional to standard crop compensation)
		(registered or not)	share (additional to standard crop compensation)
		Squatters	1 severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crops and additional to standard crop compensation)
Residential/ Commercial	Future usage of the land will get restricted permanently	Titleholder	Land for land through provision of plots comparable in value/location to plot lost; or cash for affected land at full replacement cost free of taxes, registration, transfer costs plus 15% compulsory acquisition surcharge.
Land affected by		Renter, Leaseholder	1-3 months allowance based on current monthly rent
towers/ TL		Squatters	Relocation in a public resettlement area or a self-relocation allowance
Houses and Structures	Affected houses /structures will be demolished	Relevant AHs/ squatters	Cash compensation at replacement rate for affected structure/other fixed assets free of salvaged materials, depreciation or transaction costs. For partial impacts full cash assistance to restore remaining structure.
Crops	Crops affected (damaged/lost)	All AHs/ squatters	Tower impacts: Cash compensation at current market rate based on actual impact for a maximum of 3 harvests (for this subproject, however, 1 harvest is expected to be sufficient) Line corridor stringing: cash compensation at current market rate for 1 harvest.
Trees	Trees removed	All AHs/ squatters	Cash compensation shall reflect income replacement
Business Employment	loss of business or employment	All AH/ squatters	Owner: (i) Cash compensation equal to 1 year income, if loss permanent; (ii) cash compensation for the period of business interruption, if loss is temporary. Worker/employee: lost wages indemnity for the business interruption period up to a 3 months maximum.

Table 1: Eligibility and Entitlements Matrix

Asset	Specification	Affected People	Compensation Entitlements
Relocation	Transport, transition costs	All AHs so affected	Provision of sufficient allowance to cover transport expenses and livelihood expenses for one month.
Community	structures & installations	concerned community	Rehabilitation/substitution of affected structures/utilities (i.e. mosques, roads, schools etc.
Vulnerable AH		AH below poverty	Employment priority in project-related jobs.

D. SUBPROJECT IMPACTS

- 8. A total of twelve farming households (12 AHs, 186 APs) will be affected by the construction of the new 132kV transmission line. All twelve AHs will be affected by both towers and transmission line, by the construction and erection of towers, and stringing activity. As the farmers do not cultivate their farmlands only in the *Rabi* season with wheat crop, all the 12 AHs will be compensated for the loss of wheat crop, during the stringing activity. Among them, 2 AHs will also suffer from the loss of their grape vines, and thus, they will be paid cash compensation equal to the current value of grape produce for three years, as the newly planted grape vines will take 3 years to mature and produce grapes.
- 9. For this subproject no wood or fruit trees will require removal from the transmission line corridor, and thus, no tree compensation will be applicable to this subproject.
- 10. Besides the loss of crops and grape orchards, no houses or built-up structures will be affected by the subproject. Similarly, there are no community property resources (land or structures), nor any business activities that will be affected by the construction of the towers and/or the stringing of transmission lines.

E. COMPENSATION

- 11. To comply with the ADB's *Policy on Involuntary Resettlement*, rates used to compensate for lost land and assets must be at replacement values, to "at least" restoring people's livelihoods and ensuring that people affected by a project are not left worse off. Moreover, according to the project's LARF, replacement cost is the amount of cash or kind needed to replace an asset in its existing or better condition, and is the value determined as compensation for the current market price without depreciation or deduction of the costs of any transaction or for any material salvaged. The processes for establishing the rates used for this subproject followed the methodology set out in the project's LARF.
- 12. Accordingly, the valuation of affected crop survey registered recent current wheat crop sales at market and was based on AP and community consultation. The results of the survey are provided in the tables below.

Affected Crop	Net Income from Wheat Crop (Rs.)			
	Per Acre	Per Hectare	Per Sq. Meter	
Minimum	5,250.00	12,967.50	1.30	
Maximum	6,510.00	16,079.70	1.61	
Average	5,880.00	14,523.60	1.45	

13. For the valuation of the grapes orchards current crop sales at market price and was based on AP and community consultation (including relevant local government agencies). For the grapes orchards AH will be compensated equal to three years production value. After the survey following rates were determined.



Affected Crop	Net Annual Income from Grapes (Rs)			
Affected Crop	Per Acre	Per Hectare	Per Sq. Meter	
Minimum	312,500.00	771,875.00	77.19	
Maximum	271,000.00	669,370.00	66.94	
Average	291,750.00	720,622.50	72.06	

Table 4: Rate/Price for Grape Orchards in Subproject Area

14. Based on the current market rates as given in the above two tables, compensation amounts for the affected wheat and grape crops were assessed as shown in the following Table 5, below.

Name of Affected Crop	Affected Area (m ²)	Market Rate (Rs./ m ²)	No. of Crop Compensation s	Compensation Amount (Rs.)
Wheat	152,310	1.45	1	220,850
Grapes	9,000	72.06	3	1,945,620
Total	161,310		-	2,166,470

F. GRIEVANCE MECHANISMS

- 15. A grievance mechanism will be available to allow an AH appealing any disagreeable decision, practice or activity arising from land or other assets compensation. AHs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, and time of compensation.
- 16. Care will always be taken to prevent grievances rather than going through a redress process. This can be obtained through careful LAR design and implementation, by ensuring full participation and consultation with the AHs, and by establishing extensive communication and coordination between the community, the QESCO, the LAC and local governments in general.
- 17. As finances will move differently for (i) land (for land use or access impacts) and (ii) other items compensation or rehabilitation (in the first case funds will move from QESCO through the District Collector Office to the AHs, while in the second funds will go directly from QESCO to the AHs. The complaints and grievances will be addressed through two different processes as described in Table 2.



Table 2. Glievance Resolution Process			
Land & Crop Compensation Issues	Other Compensation or Project Issues		
 First, complaints resolution will be attempted at village level through the involvement of the SDC, district government and/or informal mediators. 	1. First, complaints resolution will be attempted at village level through the involvement of the SDC, district government, and/or informal mediators.		
2. If still unsettled, a grievance can then be lodged to the LAC who has 30 days to decide on the case.	2. If still unsettled, a grievance can be lodged to the PIU/SDC, which will have 30 days to respond.		
3. If no solution was reached a grievance can be lodged with support of the LCC to the PMU. The AH must lodge the complaint within 1 month of lodging the original complaint with the LAC and must produce documents supporting his/her claim. The PMU will provide the decision within 21 days of registering the complaint. The QESCO's decision must be in compliance with this LARF provisions.	3. If no solution was reached a grievance can be lodged with support of the LCC to the PMU. The AH must lodge the complaint within 1 month of lodging the original complaint with the LAC and must produce documents supporting his/her claim. The PMU will provide the decision within 21 days of registering the complaint. The PMU decision must be in compliance with this LARF provisions.		
4. Should the grievance redress system fail to satisfy the AH, they can further submit their case to the appropriate court of law as per the process set out in Sections 18 to 22 of the LAA (1894).	4. Should the grievance redress system fail to satisfy the AH, they can further submit their case to the appropriate court of law as per the process set out in Sections 18 to 22 of the LAA (1894).		

Table 2: Grievance Resolution Process

Some basic QUESTIONS related to the impacts compensation AND rehabilitation program for the project

Question 1 - Do we need to have a land title in order to be compensated or rehabilitated?

Answer: No. Lack of formal legal rights (title) to land does not prevent AHs from receiving at least rehabilitation assistance. All AHs who were occupying or using the affected land at the time of the cut-off date (see above) will be entitled to compensation or at least rehabilitation under the project. Users of land with title or traditional rights (or who can prove they are legally using the land) who are Affected by restricted access to, or use if, the land will be entitled to compensation for land and any assets on the land affected. Users of land who do not have title or traditional rights to land will be provided full compensation for any structures, crops or trees on land affected by the project and if their access to, or use of, the land is Affected, will receive rehabilitation for land losses either in form of replacement land (if available) or in form of a cash allowance for land-use loss.

Question 2 - Does compensation apply to my house or structures?

Answer: Yes. Houses and any other structures (small shops, animal sheds, etc) that will be affected by the project shall be compensated at replacement cost so that owners can build another structure of the same size and standard.

Question 3 - What about my crops and trees?

Answer: Your affected crops and trees will also be compensated at current market value. Compensation for crops will be based on the anticipated harvest at market value, while compensation for trees will be based on the type, age and productivity of each tree Affected.

Question 4 - Does the above mean that anybody in your community can claim compensation or rehabilitation?

Answer: No. The entitled affected families are only those who where residing in project Affected areas and had Affected assets at the time the impacts assessment and the Affected people census was carried out. The cut-off-date for eligibility for this subproject is 27^{th} of August, 2007 when the impact survey and the affected people census were completed.

Anybody who encroaches into the area after the cut-off-date will not be entitled to compensation or any other form of resettlement assistance.

Question 5 - Do we need to vacate and clear the Affected properties immediately after they have been identified as needed by the project?

Answer: No. Clearing the affected areas will only take place after the compensation or rehabilitation for affected land or other lost assets and the appropriate subsidies have been provided to you. After the day the compensation and rehabilitation was delivered to you, you will then have 1 month to clear the land. If you have not done so after a month the project will be allowed to enter your ex-property and clear the land for you.

Question 6 - If there is any disagreement regarding the way the compensation policy set up in the LARP has been implemented or any other issue relative to the compensation and rehabilitation program for the project do we have the right to complain, and if so how and where?

Answer: Yes. Any AH may file a complaint or grievance. AHs will first lodge a complaint with the land acquisition collector and the project implementation unit in Quetta. If unanswered within 15 days, the complaint can then be lodged to PEPCO's project management unit in Lahore. Finally if the grievance is still not settled within 1 month, the AH can seek redress at the appropriate court. The village administrations and the Land Acquisition Coordination Committee (LACC) composed by senior members of the AH communities and by their elected representatives will assist the AH in these cases. The concerned land acquisition coordination committees will properly document all complaints and resolutions. AHs will be exempted from all taxes, administrative and legal fees associated with resolving the dispute.

Question 7 - Who can we contact for more information about the project?

Answer: For further information about the project as a whole, and/or the LARP for the New Alizai 132 kV Transmission Line Subproject, or if you would like to receive a full copy of the *Land Acquisition and Resettlement Framework* (LARF: 2007) for the project, please contact as the follows:

Quetta Electric Supply Company (QESCO) Address: WAPDA House, Quetta Phone Number: +92-81-9202211 Contact person: Muhammad Shafiq (Technical Director)

Appendix 4: Outline Terms of Reference for External Monitoring Consultant

The part time consultant will be responsible for the external evaluation of the implementation of the resettlement plan. S/he has the following general tasks:

- I. To review and verify the progress in resettlement implementation as outlined in the Resettlement Plan/s specific for the project components.
- II. To assess resettlement efficiency, effectiveness, impacts and sustainability, drawing both on policies and practices and to suggest any corrective measures, if necessary.

A. Specific Tasks

- 1. Design an appropriate set of indicators for gathering and analyzing information on resettlement impacts; the indicators shall include the following issues:
 - Budget and timeframe for land acquisition and crop/tree compensations,
 - Delivery of entitlement packages in a timely and efficient manner,
 - Satisfaction of affected people on entitlements and compensation amounts.
 - Satisfaction of AHs with grievance procedures and outcomes,
 - Socio-economic conditions of the AHs in the post-resettlement period,
 - Level of satisfaction of AHs in the post resettlement period.
- 2 Review results of internal monitoring and verify claims through random checking at the field level to assess whether resettlement objectives have been generally met. Involve the AHs and community groups in assessing the impact of resettlement for monitoring and evaluation purposes.
- 4 Conduct both individual and community level impact analysis through the use of formal and informal surveys, key informant interviews, focus group discussions and community public meeting to assess the impact of resettlement.
- 5 Identify the strengths and weaknesses of basic resettlement objectives and approaches, implementation strategies, including institutional issues, and provides suggestions for improvements in future resettlement policy making and planning. Directly feed back the results and recommendations to PMU/QESCO and ADB.

B. Qualifications

A local expert can conduct this independent evaluation. The consultant must have at least 5 years experience in project monitoring work and a MA in Social Science. The consultant should have experience in resettlement management and monitoring work in ADB-financed projects.

C. Implementation Schedule and Inputs

The expert will be hired for a total period of 30 days for one-time or intermittent input. The expert is expected to conduct one monitoring mission upon completion of the RP implementation and submit a post-completion monitoring and evaluation report to PMU/QESCO and ADB.

D. Reporting Requirements

The monitoring expert will review the status of the RP implementation in light of the targets, budget and duration as outlined in the Resettlement Plan for the hydropower project site. The expert will submit reports to the ADB and PMU/QESCO after each monitoring mission and determine the implementation status and quality of resettlement operations and also assess whether resettlement goals have been achieved. He will suggest suitable recommendations for improvement.

The external monitoring expert will prepare a Final Report on the subproject's LARP monitoring work at the end of the contract period indicating the project performance and lessons learned for future projects of this kind.

APPENDIX 14: POVERTY IMPACT ASSESSMENT

TA 4876 PAK Power Distribution Enhancement MFF Project - Pakistan

Initial Poverty Impact Assessment

Submitted to: Asian Development Bank & Pakistan Electric Power Company

Submitted by: British Power International

July 2007

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1. INTRODUCTION

The purpose of this report is to fulfil the requirement of the ToR that an initial poverty impact assessment should be produced. This is broken down into discrete activities in the project work plan, tasks P1 to P4.

Primary tasks include: (a) the preparation of a poverty profile of primary project beneficiaries, together with an analysis of the causes of deprivation, poverty and vulnerability (including a gender and local ethnic minority profile where relevant and practical). (b) An analysis of access to electricity, affordability, consumption levels and consumer satisfaction across socioeconomic groups. (c) Conduct demand projections for different growth scenarios.

There is also a requirement to analyse the social, poverty and development impact of subprojects and prepare an initial poverty impact assessment.

a. Background

The demand for power is projected to grow with an ACGR of 7.9% during the term of the MTDF (2005 - 10) and increase from 15500 MW in 2005 to 21500 MW in 2010. Applying a conventionally accepted multiplier to this growth rate implies an increase in power demand of 12%, with still greater increases in energy consumption.

The DISCOs have a pivotal role in meeting this demand. They receive electric power from NTDC in their respective geographic areas and distribute it via assets operating at voltages of up to and including 132kV. With this goes the obligation to distribute electricity and make supplies available within their geographic boundaries under rules, service conditions and tariffs laid down by the National Electric Power Regulatory Authority (NEPRA). The networks inherited by the DISCOs are problematic on several counts. They (a) do not provide complete geographic coverage; (b) have a shortage of capacity in the areas they do cover; and (c) suffer from the consequences of years of inadequate maintenance and under investment.

The Multiranche Financing Facility (MFF) will enable the DISCOs to invest in the more urgent needs to upgrade and extend the distribution networks to address the current shortfalls that exist and to expand the capacity and coverage of the network. The MFF is therefore central to the delivery of electricity supplies that are more accessible (by extending the network); reliable (by strengthening the network and facilitating improved reliability through replacement assets and enhanced maintenance regimes); and affordable (by improving the economic efficiency of the assets which form part of the network).²²

Rural electrification is categorised as a 'pro poor' sector in the Poverty Reduction Strategy Paper (PRSP)²³. Reinforcing and extending the network is not. Nonetheless the positive impact of improving the delivery of electricity supplies is well established. The impacts will be considered in sections 3 and 4 below. In

²² This is a very brief summary only. More detail is included in the Inception Report submitted on 25 May 2007, paras 19 - 26. A technical and economic review of the distribution network can be found at paras 55 -76.

²³ The PRSP outlines a national programme for poverty reduction which is the foundation for lending programmes with the IMF, World Bank, ADB and other agencies. When considering reviews and studies of poverty in Pakistan relevant to power sector development, three documents are especially relevant: (a) the Interim PRSP of 2001; (b) the final version of 2003: and (c) the Medium Term Development Framework (MTDF) 2005 – 15. For a summary of the issues, see (a) 'Pakistan – Joint Staff Assessment of the PRSP' IDA/IMF 2004 and (b) 'PRSP's capacity to mitigate poverty in Pakistan' ADB PRM May 2005.

brief there are two main benefits – a more reliable and efficient infrastructure for delivery power facilitates economic growth; and extending access to electricity will benefit families and communities directly. There will also be immediate (and sometimes short term) less direct impacts through the creation of employment and the consumption of local services to support the construction and refurbishment of the distribution network.

b. Methodology

To be prepared by appraisal.

This section will follow the 'Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of Projects' ADB 2001, see especially p 44. When taking into account the 'ten controls', we consider carefully ways in which any negative impact that emerges can be mitigated: in particular, we will focus on meeting (vii) 'Adequate arrangements should exist for monitoring and evaluation of social impacts. These should include a baseline survey, clearly specified targets, provision for data collection on outcome indicators, and provision for financing ex post evaluation of project impacts.'

2. FINDINGS

Poverty Analysis

To be completed post survey.

The pattern of poverty in Pakistan is characterised by wide variations between urban and rural areas, regions and gender. Poverty is predominantly rural. The Full PRSP identifies the following dimensions of poverty:

The rural poor are highly vulnerable to droughts

Between the two Household Income-Expenditure Surveys (HIES) rounds of 1998-99 and 2000-2001, the estimated increase in poverty is attributed largely to the increase in rural poverty. This is due to persistent drought that reduced crop yield and reduced employment opportunities.

Poverty incidence varies across provinces

NWFP has the highest rural (44.3%) as well as urban poverty (31.2%). The 1998-99 HIES for Baluchistan illustrates relatively low poverty but this has to be interpreted carefully since the 1993-94 HIES showed rural poverty in Baluchistan as high as in NWFP.

Education is key in distinguishing the poor from the non-poor

Poverty has been found to decline as the education level of the head of the household increases. HIES 1998-99 illustrates that 42 percent of the population living in households with illiterate heads of the house is poor in comparison with 21 percent of households with literate heads of the house. With poor and non-poor, net primary school enrolment rates were 36.6 and 59.3 respectively, these differences are not falling. Within female primary schools, attendance of poor households stands at 30.2 percent which is also lower than the 52.3 percent of non-poor households. Households with literate mothers were found to have lower infant mortality rates (56 per 1000 live births) compared with households with illiterate mothers (90 per 1000 live births).

Poor communities have inadequate access to public services

45 percent of children in poor households aged between one to five years old have been fully immunized whereas children of the same age group within non-poor households stand at 58 percent. Children with recent bouts of diarrhoea belonging to poor households are less likely to have had medical consultation compared to non-poor households (83.9%) and less likely to have used oral re-hydration salts (ORS) (48.5% and 58.3%)

The nature of employment and poverty are related

Among the working poor in urban areas, paid employees (44.9% of urban population) have lower incidence of poverty (25.3 %) compared to the self employed (18.2 % of the population and 27.7 % poverty incidence).

a. Overall Contribution to Reducing Poverty

The contribution of this facility will be by providing affordable electricity to additional homes and villages which in turn will bring a direct impact on the reduction of poverty.

b. Estimated Impact on Beneficiaries

There already exists a body of evidence linking improvements to the power infrastructure to economic development. A separate section is devoted to assessing the potential gender impact.

Access

The direct benefits flow to households, farms and businesses which get connections. Indirect benefits arise either from the income opportunities over spilling to others, or from benefits to unconnected households from a connection in the community. The Independent Evaluation Group (IEG) of the World Bank has synthesised the studies of impact in a helpful table.²⁴

Input	Channel	Direct	Indirect
1 Lighting	Time use	Time-saving devices Increased study time	Richer social life
	Electric lighting replaces other fuels (in principle for cooking also, but rarely in practice)	Improved indoor air quality	
2 Media access (radio, TV and internet)	Improved health knowledge	Health and nutrition Fertility	Health and nutrition Fertility Entertainment
3 Fan/ air conditioning	Improved living conditions	Greater comfort	
4 Facilities	Better social facilities with better equipment		Clinics: longer hours and more equipment, including cold chain for vaccines, internet access Schools: available for adult literacy in evenings; computer facilities Water pumps: cleaner water
5 Productive enterprise	Electrical equipment for workshops and agricultural (including lighting and pumps)	Enhanced productivity (including irrigation)	Increased income and employment Longer business hours supply
6 Food preparation	Refrigeration and boiling water	Better nutrition and reduced ill-health	
7 Community lighting			Improved security Richer social life

Table 1: Benefits from Electrification

²⁴ RURAL ELECTRIFICATION AND POVERTY REDUCTION: AN IMPACT EVALUATION World Bank 2007. See especially the section dealing with *The Channels for the Welfare Impact of Rural Electrification*.

The focus of this analysis is rural electrification; however, much of the analysis applies to households, farms and businesses newly connected to the network irrespective of their geographic location.

Reliability

There are therefore direct benefits to households and communities form improving access to electricity supplies. Less dramatic – but in the long run of equal significance - is improving the reliability of supplies as outage times are reduced by more resilient and efficient networks.

Although there are benefits from a more reliable supply in the domestic and social spheres, productivity gains to business from continuity of supply are likely to be more significant: production and the provision of services can be planned and delivered without disruption and the uncertainty that comes with routine but unpredictable outages.

Job Creation

This section will be completed when it is possible to estimate the likely numbers of direct staff/contractors/service providers required.

Indirect Effects

Health and regional effects to be reviewed by end of appraisal stage.

3. GENDER AND DEVELOPMENT

a. Current Position

The gender discriminatory practices in Pakistani society also shape the pattern of poverty in the country.²⁵ Traditional gender roles in Pakistan define the woman's place as in the home and not in the workplace, and define the man as the breadwinner. Consequently, the society invests far less in women than men. Women in Pakistan suffer from poverty of opportunities throughout their lives. Female literacy in Pakistan is 29% compared to Male literacy at 55%.

In legislative bodies, women constituted less than 3% of the legislature elected on general seats before 2002. The 1973 Constitution allowed reserved seats for women in both houses of parliament for a period of 20 years, thus ensuring that women would be represented in parliament regardless of whether or not they are elected on general seats. This provision lapsed in 1993, so parliaments elected subsequently did not have reserved seats for women. Reserved seats for women have been restored after the election of 2002. Female labour rates in Pakistan are exceptionally low.

These traditional social patterns contribute to the deteriorating situation. Despite some improvements in economic conditions after recent reforms, there are still broad discrepancies in social standing between men and women. Illiteracy is high among women and girls. In rural areas 22 per cent of girls above 10 have completed primary schooling, compared to 47 per cent of boys. Women own fewer assets, have limited economic options and less access to social services. Yet many play a major role in the household economy and in providing care for their families. Their burden of labour increases significantly when poor agricultural productivity forces men to migrate to find work.

²⁵ This analysis draws on the full PRSP (which in turn uses data from the Pakistan Integrated Household Survey or PIHS).

b. Gender Impact

The assessment of the impact of improving the access and reliability in section 3 was couched in gender neutral terms. However, there is some evidence that electrification has the potential to provide socioeconomic empowerment for those living within poor rural areas through the expansion of economic and social opportunities.

Most poverty stricken areas within Pakistan are scattered and isolated rural settlements and far from conventional electricity supply.²⁶ In these areas women rely on primitive sources of energy from pinewood torches for lighting to kerosene for cooking and diesel generators which are alone hazardous to human health and damaging to the environment. These settlements rely on subsistence agriculture and the majority of villages are products of an underdeveloped socioeconomic infrastructure where even roads are non existent.

The Pakistan Household energy study carried out in 1992 illustrated that biomass fuels accounted for 86% of a household energy source with wood alone accounting for 54%. These figures are representative of the fact that some areas that even have electrical supply have such a poor connection to the national grid that it leads to an erratic electricity supply which consequently leads to a reliance on conventional means for energy.

Electrification within poor rural areas will positively impact men, women and children in various elements depending on their activities at work and within the household. Traditionally men are the breadwinners and are primarily engaged within agriculture with women acting as a support role carrying out work within the household; cooking, washing, caring for children etc. Women, although they work during the day, often work in other areas of the household during the night. In particular clothes production for both personal and commercial purposes. According to an assessment report by the Shubinak project (Nadeem: 2004) the introduction of electricity to households in Chitral has increased the production of shu from 25 yards to 49 yards and this has increased the economic strength of these households as, following electrification, the price of shu increased from Rs. 55 to Rs. 114 per yard in 1999, although it has since fallen back to Rs. 111 per yard due to market forces.²⁷ The distribution of electricity to these households will increase the productivity of women directly by the supply of a reliable and healthy source of light and fuel for both production of goods and food. In particular with the introduction of a light source the prevalence of eye and respiratory diseases caused by conventional means of lighting such as kerosene will be reduced. This increase in health and productivity from a reliable and healthy source of light and energy can only act as a catalyst for a more efficient process in which household duties are carried out and a better quality of life is made available.

²⁶ For a detailed analysis see the full PRSP, chapter 3.

²⁷ ENERGIA News vol. 9 nr 2 – 2006 "The Electrification Benefits of Women in Chitral, Pakistan."



4. OTHER RISKS AND VULNERABILITIES

Table 2: Social Safeguards and Other Social Risks

ltem	Significant/ Not significant/	Strategy to Address Issues	Plan Required
	None		
Resettlement	☐ Significant ⊠Not significant ☐ None	The proposed subprojects involve the construction of high-voltage transmission lines and substations. Some land acquisition is required, although impacts on individual households will be limited.	☐ Full ⊠ Short ☐ None
Indigenous Peoples	☐ Significant ☐Not significant ⊠ None	The subprojects identified so far will not have significant impacts on indigenous peoples. However, an indigenous peoples development framework was prepared to cover any impact that the subprojects, under future tranches, may have.	☐ Yes ⊠ No
Labor	 ☐ Significant ☐ Not significant ☐ None 	Positive impacts are expected. The subprojects will require construction labor and will result in permanent employment for the operation and maintenance of project facilities.	☐ Yes ⊠ No Not required
Affordability	☐ Significant ⊠Not significant ☐ None	The subprojects are unlikely to result in increased prices of goods and services accessed by the poor.	☐ Yes ⊠ No Not required
Other Risks and/or Vulnerabilities	☐ Significant ☐Not significant ⊠ None	No other significant risks were identified.	☐ Yes ⊠ No