# Facility Administration Manual

Project Number: 47037
Loan Numbers: {LXXXX; LXXXX}
May 2014

## Democratic Socialist Republic of Sri Lanka:
## Green Power Development and Energy Efficiency Improvement Investment Program

**CONTENTS**

**Facility Administration Manual Purpose and Process**

The facility administration manual (FAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The FAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the FAM.

The executing and implementing agencies are wholly responsible for the implementation of ADB financed projects, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by executing and implementing agencies of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At Loan Negotiations the borrower and ADB have agreed to the FAM and ensured consistency with the Framework Financing Agreement. Such agreement has been reflected in the minutes of the Loan Negotiations. In the event of any discrepancy or contradiction between the FAM and the Framework Financing Agreement, the provisions of the Framework Financing Agreement shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP) changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the FAM or subsequent Project Administrative Manuals (PAMs), if applicable.

## Abbreviations

| | | |
|---|---|---|
| ADB | = | Asian Development Bank |
| ADF | = | Asian Development Fund |
| AFD | = | Agence Francaise de Developpement |
| AFS | = | audited financial statements |
| CEB | | Ceylon Electricity Board |
| CPS | = | country partnership strategy |
| DMF | = | design and monitoring framework |
| EA | = | executing agency |
| EIA | = | environmental impact assessment |
| EMP | = | environmental management plan |
| FAM | = | facility administration manual |
| GDP | = | gross domestic product |
| IA | = | implementing agency |
| ICB | = | international competitive bidding |
| IEE | = | initial environmental examination |
| IPP | = | indigenous people plan |
| LAR | = | land acquisition and resettlement |
| LIBOR | = | London interbank offered rate |
| NCB | = | national competitive bidding |
| NEPS | | National Energy Policy and Strategies |
| NGO | = | non-government organization |
| PAI | = | project administration instructions |
| PAM | = | project administration manual |
| PIU | = | project implementation unit |
| QCBS | = | quality- and cost based selection |
| RRP | = | report and recommendation of the President to the Board |
| SBD | = | standard bidding documents |
| SEA | = | Sustainable Energy Authority |
| SOE | = | statement of expenditure |
| SPS | = | Safeguard Policy Statement |
| SPRSS | = | summary poverty reduction and social strategy |
| TOR | = | terms of reference |

# I. FACILITY DESCRIPTION

## A. Rationale

1. **Background.** In recent years Sri Lanka has improved its energy sector and achieved a national electrification ratio of 94% (2012) compared with 29% in 1990.[1] However, a longer-term challenge is to reduce its high dependence on expensive fossil fuel energy. The energy sector struggles to (a) meet growing demand for electricity at a low cost and acceptable reliability rates, and (b) attain long term sustainability. The share of thermal oil-fired energy in the power generation mix has increased from 6% in 1995 to 59% in 2012 that creates a high energy cost base. Demand growth has been mostly met by expensive oil-fired thermal plants. This is not a viable and sustainable solution to the country's energy security and environment protection in the long term. Diversification of the generation mix primarily to renewable energy sources, improved network efficiency, and supply and demand side management is the only way to correct this situation. Another challenge is to improve system reliability and cut technical losses. The transmission network needs expansion and modernization, particularly in the former conflict-affected areas in Northern and Eastern provinces.[2] The 33 kilovolt (kV) medium voltage (MV) network needs to expand power supply into rural areas where many households have poor reliability and inadequate quality of electricity supply. To ensure sustainable functioning of the power sector, the government also pursue financial, managerial, and institutional reforms in line with the Sri Lanka Electricity Act, 2009.

2. **Policy framework and roadmap.** Sri Lanka has a national investment program that is based on 10-Year Development Framework prepared in 2006[3] and updated in 2010.[4] The framework includes an energy sector roadmap, a long-term investment program, and appropriate policy and reform measures that are linked to a National Energy Policy and Strategies.[5] The objection is to (i) increase power supply capacity to about 6,400 megawatt (MW) by 2020 and reduce the generation cost by adding aggregate base load capacity of about 2,000 MW from three coal-fired plants; (ii) increase the share in grid energy supply from nonconventional[6] renewable energy sources to 20% by 2020; and (iii) reduce the total losses in the network to 10.0% by 2020. The government intention to develop 2000 MW of coal-fired capacity aims to pursue cost recovery in expectation that with the introduction of low-cost coal-fired generation it will be possible to reduce the current high cost of thermal power generation and achieve cost recovery from 2017. Development of coal-fired capacity is complimentary to the development of renewable energy to achieve energy security. As part of its cost recovery strategy, the government increased retail electricity tariffs by 35% on average in April 2013. While the government aims to increase supply capacity and replace expensive and inefficient oil-fired power plants by constructing the coal-fired plants, the remaining supply capacity will need to come from renewable sources (and conversion of the oil-fired plants to gas-fired plants in the future). The 20% increase in power generation from non-conventional renewable sources will be in addition to 28% (2012) of the conventional hydropower and will ensure that substantial portion of electricity will be generated by domestic clean energy sources in the future. This will address the critical question about the energy security agenda.

3. **Multitranche financing facility (MFF).** The MFF will finance a slice of the government's sector investment program estimated at $4,800 million for the period of 2014-2020. It will focus on the green power development portion of the government's sector investment program and help to encourage and facilitate private sector investment in the renewable power generation through improving transmission infrastructure. The MFF will support development of hydropower generation and proposed 200 MW wind power park in the Northern Province by financing relevant

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1 Ceylon Electricity Board. 2012. *Ceylon Electricity Board's Statistical Digest Report*. Colombo.
2 The 2012 electrification rate in the Northern Province is estimated at 80%. The 2012 electrification rate in the Eastern Province is 79.8%.
3 Government of Sri Lanka. 2006. *Mahinda Chintana: Vision for a New Sri Lanka*. Colombo.
4 Government of Sri Lanka. 2010. *Mahinda Chintana: Vision for the Future*. Colombo.
5 Government of Sri Lanka, 2008. *National Energy Policy and Strategies of Sri Lanka*. Colombo.
6 Nonconventional renewable energy sources include mini hydropower (below 10 MW capacity), wind, solar, and biomass.

power evacuation transmission infrastructure.[7] The MFF will also help to keep an essential dialogue going with the government regarding further pursuing power sector reforms in coordination with other interested parties and development partners. The MFF is consistent with the Asian Development Bank (ADB) country partnership strategy for Sri Lanka.[8] It has strong grounds on previous ADB interventions focused on renewable energy development including from hydropower, wind and solar resources.[9]

4. The government requested ADB's support for the development of renewable energy, particularly hydropower and wind power generation, and energy and network efficiency projects through the MFF to expand transmission and MV infrastructure to improve efficiency, enable power evacuation from and manage integration of renewable energy in the power system. The required preconditions for the use of the MFF—a road map and strategy, a policy framework, investment and financing plans, and reliable safeguard arrangements —are in place. The MFF is the most appropriate financing modality for a long-term partnership in these activities, given the phased nature of investments in electricity generation and the need for flexibility in project design and implementation. It also ensures continuity in combining investments in physical and nonphysical aspects of renewable energy and energy efficiency development.

## B. Impact and Outcome

5. The impact of the investment program will be increased access to clean, reliable, and affordable power supply. The outcome will be enhanced clean power generation, system efficiency and reliability.

## C. Outputs

6. The outputs will be the following:

(i) **Hydropower generation developed**. This includes construction of a 30 MW, run-of-river hydropower plant at Moragolla in the Central Province,[10] including a 0.5 km, 132 kV associated transmission infrastructure to connect the station to the grid, which will increase clean and low cost base load power generation.

(ii) **Transmission infrastructure enhanced.** This comprises construction and augmentation of a 220/132 kV, 220/132/33 kV, and 132/33 kV grid substations and associated facilities in Eastern, Northern, North Central, North Western, and Western provinces that will absorb increase in power demand and ensure system's stable operation with addition of intermittent wind and solar generation.

(iii) **Efficiency of medium voltage network improved.** This includes construction of 33 kV lines and reactive power management through installation of switched capacitor banks in the MV network to address overloading of conductors, voltage drop in MV lines and poor power factor in Eastern and North Western provinces.

(iv) **Demand-side management (DSM) for energy efficiency improved.** This includes implementation of pilot DSM subprojects in Colombo through (a) use of smart grid and metering technologies, (b) retrofitting buildings with smart energy saving

[7] It is expected that the first two wind parks of 100 MW each will be established in 2017 and 2020, respectively, in the Mannar area of the Northern Province that will follow by further wind power development in the future.

[8] ADB. 2011. *Country Partnership Strategy: Sri Lanka, 2012–2016*. Manila.

[9] ADB financed strengthening transmission infrastructure for hydropower evacuation from the Central Province to load centers under the Clean Energy and Access Improvement Project (2009) and Sustainable Power Sector Support Project (2011). ADB's Clean Energy and Network Efficiency Improvement Project (2012) funds transmission infrastructure in the Northern Province that will be used for evacuation of wind power from the proposed site at Mannar district as well as solar rooftop power generation pilot. Under TA 7837-SRI (Clean Energy and Network Efficiency Improvement), ADB supported actual wind measurements and wind resource assessment at the proposed 200 MW wind park site at Mannar. A system stability study and a master plan along with a business model of the proposed wind park are currently under finalization with support of TA 8167-SRI: Capacity Building for Clean Power Development.

[10] The detailed engineering design of the hydropower plant was completed under ADB's Sustainable Power Sector Support Project (ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Administration of Technical Assistance Grant to the Democratic Socialist Republic of Sri Lanka for the Sustainable Power Sector Support Project*. Manila).

technology, and (c) installing cold thermal storage in selected buildings to achieve energy savings.

(v) **Capacity development support provided to CEB.** The investments will be reinforced through financing nonphysical capacity development components including: (a) institutional capacity for power sector development, system operation and dispatching, and energy efficiency improvement, (b) project management including implementation supervision and preparation of new projects for the second tranche.

7. Project 1 will include physical and nonphysical investments in 2014.[11] Physical investments will be for construction of (i) 30 MW, run-of-river hydropower station at Moragolla, (ii) four new grid substations and associated facilities at Kerewalapitiya (220/33 kV), Kappalturai (220/132/33 kV), Kalutara and Kesbewa (both 132/33 kV) and augmentation of Katunayake and old Anuradhapura 132/33 kV grid substation in Western, Eastern and North Central provinces; (iii) 33 kV lines and gantries at around Vavunativu and Madampe in Eastern and North Western provinces; and (iv) DSM pilot subprojects in Colombo. The nonphysical outputs comprise capacity building and project management including preparation of future MFF investments and supervision of the first generation of capital investments of Project 1. Project 2, comprising physical investments for enhancing transmission infrastructure, including power evacuation from the proposed wind park, MV network efficiency improvement and DSM subprojects, will follow in 2016.

[11] Detailed Description of Project Components (accessible from the list of linked documents in Appendix 2 of the Report and Recommendation of the President).

## II. IMPLEMENTATION PLANS

8. The investment program implementation will be completed by 30 September 2020. The last date on which any disbursement under any tranche (project) of the facility may be made will be 31 March 2021. The implementation of Project 1 will be completed by 30 September 2019, and Project 1 loan closing will be 31 March 2020. The implementation schedule of Project 1 is shown in Figure 1.

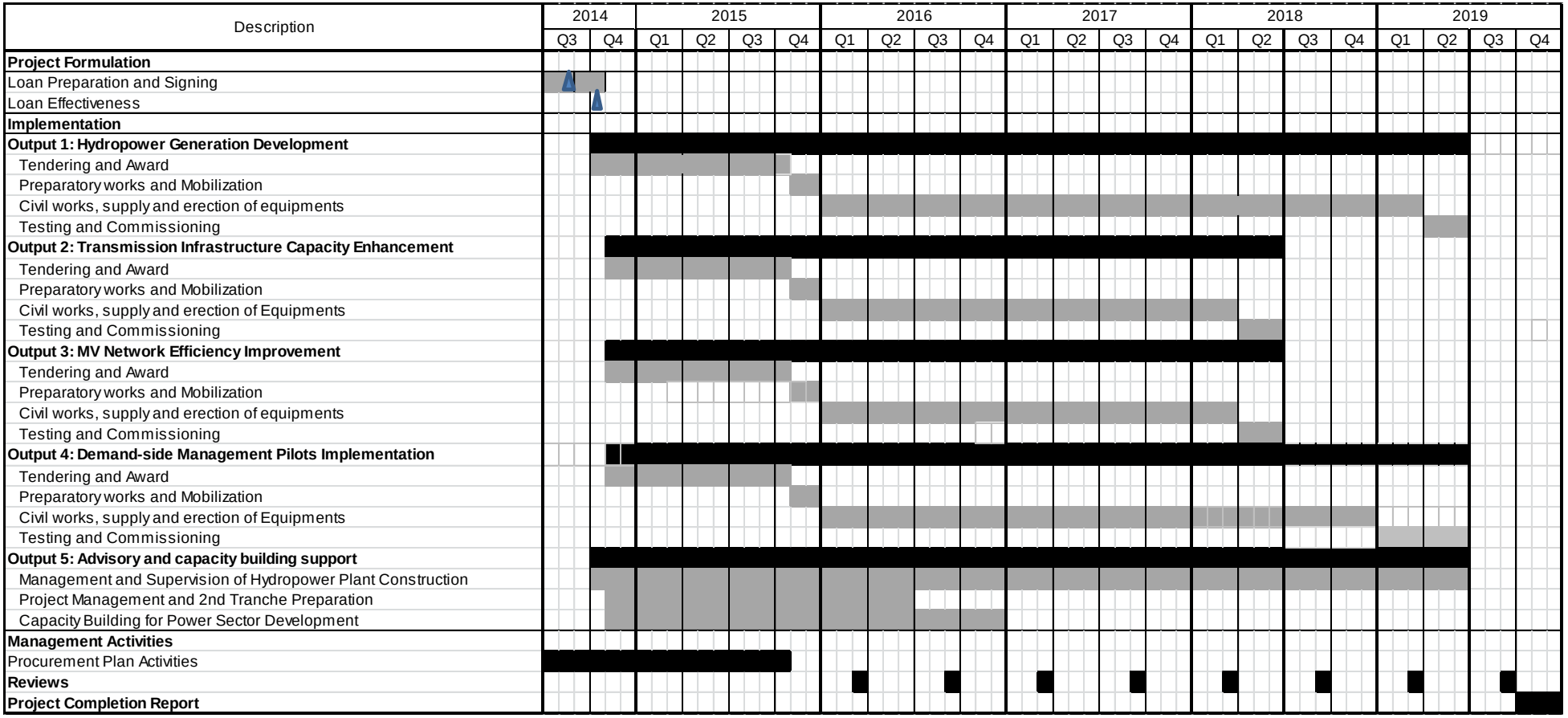
### A. Facility Readiness Activities

| | Months (2014) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Indicative Activities** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** | **Who responsible** |
| Advance contracting actions | X | | | | | | | | | CEB |
| Retroactive financing actions | X | | | | | | | | | MOFP/MOPE/ADB |
| Establish project implementation arrangements | X | | | | | | | | | MOPE/CEB |
| Loan negotiations | | X | | | | | | | | MOFP/MOPE/ADB |
| ADB Board approval | | | | X | | | | | | ADB |
| Loan signing | | | | | X | | | | | ADB and MOFP |
| Government legal opinions provided | | | | | | X | | | | MOFP/CEB |
| Government budget inclusion | | | | | | X | | | | MOFP/MOPE/CEB |
| Loan effectiveness | | | | | | | X | | | MOFP/ADB |

ADB = Asian Development Bank, CEB = Ceylon Electricity Board, MOFP = Ministry of Finance and Planning, MOPE = Ministry of Power and Energy.
Source: Asian Development Bank estimates.

## B. Overall Project Implementation Plan

### Figure 1: Implementation Schedule of Project 1



## III. PROJECT MANAGEMENT ARRANGEMENTS

### A. Facility Implementation Organizations – Roles and Responsibilities

| | Facility implementation organizations | Management Roles and Responsibilities |
|---|---|---|
| | • Executing Agency- Ministry of Power and Energy | ○ Provision of counterpart staff, operational support and budget for project activities<br>○ Monitoring and evaluation of project activities and outputs including periodic review<br>○ Dissemination and evaluation of project activities and outputs including periodic review |
| | • Implementing Agencies: Ceylon Electricity Board | ○ Provision of counterpart staff<br>○ Implementing activities under the components efficiently and effectively<br>○ Quality assurance of project outputs<br>○ Providing various reports to ADB |
| | • Facility Steering Committee | ○ Will be chaired by the Secretary, Ministry of Power and Energy. Will include representatives from the Ministry of Finance and Planning (External Resources Department, Department of National Planning, National Budget Department, Department of Project Management and Monitoring, and Treasury Operations Department), Ministry of Power and Energy, Public Utilities Commission, Ceylon Electricity Board and Sustainable Energy Authority (members) |
| | • Auditor General Department | ○ Will undertake project financial statements audits |
| | • Contractors | ○ Will undertake actual implementation of contracts for equipment, civil works and services |
| | • Asian Development Bank | ○ Will undertake reviews and facilitate implementation |

### B. Key Persons Involved in Implementation

**Executing Agency**

Ministry of Power and Energy
Mr. M.M.C. Ferdinando
Secretary
Telephone: (9411) 2574917
Email address: secrepen@sltnet.lk
Office Address: 72, Ananada Kumaraswamy Mawatha, Colombo 07, Sri Lanka

**ADB**

Energy Division, South Asia Department
Mr. Yongping Zhai
Director
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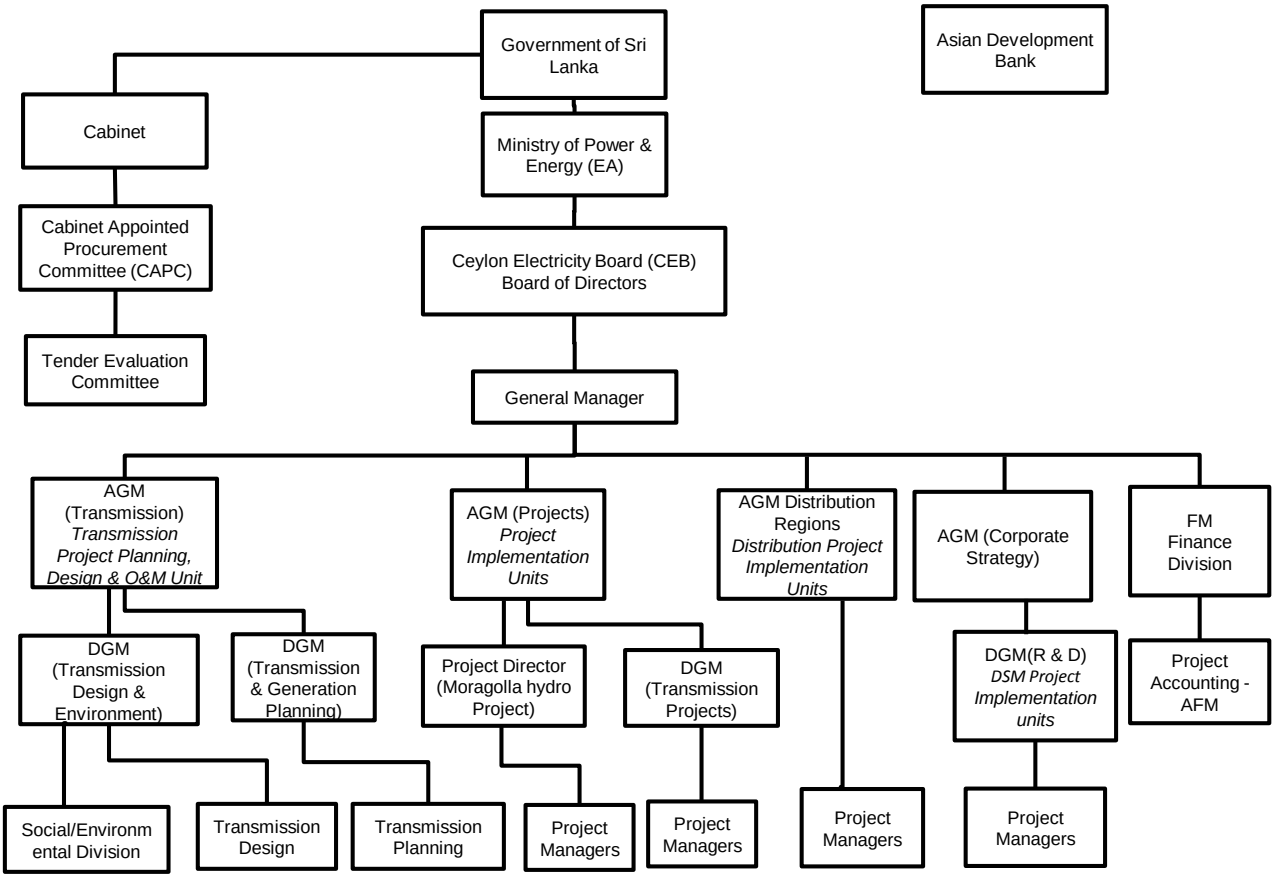
Mission Leader
Mr. Mukhtor Khamudkhanov
Principal Energy Specialist
Telephone: (632) 632 5387
Email address: mkhamudkhanov@adb.org

### C. Project Organization Structure

9. The executing agency will be the Ministry of Power and Energy (MOPE). Ceylon Electricity Board (CEB) will be the implementing agency. A steering committee chaired by the secretary of the MOPE will guide the implementing agency and review progress and results.

10. Project implementation units (PIUs) will be set up in CEB. Full-time managers will supervise each project component under the MFF. The PIUs will oversee procurement, disbursement, financial management and accounting, quality assurance, and social and environmental issues. The PIUs will coordinate closely with the procurement committee, appointed by the Cabinet or MOPE, depending on the size of the contracts. The overall investment program implementation structure is given in Figure 2.

**Figure 2: Program Implementation Structure**



## IV. COSTS AND FINANCING

11. The investment program is estimated to cost US$440 million (Table 1).

**Table 1: Program Investment Plan**
($ million)

| Item | | Amount[a] |
|---|---|---|
| **A.** | **Base Cost**[b] | |
| | 1. Construction of Moragolla Hydropower Plant | 113.18 |
| | 2. Transmission Infrastructure Development and Medium Voltage Network Efficiency Improvement | 242.58 |
| | 3. Energy Efficiency Pilot Projects | 14.04 |
| | 4. Project Management and Capacity Building[c] | 12.31 |
| | **Subtotal (A)** | **382.11** |
| **B.** | **Contingencies**[d] | **44.22** |
| **C.** | **Financing Charges During Implementation**[e] | **13.67** |
| | **Total (A+B+C)** | **440.00** |

[a] Includes taxes and duties of $18.57 million and incremental (e.g., land, environmental and social mitigation) cost of $3.54 million to be financed from Government resources.
[b] In the first quarter 2014 prices.
[c] Includes overhead costs associated with project management, implementation, and monitoring.
[d] Physical contingencies computed at 5% of base cost. Price contingencies computed using ADB's forecasts of international and domestic inflation.
[e] Financial charges during implementation include interest from all financing sources. For ADB financing, the financial charges during implementation has been computed at the 5-year swap rate for the London interbank offered rate plus an effective contractual spread of 50 basis points for ordinary capital resources (OCR) loan components and at a base rate of 2.0% for Asian Development Fund loan components. Commitment charges for an OCR loan have been computed at 0.15% per year to be charged on the undisbursed loan amount.
Source: Ceylon Electricity Board and Asian Development Bank estimates.

12. The government requested an MFF in an amount up to $360 million to finance the investment program. The MFF financing includes $216 million loan from ADB ordinary capital resources (OCR), $84 million loan from ADB's Special Funds resources (ADF) and $60 million loan from AFD to be administered by ADB. The MFF will consist of two tranches, subject to the submission of periodic financing requests, execution of loan and project agreements for each tranche, and fulfillment of terms and conditions and undertakings set forth in the framework financing agreement.[12] The MFF financing plan is in Table 2.

**Table 2: Financing Plan**
($ million)

| Source | Project 1 | Project 2 | Project 1 and 2 | Share of Total (%) |
|---|---|---|---|---|
| **Asian Development Bank** | | | | |
| OCR loan | 121.00 | 95.00 | 216.00 | 49.09 |
| ADF loan | 29.00 | 55.00 | 84.00 | 19.09 |
| Subtotal | 150.00 | 150.00 | 300.00 | 68.18 |
| **Co-financing** | | | | |
| AFD loan[a] | 30.00 | 30.00 | 60.00 | 13.64 |
| **Government** | 40.00 | 40.00 | 80.00 | 18.18 |
| **Total** | **220.00** | **220.00** | **440.00** | **100.00** |

ADF = Asian Development Fund, AFD = Agence Francaise de Developpement, OCR = ordinary capital resources.
[a] AFD confirmed that it will co-finance Project 1 and expressed interest in co-financing Project 2 subject to their Management decision at the later stage.
Source: Asian Development Bank estimates.

[12] Framework Financing Agreement (accessible from the list of linked documents in Appendix 2 of the Report and Recommendation of the President).

13. The first tranche amounts to $180 million—$121 million from ADB's OCR and $29 million from ADB's ADF and $30 million co-financing from AFD.[13] The OCR loan will have a 20-year term, including a grace period of 5 years, a straight-line repayment method, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year, and such other terms and conditions set forth in the draft loan and project agreements.[14] The ADF loan will have a 25-year term, including a grace period of 5 years, an interest rate of 2.0% per annum during the grace period and thereafter, and such other terms and conditions set forth in the draft loan and project agreements. The AFD loan will finance a separate procurement package for grid substations. The OCR loan will finance construction of the hydropower plant and portion of transmission infrastructure while the ADF loan will finance MV network efficiency improvement, DSM pilots, consulting services and portion of transmission. Accordingly, since the OCR will be commingled with the ADF resources, a waiver of the member country procurement eligibility restrictions applicable to ordinary capital resources is sought. The government and Ceylon Electricity Board (CEB) will finance the interest during implementation, taxes and duties, contingencies, and incremental costs (e.g., land acquisition, environmental and social mitigation). Financing charges during implementation include interest during construction to be paid by the government and CEB to ADB and AFD for the provided loans in an estimated total amount of US$13.67 million.

14. Detailed cost tables by expenditure category, including separating these by a financier, will be prepared for each proposed tranche and will be included in the relevant Periodic Financing Request (PFR), along with the proposed financing arrangements. The overall detailed cost estimate tables for the entire program are shown below and for Project 1 in Appendix 1.

[13] AFD will provide contractual parallel co-financing where ADB may cover procurement and disbursement supervision through partial administration of co-financing.

[14] As the OCR loan has an average loan maturity of 12.75 years, no maturity premium is payable to ADB.

## A. Detailed Cost Estimates by Expenditure Category

| Item | SLR Million | | | USD Million | | | |
|---|---|---|---|---|---|---|---|
| | FC | LC | Total Cost | FC | LC | Total Cost | % of Total Base Cost |
| A. **Investment Costs** | | | | | | | |
| 1 Civil works and erection | 7,762.44 | 8,974.10 | 16,736.54 | 59.90 | 69.25 | 129.15 | 33.80% |
| 2 Equipment | 23,525.76 | 4,118.12 | 27,643.88 | 181.54 | 31.78 | 213.32 | 55.83% |
| 3 Consultancy | | | | | | | |
| a. Project management, design & supervision | 1,346.44 | 675.16 | 2,021.60 | 10.39 | 5.21 | 15.60 | 4.08% |
| b. Capacity development | 250.11 | - | 250.11 | 1.93 | - | 1.93 | 0.51% |
| **Sub Total (A)** | **32,884.75** | **13,767.38** | **46,652.13** | **253.76** | **106.24** | **360.00** | **94.21%** |
| **Base Cost** | **32,884.75** | **13,767.38** | **46,652.13** | **253.76** | **106.24** | **360.00** | **94.21%** |
| B. **Other Costs** | | | | | | | |
| 1 Taxes and duties | - | 2,406.49 | 2,406.49 | - | 18.57 | 18.57 | 4.86% |
| 2 Consultancy | - | - | - | - | - | - | 0.00% |
| 3 Environmental & Social Mitigation | - | 458.75 | 458.75 | - | 3.54 | 3.54 | 0.93% |
| **Sub Total (B)** | **-** | **2,865.23** | **2,865.23** | **-** | **22.11** | **22.11** | **5.79%** |
| **Total Base Cost (A+B)** | **32,884.75** | **16,632.61** | **49,517.36** | **253.76** | **128.35** | **382.11** | **100.00%** |
| C. **Contingencies** | | | | | | | |
| 1 Physical | - | 2,394.82 | 2,394.82 | - | 18.48 | 18.48 | 4.84% |
| 2 Price | - | 3,335.64 | 3,335.64 | - | 25.74 | 25.74 | 6.74% |
| **Sub Total (C)** | **-** | **5,730.46** | **5,730.46** | **-** | **44.22** | **44.22** | **11.57%** |
| D. **Financing Charges During Implementation** | | | | | | | |
| 1 Interest during construction | - | 1,652.28 | 1,652.28 | - | 12.75 | 12.75 | 3.34% |
| 2 Commitment Charges | - | 119.22 | 119.22 | - | 0.92 | 0.92 | 0.24% |
| **Sub Total (D)** | **-** | **1,771.50** | **1,771.50** | **-** | **13.67** | **13.67** | **3.58%** |
| **Total Project Cost (A+B+C+D)** | **32,884.75** | **24,134.58** | **57,019.33** | **253.76** | **186.24** | **440.00** | **115.15%** |

FC = foreign cost, LC = local cost, SLR = Sri Lanka rupee, USD = United States dollar

### B. Allocation and Withdrawal of Loan Proceeds for Project 1

Works and turnkey contracts, other than Lot B of Package 2, as well as consulting services will be financed by ADB loans 100% of the base cost, excluding local taxes and duties (OCR loan 80.67% and ADF loan 19.33% of the total expenditure).

### 1. Ordinary Capital Resources for Project 1

| ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS | | | |
|---|---|---|---|
| CATEGORY | | | ADB FINANCING |
| Number | Item | Total Amount Allocated for ADB FinancingCategories (USD) CEB | Percentage and basis for withdrawal from the Loan Account |
| 1 | Works | 63,860,000.00 | 95.34 percent of total expenditure claimed** |
| 2 | Equipment* | 57,140,000.00 | 82.63 percent of total expenditure claimed** |
| | Total | 121,000,000.00 | |

* Turnkey contracts including goods and related works.
**Excluding local taxes and duties imposed within the territory of the Borrower

### 2. Asian Development Fund for Project 1

| ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS | | | |
|---|---|---|---|
| CATEGORY | | | ADB FINANCING |
| Number | Item | Total Amount Allocated for ADB Financing Categories (SDR) CEB | Percentage and basis for withdrawal from the Loan Account |
| 1 | Works* | 2,019,000 | 4.66 percent of total expenditure claimed** |
| 2 | Equipment* | 7,773,000 | 17.37 percent of total expenditure claimed** |
| 3 | Consulting services | 8,976,000 | 100 percent of total expenditure claimed** |
| | Total | 18,768,000 | |

* Turnkey contracts including goods and related works
**Excluding local taxes and duties imposed within the territory of the Borrower

## 3. AFD's loan for Project 1 (Lot B of Package 2)

| ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS | | | |
|---|---|---|---|
| CATEGORY | | | ADB FINANCING |
| Number | Item | Total Amount Allocated for AFD Financing Categories (USD) | Percentage and basis for withdrawal from the Loan Account |
| | | CEB | |
| 1 | Works* | 7,130,000.00 | 100 percent of total expenditure claimed** |
| 2 | Equipment* | 22,870,000.00 | 100 percent of total expenditure claimed** |
| | Total | 30,000,000.00 | |

* Turnkey contracts including Goods and Works
**Excluding local taxes and duties imposed within the territory of the Borrower

## C. Detailed Cost Estimates by Financier

| Item | | Total Cost | ADB | | | | AFD | | Counterpart | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | USD million | OCR | % of cost category | ADF | % of cost category | AFD | % of cost category | Amount | % of cost category |
| A. | **Investment Costs** | | | | | | | | | |
| 1 | Civil works and erection | 129.15 | 96.43 | 74.67% | 15.30 | 11.85% | 17.42 | 13.49% | - | 0.00% |
| 2 | Equipment | 213.32 | 119.57 | 56.05% | 51.17 | 23.99% | 42.58 | 19.96% | - | 0.00% |
| 3 | Consultancy | - | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% |
| a. | Project management, design & supervision | 15.60 | - | 0.00% | 15.60 | 100.00% | - | 0.00% | - | 0.00% |
| b. | Capacity development | 1.93 | - | 0.00% | 1.93 | 100.00% | - | 0.00% | - | 0.00% |
| | **Sub Total (A)** | **360.00** | **216.00** | **60.00%** | **84.00** | **23.33%** | **60.00** | **16.67%** | **-** | **0.00%** |
| | **Base Cost** | **360.00** | **216.00** | **60.00%** | **84.00** | **23.33%** | **60.00** | **16.67%** | **-** | **0.00%** |
| B. | **Other Costs** | | | | | | | | | |
| 1 | Taxes and duties | 18.57 | - | 0.00% | - | 0.00% | - | 0.00% | 18.57 | 100.00% |
| 2 | Consultancy | - | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% |
| 3 | Environmental & Social Mitigation | 3.54 | - | 0.00% | - | 0.00% | - | 0.00% | 3.54 | 100.00% |
| | **Sub Total (B)** | **22.11** | **-** | **0.00%** | **-** | 0.00% | **-** | 0.00% | **22.11** | **100.00%** |
| | **Total Base Cost (A+B)** | **382.11** | **216.00** | **56.53%** | **84.00** | **21.98%** | **60.00** | **15.70%** | **22.11** | **5.79%** |
| C. | **Contingencies** | | | | | | | | | |
| 1 | Physical | 18.48 | - | 0.00% | - | 0.00% | - | 0.00% | 18.48 | 100.00% |
| 2 | Price | 25.74 | - | 0.00% | - | 0.00% | - | 0.00% | 25.74 | 100.00% |
| | **Sub Total (C)** | **44.22** | **-** | **0.00%** | **-** | **0.00%** | **-** | **0.00%** | **44.22** | **100.00%** |
| D. | **Financing Charges During Implementation** | | | | | | | | | |
| 1 | Interest during construction | 12.75 | - | 0.00% | - | 0.00% | - | 0.00% | 12.75 | 100.00% |
| 2 | Commitment Charges | 0.92 | - | 0.00% | - | 0.00% | - | 0.00% | 0.92 | 100.00% |
| | **Sub Total (D)** | **13.67** | **-** | **0.00%** | **-** | **0.00%** | **-** | 0.00% | **13.67** | **100.00%** |
| | **Total Project Cost (A+B+C+D)** | **440.00** | **216.00** | **49.09%** | **84.00** | **19.09%** | **60.00** | **13.64%** | **80.00** | **18.18%** |

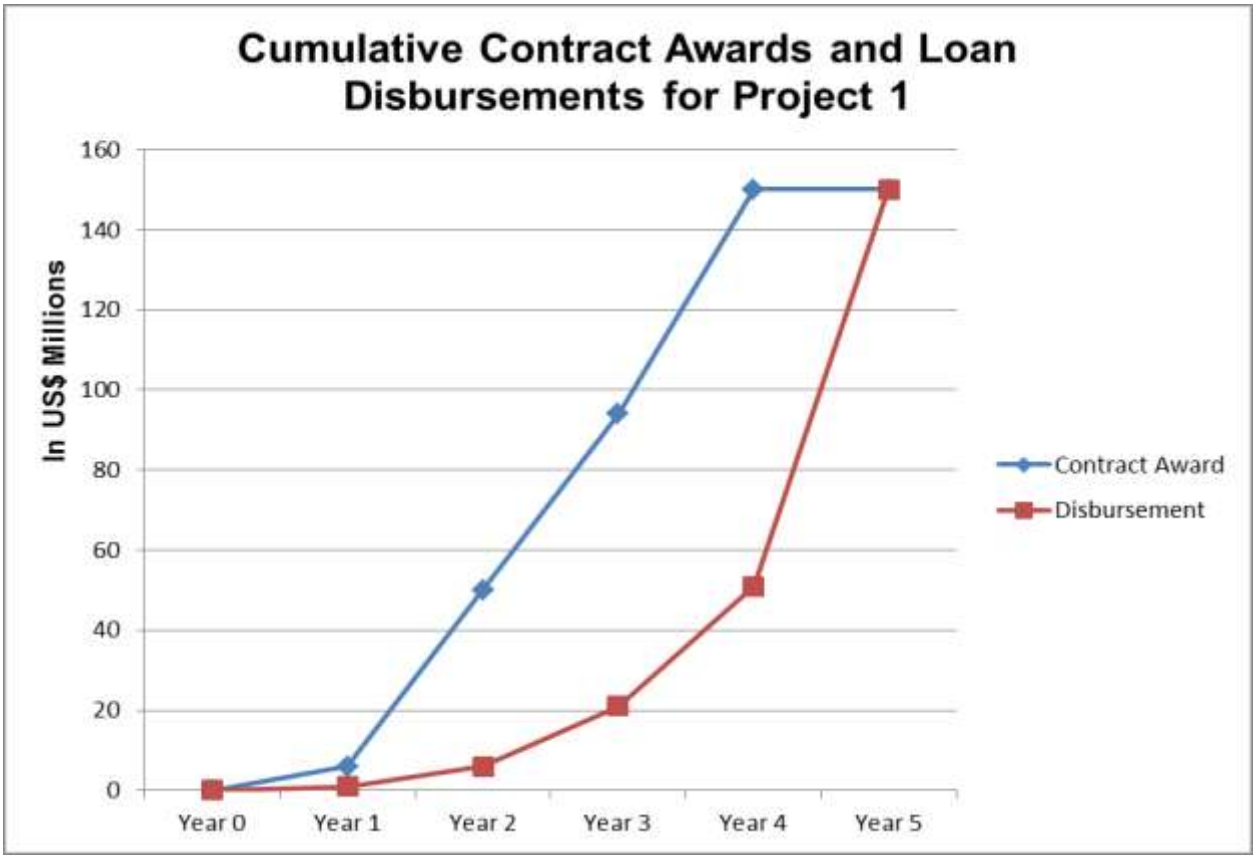
## D. Detailed Cost Estimates by Outputs/Components

| Item | | Total Cost | USD Million | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Generation | | Transmission | | Distribution | | Energy Efficiency | | Consultancy | |
| | | USD Million | Amount | % of cost category | Amount | % of cost category | Amount | % of cost category | Amount | % of cost category | Amount | % of cost category |
| A. | **Investment Costs** | | | | | | | | | | | |
| 1 | Civil works and erection | 129.15 | 59.01 | 45.69% | 62.02 | 48.02% | 7.91 | 6.12% | 0.21 | 0.16% | - | 0.00% |
| 2 | Equipment | 213.32 | 44.47 | 20.85% | 138.58 | 64.96% | 16.78 | 7.87% | 13.49 | 6.32% | - | 0.00% |
| 3 | Consultancy | | | | | | | | | | | |
| a. | Project management, design & supervision | 15.60 | - | 0.00% | 2.99 | 19.17% | 1.93 | 12.37% | 0.30 | 1.92% | 10.38 | 66.54% |
| b. | Capacity development | 1.93 | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% | 1.93 | 100.00% |
| | **Sub Total (A)** | **360.00** | **103.48** | **28.74%** | **203.59** | **56.55%** | **26.62** | **7.39%** | **14.00** | **3.89%** | **12.31** | **3.42%** |
| | **Base Cost** | **360.00** | **103.48** | **28.74%** | **203.59** | **56.55%** | **26.62** | **7.39%** | **14.00** | **3.89%** | **12.31** | **3.42%** |
| B. | **Other Costs** | | | | | | | | | | | |
| 1 | Taxes and duties | 18.57 | 7.63 | 41.09% | 7.68 | 41.36% | 3.22 | 17.34% | 0.04 | 0.22% | - | 0.00% |
| 2 | Consultancy | - | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% | | 0.00% |
| 3 | Environmental & Social Mitigation | 3.54 | 2.07 | 58.47% | 1.39 | 39.27% | 0.08 | 2.26% | - | 0.00% | - | 0.00% |
| | **Sub Total (B)** | **22.11** | **9.70** | **43.87%** | **9.07** | **41.02%** | **3.30** | **14.93%** | **0.04** | **0.18%** | **-** | **0.00%** |
| | **Total Base Cost (A+B)** | **382.11** | **113.18** | **29.62%** | **212.66** | **55.65%** | **29.92** | **7.83%** | **14.04** | **3.67%** | **12.31** | **3.22%** |
| C. | **Contingencies** | | | | | | | | | | | |
| 1 | Physical | 18.48 | 5.66 | 30.63% | 10.63 | 57.52% | 1.49 | 8.06% | 0.70 | 3.79% | - | 0.00% |
| 2 | Price | 25.74 | 5.40 | 20.98% | 18.21 | 70.75% | 1.25 | 4.86% | 0.88 | 3.42% | - | 0.00% |
| | **Sub Total (C)** | **44.22** | **11.06** | **25.01%** | **28.84** | **65.22%** | **2.74** | **6.20%** | **1.58** | **3.57%** | **-** | **0.00%** |
| D. | **Financing Charges During Implementation** | | | | | | | | | | | |
| 1 | Interest during construction | 12.75 | 3.78 | 29.65% | 6.99 | 54.82% | 0.72 | 5.65% | 0.41 | 3.22% | 0.85 | 6.67% |
| 2 | Commitment Charges | 0.92 | 0.51 | 55.43% | 0.41 | 44.57% | - | 0.00% | - | 0.00% | - | 0.00% |
| | **Sub Total (D)** | **13.67** | **4.29** | **31.38%** | **7.40** | **54.13%** | **0.72** | **5.27%** | **0.41** | **3.00%** | **0.85** | **6.22%** |
| | **Total Project Cost (A+B+C+D)** | **440.00** | **128.53** | **29.21%** | **248.90** | **56.57%** | **33.38** | **7.59%** | **16.03** | **3.64%** | **13.16** | **2.99%** |

## E. Detailed Cost Estimates by Year

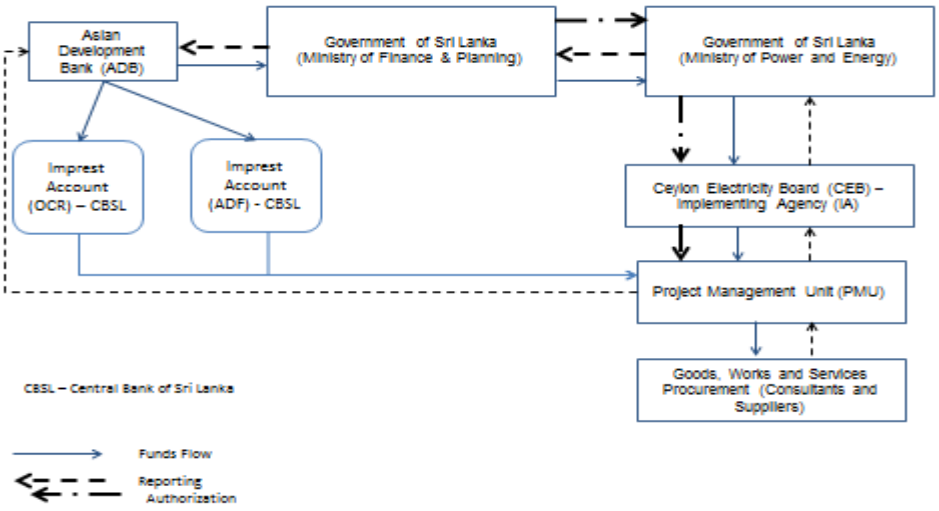
| | Detailed Cost Estimates by Year | USD Million | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Total Cost** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | ***Year 6*** |
| A. | **Investment Costs** | | | | | | | |
| 1 | Civil works and erection | 129.15 | 0.63 | 4.98 | 10.63 | 33.15 | 45.12 | 34.64 |
| 2 | Equipment | 213.32 | 1.98 | 13.32 | 22.82 | 56.65 | 60.81 | 57.74 |
| 3 | Consultancy | | | | | | | |
| a. | Project management, design & supervision | 15.60 | 0.04 | 5.60 | 2.76 | 2.30 | 2.30 | 2.60 |
| b. | Capacity development | 1.93 | - | 0.97 | 0.39 | 0.19 | 0.19 | 0.19 |
| | **Sub Total (A)** | **360.00** | **2.65** | **24.87** | **36.60** | **92.29** | **108.42** | **95.17** |
| | **Base Cost** | **360.00** | **2.65** | **24.87** | **36.60** | **92.29** | **108.42** | **95.17** |
| B. | **Other Costs** | | | | | | | |
| 1 | Taxes and duties | 18.57 | 0.08 | 0.81 | 1.71 | 4.69 | 6.26 | **5.02** |
| 2 | Consultancy | - | - | - | - | - | - | **-** |
| 3 | Environmental & Social Mitigation | 3.54 | 0.26 | 2.07 | 1.14 | 0.02 | 0.02 | **0.03** |
| | **Sub Total (B)** | **22.11** | **0.34** | **2.88** | **2.85** | **4.71** | **6.28** | **5.05** |
| | **Total Base Cost (A+B)** | **382.11** | **2.99** | **27.75** | **39.45** | **97.00** | **114.70** | **100.22** |
| C. | **Contingencies** | | | | | | | |
| 1 | Physical | 18.48 | 0.14 | 0.97 | 1.81 | 4.83 | 5.74 | **4.99** |
| 2 | Price | 25.74 | 0.79 | 1.15 | 2.67 | 5.80 | 7.24 | **8.09** |
| | **Sub Total (C)** | **44.22** | **0.93** | **2.12** | **4.48** | **10.63** | **12.98** | **13.08** |
| D. | **Financing Charges During Implementation** | | | | | | | |
| 1 | Interest during construction | 12.75 | 0.03 | 0.36 | 1.09 | 2.49 | 3.20 | **5.58** |
| 2 | Commitment Charges | 0.92 | 0.03 | 0.17 | 0.30 | 0.25 | 0.15 | **0.02** |
| | **Sub Total (D)** | **13.67** | **0.06** | **0.53** | **1.39** | **2.74** | **3.35** | **5.60** |
| **Total Project Cost (A+B+C+D)** | | **440.00** | **3.98** | **30.40** | **45.32** | **110.37** | **131.03** | **118.90** |

## F. Contract and Disbursement S-Curve




## G. Fund Flow Diagram

**FIGURE 3: FUND FLOW DIAGRAM**




Notes: ADB's direct payment and commitment letter procedures will be used for large scale payments including primarily CEB's payments. In such cases, the direct payment will be made from ADB to contractors or commitment letter reimbursement will go to a nominated bank of a supplier on the basis of withdrawal applications submitted to ADB by the relevant IA.

# V. FINANCIAL MANAGEMENT

## A. Financial Management Assessment

15. The adequacy of the existing financial management at the EA/IA was evaluated to assess its compliance with ADB's guidelines[15] and to identify measures that would need to be instituted to ensure compliance with ADB requirements. The financial management of the Ceylon Electricity Board (CEB) was reviewed and found to be adequate under ADB financed Loan Loans No. 2892/2893 (SF), Grant 0303(EF)-SRI: Clean Energy and Network Efficiency Improvement Project approved in 2012. During the processing of this multi tranche financing facility (MFF), the financial management assessment was updated to ensure CEB's fulfillment of ADB fiduciary requirements. A financial management assessment questionnaire was completed to facilitate a review of its financial systems and processes, identifying any issues and constraints. Significant progress on strengthening corporate governance and financial management has been made in the past years.

16. **Budgeting and planning.** CEB is an integrated utility fully owned by the government and engaged in generation, transmission, and distribution of electricity. The Company's revenue is determined through the tariff approved by the Public Utilities Commission of Sri Lanka (PUCSL) based on annual tariff petitions. The Company undertakes extensive budgeting and planning exercise each year for the subsequent financial year. The annual budget is approved by CEB Board and covers the recurring as well as capital expenditure requirements. The contribution from the Government in terms of equity / loan is however dependent on the Annual Budget provided by the Government considering the resource availability.

17. CEB has been receiving external funding from multi-lateral and bilateral agencies for funding the power sector projects. These funds are on-lend by Government of Sri Lanka to CEB along with the counter-part funding for the projects. The financial management process within CEB has been streamlined over past few years and there has not been any significant issue in timely availability of funds. CEB staff has understanding of ADB's requirements of project reporting and audits, having received ADB funding under Clean Energy and Network Efficiency Improvement Project and Clean Energy and Access Improvement Project during last 5 years. CEB has, in the past, set up dedicated Project Management Units (PMU) for various components and even under this proposed Facility; PMUs would be established for the generation, transmission, distribution and energy efficiency components. The financial management for implementing projects within CEB is quite effective and there has not been any critical issues raised during the audits.

18. **Accounting and Reporting.** CEB has adequate capacity for project accounting, reporting, and managing funds flow, and has previously managed large external projects financed by Multilateral and Bilateral Donor Agencies. CEB's annual accounts are prepared on an accrual basis in accordance with Sri Lanka Accounting Standards, which are based on International Accounting Standards i.e. IFRS. The year 2012 was the first year of transition to the new Accounting standards. The accounts are audited by the auditor general. The audited accounts upto financial year 2011 have been published while accounts for 2012 have not been approved by the Parliament. CEB's accounting records are maintained at site offices and monthly summaries are forwarded to head office for consolidation. Under the general manager responsible for day-to-day management, additional general managers manage six functional business units (FBUs), one generation unit, one transmission unit, and four distribution units in different geographic areas.

19. The accounts department is adequately staffed with qualified professionals and has qualified Chartered Accountants at various levels. There is no training policy manual existing in the organization for the finance and accounting staff. However, need based training is provided. CEB is currently in the process of implementing a new accounting package with 4 modules having been implemented till date i.e. Cash book, Inventory, Journal Vouchers and Projects. The system generates only upto the Trial Balance stage and all subsequent activity related to preparation of Financial Statements is manual. This includes consolidation of all accounting units spread across the country. The second level consolidation of CEB with the accounts of its subsidiaries is also

[15] "Financial Due Diligence A Methodology Note, ADB, January 2009"

manual. Fixed assets are manually maintained and depreciation calculations are not automated. Though there is already a computerized billing system, its interface with the Accounting system is manual. It approximately takes about 2 to 3 months for CEB to finalize its accounts for the year.

20. The accounting separation amongst the functional business units is yet to be fully achieved, with the licensees preparing their first year unaudited accounts for the year 2012. The basis of the accounting separation and the methodology adopted for such separation is yet to be reviewed and approved by the regulator as well as the auditor. The computerized management reporting systems are not available in CEB. The current financial accounting system being implemented is a standalone system that takes care of accounting requirements only, and is not interfaced / integrated with other IT applications that exist in CEB. Almost all financial information is sourced from the accounting system; these are processed and prepared in the desired formats using MS-Excel.

21. The existing accounting system, while adequate for current purposes, CEB is likely to find that new reporting and tariff filing requirements imposed by the Public Utilities Commission of Sri Lanka (PUCSL) put pressure on its manual accounting system. CEB is a single legal entity with six licenses i.e. one for generation, one for transmission and bulk supply and four for distribution The regulatory regime for CEB commenced from 2011-12 and the first multi-year tariff period of 5 years in currently underway. PUCSL is in the process of defining the regulatory accounting requirements and other information it requires to review the status and performance of the licensees each year. Currently, the licensees are providing the desired monthly information in the form of technical data to PUCSL and the accounts at the end of each year.

22. An integrated computerized management reporting system for CEB should also form part of the reforms drive towards modernization of its systems and processes. In this context, CEB is actively evaluating Enterprise Resource Planning (ERP) software which would also cover the finance and accounts, projects functions.

23. The CEB will maintain separate project accounts and records by funding source for all expenditures incurred on the project. Project accounts will follow Sri Lanka Accounting Standards, which are harmonized with international accounting principles and practices. The CEB has implemented ADB and external funded projects for many years and is currently implementing the ADB's Clean Energy and Network Efficiency Improvement Project.

24. **External and Internal Auditing.** The External Audit and Internal Audit are being carried out in accordance with the rules and procedures laid out by the Act of Parliament.

25. CEB’s accounts are audited by the Auditor General of Sri Lanka. CEB's accounting records are maintained at site offices and monthly summaries are forwarded to head office for consolidation. Under the general manager responsible for day-to-day management, additional general managers manage six functional business units (FBUs), one generation unit, one transmission unit, and four distribution units in different geographic areas. The audited annual accounts are tabled in Parliament for approval. For 2012, the audited accounts have been finalized and got delayed due to legislative approval process.

26. CEB has an In-house internal audit department headed by Chief Internal Auditor and has staff of more than 50 well qualified accounting and auditing professionals including Chartered Accountants. The internal audit department head administratively reports to the Chairman.

27. The main focus of the internal audit department is to provide independent assurance on overall system of internal controls and Compliance with laws and regulations and established policies and procedures of CEB. It assesses the effectiveness and successful implementation of existing controls and makes recommendations on both measures required for strengthening these as well as putting in place new controls as necessary. On an average, 80 internal reports have been issued annually by internal audit covering areas of routine audits, review audits and special investigations. The Audit Committee of Board comprised of four members and the committee has met six times in year. The internal audit reports are reviewed by Audit Committee but there has been some delay in completing this task in the past.

28. The audit report for 2011 highlights some of the accounting deficiencies which have been adequately addressed by CEB as per the Management response provided.

29. CEB will cause the proposed project accounts to be audited in accordance with sound auditing standards acceptable to ADB by an auditor acceptable to ADB. The audited accounts will be submitted in the English language to ADB within 6 months of the end of the fiscal year by the IAs. The annual audit report will include a separate audit opinion on the use of the imprest accounts and the SOE procedures, as applicable. The government, MOPE and CEB have been made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited accounts. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures. ADB requires audited financial statements (AFS) for CEB.

30. **Risk Analysis.** A Financial Management Internal Control and Risk Management Assessment was conducted. The following risk assessments are based on existing circumstances, staffing and procedures, and include recommendations for risk mitigation measures

**Table: Risk Analysis and Mitigation Measures – CEB**

| Risk type | Risk Asst[16] | Risk Description | Mitigation Measures |
|---|---|---|---|
| **Inherent Risk:** Inherent Risk is the susceptibility of the project financial management system to factors arising from the environment in which it operates | | | |
| 1. Entity-Specific Risks | N | Record-keeping, internal reporting and monitoring | Strengthen internal management reporting and record keeping through implementing IT based systems preferably ERP<br>Targeted periodic training and capacity building at all levels |
| | S | Regulatory reporting requirements are likely to increase. PUCSL is in the process of defining the regulatory accounting requirements and other information it requires to review the status and performance of the licensees each year. | The reporting system would need to computerized fully to timely meet the regulatory information requirements.<br>Further, CEB is considering ERP system for the organization which would significantly improve the information system |
| 2. Project-Specific Risks | M | Delays in project implementation due to inadequate monitoring and project planning<br><br>Training of personnel deployed in Project Management Units (PMU) | Significant planning has been undertaken in project preparatory phases so that procurement of turnkey implementations could be initiated on loan approval.<br><br>Use of project planning tools like Microsoft Projects / Primavera in project implementation phase and monitoring of turnkey contracts are recommended<br>Project Implementation Consultants to provide technical support to PMU and also assist in procurement process |
| **Overall Inherent Risk** | **M** | | |

[16] H = High, S = Substantial, M = Moderate, N = Negligible or Low.

| Risk type | Risk Asst[16] | Risk Description | Mitigation Measures |
|---|---|---|---|
| **Control Risk:** Control Risk is the risk that the project's accounting and internal control framework are inadequate to ensure project funds are used economically and efficiently | | | |
| 1. Implementing Entity | N | Interpretation of ADB guidelines in disbursement and withdrawal of project funds by EA and IA | EA/IA have extensive experience in following ADB guidelines. A clear authority and reporting structure needs to be established for financial management |
| 2. Staffing | N | Staffing skills are satisfactory for book keeping, but staff responsibilities for the effectiveness of the accounting systems and reports could be improved.<br>Financial management staff at the implementing agency are appropriately qualified and experienced in implementation of externally funded project including ADB | Accounting staff to be trained for enhancing skills levels<br><br>Provide regular training on ADB's procurement and disbursement processes to new recruits. |
| 3. Accounting and Reporting | M | Inadequate control over management reporting - There are no computerized management reporting systems in CEB. Cost accounting computerized systems is also not in place. The current financial accounting system being implemented is a standalone system that takes care of accounting requirements only | Comprehensive ERP system may be evaluated for organization wide implementation<br><br>Expedite the updating of current system |
| **Overall Control Risk** | **N** | | |

### B. Disbursement

31. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012, as amended from time to time), and detailed arrangements agreed upon between the government and ADB.

32. ADB's direct payment and commitment letter procedures will be used for large scale payments including CEB's payments.

33. To expedite implementation of the project through the timely release of funds, ~~a~~ separate imprest accounts for each of OCR and ADF loans may be established at the Central Bank of Sri Lanka (CBSL) by CEB. The ceiling for the imprest accounts should not exceed 10% of the relevant loan amount. The request for advance to the imprest account should be accompanied by an Estimate of Expenditure Sheet setting out the estimated expenditures for the first six (6) months of project implementation, and submission of evidence satisfactory to ADB that the imprest account has been duly opened. For every liquidation and replenishment request of the imprest account, the borrower will furnish to ADB (a) Statement of Account (Bank Statement) where the imprest account is maintained, and (b) the Imprest Account Reconciliation Statement (IARS) reconciling the above mentioned bank statement against the IA's records. ADB's Statement of Expenditures (SOE) procedure is used for reimbursement of eligible project expenditures and liquidation and replenishment of the imprest account(s), with a SOE ceiling of $100,000 per individual payment. SOE records should be maintained and made readily available for review by ADB's disbursement and review mission or upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit.

34. Each project manager of CEB will be responsible for: (i) preparing disbursement projections, (ii) requesting budgetary allocations for counterpart funds, (iii) collecting supporting documents, and (iv) preparing and sending withdrawal applications to ADB.

35. Before the submission of the first withdrawal application, the borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the borrower, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is $100,000 equivalent, unless otherwise approved by ADB. Individual payments below this amount should generally be paid from the imprest accounts, or by the executing/implementing agencies and subsequently claimed to ADB through reimbursement. ADB reserves the right not to accept withdrawal applications below the minimum amount. Withdrawal applications and supporting documents will demonstrate, among other things that the goods, and/or services were produced in or from ADB members, and are eligible for ADB financing. Government counterpart funds will be used to finance taxes and duties, which are not financed by ADB.

### C. Accounting

36. The CEB will maintain separate project financial statements and records by funding source for all expenditures incurred on the project. Project financial statements will follow Sri Lanka Accounting Standards, which are harmonized with international accounting principles and practices. The CEB has implemented ADB and external funded projects for many years and is currently implementing the ADB's Clean Energy and Access Improvement Project, Sustainable Power Sector Support Project, and Clean Energy and Network Efficiency Improvement Project.

### D. Auditing

37. CEB will cause the project financial statements to be audited in accordance with International Standards on Auditing and with the Government's audit regulations, by an independent auditor acceptable to ADB. The audited project financial statements will be submitted in the English language to ADB within six months of the end of the fiscal year by CEB.

38. In addition, CEB will also cause its entity-level financial statements to be audited in accordance with International Standards on Auditing and with the Government's audit regulations, by an independent auditor. The audited entity-level financial statements, together with the auditors' report and management letter, will be submitted in the English language to ADB within one month after their approval by the competent authority.

39. The annual audit report for the project accounts will include audit opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan proceeds were used only for the purposes of the project or not; (iii) the level of compliance for each financial covenant contained in the legal agreements for the project; (iv) use of the imprest fund procedure; and (v) the use of the statement of expenditure procedure certifying to the eligibility of those expenditures claimed under SOE procedures, and proper use of the SOE and imprest procedures in accordance with ADB's Loan Disbursement Handbook and the project documents. A management letter shall also be provided, unless already provided with the entity-level financial statements

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

41. The Government and CEB have been made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements[17]. ADB reserves the right to require a change in the auditor (in a manner consistent

[17] ADB Policy on delayed submission of audited project financial statements:

- When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (i) the audit documents are overdue; and (ii) if they are not received within the next six

with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial statements to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

42. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011).[18] After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The management letter [and entity level financial statements] will not be disclosed.

43. Pursuant to ADB's Safeguard Policy Statement (2009) (SPS),[19] ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS.

months, requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.

- When audited project financial statements have not been received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (i) inform the executing agency of ADB's actions; and (ii) advise that the loan may be suspended if the audit documents are not received within the next six months.
- When audited project financial statements have not been received within 12 months after the due date, ADB may suspend the loan.

[18] Available from http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications
[19] Available at: http://www.adb.org/Documents/Policies/Safeguards/Safeguard-Policy-Statement-June2009.pdf

# VI. PROCUREMENT AND CONSULTING SERVICES

## A. Advance Contracting

44. All advance contracting will be undertaken in conformity with ADB's *Procurement Guidelines* (2013, as amended from time to time) (ADB's *Procurement Guidelines)*[20] and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time) (ADB's *Guidelines on the Use of Consultants).*[21]

45. **Advance Contracting.** ADB approved advance contracting for recruitment of consultants and procurement of goods, related services and civil works including inviting and receiving bids for contracts that might be approved for implementation prior to loan effectiveness. The issuance of invitations to bid under advance contracting will be subjected to ADB approval. The borrower, MOPE, and CEB have been advised that approval of advance contracting does not commit ADB to finance the project.

46. **Retroactive financing.** Except as otherwise agreed with ADB, the expenditures incurred for equipment, civil works, and consulting services will be eligible for retroactive financing, provided that these are incurred before the effectiveness of the related loan agreement, but not earlier than 12 months preceding the signing of the related loan agreement, and as long as they do not exceed an amount of 20% of the individual loan. It is understood that ADB's approval of the advance contracting and retroactive financing does not commit ADB to finance the proposed Project.

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

47. Procurement of works, goods, and services will be carried out in accordance with ADB's *Procurement Guidelines*. ADB will allow advance contracting. ADB's *Procurement Guidelines* allow for the use of domestic preference to the goods and turnkey contracts. The Government has requested for the domestic preference for goods and turnkey contracts and a provision will be made in the loan agreement and further details of its application will be included in the bidding documents. It will be applicable to domestically manufactured goods in single responsibility turnkey contracts where the cost of the goods and supplies for permanent works is estimated prior to the bidding is equal or exceed 60% of such works.

48. International competitive bidding (ICB) procedures will be used for procurement packages for the hydropower plant, 132 kV and 220 kV transmission lines, 220/132/33 kV grid substations, and 33 kV distribution lines and gantries and DSM pilot subprojects.

49. CEB will recruit consultants to provide technical, supervision and monitoring support for implementation of hydropower power generation and other subprojects as well as capacity building for power sector development. The consultants will be recruited using ADB's *Guidelines on Use of Consultants*.

## C. Procurement Plan

50. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and general guidelines for the use of national competitive bidding are presented below.

51. All consultants will be recruited according to ADB's *Guidelines on the Use of Consultants*.[22] The terms of reference for all consulting services are detailed in Section D.

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[20] Available at: http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf
[21] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf
[22] Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: http://www.adb.org/documents/handbooks/project-implementation/

# PROCUREMENT PLAN

**Basic Data**

| | |
|---|---|
| **Project Name**: Green Power Development and Energy Efficiency Improvement Investment Program (Project 1) | |
| **Project Number:** 47037 | **Approval Number**: To be provided |
| **Country:** Democratic Socialist Republic of Sri Lanka | **Executing Agency**: Ministry of Power and Energy |
| **Project Financing Amount**: $180 million<br>**ADB Financing:** $150 million<br>**Non-ADB Financing:** $30 million | **Implementing Agency:** Ceylon Electricity Board |
| **Date of First Procurement Plan:**<br>21 February 2014 | **Date of this Procurement Plan**:<br>19 May 2014 |

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

### 1. Procurement and Consulting Methods and Thresholds

52. Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

**Procurement of Goods and Works**

| Method | Threshold |
|---|---|
| | |
| International Competitive Bidding (ICB) for Works | $7,500,000 |
| International Competitive Bidding for Goods[1] | $ 500,000 |
| National Competitive Bidding (NCB) for Works[1] | Beneath that stated for ICB, Works |
| National Competitive Bidding for Goods[1] | Below the limit stated for ICB, Goods |
| Shopping for Works | Below $100,000 |
| Shopping for Goods | Below $100,000 |

| Consulting Services | |
|---|---|
| **Method** | **Comments** |
| Quality and Cost Based Selection (QCBS) | QCBS will be used for consulting services from firms |
| Quality Based Selection | Not applicable |
| Consultants' Qualifications Selection | Not applicable |
| Least-Cost Selection | Not applicable |
| Fixed Budget Selection | Not applicable |

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

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

| Package Number | General Description | Estimated Value (US$ million) | Procure-ment Method | Review (Prior / Post) | Bidding Procedure | Adverti-sement Date (quarter/ year) | Comments |
|---|---|---|---|---|---|---|---|
| **1** | **Construction of Moragolla HPP** | **103.48** | ICB | Prior | 1S2E | Q2 2014 | Prequalification; domestic preference for goods only |
| | **Lot A:** Civil Works | 59.01 | ICB | Prior | 1S2E | Q2 2014 | Prequalification; large works |
| | **Lot B**: Mechanical and | 44.47 | ICB | Prior | 1S2E | Q2 2014 | Prequalification; turnkey with |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Electrical Facilities | | | | | | domestic preference for goods |
| **2** | **Construction of Transmission Infrastructure** | **52.88** | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |
| | **Lot A**: Construction of 132 kV and 220 kV Transmission Infrastructure (Katunayake, Kerawalapitiya and Kappalturai GSS) | 23.24 | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |
| | **Lot B**: Construction and augmentation of 132 kV Transmission Infrastructure (Kalutara, Kesweba and Old Anuradhapura GSS) | 29.64 | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |
| **3** | **MV Network Efficiency Improvement** | **8.19** | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |
| **4** | **Energy Efficiency Pilots** | **3.14** | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |
| | **Lot B**: Smart Building and Cold Thermal Storage Pilot | 2.50 | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |

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

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

| **Package Number** | **General Description** | **Estimated Value** | **Recruitment Method** | **Review** (Prior / Post) | **Adverti-sement Date** (quarter/ year) | **Type of Proposal** | **Comments** |
|---|---|---|---|---|---|---|---|
| C1 | Project Management and Supervisory support for construction of Moragolla HPP | $10,380,000 | QCBS | Prior | Q2 2014 | FTP | International; Quality-cost ratio of 90:10 |
| C2 | Project management (preparation of Project 2) | $1,200,000 | QCBS | Prior | Q2 2015 | FTP | International; Quality-cost ratio of 90:10 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C3 | Capacity building for power sector | $730,000 | QCBS | Prior | Q3 2014 | STP | International; Quality-cost ratio of 90:10 |

### 4. Goods and Works Contracts Estimated to Cost Less than $1 Million and Consulting Services Contracts Less than $100,000 (Smaller Value Contracts)

The following table groups smaller-value goods, works and consulting services contracts for which the activity is either ongoing or expected to commence within the next 18 months.

| **Goods and Works** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Package Number** | **General Description** | **Estimated Value** | **Number of Contracts** | **Procure-ment Method** | **Review** (Prior / Post) | **Bidding Proce-dure** | **Adverti-sement Date** (quarter/ year) | **Comments** [7] |
| 4 | **Lot A**: Smart Grid Pilot | 0.64 | 1 | ICB | Prior | 1S2E | Q4 2014 | Turnkey with domestic preference for goods |

There are no consulting services contracts less than $100,000.

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

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

There are no goods, works and consulting services contracts over the life of the project, other than those mentioned in previous sections

## C. List of Awarded and On-going, and Completed Contracts

There are currently no awarded and on-going contracts, and completed contracts.

## D. Non-ADB Financing

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

| **Goods and Works** | | | | |
|---|---|---|---|---|
| **General Description** | **Estimated Value (cumulative)** | **Estimated Number of Contracts** | **Procurement Method** | **Comments** |
| **Package 2, Lot B**: Construction and augmentation of 132 kV Transmission Infrastructure (Kalutara, Kesweba and Old Anuradhapura GSS) | 29.64 | 1 | ICB | To be financed by AFD |

There are no consulting services contracts over the life of the project, financed by Non-ADB sources.

## E. National Competitive Bidding

### 1. General

53. National competitive bidding shall conform to the provisions for "National Competitive Bidding" as prescribed in the *Procurement Guidelines 2006 for Goods and Works* issued in January 2006 by the National Procurement Agency, and the specific procedures prescribed by the *Procurement Manual* issued on March 2006, with the clarifications and modifications described in the following paragraphs required for compliance with the provisions of the ADB Procurement Guidelines.

### 2. Registration

54. Bidding shall not be restricted to pre-registered firms under the national registration system of the Institute for Construction, Training and Development (ICTAD), and such registration shall not be a condition for the submission of bids in the bidding process.

55. Where registration is required prior to award of contract, bidders: (i) shall be allowed a reasonable time to complete the ICTAD registration process; and (ii) shall not be denied registration for reasons unrelated to their capability and resources to successfully perform the contract, which shall be verified through post-qualification.

56. National sanction lists or blacklists may be applied only with prior approval of ADB.

### 3. Prequalification

57. Post qualification shall be used unless prequalification is explicitly provided for in the loan agreement/procurement plan. When used for large or complex Works contracts, *i.e.* turnkey, design and build, or management contracts; or custom-designed equipment, industrial plants, and specialized services, prequalification evaluation shall not include the evaluation of equipment and personnel. This assessment shall be undertaken at the bid evaluation stage. Irrespective of the procedure applied (whether prequalification or postqualification), no domestic or foreign contractor shall be precluded from participation.

### 4. Advertising

58. Bidding of NCB contracts estimated at $500,000 or more for goods and related services or $1,000,000 or more for civil works shall be advertised on ADB's website via the posting of the Procurement Plan.

### 5. Bidding Documents

59. Procuring entities shall use standard bidding documents acceptable to ADB for the Procurement of Goods, Works and Consulting Services, based ideally on the standard bidding documents issued by ADB.

### 6. Packaging

60. Slicing or splitting of contracts within a package shall not be used to change the contract sizes and their corresponding methods of procurement as approved in the Procurement Plan.

### 7. Bid Security

61. Where required, bid security shall be in the form of a bank guarantee from a reputable bank.

### 8. Preferences

62. No preference of any kind shall be given to domestic bidders or for domestically manufactured goods.

63. Foreign suppliers and contractors from ADB member countries shall be allowed to bid, without registration, licensing, and other government authorizations, leaving compliance with these requirements for after award and before signing of contract.

### 9. Procurement of Works

64. Specifications for works may be based on specifications recommended by ICTAD to the extent possible, but ICTAD approval shall not be required for adoption of specifications in a particular procurement activity.

65. The determination of the financial capacity of a bidder for award of the contract in postqualification evaluation shall take into account current contract commitments and shall not be confined, for domestic bidders, to the ICTAD registration.

### 10. Bid Rejection for Unrealistic Rates

66. Bids shall not be subjected to a test for unrealistic rates. No lowest evaluated and substantially responsive bid shall be rejected on the basis of comparison to rates, including but not limited to market, historical, or agency established rates, without prior approval of ADB.

### 11. Rejection of All Bids and Rebidding

67. Bids shall not be rejected and new bids solicited without the ADB’s prior concurrence.

### 12. Price Negotiations

68. Price negotiation shall be allowed only where the price offered by the lowest evaluated and substantially responsive bidder substantially exceeds costs estimates. Approval of ADB is required prior to any negotiation of prices.

### 13. Participation by Government-Owned Enterprises

69. Government-owned enterprises in the Democratic Socialist Republic of Sri Lanka shall be eligible to participate only if they can establish that they are legally and financially autonomous, operate under commercial law, and are not a dependent agency of the procuring entity, or the Project Executing Agency or Implementing Agency.

## D. Consultant's Terms of Reference

70. Outline Terms of Reference (TORs) for consultants are presented in Appendix 2.

# VII. SAFEGUARDS

## A. Environment

71. CEB will implement the necessary Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE) and Environmental Management Plan (EMP) for each subproject that were prepared. The CEB will monitor, audit, and report to ADB on a quarterly basis on the implementation of the EMPs for each subproject. The EA/CEB will verify that all associated facilities not financed by ADB will be constructed and commissioned in compliance with the laws and regulations of Sri Lanka and will be undertaken in a manner consistent with ADB's *Safeguard Policy Statement 2009* prior to connecting such facilities to the ADB-supported transmission and distribution network.

72. The social and environmental management cell within CEB will assist in promoting environmentally responsible implementation of contracts and will monitor the implementation of all mitigation measures. The mitigation measures will be incorporated in contract documents for the Engineering, Procurement and Construction (EPC) contractor. The EARF has been developed for the entire investment program. The Moragolla hydropower plant (Tranche 1) and the 132 kV transmission infrastructure connecting to Mannar island (Tranche 2) are sub-projects with substantial risk from an environmental perspective. Tranche 2 shall also develop suitable EIA/IEEs as per EARF guidance.

73. In line with *Safeguard Policy Statement 2009*, CEB and the EPC contractor must ensure mitigation of all adverse impacts through measures listed in the EMPs and also ensure complete adherence to critical habitat management policies of both ADB and the national government. Accordingly, CEB shall hire experienced experts and staff for close supervision and monitoring during project preparation, implementation and operation, set out responsibilities for implementation relating to ecological mitigation, dam safety requirement, management of critical habitats, associated facilities, stakeholder participation, grievance redress and biodiversity offset planning.

## B. Involuntary Resettlement

74. The objective of safeguards is to avoid adverse impacts of projects on the environment and affected people (AP) and to prevent, minimize, mitigate or compensate adverse impacts, where these are considered to be temporary and of a reversible nature. Implementation of project safeguard plans is guided by loan covenants and other approved safeguard planning instruments. The investment program has a Resettlement Framework and Project 1 has Resettlement Plans (RP) to address and provide details on the nature and scale of land acquisition and resettlement required for the project, though this has been identified as minor and insignificant in nature. A loan condition of the project will be to ensure that the Resettlement Plan is implemented in accordance with its terms prior to the commencement of civil work activities. CEB will be the entity responsible for ensuring this. The PIU, through the CEB Environmental and Social Division, will be responsible for updating and finalizing the resettlement plan, followed by disclosure to the local people. CEB will, in advance of project disbursement, allocate the land acquisition and resettlement budget and costs in their overall annual budget, as identified in the RPs. All affected and displaced people will be identified by the CEB through PIU and its Environmental and Social Division. Disbursement of compensation and assistance will be carried out in accordance to the eligibility and entitlement matrix in the RP. Details of implementation arrangements are given in the RP.

75. Complete details of compensation rates for the loss of land and structures, shifting assistance, and other income restoration assistance are provided in the resettlement framework and the resettlement plans. Additional support provisions for displace people belonging to vulnerable groups are also included. Proper consultation during the preparation of the RP with the project displaced persons including land acquisition and compensation process and disclosure to general public through the ADB website will be undertaken. If during implementation any

modification or additional land requirement or involuntary resettlement impacts are identified, an RP should be prepared or modified in accordance with the applicable laws referred to in the resettlement framework. Prior approval of the ADB shall be obtained before any further implementation of the relevant subproject.

76. All displaced people should be paid compensation and assistance in accordance with the resettlement plan. The land should be made free of encumbrances and obstructions from the related subproject required to be handed over to the contractor for and prior to commencement of construction thereof in accordance with the work schedule under the related civil works contract. Efficient grievance redress mechanism is in place in accordance with the related RP to assist displaced persons to resolve grievances and complaints if any in a timely manner.

77. The implementation of the Resettlement Plans will be monitored internally by the EA/CEB and externally by qualified and experienced external experts, who will undertake the overall monitoring of the safeguards and relevant social issues and submit quarterly monitoring reports to EA for submission to ADB. The external experts will advise on safeguard compliance issues, and if any significant involuntary resettlement issues are identified, a corrective action plan will be prepared.

78. The project is classified as category C for indigenous peoples. According to social assessments, no indigenous peoples are expected to be impacted by project activities The project will not impact the existing socio-cultural system of indigenous peoples. No tribal lands will be acquired or affected Should any impacts on indigenous peoples be identified, an indigenous peoples plan will be prepared in accordance with the indigenous peoples planning framework and ADB's Safeguard Policy Statement. The same will further be approved by ADB before award of related civil works contract and implemented before commencement of the civil works contract as applicable.

## VIII. GENDER AND SOCIAL DIMENSIONS

79. **Gender:** Focus group discussions and consultations were undertaken with women from different socioeconomic groups in the project influenced area. The consultations brought forth that the impact of the investment program will be increased access to clean, reliable, and affordable power supply. This will contribute to sustainable economic growth in Sri Lanka which will further increase economic opportunities.

80. The bidding documents provide clauses designed to ensure that all civil works contractors comply with applicable labor laws, do not employ child labor, encourage the employment of the poor particularly women, and do not offer different wages to men and women particularly for work of equal value. Dialogue and communication (both written and verbal) with stakeholders will be carried out in a gender specific and culturally sensitive manner and in local languages, as required during safeguards implementation. There are special provisions for the vulnerable households including the women headed households in the resettlement framework and the Resettlement Plans.

81. **HIV /AIDS:** Based on the poverty and social assessment, there is no risk that the project will increase HIV/AIDS incidence. However contractors will carry out HIV/AIDS awareness for their laborers at work sites, which will be monitored by the construction supervision consultants. The EA/CEB with the help of civil society organizations and public health agencies will carry out the awareness amongst the communities in the project influence area.

82. **Health:** The EA/CEB will ensure that contractors provide adequately for the health and safety of the construction workers and further ensure that bidding documents include measures on how contractors will address this, including an information and awareness raising campaign for construction workers on sexually transmitted diseases, including HIV/AIDS and human trafficking.

83. **Labor:** The EA/CEB will ensure that civil works contractors comply with all applicable labor laws and regulations do not employ child labor for construction and maintenance activities, provide appropriate facilities for women and children in construction campsites; and do not differentiate wages between men and women for work of equal value. The EA/CEB will ensure that specific clauses ensuring these will be included in bidding documents.

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

### A. Facility Design and Monitoring Framework

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|---|---|
| **Impact**<br>Increased access to clean and reliable power supply | System supply capacity increased from 3,312 MW in 2012 to 6,367 MW by 2020<br><br>Electrification rate increased from 94% in 2012 to 100% access to all by 2016<br><br>In-grid energy supply from nonconventional renewable energy sources increased from 6.4% in 2012 to 10.0% by 2016 and 20.0% by 2020 | (For all indicators)<br><br>CEB annual report (power sector statistics)<br><br>Progress reports on 10-year development framework | **Assumptions**<br>The government remains committed to power sector reforms and development of renewable energy sources<br>Adoption of a conducive regulatory environment for the private sector involvement in developing renewable energy<br><br>**Risk**<br>Increase in fuel oil costs, reliance on expensive thermal electricity generation, and tariffs set below supply cost will impact CEB operation and financial capacity<br>Unfavorable changes in global financial and economic environment will adversely affect the domestic economy |
| **Outcome**<br>Enhanced clean power generation, system efficiency and reliability | The total losses of the CEB network reduced from 10.67% of net generation in 2012 to 10.0% by 2020<br><br>Transmission infrastructure for connecting 200 MW of wind power to the grid completed by December 2018<br><br>97.7 GWh clean hydropower generation per year, resulting in annual avoided 72,272 tons of carbon dioxide emissions, added to the system by June 2019<br><br>Distribution line end voltage fluctuation maintained within 5% in project areas by December 2018 (baseline: 10% in 2013) | (For all indicators)<br><br>CEB annual report (power sector statistics)<br><br>Progress reports on 10-year development framework<br><br>CEB monthly system reports | **Assumptions**<br>Least-cost generation expansion plan, including generation from renewable sources, implemented as scheduled<br><br>The government to continue to fund grid extension and strengthening<br><br>**Risk**<br><br>Integration of intermittent wind generation may create potential difficulties in managing grid. |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|---|---|
| **Outputs** | | | **Assumption** |
| 1. Hydropower generation developed in the Central Province | 30 MW of run-of-river hydropower plant constructed by June 2019<br><br>0.5 km of dedicated 132 kV transmission line constructed to connect the hydropower plant to the grid by June 2019 | CEB annual report (power sector statistics)<br><br>Government budget<br><br>Government gazette | Implementation capacity of CEB remains sufficient to handle multiple projects<br><br>**Risks**<br>Unexpected increase in prices of commodities and raw materials, and construction delays |
| 2. Transmission infrastructure enhanced | 210 MVA 220/132 kV and 816.5 MVA 132/33 kV grid substation capacity added by June 2020<br><br>12.3 km upgraded and 175 km of new 132 kV, and 151 km of new 220 kV transmission lines added by June 2020<br><br>2x63 MVA, 220/132/33 kV grid substation capacity and 30 km 220 kV transmission line constructed by December 2018 to enable connection of future wind generation in the Northern Province | CEB annual report (power sector statistics)<br><br>Project progress reports by CEB<br><br>CEB monthly reporting | Reduced water flow during the dry season in the Mahaweli river |
| 3. Efficiency of medium voltage network improved | 235.4 km of new 33 kV lines added to improve power supply quality to about 300,000 customers by June 2020<br><br>75 MVAr installed in 33 kV network for reactive power management by June 2020 | Project progress reports by CEB<br><br>CEB annual report (power sector statistics)<br><br>CEB monthly reporting | |
| 4. Demand-side management for energy efficiency improved | Energy savings of 1,700 MWh/year from pilot sub-project implementation by June 2019<br><br>DSM regulations approved and announced by 1 January 2016 | Project progress reports by CEB<br>CEB annual report (power sector statistics)<br>CEB monthly reporting<br>PUCSL and CEB reports | |
| 5. Capacity development support provided to CEB | Support in review of transmission design specifications and standards, and application of new technologies provided by 2016<br>New sub-projects | PUCSL and CEB reports<br><br>Project progress reports by CEB | |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|---|---|
| | prepared for the second tranche by June 2016<br>Project monitoring and supervision guidelines approved and in place by December 2015. | | |
| **Activities with Milestones**<br>**1. Hydropower generation developed**<br>1.1. Land acquisition completed by January 2015.<br>1.2. Construction of Moragolla 30 MW run-of-river hydropower plant by June 2019<br>1.3. Construction of 132 kV transmission line to connect Moragolla hydropower plant to the grid by June 2019<br>**2. Transmission infrastructure enhanced**<br>2.1. Land acquisition completed by January 2015.<br>2.2. Construction/augmentation of 220/132 kV and 132/33 kV grid substations in critical locations and associated transmission lines by June 2019<br>2.3. Construction of 2x63 MVA, 220/132/33 kV grid substation and 30 km 220 kV transmission line in Mannar district of the Northern Province by December 2018<br>**3. Efficiency of medium voltage network improved**<br>3.1. Land acquisition completed by January 2015.<br>3.2. Construction of new 33 kV lines and gantries by June 2020<br>3.3. Installation of reactive power devices by June 2020<br>**4. Demand-side management for energy efficiency improved**<br>4.1. DSM pilot projects undertaken by June 2019<br>4.2. DSM regulations approved and announced by 1 January 2016<br>**5. Capacity development support provided to CEB**<br>5.1. Design of new sub-projects finalized for the second tranche by June 2016<br>5.2. Project supervision capabilities enhanced by December 2015 | **Inputs**<br><br>**Loans in two tranches**<br>**ADB: $300 million**<br><br>**Government: $80.00 million**<br><br>**Cofinancing (AFD): $60.00 million** | | |

ADB = Asian Development Bank, AFD = Agence Francaise Developpement, CEB = Ceylon Electricity Board, GWh = gigawatt-hour, km = kilometer, kV = kilovolt, MVA = megavolt-ampere, MVAr = megavolt-ampere reactive, MW = megawatt, OCR = ordinary capital resources, PUCSL = Public Utilities Commission of Sri Lanka.

Sources: Ceylon Electricity Board. 2012. *CEB Statistical Digest Report*. Colombo; Government of Sri Lanka. 2010. *Mahinda Chintana: Vision for the Future.* Colombo; Ceylon Electricity Board and Asian Development Bank estimates.

## B. Monitoring

### 1. Environment and Involuntary Resettlement Monitoring

84. The contractors, subcontractors, and PIUs must adhere to the EMP and RP during contract implementation as prepared in accordance with ADB's *Safeguard Policy Statement 2009* and as agreed/ endorsed by the Government of Sri Lanka. The contractors and subcontractors shall prepare and submit the monthly progress report in conformance to the PIU and shall indicate when, how and at what cost the contractors' plans to satisfy the requirements as per detailed specifications. For each component, these programs shall detail the resources to be provided or utilized and any related subcontracting proposed. The PIU, through the related implementing office, will be responsible for processing and implementing the subprojects. It will be assisted by technical staff/experts who will evaluate the technical reports, feasibility studies, preliminary design reports, environmental assessment reports (including the EMP with budget), resettlement and indigenous people's development plans, and detailed design reports to ensure compliance with ADB and government requirements. Summary appraisal reports will be submitted to ADB subsequent to EA/IA approval and the required Sri Lanka Government clearances. The PIU will prepare progress reports and submit them to ADB on a quarterly basis and will submit other required performance and monitoring reports twice a year.

85. Monitoring of land acquisition and resettlement will be the responsibility of the CEB through its PIU. The extent of monitoring activities, including the scope and frequency of monitoring, will be commensurate to the nature and scale of the project's risks and impacts. CEB will be required to implement safeguard measures and relevant safeguard plans, as provided in the legal agreements, and to submit periodic monitoring reports on their implementation performance on a quarterly or semi-annual basis. CEB will ensure that the communities in the project areas are informed about the Grievance Redress Mechanism (GRM), which is established by PUCSL, procedure for making complaints, including place and a responsible person to contact in a practical way. PUCSL has a standard mechanism of (i) informing the affected people about GRM and its functions, (ii) how peoples representatives in the Grievance Redress Committee will be selected, (iii) procedure and the mechanisms adopted for making complaints, (iv) supporting complainants in communicating their grievance and attending GRM meetings, and (v) implementing compliance to a GRMs' decision, its monitoring and communication to the people.

86. Compliance with safeguard requirements will include the need to ensure that project contractors and sub-contractors adhere to ADB safeguard policy requirements. CEB's PIUs have overall responsibility for ensuring compliance with EMPs. For Moragolla hydropower project, CEB will establish an Environment Management Office at the PIU level and engage suitable supervision consultants/external experts for environmental monitoring as it is environmental category A. For the Moragolla hydropower subproject (Tranche 1), project supervision consultants will be engaged including environment and social specialists and dam safety engineer among others. Environmental specialists for Mannar Transmission project (Tranche 2) which involves constructing a transmission line through protected area, Sri Lankan experts on ecology, ornithology and marine biology were engaged by CEB for both the line and the associated facility. Once the ongoing bird migration survey with support of the environmental consultant for Tranche 2 is complete, CEB shall complete the EIA as required and seek approval from designated authority.

87. ADB will require CEB to:

- establish and maintain procedures to monitor the progress of implementation of safeguard plans,
- verify the compliance with safeguard measures and their progress toward intended outcomes,
- document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports,
- follow up on these actions to ensure progress toward the desired outcomes,

- retain qualified and experienced external expert to verify monitoring information for projects with significant impacts and risks, and
- submit periodic monitoring reports on safeguard measures, as agreed with ADB.

88. The CEB/PIU monitoring will include daily planning, implementation, feedback and trouble shooting, individual AP file maintenance, community relationships, dates for consultations, number of appeals placed and progress reports. Monitoring reports documenting progress on resettlement implementation and RP completion reports will be provided by the PIU to ADB for review. Additionally, ADB will monitor projects on an ongoing basis until a project completion report is issued. The Department of Project Management and Monitoring of the MOFP will also conduct periodic monitoring of the project.

### 2. Gender and Social Dimensions Monitoring

89. Social data will be monitored, collated and analyzed to provide an indication of change in the life of beneficiaries, which in turn will be important for recording the outputs and performance of the project. The analysis will provide the basis for management review and decisions regarding social development aspects. The results of social monitoring will be reported to ADB and through CEB/PIU with routine project progress reports. The CEB's Environment and Social Division through its concerned social development specialist will be responsible for preparing the monitoring reports, which in turn should be closely monitored along with the project implementation targets and activities.

90. CEB will ensure that project contractors and sub-contractors comply with core labor standards, occupational health and safety, and acceptable and fair working standards and conditions in line with host country requirements. To avoid the risk of spreading preventable transmissible illnesses and diseases like HIV/AIDs as a result of an influx of workers into the project area during construction works, CEB/PIU will be expected to inform and educate project workers about the risks of HIV/AIDs, how it is spread and how it can be prevented.

## C. Evaluation

91. Within 6 months of physical completion of the project CEB will submit a project completion report ADB.[23]

**Table: Evaluation Methodology**

| Evaluation Activity | Purpose | Methodology | Who responsible and involved |
|---|---|---|---|
| Review mission | Review the progress of the project and provide guidance to facilitate implementation | Site visit and meetings with EA/IA officials, contractors, consultants at least twice a year | ADB/MOPE/CEB |
| Mid Term review | Comprehensive review of project | Site visit and meetings with EA/IA officials, contractors, consultants | ADB/DPMM/MOPE/CEB |
| Project Completion Report | Evaluate the overall output of the project and its relevance and suitability | Site visit and meetings with EA/IA officials, contractors, consultants | ADB/MOPE/CEB |

ADB = Asian Development Bank, CEB = Ceylon Electricity Board, DPMM = Department of Project Management and Monitoring of the Ministry of Finance and Planning, MOPE = Ministry of Power and Energy, SEA = Sustainable Energy Authority.

[23] Project completion report format is available at: http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar

## D. Reporting

92. The PIUs of CEB will provide ADB and the Department of Project Management and Monitoring (DPMM) of the Ministry of Finance and Planning with (i) quarterly progress reports[24] in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure the project continue to be both viable and sustainable, project accounts and the CEB's audited financial statements, together with the associated auditor's report, should be adequately reviewed.

## E. Stakeholder Communication Strategy

93. The investment program consists of construction of two environmentally sensitive sub-projects, i.e. 30 MW Moragolla hydropower plant (Project 1) and 132 kV power evacuation line from Mannar island that has an associated wind park facility. Accordingly, to adhere to ADB's Safeguard Policy Statement 2009 and Public Communications Policy 2011, the PMU at CEB shall engage in dialogue with all stakeholders identified during the EIA and IEE development process.

94. An abridged Stakeholder Communications Strategy is presented in the following table. CEB will provide all sub-project related information through a dedicated webpage for the investment program. This webpage will include the following information: (i) Project Documents: (a). bidding procedures, bidders, and contract awards; (b) use of the funds disbursed under the project; and (c) physical progress; (ii). safeguards documents: (a) environment and social assessments conducted for each sub-project; (b) details of due-diligence studies conducted for environmentally sensitive components; (c) public consultations, and (d) comments section from affected persons, and stakeholders.

**Table: Stakeholder Communication Strategy**

| Project information to be communicated | Means of communication | Responsible for Communication | Audience | Frequency |
|---|---|---|---|---|
| Report and Recommendation to the President with web-linked documents<br>(a). Safeguards<br>(b). Public Consultation | ADB website | ADB | ADB, Government of Sri Lanka, Development Partners, NGOs, Civil Society, private sector, individuals | Once |
| Project information while planning/ designing<br>(a). Techincal<br>(b). Safeguards | Discussions and stakeholders consultation | CEB | Project beneficiaries, project affected persons | Regular intervals during planning and design |
| Status of implementation during construction<br>(a). Techincal<br>(b). Safeguards | Boards on project construction sites | CEB/Contractors | Project beneficiaries, biodiversity stakeholders | All the time at construction sites |
| Project Data Sheet | ADB website | ADB | ADB, Government of Sri Lanka, Development Partners, NGOs, Civil Society, private sector, individuals | At least twice a year |
| Quarterly progress | CEB website | CEB | ADB, Government | Quarterly |

[24] The PUIs of CEB will also provide monthly progress reports to DPMM.

| | | | | |
|---|---|---|---|---|
| reports<br>(a). Technical<br>(b). Safeguards | | | of Sri Lanka, Development Partners, NGOs, biodiversity stakeholders, Civil Society, private sector, individuals | |
| Project Completion Report | ADB website | ADB | ADB, Government of Sri Lanka, Development Partners, NGOs, Civil Society, private sector, individuals | once |

ADB = Asian Development Bank, CEB = Ceylon Electricity Board, NGO = non-government organization.

## X. ANTICORRUPTION POLICY

95. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the Project.[25] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all Project contractors, suppliers, consultants and other service providers. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the Project.[26]

96. To support these efforts, relevant provisions are included in the loan agreement/regulations and the bidding documents for the project.

97. The project incorporates several specific anticorruption measures, including (i) strict financial management with full adherence to monitoring and reporting systems; (ii) strict compliance with local laws and procurement regulations/guidelines published by Department of Public Finance; (iii) the financial audit by the Auditor General's office of all subprojects; and (iv) random and independent spot checks of implementation by ADB. Furthermore, CEB will maintain a project webpage that will be updated regularly and will include (i) bidding procedures, bidders, and contract awards; (ii) use of the funds disbursed under the project; and (iii) physical progress.

## XI. ACCOUNTABILITY MECHANISM

68. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[27]

## XII. RECORD OF FAM CHANGES

[25] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[26] ADB's Integrity Office web site is available at: http://www.adb.org/integrity/unit.asp
[27] For further information see: http://www.adb.org/Accountability-Mechanism/default.asp.

## APPENDIX 1: PROJECT 1 BASIC DATA

## DESIGN AND MONITORING FRAMEWORK FOR PROJECT 1

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|---|---|
| **Impact**<br>Enhanced clean power generation, system efficiency and reliability | The total losses of the CEB network reduced from 10.67% of net generation in 2012 to 10.0% by 2020<br><br>97.7 GWh clean hydropower generation per year, resulting in annual avoided 72,272 tons of carbon dioxide emissions, added to the system by June 2019<br><br>Distribution line end voltage fluctuation maintained within 5% in project areas by December 2018 (baseline: 10% in 2013) | (For all indicators)<br><br>CEB annual report (power sector statistics)<br><br>Progress reports on 10-year development framework<br><br>CEB monthly system reports | **Assumptions**<br>Least-cost generation expansion plan, including generation from renewable sources, implemented as scheduled<br><br>The government to continue to fund grid extension and strengthening |
| **Outcome**<br>Increased hydropower generation capacity and transmission and medium voltage network efficiency | Annual base load hydropower generation increased by 97.7 GWh from June 2019<br><br>Transmission capacity increased to cover additional demand load of 3,596 GWh by January 2019<br><br>Annual energy saving of 8,206 MWh in the medium voltage network achieved by June 2018 | (For all indicators)<br><br>CEB annual report (power sector statistics)<br><br>CEB monthly system reports | **Assumptions**<br>The government remains committed to timely implementation of the least-cost long term generation expansion plan, long-term transmission and distribution development plans. |
| **Outputs**<br>1. Hydropower generation developed in the Central Province | 30 MW of run-of-river hydropower plant constructed by June 2019<br><br>0.5 km of dedicated 132 kV transmission line constructed to connect the hydropower plant to the grid by June 2019 | CEB annual report (power sector statistics)<br><br>Government budget<br><br>Government gazette | **Assumption**<br>Implementation capacity of CEB remains sufficient to handle multiple projects<br><br>**Risks**<br>Unexpected increase in prices of commodities and raw materials, and construction delays |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|---|---|
| 2. Transmission infrastructure capacity enhanced | 210 MVA 220/132/33 kV and 200.5 MVA 132/33 kV grid substation capacity added by June 2018<br><br>12.3 km upgraded and 10 km of new 132 kV transmission lines added by June 2018 | CEB annual report (power sector statistics)<br><br>Project progress reports by CEB<br><br>CEB monthly reporting | Reduced water flow during the dry season in the Mahaweli river |
| 3. Efficiency of medium voltage network improved | 92.3 km of new 33 kV lines added to improve power supply quality to about 156,470 customers by June 2018 | Project progress reports by CEB<br><br>CEB annual report (power sector statistics)<br>CEB monthly reporting | |
| 4. Demand-side management for energy efficiency improved | Energy savings of 500 MWh/year from pilot sub-project implementation by June 2019<br><br>DSM regulations approved and announced by 1 January 2016 | Project progress reports by CEB<br><br>CEB annual report (power sector statistics)<br><br>CEB monthly reporting<br><br>PUCSL and CEB reports | |
| 5. Capacity development support provided to CEB | Support in review of transmission design specifications and standards, and application of new technologies provided by 2016<br><br>New sub-projects prepared for the second tranche by June 2016<br><br>Project monitoring and supervision guidelines approved and in place by December 2015. | PUCSL and CEB reports<br><br>Project progress reports by CEB | |

| Activities with Milestones | Inputs |
|---|---|
| **1. Hydropower generation developed** | |
| 1.4. Land acquisition completed by January 2015. | **Loans in two tranches** |
| 1.5. Construction of Moragolla 30 MW run-of-river hydropower plant by June 2019 | **ADB: $150 million** |
| 1.6. Construction of 132 kV transmission line to connect Moragolla hydropower plant to the grid by June 2019 | **Government: $40.00 million** |
| **2. Transmission infrastructure enhanced** | **Cofinancing (AFD): $30.00 million** |
| 5.1. Land acquisition completed by January 2015. | |
| 2.2. Construction/augmentation of 220/132 kV, 220/132/33 kV and 132/33 kV grid substations in critical locations and associated transmission lines by June 2019 | |
| **3. Efficiency of medium voltage network improved** | |
| 6.1. Land acquisition completed by January 2015. | |
| 3.3. Construction of new 33 kV lines and gantries by June 2020 | |
| **4. Demand-side management for energy efficiency improved** | |
| 7.1. DSM pilot projects undertaken by June 2019 | |
| 4.3. DSM regulations approved and announced by 1 January 2016 | |
| **5. Capacity development support provided** | |
| 5.1. Design of new sub-projects finalized for the second tranche by June 2016 | |
| 5.2. Project supervision capabilities enhanced by December 2015 | |

ADB = Asian Development Bank, AFD = Agence Francaise Developpement, CEB = Ceylon Electricity Board, GWh = gigawatt-hour, km = kilometer, kV = kilovolt, MVA = megavolt-ampere, MW = megawatt, OCR = ordinary capital resources, PUCSL = Public Utilities Commission of Sri Lanka.

## A. Detailed Cost Estimates by Expenditure Category for Project 1

| Item | | SLR Million | | | USD Million | | | |
|---|---|---|---|---|---|---|---|---|
| | | FC | LC | Total Cost | FC | LC | Total Cost | % of Total Base Cost |
| A. | **Investment Costs** | | | | | | | |
| 1 | Civil works and erection | 3,903.25 | 5,700.66 | 9,603.91 | 30.12 | 43.99 | 74.11 | 38.44% |
| 2 | Equipment | 10,215.57 | 1,709.04 | 11,924.61 | 78.83 | 13.19 | 92.02 | 47.73% |
| 3 | Consultancy | | | | | | - | |
| a. | Project management, design & supervision | 1,041.90 | 505.40 | 1,547.30 | 8.04 | 3.90 | 11.94 | 6.19% |
| b. | Capacity development | 250.11 | - | 250.11 | 1.93 | - | 1.93 | 1.00% |
| | **Sub Total (A)** | **15,410.83** | **7,915.10** | **23,325.93** | **118.92** | **61.08** | **180.00** | **93.37%** |
| | **Base Cost** | **15,410.83** | **7,915.10** | **23,325.93** | **118.92** | **61.08** | **180.00** | **93.37%** |
| B. | **Other Costs** | | | | | | | |
| 1 | Taxes and duties | - | 1,352.92 | 1,352.92 | - | 10.44 | 10.44 | 5.42% |
| 2 | Consultancy | - | - | - | - | - | - | 0.00% |
| 3 | Environmental & Social Mitigation | - | 304.54 | 304.54 | - | 2.35 | 2.35 | 1.22% |
| | **Sub Total (B)** | **-** | **1,657.46** | **1,657.46** | **-** | **12.79** | **12.79** | **6.63%** |
| | **Total Base Cost (A+B)** | **15,410.83** | **9,572.56** | **24,983.39** | **118.92** | **73.87** | **192.79** | **100.00%** |
| C. | **Contingencies** | | | | | | | |
| 1 | Physical | - | 1,168.90 | 1,168.90 | - | 9.02 | 9.02 | 4.68% |
| 2 | Price | - | 1,386.61 | 1,386.61 | - | 10.70 | 10.70 | 5.55% |
| | **Sub Total (C)** | **-** | **2,555.51** | **2,555.51** | **-** | **19.72** | **19.72** | **10.23%** |
| D. | **Financing Charges During Implementation** | | | | | | | |
| 1 | Interest during construction | - | 895.47 | 895.47 | - | 6.91 | 6.91 | 3.58% |
| 2 | Commitment Charges | - | 75.16 | 75.16 | - | 0.58 | 0.58 | 0.30% |
| | **Sub Total (D)** | **-** | **970.63** | **970.63** | **-** | **7.49** | **7.49** | **3.89%** |
| **Total Project Cost (A+B+C+D)** | | **15,410.83** | **13,098.70** | **28,509.53** | **118.92** | **101.08** | **220.00** | **114.11%** |

FC = foreign cost, LC = local cost, SLR = Sri Lanka rupee, USD = United States dollar

## B. Detailed Cost Estimates by Financier for Project 1

| Item | | Total Cost | ADB | | | | AFD | | Counterpart | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | USD million | OCR | % of cost category | ADF | % of cost category | AFD | % of cost category | Amount | % of cost category |
| A. | **Investment Costs** | | | | | | | | | |
| 1 | Civil works and erection | 74.11 | 63.86 | 86.17% | 3.12 | 4.21% | 7.13 | 9.62% | - | 0.00% |
| 2 | Equipment | 92.02 | 57.14 | 62.10% | 12.01 | 13.05% | 22.87 | 24.85% | - | 0.00% |
| 3 | Consultancy | | | | | | | | | |
| a. | Project management, design & supervision | 11.94 | - | 0.00% | 11.94 | 100.00% | - | 0.00% | - | 0.00% |
| b. | Capacity development | 1.93 | - | 0.00% | 1.93 | 100.00% | - | 0.00% | - | 0.00% |
| | **Sub Total (A)** | **180.00** | **121.00** | **67.22%** | **29.00** | **16.11%** | **30.00** | **16.67%** | **-** | **0.00%** |
| | **Base Cost** | **180.00** | **121.00** | **67.22%** | **29.00** | **16.11%** | **30.00** | **16.67%** | **-** | **0.00%** |
| B. | **Other Costs** | | | | | | | | | |
| 1 | Taxes and duties | 10.44 | - | 0.00% | - | 0.00% | - | 0.00% | 10.44 | 100.00% |
| 2 | Consultancy | - | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% |
| 3 | Environmental & Social Mitigation | 2.35 | - | 0.00% | - | 0.00% | - | 0.00% | 2.35 | 100.00% |
| | **Sub Total (B)** | **12.79** | - | **0.00%** | - | 0.00% | - | 0.00% | **12.79** | **100.00%** |
| | **Total Base Cost (A+B)** | **192.79** | **121.00** | **62.76%** | **29.00** | **15.04%** | **30.00** | **15.56%** | **12.79** | **6.63%** |
| C. | **Contingencies** | | | | | | | | | |
| 1 | Physical | 9.02 | - | 0.00% | - | 0.00% | - | 0.00% | 9.02 | 100.00% |
| 2 | Price | 10.70 | - | 0.00% | - | 0.00% | - | 0.00% | 10.70 | 100.00% |
| | **Sub Total (C)** | **19.72** | **-** | **0.00%** | **-** | **0.00%** | **-** | **0.00%** | **19.72** | **100.00%** |
| D. | **Financing Charges During Implementation** | | | | | | | | | |
| 1 | Interest during construction | 6.91 | - | 0.00% | - | 0.00% | - | 0.00% | 6.91 | 100.00% |
| 2 | Commitment Charges | 0.58 | - | 0.00% | - | 0.00% | - | 0.00% | 0.58 | 100.00% |
| | **Sub Total (D)** | **7.49** | **-** | **0.00%** | **-** | **0.00%** | **-** | **0.00%** | **7.49** | **100.00%** |
| | **Total Project Cost (A+B+C+D)** | **220.00** | **121.00** | **55.00%** | **29.00** | **13.18%** | **30.00** | **13.64%** | **40.00** | **18.18%** |

Notes: [a] AFD will finance 100%, excluding local taxes and duties, of Lot B of Package 2.
[b] Works and turnkey contracts other than Lot B of Package 2 will be financed by ADB loans 100% excluding local taxes and duties (OCR loan 88.89% and ADF loan 11.11%).

## C. Detailed Cost Estimates by Outputs/Components for Project 1

| Item | | Total Cost | USD Million | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Generation | | Transmission | | Distribution | | Energy Efficiency | | Consultancy | |
| | | USD Million | Amount | % of cost category | Amount | % of cost category | Amount | % of cost category | Amount | % of cost category | Amount | % of cost category |
| A. | **Investment Costs** | | | | | | | | | | | |
| 1 | Civil works and erection | 74.11 | 59.01 | 45.69% | 12.56 | 9.73% | 2.44 | 1.89% | 0.10 | 0.08% | - | 0.00% |
| 2 | Equipment | 92.02 | 44.47 | 20.85% | 39.55 | 18.54% | 5.16 | 2.42% | 2.84 | 1.33% | - | 0.00% |
| 3 | Consultancy | - | | | | | | | | | - | |
| a. | Project management, design & supervision | 11.94 | - | 0.00% | 0.77 | 4.94% | 0.59 | 3.78% | 0.20 | 1.28% | 10.38 | 66.54% |
| b. | Capacity development | 1.93 | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% | 1.93 | 100.00% |
| | **Sub Total (A)** | **180.00** | **103.48** | **28.74%** | **52.88** | **14.69%** | **8.19** | **2.28%** | **3.14** | **0.87%** | **12.31** | **3.42%** |
| | **Base Cost** | 180.00 | **103.48** | **28.74%** | **52.88** | **14.69%** | **8.19** | **2.28%** | **3.14** | **0.87%** | **12.31** | **3.42%** |
| | | - | | | | | | | | | | |
| B. | **Other Costs** | - | | | | | | | | | | |
| 1 | Taxes and duties | 10.44 | 7.63 | 41.09% | 1.57 | 8.45% | 1.22 | 6.57% | 0.02 | 0.11% | - | 0.00% |
| 2 | Consultancy | - | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% | - | 0.00% |
| 3 | Environmental & Social Mitigation | 2.35 | 2.07 | 58.47% | 0.26 | 7.34% | 0.02 | 0.56% | - | 0.00% | - | 0.00% |
| | **Sub Total (B)** | 12.79 | **9.70** | **99.56%** | **1.83** | **8.28%** | **1.24** | **5.61%** | **0.02** | **0.09%** | - | **0.00%** |
| | | - | | | | | | | | | | |
| | **Total Base Cost (A+B)** | 192.79 | **113.18** | **29.62%** | **54.71** | **14.32%** | **9.43** | **2.47%** | **3.16** | **0.83%** | **12.31** | **3.22%** |
| | | - | | | | | | | | | | |
| C. | **Contingencies** | - | | | | | | | | | | |
| 1 | Physical | 9.02 | 5.66 | 30.63% | 2.73 | 14.77% | 0.47 | 2.54% | 0.16 | 0.87% | - | 0.00% |
| 2 | Price | 10.70 | 5.40 | 20.98% | 5.04 | 19.58% | 0.16 | 0.62% | 0.10 | 0.39% | - | 0.00% |
| | **Sub Total (C)** | 19.72 | **11.06** | **25.01%** | **7.77** | **17.57%** | **0.63** | **1.42%** | **0.26** | **0.59%** | - | **0.00%** |
| | | - | | | | | | | | | | |
| D. | **Financing Charges During Implementation** | - | | | | | | | | | | |
| 1 | Interest during construction | 6.91 | 3.78 | 29.65% | 1.99 | 15.61% | 0.22 | 1.73% | 0.07 | 0.55% | 0.85 | 6.67% |
| 2 | Commitment Charges | 0.58 | 0.51 | 55.43% | 0.07 | 7.61% | - | 0.00% | - | 0.00% | - | 0.00% |
| | **Sub Total (D)** | 7.49 | **4.29** | **31.38%** | **2.06** | **15.07%** | **0.22** | **1.61%** | **0.07** | **0.51%** | **0.85** | **6.22%** |
| | | - | | | | | | | | | | |
| | **Total Project Cost (A+B+C+D)** | 220.00 | **128.53** | **29.21%** | **64.54** | **14.67%** | **10.28** | **2.34%** | **3.49** | **0.79%** | **13.16** | **2.99%** |

## D. Detailed Cost Estimates by Year for Project 1

| | Detailed Cost Estimates by Year | USD Million | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Total Cost** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| A. | **Investment Costs** | | | | | | | |
| 1 | Civil works and erection | 74.11 | 0.63 | 4.98 | 8.16 | 20.21 | 28.03 | 12.10 |
| 2 | Equipment | 92.02 | 1.98 | 13.32 | 17.87 | 28.60 | 21.12 | 9.13 |
| 3 | Consultancy | - | | | | | | |
| a. | Project management, design & supervision | 11.94 | 0.04 | 5.60 | 2.65 | 1.59 | 1.04 | 1.02 |
| b. | Capacity development | 1.93 | - | 0.97 | 0.39 | 0.19 | 0.19 | 0.19 |
| | **Sub Total (A)** | **180.00** | **2.65** | **24.87** | **29.07** | **50.59** | **50.38** | **22.44** |
| | **Base Cost** | **180.00** | **2.65** | **24.87** | **29.07** | **50.59** | **50.38** | **22.44** |
| B. | **Other Costs** | | | | | | | |
| 1 | Taxes and duties | 10.44 | 0.08 | 0.81 | 1.40 | 2.96 | 3.62 | 1.57 |
| 2 | Consultancy | - | - | - | - | - | - | - |
| 3 | Environmental & Social Mitigation | 2.35 | 0.26 | 2.07 | 0.01 | 0.01 | - | - |
| | **Sub Total (B)** | **12.79** | **0.34** | **2.88** | **1.41** | **2.97** | **3.62** | **1.57** |
| | **Total Base Cost (A+B)** | **192.79** | **2.99** | **27.75** | **30.48** | **53.56** | **54.00** | **24.01** |
| C. | **Contingencies** | | | | | | | |
| 1 | Physical | 9.02 | 0.14 | 0.97 | 1.41 | 2.64 | 2.69 | 1.17 |
| 2 | Price | 10.70 | 0.79 | 1.15 | 1.59 | 2.94 | 2.73 | 1.50 |
| | **Sub Total (C)** | **19.72** | **0.93** | **2.12** | **3.00** | **5.58** | **5.42** | **2.67** |
| D. | **Financing Charges During Implementation** | | | | | | | |
| 1 | Interest during construction | 6.91 | 0.03 | 0.36 | 1.00 | 1.85 | 1.44 | 2.23 |
| 2 | Commitment Charges | 0.58 | 0.03 | 0.17 | 0.16 | 0.13 | 0.07 | 0.02 |
| | **Sub Total (D)** | **7.49** | **0.06** | **0.53** | **1.16** | **1.98** | **1.51** | **2.25** |
| **Total Project Cost (A+B+C+D)** | | **220.00** | **3.98** | **30.40** | **34.64** | **61.12** | **60.93** | **28.93** |

## APPENDIX 2: OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES FOR PROJECT MANAGEMENT AND CAPACITY BUILDING

### A. Introduction

1. Consulting services for Project Management and Capacity Building will include:

   (i) Project management for Moragolla hydropower plant;
   (ii) Project management support for Tranche 2 subprojects:
      a. Transmission subprojects procurement;
      b. Distribution subprojects procurement;
      c. Demand-side management (DSM) subprojects covering the smart grid/metering, smart buildings and cold thermal storage;
   (iii) Capacity building for power sector:
      a. Transmission design and standards;
      b. Transmission planning and operation.

### B. Project Management and Supervision for Moragolla Hydropower Plant

2. The site of the Moragolla hydropower plant is located on the upper reaches of the Mahaweli river in the Central Highlands, approximately 22 kilometers (km) south of Kandy City and about 130 km north-east of Colombo. The site is in hill area with altitude of EL. 470 meters (m) to El. 650 m. The dam site is on 7°06' North latitude and 80°34' East longitude. The catchment area above the dam site is 809 square km including the Kotmale Oya basin. The mean annual basin rainfall is estimated at 3,852 millimeters (mm). The long term average river discharge estimated for the dam site is 22.4 cubic meter per second ($m^3/s$). The proposed Moragolla powerhouse site is located 0.5 km north-west of the tailrace outfall of the existing Kotmale hydropower station commissioned in 1985. The site of the intake dam is located approximately 3 km downstream from the confluence of the Mahaweli river with the Kotmale Oya. The proposed plant is run-of-river generation power station with the installed capacity of 30.2 megawatt (MW), i.e. 2 x 15.1 MW, which utilizes the gross head of 76.7 m and discharge of 50 $m^3/s$ at the maximum. The intake dam will be a 37 m high concrete gravity dam with 77 m wide overflow spillway equipped with five radial gates (13.0 m wide, 15.6 m high each).

3. The Project Management and Supervision Consultant will perform the role of an advisor to Ceylon Electricity Board (CEB) during the pre-construction phase of the hydropower project implementation by assisting CEB in finalization of project specifications and in process of appointment of contractors. During the project implementation phase, the consultant would act as the Client's Engineer. The key objectives of procuring project management and supervision consultants for construction of the Moragolla hydropower plant are:

- To assist CEB in prequalification of contractors and tendering for construction;
- To assist CEB on the project management for implementation of civil and electro-mechanical works; and
- To support CEB as the Client's Engineer during construction work by planning, monitoring and controlling the project to ensure the project is completed at the planned in quality, time and cost.

#### 1. Project Management and Supervision Consultancy Team

4. A team of international and national consultants will be deployed for assisting CEB in the project implementation phase of the Moragolla hydropower project. The following key positions will be provided by the firm selected for the project management and supervision consultancy:

| International experts | Person-months |
|---|---|
| Project Manager | 54 |
| Contract Engineer | 46 |
| Dam Engineer | 37 |
| Waterway Engineer | 30 |
| Powerhouse Engineer (Civil) | 31 |
| Structural Engineer | 12 |
| Utility Engineer | 12 |
| Hydro-mechanical Engineer | 24 |
| Electromechanical Engineer | 29 |
| Electrical Engineer (SCADA, Protection and Communication) | 5 |
| Procurement Specialist | 20 |
| Environmental Specialist | 10 |
| **Total International** | **310** |
| **National experts** | |
| Deputy Project Manager/Camp Engineer | 52 |
| Road Engineer | 25 |
| Material Engineer | 46 |
| Dam Engineer | 36 |
| Waterway Engineer (Civil) | 34 |
| Waterway Engineer (Mechanical), | 34 |
| Powerhouse Engineer (Civil) | 38 |
| Hydro-mechanical Engineer | 19 |
| Mechanical Engineer (P/H) | 19 |
| Civil Engineer (General) | 52 |
| Electrical Engineer (P/H) | 25 |
| Electrical Engineer (M/H) | 19 |
| Transmission Line/Switchyard Engineer | 16 |
| Design Engineer | 36 |
| Environmental Expert (Natural) | 18 |
| Environmental Expert (Fishery) | 10 |
| Social Expert | 12 |
| Procurement Specialist | 10 |
| **Total National** | **501** |

5. It is estimated that the consultancy team will require total of 310 person-months of international consulting services and 501 person-months of national consultants, which includes 20 person-months of international and 10 person-months of national consultants during pre-construction stage for reviewing of detailed design and tender documents and to carry out pre-qualification, tender clarification and tender evaluation, etc.

## 2. Scope of Services

6. The following services shall be provided by the consultancy firm during pre-construction stage:

- **Revew of Detailed Design and Updating of Tender Documents:** The detailed design specifications have already been prepared and the Consultant shall review the detailed design and finalization of specifications, project plan, and procurement process in consultation with CEB. It will also support CEB in reviewing and fine tuning of the bidding documents for International Competitive Bidding (ICB) for the appointment of contractors for undertaking the civil and electro-mechanical works.
- **Assistance to CEB's Project Management Office (PMO)**: Assist the PMO to be established by the CEB for the project to reinforce its management capability in the pre-construction stage.

- **Prequalification of Bidders** - The prequalification of bidders shall be carried out for various packages, for which the Consultant shall assist CEB in the preparation of:

  – Bid Evaluation Criteria;
  – Bid Evaluation Report.

- **Tendering and contracting**: For all the packages, the Consultant shall assist CEB in:

  – Arranging the pre-tender conference and site visit;
  – Evaluating the tenders; and
  – Assistance to CEB in negotiating with prospective tenderer for contract and issuing the Letter of Acceptance.

- **Detailed Organization of the Engineer:** The Consultant shall assist CEB in preparing detailed organization of the Engineer with Job Description and allocation of staff and other resources for obtaining Engineer's service efficiently and effectively.

7. The following services shall be provided by the consultancy firm during the **Construction Stage**.

8. **Assignment Schedule**: The Consultant, in agreement with CEB, shall update the assignment schedule:

- At the initial stage of construction works for the period between Notice to Proceed and Completion of the Works; and
- At any occasion during the construction stage, if needed, to meet the requirement arising from actual progress of construction works.

9. **Project Management**: The Consultant shall help CEB establish, at the initial stage of construction work, Project Management System which will incorporate the following:

- Overall organization with construction and correspondence system, including CEB (the implementing agency), Contractors plus other parties concerned such as Financing Agency;
- Joint meetings to facilitate the project management, which would include:
  – Progress meetings to be held periodically (frequency to be finalized in consultation with CEB) with respective contractors;
  – Interface meetings to be held monthly with attendance of all the contractors;
  – Other meetings as and when required;
- Establishing and managing the information system including:
  – Correspondence data base;
  – Correspondence drawing data base;
  – Administration, procurement and quality assurance of all the contracts for construction;
  – Progress monitoring;
  – Cost control;
  – Monitoring environmental and social safeguards;
  – Other activities as deemed necessary.

10. **Additional Surveys or Investigations**: Based on the requirements, any additional surveys or investigations required during the construction stage shall be conducted by the Consultant. In addition, the consultant shall prepare:

  – A plan for additional survey or investigation to obtain approval of CEB and the financing agency;
  – Technical specification with the bill of quantities for procurement of Contractors by CEB.

11. **Review of Contractor's Drawings and Documents:** With regard to the Civil Works package, the Consultant shall perform the following tasks:

- Finalization of construction drawings based on the tender design for the purpose of proper and adequate execution of the Works, which shall be used by the Contractor in accordance with the construction schedule. The Construction Drawings shall show sufficient dimensions, specific details and typical details to define the various features of the Works, which shall be read in conjunction with the Technical Specifications.
- Prepare As-built Drawings showing all permanent works constructed under the contract
- Review and approve drawings and documents prepared by the Contractors. This shall comprise:
  - Detailed reinforcement drawings such as bar bending schedules;
  - Shop drawings;
  - Operation and maintenance manual for any plant and equipment incorporated in the Permanent Works;
  - Other drawings and documents such as lift drawings showing method of construction, specifications, pamphlets and data of all materials and equipment to be furnished.

12. **Review and Approval of Design by Manufacturers**: For the electro-mechanical works packages, the Consultant shall review and approve the following before placement of the actual orders:

- Manufacturer's design calculations;
- Manufacturer's drawings which show all significant details of the equipment and material.

13. **Review and approve the construction program and preparation of overall construction time schedule**:

- Review and approve the construction program to be submitted by the contractor immediately after issuance of Letter of Acceptance. This construction program is to be updated from time to time as required. It shall include a CPM network with detailed statements of construction method, list of construction plant, forecast of labor requirement, site management, and organization chart and staff requirement.
- Prepare the overall construction time schedule, which clearly indicates inter-relation among the construction works of contractors to coordinate resource mobilization and construction method without serious interface problem.

14. **Control and Supervision of Progress, Quality and Environmental Protection:** The Consultant shall support CEB in following tasks:

- Review progress of the contractor's work regularly by:
  - Monitoring performance of the contractors;
  - Comparing actual progress with the schedule;
  - Communicating with the contractors to maintain the progress on time for ensuring the date of completion of the relevant work reasonably fall on or before the specified date;
- Establish procedures, methods and reporting systems to confirm that every work item being performed by contractors shall fully comply with the specifications;
- Executive quality control by:
  - Carrying out inspections and test on materials and equipment;
  - Inspecting field works with reference to the specifications;
  - Accepting or rejecting the works in accordance with the requirements stipulated in the specifications;
- Review and approve safety program to be submitted by the contractors;
- Establish overall safety control organization and program and hold safety meetings regularly with the contractors with attendance of relevant safety authority.

15. **Monitoring Quality during Manufacturing and Delivery**: The Consultant shall perform the following tasks:

- Review and approve Contractor's proposal on quality assurance and delivery program;

- Monitoring to ensure quality and timely manufacturing, testing and delivery by carrying out:
  – Inspection and witnessing tests on materials at the place of manufacture;
  – Shop inspection and witnessing tests after assembling at the manufacturer's shop.

16. **Certification of Payments:** The Consultant shall:

- Certify payments to the contractors, after checking and verifying the contractor's claims;
- Report regularly financial status of the project to CEB by:
  – Reviewing payment records;
  – Recommending possible measures to save expenditures if any;
  – Estimating future payment schedule.

17. **Issuance of variation Orders:** The Consultant shall:

- Advise CEB on any variation in plans, drawings or specifications, by preparing revised documents with estimate of change in cost;
- Issue variation orders to the contractors upon approval of CEB.

18. **Maintenance Records of Construction Activities:** The Consultant shall maintain records of construction activities, which will be eventually needed to prepare the completion report, operation/maintenance and As-Built drawings. This shall include records of:

- Investigation and monitoring;
- Drawings;
- Engineer's activities;
- Contractor's activities;
- Payments;
- Quality control;
- Progress of work;
- Safety control;
- Notable events;
- Any other matters as required.

19. **Environment management:** An Environment Management Office (EMO) will be established in CEB's Project Management Office. The Consultant shall work in close association with the EMO to perform the following tasks:

- Ensure all contractors, subcontractors and all others connected with the construction stage conform to the Environmental Policy Statement (EPS) of CEB;
- Supervise implementation of environmental and social interventions, which include review of mitigation measures in the project's final design including specifications, implementation of environmental protection and restoration measures specified in the contract documents (e.g. Environmental Management Plan, etc.) and advice on taking additional environmental and social mitigation interventions, as and when required;
- Supervise implementation of Environmental Monitoring Program. The purpose of the monitoring program is to improve the management of environmental and social interventions as proposed in project documents and to allow the project to respond to changing circumstances as they occur;
- Supervise implementation of a Resettlement Program, Skill development programs, etc. as proposed in the Resettlement Plan;
- Prepare Environmental Status reports and any other statutory reports as may be required by the government agencies and lenders (Asian Development Bank), etc.

20. **Dispute resolution and claim settlement for contractors**: In the event of claim or dispute the consultant shall:

- Review the claim and its supporting data;

- Prepare evaluation reports on the claim;
- Assist CEB to settle the claim or dispute.

21. **Issuance of Taking-Over Certificates**: When the work are ready for inspection and testing for substantial completion, the Consultant shall:

- Prepare a program for inspection and testing in compliance with the contract documents/ agreed process;
- Inspect and test the works to examine and assure that they are ready operation;
- Issue Taking-Over Certificate to the Contractors if the works are verified satisfactory for operation or instruct the Contractors on remedial works and/or further repetition of test if verification is not attained.

22. **Panels of Experts (POE) Meetings**: CEB may appoint a POE to review the plans and performances of the work in time to time to ascertain that they are implemented in accordance with the national as well as to the international standards and practices of CEB. The Consultant shall facilitate in the reviews of POE by furnishing necessary information and data.

23. **Preparation of Reports and Documents**: The consultant shall perform the role of Client's Engineer and involved in the preparation and updating reports and documents on the project throughout the contract period. This shall include:

- Evaluation criteria for pre-qualification and tender;
- Evaluation reports for pre-qualification and tender;
- Consultancy schedule;
- Programs for Project Management System;
- Plans for additional survey and investigation;
- As-Built drawings;
- Operation and maintenance manuals;
- Completion reports;
- Monthly progress reports;
- Quarterly progress reports;
- Other documents as reasonably needed;
- Environmental status reports;
- Claim evaluation reports.

24. **Knowledge dissemination**: The Consultant shall provide the following services:

- The Consultant shall make the best effort to transfer his engineering knowledge to the local staff engaged in the project by means of seminars, lectures, field visits and on-the-job training. The Consultant shall also provide overseas training for hydro project development to CEB staff as necessary.
- Consultants shall provide, maintain and ascertain availability of vehicles for exclusive use of the Client's staff engaged in the project. They should be new when supplied and shall remain property of contractor throughout the contract and shall be handed over to the Client at the end of the contract.

25. **Counterparty support:** CEB will provide the following supporting requirement:

- Office at the project site fully furnished with the supply of electricity and water;
- Furnished accommodation at the project site;
- Documents, drawings, maps and updated data and information as necessary for the execution of the services;
- Arrangement with other governmental and provincial agencies, authorities and offices for receiving their cooperation as necessary for the execution of the servicers; and

- Assistance in arranging permits and authorizations from governmental agencies for clearance through customs, obtaining entry and exit visas, residence permits, etc., as necessary, for the execution of the servicers.
- Counterpart engineers will be provided for the following assignments of the national expert team:

(1) Waterway Engineer (Civil & Mechanical);
(2) Powerhouse Engineer (Civil);
(3) Hydro-mechanical Engineer;
(4) Electromechanical Engineer;
(5) Transmission line Engineer;
(6) Electrical Engineer (P/H, M/H); and
(7) Civil Engineer (General).

## C. Project Management Support for Tranche 2 Subprojects

26. The Consultants' scope of work will cover four major areas: (i) support CEB for finalizing the Tranche 2 transmission and distribution subprojects; (ii) develop the smart grid pilot project concept design and implement the smart grid pilot subproject in Tranche 2 and assist in large scale implementation of concept under Tranche 2; (iii) develop, design and implement the smart building pilot project concept and assist in implementing the concept on large scale during Tranche 2; (iv) develop the cold thermal storage pilot project concept and assist in implementing the concept on large scale during Tranche 2. The consultants' outline terms of reference will include, but not necessarily be limited to, the following tasks.

### 1. POWER ENGINEER
(international, 6 person-months; national, 6 person-months)

27. The international power engineer shall work with the executing and implementing agencies and be responsible for finalization of transmission and distribution subprojects under Tranche 2 funding. He/she will be a team leader and coordinate activities of other consultants. The international power engineer will have at least a bachelor degree in engineering with 15 year of experience in the power sector. The national power engineer will have at least a bachelor degree in engineering with 7 year of experience in the power sector. In particular, the tasks of the specialists will include, however not be limited, to the following:

(i) Review the shortlisted transmission and distribution subprojects and finalize the same for funding under Tranche 2 in consultation with CEB;
(ii) Review and update the cost estimates for the identified transmission and distribution projects;
(iii) Support in finalizing the investment plan, implementation and procurement schedule for the proposed transmission and distribution projects to be covered by Tranche 2 of the MFF in 2016;
(iv) Prepare a project report consisting of information needed for approval from multilateral agencies involved in funding the program;
(v) Compliance with the monitoring framework of funding agencies post evaluation and during implementation; and
(vi) Provide inputs to safeguard specialists for their studies.

### 2. FINANCIAL ANALYST
(international, 2 person-months; national, 2 person-months)

28. In accordance with ADS's Guidelines for the Financial Analysis and Management of Projects (2005), the Financial Management Assessment Questionnaire (2005), and the Financial Due Diligence Methodology Note (2009), the international financial analyst will undertake financial analysis of the proposed investment components and assess the financial performance and the

financial management capabilities of the executing/implementing agencies, with assistance of the national financial analyst. The international specialist will have at least a bachelor degree in economics/finance and 15 years of relevant experience in financial management assessment and/or financial analysis of projects. The national specialist will have at least a bachelor's degree from an established university and at least 7 years of experience in financial analysis of projects. Working in collaboration with other members to ensure the use of consistent approach and assumptions across the financial and economic analyses, the financial analysts will carry out, but not be limited to, the following tasks:

(i) Prepare second tranche cost tables and a financing plan for the investment components, including proposed ADB lending and appropriate counterpart funds for local currency and expenditures;
(ii) Carry out a financial analysis of the identified investment components by building a financial forecasting model that will create future year projections comprising CEB income statements, balance sheets, cash-flow statements and key financial ratios. Key risks should be identified and sensitivity modeled;
(iii) Carry out a financial evaluation of the proposed investment components over the construction and operating periods by calculating the financial internal rate of return and comparing it with a weighted average cost of capital in accordance with the ADB's Guidelines;
(iv) Undertake a financial management assessment of the proposed executing/implementing agencies;
(v) Prepare a project report consisting of information needed for approval from multilateral agencies involved in funding the program;
(vi) Prepare the investment project risk assessment and risk mitigation plans in consultation with CEB;
(vii) Prepare the capital and operating cost estimates, implementation schedule showing anticipated progress of work and expenditures, contracting, and implementation arrangements, and combine and formulate suitable procurement packages for all components, and support CEB in preparing relevant bidding documents;
(viii) Compliance with the monitoring framework of funding agencies post evaluation and during implementation.

**3. POWER ECONOMIST**
(international, 2 person-months; national, 2 person-months)

29. In accordance with ADB's Guidelines for the Economic Analysis of Projects, the international power economist, with assistance of the national power economist, will undertake economic analysis of the proposed investments and assess their economic viability. The international power economist will have at least a bachelor degree in economics and 15 years of relevant experience in economic analysis of projects. The national power economist will have at least a bachelor's degree from an established university and at least five years of experience in economic analysis of projects. Working in collaboration with the financial analysts to ensure the use of consistent approach and assumptions across the financial and economic analyses, the economic analysts will carry out, but not be limited to, the following tasks:

(i) Provide the economic rationale for the second tranche of MFF subprojects including an analysis of alternatives;
(ii) Assess economic feasibility of various investment components;
(iii) Estimate the economic capital and operating costs, and carry out least-cost, viability, and beneficiary analysis of the proposed investments, including sensitivity analysis;
(iv) Conduct economic benefit-cost analysis to confirm the overall viability of the proposed investments in terms of economic internal rates of return; and
(v) Assess economic and sustainability issues and carry out distribution, sensitivity and risk analyses.

**4. ENERGY EFFICIENCY IMPLEMENTATION – SMART GRID SPECIALIST**
(international 7.5 person-months; national 7.5 person-months)

30. The smart grid development specialist shall be responsible for monitoring of the smart grid initiatives taken up as part of pilot subprojects under Tranche 1 and finalization of smart grid subprojects under Tranche 2. The international specialist will have at least a masters' degree in engineering with 15 year of experience in the power sector distribution design. The national consultant will have a bachelor's degree in engineering with five years of experience in power system engineering and energy efficiency. The specialist should have experience of implementation/conducting feasibility studies for smart grid initiatives in at least one distribution utility. In particular, the tasks of the smart grid development specialist will include, but not be limited, to the following:

(i) Design the smart grid pilot subproject under Tranche 1 with the agreement of the executing agency(EA)/implementing (IA). The design should cover all related aspects of a smart grid including smart meters on the utility side and consumer side to implement demand-side integration, including load estimation, voluntary demand deduction, direct load control, home energy management systems;
(ii) Develop a monitoring and evaluation framework for measuring the performance of the smart grid pilot subproject under Tranche 1; at the design stage with pre- and post implementation status taken into consideration;
(iii) Assist EA/IA in finalization of the smart grid pilot subproject under Tranche 1 including review of cost estimates and implementation schedule;
(iv) Assist EA/IA to implement the smart grid pilot project by preparing specifications, request for proposals, selection of contractors, and ensuring the pilot subproject is implemented in accordance with the concept and the specifications;
(v) Prepare DSM pilot program monitoring reports to enable successful monitoring and evaluation and to facilitate lessons learned and evidence of DSM subproject results that may warrant scale-up;
(vi) Identify the specific replication opportunities for the smart grid in the Sri Lankan power system for funding under Tranche 2 in consultation with the agencies;
(vii) Assist the agencies in procurement process by finalizing the specifications, design and cost estimates of the systems to be procured under replication subproject(s) under Tranche 2; and
(viii) Provide support to the CEB's team in monitoring and evaluation of smart grid initiatives under the ADB's MFF.

**5. ENERGY EFFICIENCY IMPLEMENTATION: IT SPECIALIST FOR SMART GRID DEVELOPMENT**
(international 2 person-months; national 4 person-months)

31. The international information technology (IT) specialist will have a master's degree in engineering/information technology/computer science with 15 years of experience in the design and development of wide area IT infrastructure, including communication. Specific experience in power sector or other infrastructure industries is desirable. The national consultant will have a bachelor's degree in engineering/information technology/computer science with five years of experience in design and development of IT infrastructure for public utilities. The IT specialist shall be responsible for development, implementation and monitoring of the IT infrastructure for the smart grid pilot subproject taken up under Tranche 1, and finalization of similar details for smart grid subprojects to be implemented under Tranche 2. In particular, the tasks of the IT specialist for smart grid development will include, but not be limited, to the following:

(i) In consultation with the International Smart Grid Specialist, design the IT facilities required for smart grid pilot subproject under Tranche 1 with the agreement of the EA/IA. The design should cover all related aspects of a smart grid including smart meters, software and hardware on the utility side and consumer side to implement

demand-side integration, including load estimation, voluntary demand deduction, direct load control, home energy management systems;

(ii) Develop a monitoring and evaluation framework for measuring the performance of the information and communication technology (ICT) aspects of the smart grid pilot subproject under Tranche 1 at the design stage with pre- and post implementation status taken into consideration;

(iii) Assist EA/IA in finalization of the ICT aspects of the smart grid pilot subproject under Tranche 1 including review of cost estimates and implementation schedule;

(iv) Assist EA/IA to implement the ICT aspects of the smart grid pilot subproject by preparing specifications, request for proposals, selection of contractors, and ensuring the pilot subproject is implemented in accordance with the concept and the specifications;

(v) Provide support to the EA/IA's team in monitoring and evaluation of smart grid initiatives under Tranche 1;

(vi) Prepare monitoring reports of the smart grid pilot subproject to enable successful monitoring and evaluation, disseminate lessons learned and strengthen the pilot project results that may warrant scale-up under Tranche 2; and

(vii) Assist the EA/IA in planning the procurement process by finalizing the specifications, design and cost estimates of the ICT systems to be procured under replication subproject(s) in Tranche 2.

**6. ENERGY EFFICIENCY IMPLEMENTATION – SMART BUILDINGS SPECIALIST**
(international 12 person-months; national 12 person-months)

32. The international energy efficiency implementation specialist shall have a master's degree in engineering with 15 years of experience in implementation of energy efficiency solutions and have extensive knowledge of the technical, regulatory and policy aspects of energy efficiency sector with specific focus on smart buildings. Prior experience in developing sector specific plans would be preferable. The national consultant will have a bachelor degree in engineering with 5 years of experience in building energy analyses and energy management systems. The smart buildings specialist will undertake, including but not limited to, the following tasks:

(i) Design the smart buildings pilot subproject under Tranche 1 with the agreement of the EA/IA. The design should cover all related aspects of smart buildings including ICT, software and hardware on the consumer side;

(ii) Develop a monitoring and evaluation framework for measuring the performance of the smart buildings pilot subproject under Tranche 1 at the design stage with pre- and post implementation status taken into consideration;

(iii) Assist EA/IA to implement the smart buildings pilot subproject by preparing specifications, request for proposals, selection of contractors, and ensuring the pilot subproject is implemented in accordance with the concept and the specifications;

(iv) Assist EA/IA in finalization of the smart buildings pilot subproject under Tranche 1 including review of cost estimates and implementation schedule;

(v) Prepare monitoring reports of the smart buildings pilot subproject to enable successful monitoring and evaluation, disseminate lessons learned and strengthen the pilot subproject results that may warrant scale-up under Tranche 2;

(vi) Identify the specific replication opportunities for smart buildings in Sri Lanka for funding under Tranche 2 in consultation with the relevant agencies;

(vii) Assist the EA/IA in planning the procurement process by finalizing the specifications, design and cost estimates of the systems to be procured under replication subproject(s) under Tranche 2;

(viii) Provide support to the CEB's team in monitoring and evaluation of smart grid initiatives under the ADB's MFF; and

(ix) Review the relevant regulations and policies and recommend on the changes to be made for facilitating the implementation of identified smart buildings subprojects.

**7. ENERGY EFFICIENCY IMPLEMENTATION – COLD THERMAL STORAGE SPECIALIST**
(international 8 person-months; national 10 person-months)

33. The international cold thermal storage specialist shall have a master's degree in engineering with 15 years of experience in implementation of energy efficiency solutions and have extensive knowledge of the technical, regulatory and policy aspects of energy efficiency sector with specific focus on cold thermal storages systems and demand side management. Prior experience in developing sector specific plans and demand side management programs would be preferable. The national cold thermal storage systems specialist will have a bachelor's degree in engineering, with 5 years of experience in building air conditioning system design and implementation, with an energy efficiency and demand management focus. The cold thermal storage specialist will undertake, including but not limited to, the following tasks:

(i) Design the cold thermal storages pilot subproject under Tranche 1 with the agreement of the EA/IA. The design should cover all related aspects of cold thermal storages;
(ii) Assist EA/IA in finalization of the cold thermal storages pilot subproject under Tranche 1 including review of cost estimates and implementation schedule;
(iii) Develop a monitoring and evaluation framework for measuring the performance of the cold thermal storages pilot subproject under Tranche 1 at the design stage with pre- and post implementation status taken into consideration;
(iv) Assist EA/IA to implement the cold thermal storage pilot subproject in the preparation of specifications, request for proposals, selection of contractors, and to ensure that the pilot subproject is implemented in accordance with the concept and the specifications;
(v) Provide support to the CEB's team in monitoring and evaluation of cold thermal storage initiatives under Tranche 1;
(vi) Prepare monitoring reports of the cold thermal storage pilot subprojects to enable successful monitoring and evaluation, disseminate lessons learned and strengthen the pilot subproject results that may warrant scale-up under Tranche 2;
(vii) Identify the specific replication opportunities for cold thermal storages in Sri Lanka for funding under Tranche 2 in consultation with EA/IA;
(viii) Assist the EA/IA in finalizing the scope of cold thermal storage projects to be financed under Tranche 2, and assist in planning the procurement process by finalizing the specifications, design and cost estimates of the systems to be procured under replication subproject(s) in Tranche 2;
(ix) Provide support to the CEB's team in monitoring and evaluation of cold thermal storages initiatives under the ADB's MFF;
(x) Review the relevant regulations and policies and recommend on the changes to be made for facilitating the implementation of identified cold thermal storages subprojects.

**8. ENVIRONMENTAL SPECIALIST**
(international, 2 person-months; national, 3 person-months)

34. The international environmental consultant should have at least a bachelor degree in environmental science/engineering and at least 10 years of experience in carrying environmental studies for projects, Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) preparation for power sector projects, preferably financed by international financial institutions, specifically ADB and the World Bank. Working experience in the South Asian region would be preferable. Familiarity and knowledge about Sri Lanka's environmental framework and approval requirements related to environmental clearances for power sector investment projects would be an asset. The national environmental specialist will have a bachelor's degree with at least 5 years of experience in carrying environmental studies for power sector projects. In accordance with relevant guidelines and policies for environmental assessment, the international

consultant, with assistance of the national Environmental Specialist, will undertake, but not be limited to, the following tasks:

(i) Review laws, regulations and policies of Sri Lanka on environment;
(ii) Prepare Rapid Environmental Assessment Checklist and determine environmental category for each component;
(iii) Prepare component descriptions and a summary of environmental issues identified for each component to support the determination of the component environmental categorization;
(iv) Prepare EIAs or IEEs depending on the component/subproject categorization (environmental category A or B) assigned by ADB in accordance with the ADB's *Safeguard Policy Statement (2009)* for the components including analysis of potential impacts of associated wind or other facilities*;*
(v) Organize and coordinate required environmental surveys and specialist baseline condition surveys;
(vi) Document and organize public consultations, including local stakeholders, at least once in representative project sites. If any environment Category-A component is identified, carry out two public consultations (once during the early stages of an EIA field work, and once when the draft EIA report is available and before loan appraisal by ADB); and
(vii) Prepare Environmental Management Plan (EMP) for each component and a combined EMP for the entire project. The component EMPs and the combined EMP shall include a cost estimate plan for implementation of the proposed mitigation measures.

**9. SOCIAL DEVELOPMENT SPECIALIST**
(international, 2 person-months; national, 3 person-months)

35. The international social development specialist should have at least a bachelor degree in social development or related fields and at least 10 years of relevant experience. She/he shall have experience in conducting social and poverty analysis and preparing Resettlement Plans (RPs) of projects financed by international financial institutions, specifically ADB and/or the World Bank. Working experience in the South Asian region would be preferable. The national environmental specialist will have a bachelor's degree with at least 5 years of experience in conducting social and poverty analysis. In accordance with all relevant policies, in particular with the relevant laws and policies of Sri Lanka and ADB's *Safeguard Policy Statement (2009)*, the tasks of the international social development specialist, with assistance of the national social development specialist, will include, but not be limited to, the following:

(i) Review the national legal policies on land acquisition and involuntary resettlement to verify adequacy and consistency with the ADB's *Safeguard Policy Statement (2009)*. Analyze and confirm the following aspects (at national and local levels) that will apply to land acquisition and resettlement in the project area: (a) laws and regulations, including local practices; (b) budgetary processes (tentative agreement from concerned authorities on provision of outlays necessary for land acquisition and resettlement); and (c) relevant administrative arrangements and requirements;
(ii) If the project components involve resettlement, prepare a RP for relevant components with full stakeholder participation including participation of the executing and implementing agencies. RP should be implementable in the Sri Lankan context and still meet ADB policy requirements;
(iii) Determine the replacement costs of all categories of losses; and prepare an indicative budget for land acquisition and resettlement costs with specific sourcing and approval process;
(iv) Organize and coordinate required baseline condition surveys;
(v) Assess the need for an Indigenous Peoples Development Plan (IPDP) and carry out any further indigenous people-targeted surveys, as necessary;

(vi) Prepare a socioeconomic analysis, including a poverty profile and characteristics and determinants of primary project beneficiaries in the target areas of the proposed investment components based on a review of existing studies, data, and development plans. The analysis will include a review of poverty by gender and ethnic minority and propose specific actions to benefit vulnerable indigenous peoples and minorities;

(vii) Analyze access to electricity, affordability, consumption levels, and consumer satisfaction across socioeconomic groups in target project areas, assess the determinants and elasticity of the demand for power by different socioeconomic groups, categorize areas where electrification would have the largest growth and poverty reduction impacts given the underlying potential of those areas, and assess the implications on employment generation for poor;

(viii) In consultation with a power economist and a financial analyst define groups that would benefit from the proposed investment components, prepare an estimate of the distribution of the project's financial and economic benefits, and summarize the likely net benefits for each group in accordance with ADB's *Handbook for Integrating Poverty Impact in Economic Analysis for Projects.* Given the available dataset, assess the direct, indirect, and distributional impacts of the project under different growth scenarios with and without the project, summarize the distributional impacts in a matrix, calculate the poverty impact ratio, and carry out appropriate risk and sensitivity analyses with respect to the poverty impact ratio;

(ix) Prepare a gender needs analysis to identify specific energy needs and preferences of poor and vulnerable women in project areas, design activities/indicators/targets responding to these energy needs to ensure gender beneficial impacts, and develop participatory gender-inclusive strategies to maximize women's participation in program design, development and implementation;

(x) Assess and recommend ways to improve gender equity, prepare a Gender Action Plan (GAP), if needed;

(xi) Review land acquisition and relocation plans of project components that involve resettlement, and assess their conformity with ADB *Guidelines for Involuntary Resettlement,* including (a) time-bound arrangements, public consultation, public disclosure, relocation, compensation for affected inhabitants, and (b) costs related to relocation, compensation for land acquisition, and right-of-way;

(xii) Review potential social and gender impacts of associated wind or other facilities, and prepare relevant design recommendations as appropriate;

(xiii) Incorporate all mitigation measures into the cost estimates of the proposed components; and

(xiv) Prepare the TOR for the NGO/consultant who will be in charge of the implementation of the RPs, IPDP and GAP, if necessary.

**10. REPORTING REQUIREMENTS**

36. The following reports will be produced by the team/each of the specialists (as applicable) while working on the assignment:

(i) an inception report within one month of commencement;
(ii) a midterm report within 5 months of commencement;
(iii) a draft final report within 10 months of commencement; and
(iv) a final report at the end of the 11 month of commencement incorporating all comments received.

## D. Capacity Building for power sector

37. The present CEB transmission network consists of 62 grid substations (220 kV and 132 kV). CEB plans to construct another 10 grid substations under the ADB loan for the Green Power Development and Energy Efficiency Improvement Investment Program. Another 15 grid

substations are in the pipeline for implementation over the next 10-year time. Sri Lanka also plans to build a 400 kV transmission backbone network over the next 10 years. So far almost all grid substations have been constructed on a turnkey basis by companies selected through International Competitive Bidding. However, under present government policy, local constructions entities (both CEB in house construction unit and national construction companies) are to be encouraged to participate in the construction of high voltage (HV) substation projects. To achieve this objective, the detailed design of such substations are required to be prepared by CEB and such construction documents would be made available to the CEB construction unit or a national contractor. Furthermore, a considerable increase is expected in renewable energy penetration with the proposed 375 MW of wind power generation expected in the Mannar area, which is significant in a power system with a peak demand of about 2,200 MW. Therefore, there is a need for capacity building in power system operation and dispatching, when intermittent sources of energy such as wind power frequently exceeding 10% of demand. The new challenges in power system operations relate to wind power forecasting, balancing and transient stability.

**1. TRANSMISSION SUBSTATION DESIGN SPECIALIST**
(international, 8 person-months)

38. The Transmission Design Branch of CEB prepares mainly conceptual designs of HV substation, which is required for bidding the turnkey Engineering, Procurement and Construction (EPC) contracts. Further design review works are carried out during the implementation stage for those EPC contracts. CEB management has now decided to extend capacities of the Transmission Design and Transmission Construction branches in the area of preparing the detailed design of substation for future foreign funded projects. To achieve this, capacities of engineers in said branches should be built with necessary consultancy guidance, training and providing the required software tools. The international transmission substation design specialist will have a master's degree in power engineering with 15 years of proven hands-on experience in the design of transmission substations and extensive knowledge of the modern techniques, designs, material and equipment used in both indoor and outdoor substations. The international consultant will prepare the detailed designs of primary and secondary equipment of HV/EHV substation. The consultant's outline terms of reference will include, but not necessarily be limited to, the following tasks:

(i) Prepare the sub-station design manual for CEB. This will cover the voltage levels 400 kV, 220 kV and 132 kV;
(ii) Review the existing substation technical specification and prepare a master list of documents, including but not limited to, standards, guidelines, templates, codes of practice, required for substation design;
(iii) Prepare the detailed design of a grid substation, simultaneously establishing a system of planning and documentation of the design process (with due recognition for the existing processes, if any) in sufficient detail to ensure clarity and understanding by CEB and prospective contractors/sub-contractors. The detailed design will, at the minimum, include construction drawings, detailed cost estimate, necessary calculation to determine and justify the engineering details for the substation;
(iv) Prepare the interfacing drawing/documents for primary and secondary equipment for different manufacturers, for the grid substation;
(v) Advise CEB on grouping of substation equipment in specific packages to expedite the procurement process;
(vi) Conduct and/or arrange specific capacity building and training activities for CEB staff, including but not limited to small group discussion meetings, workshops, seminars, site visits, hands-on work in other design offices recommended by the international consultant, to ensure a sufficient number of CEB staff is fully acquainted with modern approaches to substation design and implementation;
(vii) Share international experience in the transmission sub-station design functioning and propose changes in the current operations and functioning of CEB's Transmission Design Branch;

(viii) Assist CEB in formulating process for pre-approval of vendors for primary and secondary equipment for substation;
(ix) Review and advise on the procurement of software tools and assist in providing necessary training on their use. The software tools would indicatively cover:
- Bus design calculations for grid sub-stations
- Calculation of short circuit forces in the grid substations for the design of equipment structures;
- Battery bank & battery charger sizing calculations for 110 and 48 volt (V);
- Soil resistivity repot for earth mat design;
- Earthing grid design for switchyard;
- MV cable design calculation
- Lightning protection design calculations;
- Illumination design calculation for outdoor switchyard; and
- Relay setting calculations.

(x) Arrange the required training for above identified software tools.
(xi) Prepare and develop a roadmap and continues training plan for the substation design engineers in CEB's Transmission Design Branch.

**2. TRANSMISSION LINE DESIGN SPECIALIST**
(international, 8 person-months)

39. The Transmission Design Branch of CEB is responsible for preparation of conceptual designs of transmission lines, which is required for bidding the turnkey EPC contracts. Further, design review works are carried out during the implementation stage for those EPC contracts. CEB management has now decided to extend capacities of the Transmission Design and Transmission Construction branches in the area of preparing the detailed design of transmission lines to assimilate new technologies for future foreign funded projects. To achieve this, capacities of engineers in said branches should be built with necessary consultancy guidance, training and providing the required software tools. The international transmission planning specialist will have a master's degree in engineering with 15 years of proven hands-on experience in planning of transmission networks. The expert should have proven skills and experience in developing and conducting capacity building programs internationally. She/he must have worked with transmission companies internationally. The national transmission planning specialist will have a degree in engineering with 10 years of experience, including power system planning and capacity building. The international consultant will prepare the detailed designs of transmission lines ranging from 132 kV to 400 kV. The consultant's outline terms of reference will include, but not necessarily be limited to, the following tasks:

(i) Prepare the transmission line design manual covering the voltage levels 400 kV, 220 kV and 132 kV;
(ii) Review the existing transmission line technical specification and prepare a master list of documents required for transmission line design;
(iii) Prepare the detailed design of transmission line simultaneously establishing a system of planning and documentation of the design process (with due recognition for the existing processes, if any) in sufficient detail to ensure clarity and understanding by CEB and prospective contractors/subcontractors. The detailed design will, at the minimum, include construction drawings, detailed cost estimate, necessary calculation to determine and justify the engineering details;
(iv) The consultants will be responsible for arranging capacity building activities and training relating to development of Transmission Design Branch;
(v) Share international experience in the transmission line design functioning and propose changes in the current operations and functioning of CEB's Transmission Design Branch;
(vi) Assist CEB in formulating process for pre-approval of vendors for transmission line components;
(vii) Introduction to new type of towers such as compact pole, tubular lattice type, etc. for the places where right of way issues exist;

(viii) Review and advise on the procurement of software tools and providing necessary training on their use. The software tools would cover:
- Transmission line profile design;
- Preparation of sag-tension, stringing chart;
- Tower design and standardizing the towers for 400 kV, 220 kV and 132 kV voltage levels;
- Preparation of all other charts and tables required for transmission line construction.

(ix) Prepare and develop a roadmap and continues training plan for the transmission line design engineers in CEB's Transmission Design Branch.

**3. TRANSMISSION PLANNING SPECIALIST**
(international, 6 person-months)

40. The transmission planning branch of CEB prepares mainly Long Term Transmission Development Plan. The Long Term Transmission Development Plan is a 10-year plan and is reviewed once in two years. It includes the expansion and reinforcement of transmission network in Sri Lanka, which is owned and operated by CEB. Further system stability studies are carried out as a requirement of the Transmission Development Plan. All the technical studies like system black out, partial failures, abnormal overvoltage conditions and others, which are related to transmission network, are carried out by the engineers in the transmission planning branch.

41. The purpose of the capacity building exercise for the transmission planning branch is to provide hands-on experience to the staff on latest planning tools and technologies. This would include emerging concepts in transmission system in Sri Lanka like 400 kV AC system, HVDC transmission system (likely connection with India), addition of large scale renewables capacities, large base load stations running on coal, equipment with power electronic components such as FACT devices, latest technologies, etc.

42. The expert must have proven skills and experience in developing capacity building programs internationally, especially in the power sector. She/he must have worked with transmission companies internationally. The consultant's outline terms of reference will include, but not necessarily be limited to, the following tasks:

(i) Conduct discussions with relevant officers of CEB to examine the requirements of institutional capacity development in transmission planning process;

(ii) Conduct a formal and structured Training Needs Assessment (TNA) and identify and highlight capacity gaps in the technical skills of personnel in the transmission planning branch;

(iii) Based upon findings, prepare and develop a report on training plan, highlighting short, medium and long term trainings for individuals and sub-groups. Identify the elements of training to be conducted by the consultant hands-on in Sri Lanka and elements that require to be outsourced. The consultant will be responsible for developing these trainings as well as making all necessary arrangements on behalf of CEB for outsourced components;

(iv) Carry out a comprehensive analysis, short listing and selection of reputed planning software training providers, located both within the country and abroad to develop a Training Plan for CEB for enhancing the desired capacities covering, but not limited to the following areas, giving due consideration to cost and quality perspectives:

- Transmission system planning techniques covering 132 kV, 220 kV and 400 kV system voltages;
- Steady state and dynamic analysis of transmission system including system modeling and reactive power management;
- HVDC transmission system planning with cross border power exchange in synchronous and asynchronous mode;

- Modeling of renewable energy integration, especially intermittent sources and transmission system planning in the presence of these sources; and
- Economic and financial analysis of transmission projects.

(v) Taking into consideration a considerable expected increase in renewable energy penetration with future integration of wind power generation in the Mannar area, carry out/plan capacity building activities in power system operation and dispatching, including issues of wind power forecasting, balancing and transient stability;

(vi) In line with the developed capacity building plan, arrange trainings in Sri Lanka (preferred) as well as out of country for a period of two to three months of a selected number of participants from the transmission planning branch. Funds for this will be as lumpsum amount in the provisional sum category of the budget;

(vii) Provide suggestions and develop a plan on establishing internal technical capacity building system in CEB and make recommendation on the sustainability of the training process.