Project Administration Manual

Project Number: 53324-001
Loan and/or Grant Number(s): LXXXX; GXXXX
August 2020

Kingdom of Cambodia: Grid Reinforcement Project

ABBREVIATIONS

ADB	–	Asian Development Bank
BESS	–	battery energy storage system
cct-km	–	circuit-kilometer
CEMP	–	construction EMP
DDR	–	due diligence report
EDC	–	Electricité du Cambodge
EMP	–	environmental management plan
EPC	–	engineering, procurement and construction
GAP	–	gender action plan
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
IEIA	–	initial environmental impact assessment
kV	–	kilovolt
LARF	–	land acquisition and resettlement framework
LARP	–	land acquisition and resettlement plan
MEF	–	Ministry of Economy and Finance
MOE	–	Ministry of Environment
O&M	–	operations and maintenance
OCB	–	open competitive bidding
PAM	–	project administration manual
PIC	–	project implementation consultant
PMU	–	Project Management Unit
PPU	–	Project Procurement Unit
RDDR	–	resettlement DDR
RRP	–	report and recommendation of the President
SPS	–	Safeguard Policy Statement

CONTENTS

APPENDIXES

Project Administration Manual Purpose and Process

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

The Electricité du Cambodge (EDC) is wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by the executing agency of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the loan and grant agreements. Such agreement shall be reflected in the minutes of the loan negotiations. In the event of any discrepancy or contradiction between the PAM and the legal agreements, the provisions of the loan and grant agreements shall prevail.

After ADB Board approval of the project's report and recommendation 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 PAM.

I. PROJECT DESCRIPTION

1. The Grid Reinforcement Project (the project) will support Electricité du Cambodge (EDC), the state-owned power utility, to improve transmission network capacity and stability. The project will (i) expand the electricity transmission infrastructure by constructing four 115 kilovolt (kV) and 230 kV transmission lines and ten substations in Phnom Penh, Kampong Chhnang, Kampong Cham, and Takeo provinces, and (ii) introduce as a pilot the first utility-scale battery energy storage system (BESS) to understand the technology's performance and assess different business models to provide a combined set of services for (a) renewable energy integration, (b) ancillary services,[1] and (c) transmission congestions relief. Support will be provided to EDC in implementing the project and strengthening capacity to improve probity, efficiency, inclusion and gender equality.

2. The project is aligned with the following impact: adequate and reliable power supply from environmentally sustainable energy sources ensured. The project will have the following outcome: transmission network capacity and stability improved.

3. **Output 1: 115 kilovolt and 230 kilovolt grid infrastructure expanded and reinforced.** The proposed project will support the expansion of 115 kV and 230 kV overhead and underground transmission lines and associated substations in Phnom Penh, Kampong Chhnang, and Kampong Cham provinces. It will add 13 circuit-kilometer (cct-km) of 230 kV transmission lines, 36.7 cct-km of 115 kV transmission lines, 1,475 megavolt-ampere to 230 kV/ 115 kV substation and 230 kV / 22 kV transformer capacity and 350 megavolt-ampere to 115 kV/ 22 kV substation transformer capacity.

Table 1: 115 kilovolt and 230 kilovolt Grid Infrastructure Expanded and Reinforced

N°	Subproject Name	Subproject Scope
Transmission Lines and Substations in Phnom Penh		
TPP1	New 6.52 km 230 kV transmission line from existing GS5 to proposed Sen Sok substation	230 kV double circuit line; ~ 5 km overhead on monopoles and 1.5 km underground cable
TPP2	New 2.44 km 115 kV transmission line from proposed Sen Sok to proposed Russei Keo substations	115 kV double circuit line; ~ 1.5 km overhead on monopoles and 1.0 km underground cable
TPP3	New 4.4 km 115 kV transmission line from proposed Boeung Tompon substation to new Olympic substation	115 kV double circuit line; ~ 2.4 km overhead on monopoles and 2.0 km underground cable; plus 0.8 km underground cable for SPP3 connection
SPP1	New 230/115 kV Dangkor substation	2×240 MVA 230/115 kV transformers; outdoor switchyard; 2 x 230 kV circuits; 4 x 115 kV circuits
SPP2	New 230/115/22 kV Sen Sok substation	1×360 MVA 230/115 kV transformer; 1×75 MVA 115/22 kV transformer; GIS indoor switchgear; 2 x 230 kV circuits; 2 x 115 kV circuits
SPP3	New 115/22 kV RUPP substation	1×75 MVA 115/22 kV transformers; GIS indoor switchgear; 4 x 115 kV circuits
SPP4	New 115/22 kV Boeung Tompon substation	1×75 MVA 115/22 kV transformer; GIS indoor switchgear; 6 x 115 kV circuits

[1] Including primary frequency response and curtailment reserve.

N°	Subproject Name	Subproject Scope
SPP5	New 115/22 kV Russei Keo substation	1×75 MVA 115/22 kV transformer; GIS indoor switchgear; 4 x 115 kV circuits
Transmission Lines and Substations in Kampong Chhang (KCN), Kampong Cham (KPC) and Takeo (TKO) provinces		
TKCN1	New 11.1 km 115 kV transmission line from proposed Samiki Meanchey to proposed Kampong Tralach substations	115 kV double circuit line; overhead on steel towers
SKCN1	New 230/115/22 kV Samiki Meanchey substation	1×160 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits
SKCN2	New 115/22 kV Kampong Tralach substation	1×50 MVA 115/22 kV transformer; outdoor switchyard; 2 x 115 kV circuits
SKPC1	New 230/115/22 kV Thnal Keng substation	1×160 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits, 2 x 115 kV circuits
SKPC2	New 230/22 kV Skun substation	1×75 MVA 230/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits
STKO1	New 230/115/22 kV Samroang Yoang substation	1×240 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits

4. **Output 2: First utility-scale energy storage system provided.** The project will support EDC in designing, procuring, operating, and analyzing the performance of the first utility-scale BESS in Cambodia capable of storing 16 megawatt-hours (MWh).[2] This is a desirable size to support multiple applications, which is a standard feature of BESS installations including (i) smoothing output at 80% from the 60 megawatt (MW) Asian Development Bank (ADB) solar park in Kampong Chhnang,[3] (ii) providing 0.5 hours of curtailment reserve to address daily power outages, (iii) providing primary frequency control, and (iv) providing congestion relief thus, deferring upgrades in transformer capacity at Grid Substation 6 (a substation near ADB solar park site).

5. Project implementation consultants will complement existing staff of EDC in ensuring a high degree of project management efficiency and provide on-the-job training to strengthen transparency, accountability, and inclusive citizen participation in decision-making processes. In addition, EDC will undertake specific activities to (i) promote inclusion and gender equality in the workplace, (ii) inform communities about safe use of electricity, and (iii) dismantle gender-based stereotypes related to women's participation in energy sector activities and employment.

[2] A first workshop on the design of battery energy storage system was provided during project preparation.

[3] ADB. 2019. *Report and Recommendations of the President to the Board of Directors: Proposed Loan and Administration of Loan, Grant, and Technical Assistance Grant to the Kingdom of Cambodia for the National Solar Park Project*. Manila.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

Table 2: Project Readiness Activities

No.	Key Project Preparation Elements	Stage of Project Preparation			Responsible Entity
		Appraisal/ Fact-Finding (March 2020)	Loan Negotiations (June 2020)	Effectiveness (October 2020)	
1	Government budget inclusion	Confirmed	Included		Ministry of Economy and Finance (MEF)
2	Government Legal Opinion			With signing and effectiveness	MEF
3	Identification of Project Areas	Transmission line and substation subprojects for Phnom Penh, Kampong Cham, Kampong Chhnang, and Takeo provinces confirmed and National Solar Park substation as location for battery energy storage system confirmed	Transmission line and substation subprojects for Phnom Penh, Kampong Cham, Kampong Chhnang, and Takeo provinces and National Solar Park substation as location for battery energy storage system agreed		Electricité du Cambodge (EDC)
4	Project Management Arrangements	Continuous project preparation arrangements in place; commence recruitment of project implementation consultants	Agreed	Project management arrangements in place; review allocation and assignment of project management staff	Asian Development Bank (ADB) and EDC
5	Project Implementation Plan	Confirmed	Agreed	Regular review	ADB and EDC
6	Project Administration Manual (PAM)	Confirmed	Agreed	Review of project administration manual	ADB and EDC
7	Counterpart Funds	Confirmed	Agreed	Funds allocated	MEF and EDC

No.	Key Project Preparation Elements	Stage of Project Preparation			Responsible Entity
		Appraisal/ Fact-Finding (March 2020)	Loan Negotiations (June 2020)	Effectiveness (October 2020)	
8	Re-lending and Re-granting Arrangements	Confirmed	Agreed	Subsidiary Loan Agreement and Subsidiary Grant Agreement executed and delivered	MEF and EDC
9	Auditing Arrangements	Confirmed	Agreed	Commence review and monitoring	ADB and EDC
10	Procurement Arrangements	Confirmed	Procurement actions initiated	Advance procurement and procurement activities ongoing	ADB and EDC
11	Procurement Plan (engineering, procurement, and construction [EPC] for transmission lines and substations and EPC & operation and maintenance for BESS)	Confirmed	Agreed		ADB and EDC
12	Project Implementation Consulting Services(PIC)	Terms of reference (TOR) for PIC drafted, financing for consulting services confirmed	TOR and financing of consulting services agreed		ADB and EDC
13	Initial Environmental Examination (IEE) and Environmental Management Plan (EMP)	Draft Borrower IEE and EMP prepared and endorsed		Initial Environmental Social Impact Assessment (IESIA)/EMP to be approved by the Ministry of Environment (MOE) during detailed design stage by MOE registered consulting firm. Clearance obtained	ADB and EDC

No.	Key Project Preparation Elements	Stage of Project Preparation			Responsible Entity
		Appraisal/ Fact-Finding (March 2020)	Loan Negotiations (June 2020)	Effectiveness (October 2020)	
				by MOE prior to commencement of civil works.	
14	Land acquisition and resettlement framework (LARF), Resettlement due diligence report (RDDR), Land acquisition and resettlement Plan (LARP), Due diligence report verified by third-party (DDR)[a]	Draft Borrower LARF, RDDR, LARP, DDR prepared and endorsed		Commence implementation	ADB and EDC
16	Financial Management Assessment of executing agency/ implementing agency capacity	Finalized and proposed actions endorsed	Startup actions initiated	Commence review and monitoring	ADB and EDC
17	Procurement Capacity Assessment of executing agency and implementing agency	Finalized and proposed actions endorsed	Startup actions initiated	Commence review and monitoring	ADB and EDC
18	Risk Assessment and Risk Management Plan	Drafted and confirmed	Agreed	Implementation of risk mitigation measures monitored and implemented	ADB and EDC
19	Monitoring, Reporting and Evaluation Arrangements including baseline and performance indicators	Confirmed (PAM and design and monitoring framework [DMF])	Agreed (PAM and DMF)	Commence review and monitoring	ADB and EDC

[a] Due diligence reports verified by third-party are due diligence reports that have been prepared for subprojects where land is acquired through negotiated settlement.
Source: Asian Development Bank staff estimates.

B. Overall Project Implementation Plan

Table 3: Project Implementation Plan

Activity	2020				2021				2022				2023				2024				2025			
	QI	QII	QIII	QIV	QI	QII	QIII	QIV	QI	QII	QIII	QIV	QI	QII	QIII	QIV	QI	QII	QIII	QIV	QI	QII	QIII	QIV
Advance action for PIC contract																								
Advance action for EPC contract																								
Project outputs																								
Output 1: 115 kV and 230 kV grid infrastructure expanded																								
(i) release bidding documents																								
(ii) award EPC contract for transmission lines and substations																								
(iii) complete detail engineering design																								
(iv) complete land acquisition and compensation process																								
(v) obtain IEE approval from MoE																								
(vi) construct and commission transmission lines and substations																								
(vii) issue request for expression of interest for PIC																								
(viii) award PIC contract																								
(ix) mobilize and complete consulting services																								
Output 2: First utility-scale energy storage system provided																								
(i) release bidding document																								
(ii) award EPC (O&M) contract for battery storage																								
(iii) complete detail engineering design																								
(iv) obtain IESIA approval from MoE																								
(v) constuct and commission battery storage system																								
(vi) operate, maintain and transfer battery storage system to EDC																								
Project performance monitoring and reporting																								
(i) periodic project review																								
(ii) progress reports (including safeguard and gender)																								
(iii) safeguards monitoring reports																								
(iv) gender dimension progress reports																								
(v) audited project/financial statements																								
(vi) project closing activities																								

EDC = Electricité du Cambodge; EPC = engineering, procurement and construction; IESIA = initial environmental and social impact assessment; kV= kilovolt; MOE = Ministry of Environment; PIC = project implementation consultant.
Source: Asian Development Bank estimates.

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

Table 4: Project Implementation Organizations

Project Implementation Organizations	Management Roles and Responsibilities
Ministry of Economy and Finance (Borrower)	• Sign legal agreements between the government and ADB • Provide subsidiary loan and subsidiary grant agreements to EDC • Ensure compliance with all loan and grant covenants • Approve exemption of taxes and duties related to the project • Submit withdrawal applications to ADB
Electricité du Cambodge (Executing Agency)	• Responsible for overall supervision, coordination, monitoring, and reporting of various project activities and implementation • Establish the PMU with sufficient staff and appropriate qualification • Ensure implementation of the safeguards planning document is compliant with the loan and grant covenants • Provision of counterpart staff, operational support and budget for project activities • Ensure compliance with all loan and grant covenants
	Project implementation related aspects: • Responsible for day-to-day project management and supervision • Responsible for implementing project in accordance with the legal agreements • Responsible for coordinating with line ministries to ensure efficient implementation of the project • Responsible for procurement of goods, works and services • Secure technical and safeguard approvals for all civil works prior to contract award • Ensure compliance with all loan and grant covenants • Responsible for submission of reports, including submission of summary of financial and project accounts and annual financial statements • Prepare and submit withdrawal applications to MEF • Responsible for implementation of gender activities and timely submission of semi-annual gender progress reports to ADB
	Safeguard related aspects: • Ensure compliance with ADB safeguards requirements • Ensure compliance and consistency of safeguards documents with the government policy, legal and administrative framework across all jurisdictions--national, state and local • Responsible for coordinating with EDC province/district offices to assign a focal person for safeguards and grievance redress committees/focal persons at all levels • Responsible for management of national IEIA approval process including engagement of MOE registered firm • Responsible for obtaining Environmental Protection Contract prior to contract award • Responsible for coordinating with EDC province/district offices safeguard focal to disclose and disseminate information, conduct ongoing public consultation, manage grievance redress mechanism at all levels • Responsible for establishing and functionality of the project-specific grievance redress mechanism

Project Implementation Organizations	Management Roles and Responsibilities
	• Implement safeguards requirements detailed in the safeguard documents • Responsible for engaging independent external third-party to document the negotiation and settlement processes, in case of negotiated land acquisition (third-party verified due diligence reports [DDRs]) • Responsible for implementing LARP before commencement of civil works, and for ensuring any civil works start strictly on land free from encumbrances upon ADB's no-objection • Responsible for updating the draft RDDRs based on the detailed engineering design and submit RDDRs and DDRs for ADB concurrence and disclosure before commencement of civil works • Responsible for timely submission of semi-annual safeguard monitoring reports to ADB • Responsible for overall implementation of safeguards requirements
Project Implementation Consultants	In coordination with Project Management Unit of EDC: • Procurement process/implementation and contract management • Supervision of construction, final testing and commissioning • Responsible for supporting EDC (SEPRO) in managing IEIA approval process • Responsible for supporting EDC (SEPRO) in updating RDDRs and submitting to ADB for concurrence and disclosure before commencement of civil works • Responsible for supporting EDC (SEPRO) in implementing final LARP and submitting implementation compliance report to ADB before commencement of civil works • Ensure compliance with safeguards requirements through effective implementation and monitoring of social and environmental safeguards • Ensure implementation of gender activities and progress reporting • Project performance monitoring and evaluation, including preparation of progress reports, semi-annual safeguard and gender monitoring reports, and completion report
Asian Development Bank	• Ensure technical and financing support and oversight according to the project administration manual and legal agreements • Administer cofinancing • Review all documents that require ADB approval and issue timely no objection for commencement of civil works • Undertake project reviews • Monitor and require the compliance of all loan covenants • Process withdrawal applications and disburse the loan proceeds • Monitor and require the compliance of financial audit recommendations • Review and approval of updates of safeguards documents and monitoring of safeguards implementation • Regularly post on ADB website the updated project information and documents for public disclosure

ADB = Asian Development Bank; DDR = due diligence report; EDC = Electricité du Cambodge; LARP = land acquisition and resettlement plan; MEF = Ministry of Economy and Finance; MOE = Ministry of Environment; PIC = project implementation consultants; PMU = Project Management Unit; RDDR = resettlement DDR; SEPRO = Social, Environment and Public Relations Office.
Source: Asian Development Bank.

B. Key Persons Involved in Implementation

Executing Agency Electricité du Cambodge	H.E. Keo Rottanak Minister Attached to the Prime Minister Managing Director Telephone: (+855) 23 723 971 Email address: rottanak@online.com.kh Dr. Praing Chulasa Deputy Managing Director of Planning and Techniques Telephone: (+855) 23 426 018 Email: chulasa_praing@yahoo.com Mr. Nget Sokhan Deputy Managing Director of Finance and Business Telephone: (+855) 12 725 777 Email: ngtsokhan@yahoo.com
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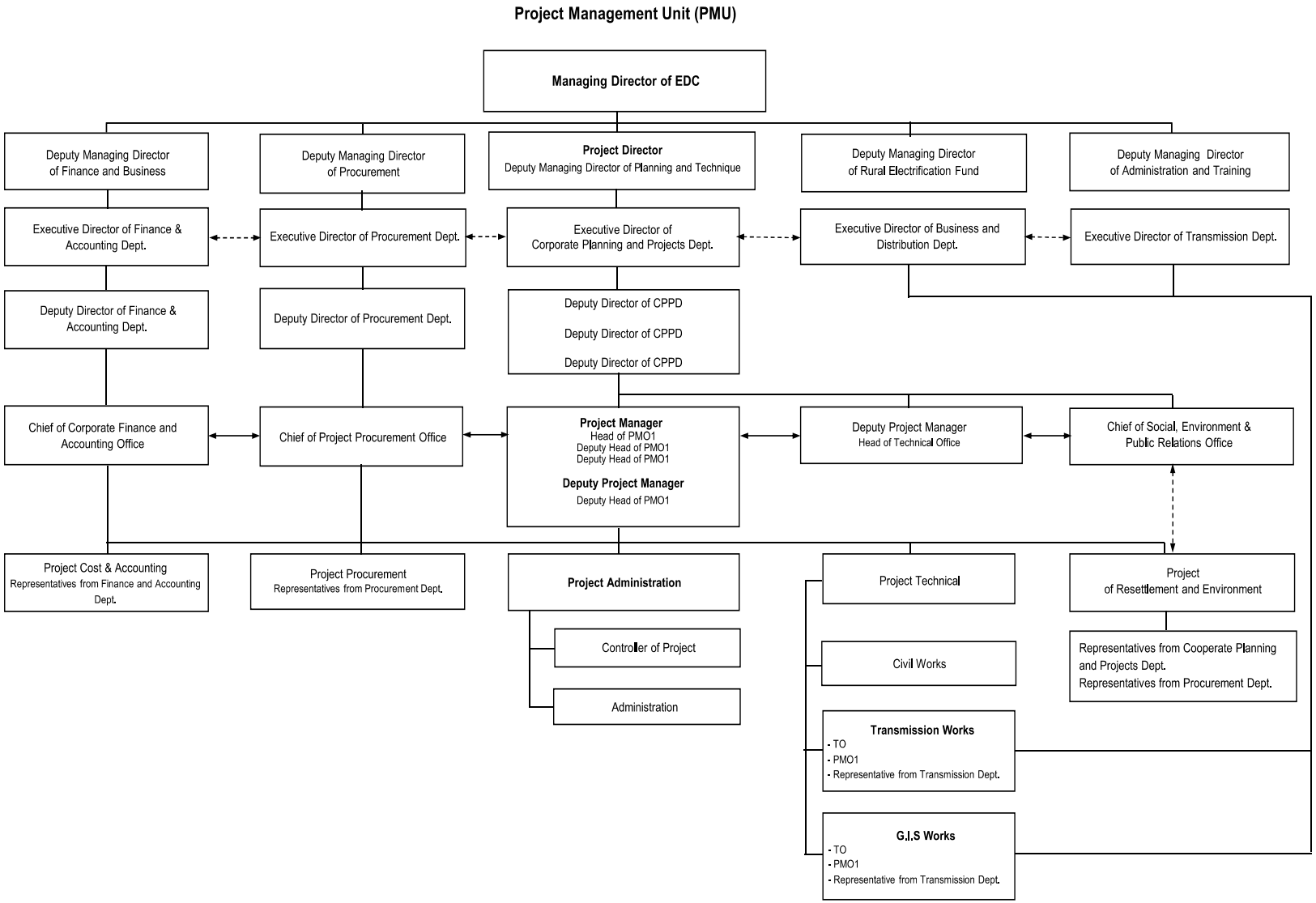
Mission Leader	Ms. Daniela Schmidt Energy Specialist Telephone: (+63) 2 8683 1159 Email: dschmidt@adb.org

C. Project Organization Structure



IV. COSTS AND FINANCING

6. **Investment and financing plan.** The total cost of the project is $193.65 million (Table 5). The financing plan for the project is provided in Table 6.

Table 5: Investment Plan
($ million)

Item		Amount
A	**Base Costs**[a b]	
1	Output 1: 115 kV + 230 kV grid infrastructure expanded and reinforced	160.24
2	Output 2: First utility-scale energy storage system provided	8.25
	Sub-total (A)	**168.48**
B	**Contingencies**[c]	21.22
C	**Financial Charges During Implementation**[d]	3.95
	Total (A+B+C)	**193.65**

kV = kilovolt.
[a] Includes taxes and duties of $26.56 million to be financed by the government through exemptions as in-kind contribution.
[b] Prices as of January 2020.
[c] Physical contingencies computed at 10% of the EPC costs. Price contingencies reflect inflation expectations.
[d] Includes interest and service charges. Interest during construction for the ADB concessional loan has been computed at 1.00%. Onlending service charges are applied from MEF to EDC at 0.65%.
Source: Asian Development Bank estimates.

Table 6: Financing Plan
($ million and percentage share)

Source	Amount ($ million)	Share of total (%)
Asian Development Bank		
Ordinary capital resources (concessional loan)	127.80	66.0
Strategic Climate Fund (grant)[a]	4.70	2.4
Clean Energy Fund (grant)[b] under the Clean Energy Financing Partnership Facility	2.00	1.0
Government[c]	28.95	15.0
Electricité du Cambodge[d]	30.20	15.6
Total	**193.65**	**100.0**

[a] Under the Scaling Up Renewable Energy Program in Low-Income Countries. Administered by the Asian Development Bank.
[b] Financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom. Administered by the Asian Development Bank.
[c] Includes taxes and duties of $26.56 million to be financed by the government through exemptions as in-kind contribution.
[d] Includes land acquisition and resettlement costs, safeguards costs, contingencies and financial charges during implementation.
Source: Asian Development Bank estimates.

7. Detailed cost tables by expenditure, by financier, by outputs and by year are provided in Sections C to G.

A. Cost Estimates Preparation and Revisions

8. The project cost estimates were prepared by EDC, in conjunction with the project preparatory consultant, based on an assessment of unit quantities and recent tender prices received for similar works. Contingencies and financing charges during implementation were

estimated by ADB. A detailed cost breakdown of the transmission line, substation subprojects and battery energy storage system is provided in Appendix 1.

9. During project implementation, project cost estimates are normally revised after contracts are awarded, using the contract price, and updated from time to time for quantity and price variations and the final contract price. The revised cost estimates and contract prices will be reflected during periodic updating of the procurement plan.

B. Key Assumptions

10. The following key assumptions will underpin the cost estimates and financing plan:

i) Exchange rate: All costs are assumed to be incurred in $. The Cambodian economy is highly-dollarized and it is conventional for contracts for local services to be expressed in $.
ii) Price contingencies based on expected cumulative inflation over the implementation period (Table 7):

Table 7: Escalation Rates for Price Contingency Calculation

	2020	2021	2022	2023	2024	2025
International	1.5%	1.6%	1.6%	1.6%	1.6%	1.6%
Domestic	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%

Source: Asian Development Bank

C. Detailed Cost Estimates by Expenditure Category

($ million)

		Foreign	Local	Total cost	% of total base cost
A	**Base Costs**				
1	EPC contract	105.54	25.44	130.98	77.7
2	Land acquisition and resettlement	-	6.91	6.91	4.1
3	Environmental safeguards [a]	-	0.52	0.52	0.3
4	Implementation consultant	2.64	0.88	3.52	2.1
5	Taxes and duties [b]	-	26.56	26.56	15.8
	Sub-total (A) [c]	**108.18**	**60.30**	**168.48**	100.0
B	**Contingencies** [d]				
1	Physical	10.55	2.54	13.10	7.8
2	Price	5.26	2.86	8.12	4.8
	Sub-total (B)	**15.81**	**5.40**	**21.22**	12.6
C	**Financial Charges During Implementation** [e]				
1	Interest during construction	2.40	-	2.40	1.4
2	Service charges	1.56	-	1.56	0.9
	Sub-total (C)	**3.95**	**-**	**3.95**	2.3
	Total Project Cost (A+B+C)	**127.95**	**65.70**	**193.65**	114.9

EPC = engineering, procurement and construction.
[a] Includes UXO assessment and IEISA.
[b] Includes taxes and duties of $26.56 million to be financed by the government through exemptions as in-kind contribution.
[c] Prices as of January 2020.
[d] Physical contingencies computed at 10% of the EPC costs. Price contingencies reflect inflation expectations.
[e] Includes interest and service charges. Interest during construction for the ADB concessional loan has been computed at 1.00%. Onlending service charges are applied from MEF to EDC at 0.65%.
Source: Asian Development Bank estimates

D. Allocation and Withdrawal of Loan and Grant Proceeds

1. Allocation and Withdrawal of Loan Proceeds for ADB Financing

CATEGORY		ADB FINANCING	
Number	**Item**	**Total Amount Allocated (USD)** **Category**	**Percentage and Basis for Withdrawal from the Loan Account**
1	Works and Goods (Engineering, Procurement, Construction – transmission lines and substations)**	**124,280,000**	100% of total expenditure claimed*
2	Consulting Services	**3,520,000**	100% of total expenditure claimed*
	Total	**127,800,000**	

* Exclusive of taxes and duties imposed within the territory of the Borrower.
** Subject to the condition for withdrawal described in paragraph 6 of Schedule 3 ADB Loan Agreement.

2. Allocation and Withdrawal of Grant Proceeds for SCF Financing

CATEGORY		SCF FINANCING	
Number	**Item**	**Total Amount Allocated (USD)** **Category**	**Percentage and Basis for Withdrawal from the Grant Account**
1	Goods, Works, Consulting Services (Engineering, Procurement, Construction, and 3-year Operation and Maintenance (battery energy storage system))**	**4,700,000**	70.15% of total expenditure claimed*
	Total	**4,700,000**	

* Exclusive of taxes and duties imposed within the territory of the Borrower.
** Subject to the condition for withdrawal described in paragraph 5 of Schedule 1, SCF Grant Agreement.

3. Allocation and Withdrawal of Grant Proceeds for CEF Financing

CATEGORY		CEF FINANCING	
Number	**Item**	**Total Amount Allocated (USD)** **Category**	**Percentage and Basis for Withdrawal from the Grant Account**
1	Engineering, Procurement, Construction, and 3-year Operation and Maintenance (battery energy storage system)**	**2,000,000**	29.85% of total expenditure claimed*
	Total	**2,000,000**	

* Exclusive of taxes and duties imposed within the territory of the Borrower.
** Subject to the condition for withdrawal described in paragraph 5 of Schedule 1, CEF Grant Agreement.

E. Detailed Cost Estimates by Financier

($ million)

		ADB (OCR COL)		CEFPF (CEF grant)		SREP (SCF grant)		Government		EDC			
		Amount	% of cost category	Amount	% of cost category	Amount	% of cost category	Amount	% of cost category	Amount	% of cost category	Total cost	Taxes and duties
A	**Base Costs**												
1	EPC contract	124.28	94.9	2.00	1.5	4.70	3.6	-	-	-	-	130.98	26.20
2	Land acquisition and resettlement	-	-	-	-	-	-	-	-	6.91	100.0	6.91	
3	Environmental safeguards[a]	-	-	-	-	-	-	-	-	0.52	100.0	0.52	
4	Implementation consultant	3.52	100.0	-	-	-	-	-	-	-	-	3.52	0.35
5	Taxes and duties[b]	-	-	-	-	-	-	26.56	100.0	-	-	26.56	
	Sub-total (A)[c]	**127.80**	**75.9**	**2.00**	**1.2**	**4.70**	**2.8**	**26.56**	**15.8**	**7.43**	**4.4**	**168.48**	
B	**Contingencies**[d]												
1	Physical	-	-	-	-	-	-	-	-	13.10	100.0	13.10	
2	Price	-	-	-	-	-	-	-	-	8.12	100.0	8.12	
	Sub-total (B)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**21.22**	**100.0**	**21.22**	
C	**Financial Charges During Implementation**[e]												
1	Interest during construction	-	-	-	-	-	-	2.40	100.0	-	-	2.40	
2	Service charges	-	-	-	-	-	-	-	-	1.56	100.0	1.56	
	Sub-total (C)	**-**	**-**	**-**	**-**	**-**	**-**	**2.40**	**60.6**	**1.56**	**39.4**	**3.95**	
	Total Project Cost (A+B+C)	**127.80**	**66.0**	**2.00**	**1.0**	**4.70**	**2.4**	**28.95**	**15.0**	**30.20**	**15.6**	**193.65**	

ADB = Asian Development Bank; EDC = Electricité du Cambodge; EPC = engineering, procurement and construction; OCR = ordinary capital resources; SCF = Strategic Climate Fund; SREP = Scaling-up Renewable Energy Program.

[a] Includes UXO assessment and IEISA.

[b] Includes taxes and duties of $26.56 million to be financed by the government through exemptions as in-kind contribution.

[c] Prices as of January 2020.

[d] Physical contingencies computed at 10% of the EPC costs. Price contingencies reflect inflation expectations.

[e] Includes interest and service charges. Interest during construction for the ADB concessional loan has been computed at 1.00%. Onlending service charges are applied from MEF to EDC at 0.65%.

Source: Asian Development Bank estimates.

F. Detailed Cost Estimates by Outputs

($ million)

			Output 1: 115 kV + 230 kV grid infrastructure expanded and reinforced		Output 2: First utility-scale energy storage system provided	
		Total cost	Amount	% of cost category	Amount	% of cost category
A	**Base Costs**					
1	EPC contract	130.98	124.28	94.9	6.70	5.1
2	Land acquisition and resettlement	6.91	6.91	100.0	-	-
3	Environmental safeguards[a]	0.52	0.52	100.0	-	-
4	Implementation consultant	3.52	3.52	100.0	-	-
5	Taxes and duties[b]	26.56	25.01	94.2	1.55	5.8
	Sub-total (A)[c]	**168.48**	**160.24**	95.1	**8.25**	4.9
B	**Contingencies**[d]					
1	Physical	13.10	12.43	94.9	0.67	5.1
2	Price	8.12	7.80	96.1	0.31	3.9
	Sub-total (B)	**21.22**	**20.23**	95.4	**0.98**	4.6
C	**Financial Charges During Implementation**[e]					
1	Interest during construction	2.40	2.40	100.0	-	-
2	Service charges	1.56	1.56	100.0	-	-
	Sub-total (C)	**3.95**	**3.95**	100.0	**-**	-
	Total Project Cost (A+B+C)	**193.65**	**184.42**	95.2	**9.23**	4.8

EPC = engineering, procurement and construction; kV = kilovolt.

[a] Includes UXO assessment and IEISA.

[b] Includes taxes and duties of $26.56 million to be financed by the government through exemptions as in-kind contribution.

[c] Prices as of January 2020.

[d] Physical contingencies computed at 10% of the EPC costs. Price contingencies reflect inflation expectations.

[e] Includes interest and service charges. Interest during construction for the ADB concessional loan has been computed at 1.00%. Onlending service charges are applied from MEF to EDC at 0.65%.

Source: Asian Development Bank estimates.

G. Detailed Cost Estimates by Year

($ million)

		Total cost	Year 1 2020	Year 2 2021	Year 3 2022	Year 4 2023	Year 5 2024	Year 6 2025
A	**Base Costs**							
1	EPC contract[a]	131.00	-	34.52	58.95	24.96	12.53	0.05
2	Land acquisition and resettlement	6.91	-	1.82	3.11	1.32	0.66	0.00
3	Environmental safeguards[b]	0.52	-	0.14	0.23	0.10	0.05	0.00
4	Implementation consultant	3.52	-	1.41	1.41	0.63	0.04	0.04
5	Taxes and duties[c]	26.56	-	7.00	11.95	5.06	2.54	0.01
	Sub-total (A)[d]	**168.51**	**-**	**44.88**	**75.65**	**32.06**	**15.81**	**0.10**
B	**Contingencies[e]**							
1	Physical	13.10	-	3.45	5.89	2.50	1.25	0.00
2	Price	8.12	-	1.33	3.49	2.01	1.28	0.01
	Sub-total (B)	**21.22**	**-**	**4.78**	**9.39**	**4.51**	**2.53**	**0.01**
C	**Financial Charges During Implementation[f]**							
1	Interest during construction	2.40	-	0.16	0.61	1.02	0.61	-
2	Service charges	1.56	-	0.10	0.39	0.66	0.39	-
	Sub-total (C)	**3.95**	**-**	**0.26**	**1.00**	**1.69**	**1.00**	**-**
	Total Project Cost (A+B+C)	**193.68**	**-**	**49.93**	**86.04**	**38.26**	**19.35**	**0.11**
	% Total Project Cost	100.0	-	25.8	44.4	19.8	10.0	0.1

EPC = engineering, procurement and construction.

[a] Construction of all subprojects ends Q2 2024. Costs in Year 6 relate to BESS O&M costs (3-year O&M support is bundled into BESS EPC contract).

[b] Includes UXO assessment and IEISA

[c] Includes taxes and duties of $26.56 million to be financed by the government through exemptions as in-kind contribution.

[d] Prices as of January 2020.

[e] Physical contingencies computed at 10% of the EPC costs. Price contingencies reflect inflation expectations.

[f] Includes interest and service charges. Interest during construction for the ADB concessional loan has been computed at 1.00%. Onlending service charges are applied from MEF to EDC at 0.65%.

Source: Asian Development Bank estimates.

11. **Climate finance.** The calculation of climate financing follows Asian Development Bank (ADB) guidelines for the energy sector.[4] Key elements relevant to the proposed project are as follows:

i) For projects expanding the capacity of transmission and distribution systems, only that part which reduces losses is counted as climate financing.
ii) For projects developing storage systems intended to facilitate the integration of renewable energy into grids, 100% of investment costs are counted as climate financing.

12. Investment costs are calculated as the value of the associated financing mobilized by ADB, including base costs and support costs (contingencies and financial charges during implementation where funded by ADB).

13. Consistent with ADB guidance, for Output 1, climate financing is calculated as a share of investment costs proportional to the share of loss reductions in the total additional energy supplied as a result of the proposed subprojects. For Output 2, the full investment costs of the subproject are counted as climate financing.

14. Under Output 1, the lifetime reduction in losses in the provinces included in the project, calculated as the difference in the loss percentage in the with- and without-project cases and multiplied by forecast supply in these provinces, is estimated at 3,529 gigawatt-hours (GWh) (undiscounted) or on average annual reduction of 141 GWh. The incremental supply totals 100,923 GWh over the 25-year life of the transmission lines and substations. The share of investment costs under Output 1 which is considered to represent climate financing is, therefore, calculated as below:

Climate Finance = 3,529 GWh / 100,923 GWh = 3.5%

15. The resulting calculation of climate financing is shown in Table 8.

[4] ADB. 2017. Guidance Note on Counting Climate Finance in Energy. (unpublished).

Table 8: Climate Financing

Financing source (ADB and ADB administered)	Output 1			Output 2			Project		
	Total	Climate financing		Total	Climate financing		Total	Climate financing	
	$ million	%	$ million	$ million	%	$ million	$ million	%	$ million
1. Ordinary Capital Resources (COL)									
a. Base costs	124.28	3.5%	4.35	-	-	-	124.28	3.5%	4.35
b. Contingency	20.23	3.5%	0.71	0.98	100.0%	0.98	21.21	7.6%	1.69
Sub-total	**144.51**	**3.5%**	**5.06**	**0.98**	**100.0%**	**0.98**	**145.49**	**4.2%**	**6.04**
2. Clean Energy Fund	-	-	-	2.00	100.0%	2.00	2.00	100.0%	2.00
3. Strategic Climate Fund	-	-	-	4.70	100.0%	4.70	4.70	100.0%	4.70
Total	**144.51**	**3.5%**	**5.06**	**7.68**	**100.0%**	**7.68**	**152.19**	**8.4%**	**12.74**

ADB = Asian Development Bank.
Source: Asian Development Bank estimates.

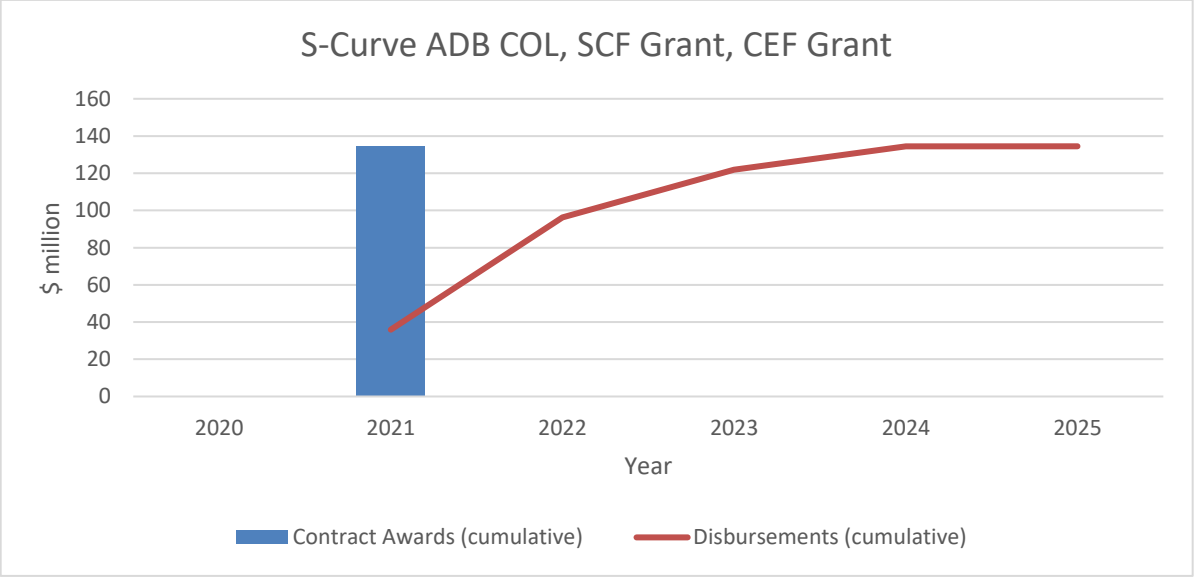
H. Contract and Disbursement S-Curve

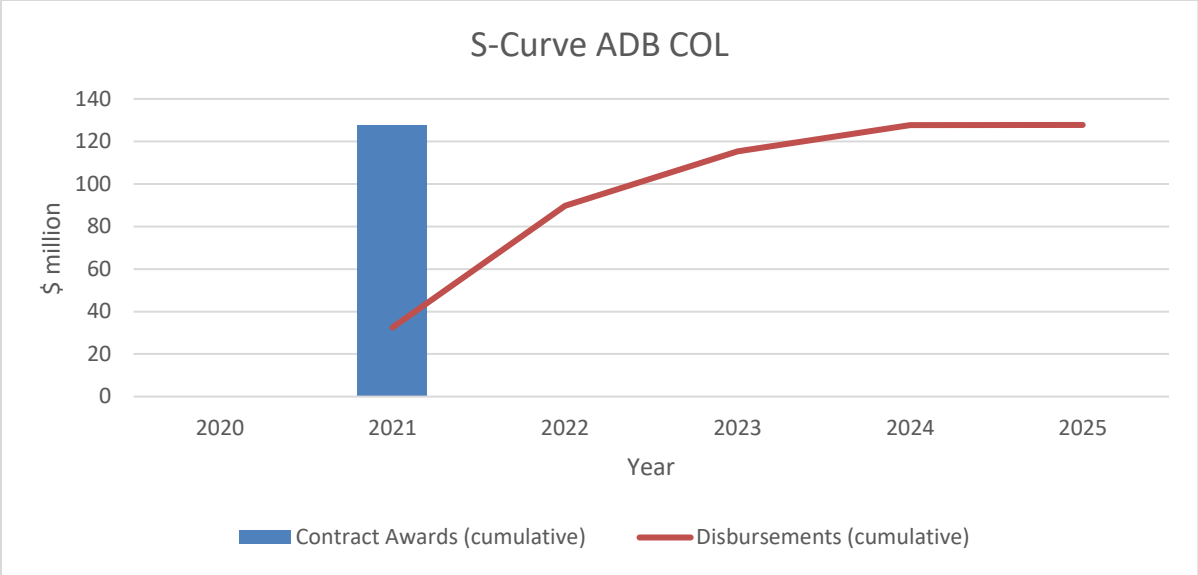
16. The table below shows quarterly contract awards and disbursement projections over the life of the project. The S-curve is for ADB financing and ADB administered co-financing, which will be recorded in the ADB system and reported through e-Ops.

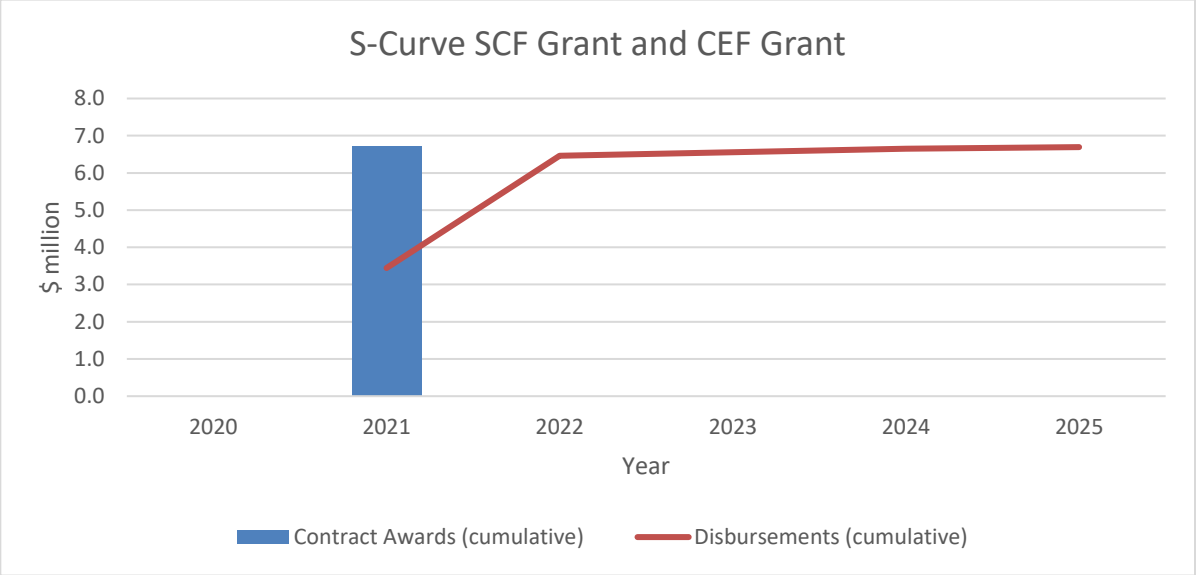
Table 9: Total Contract Awards and Disbursement
($ million)

	Contract Awards					Disbursements				
Year	**QI**	**QII**	**QIII**	**QIV**	**Total**	**QI**	**QII**	**QIII**	**QIV**	**Total**
2020										
2021	134.50				134.50	13.45	6.90	7.40	8.17	35.92
2022						6.57	7.57	18.99	27.22	60.35
2023						6.39	6.42	6.35	6.40	25.57
2024						6.22	6.27	0.01	0.06	12.56
2025						0.01	0.06	0.02	0.00	0.08
Total Contract Awards					**134.50**	**Total Disbursements**				**134.48**

Numbers do not sum up because of rounding.



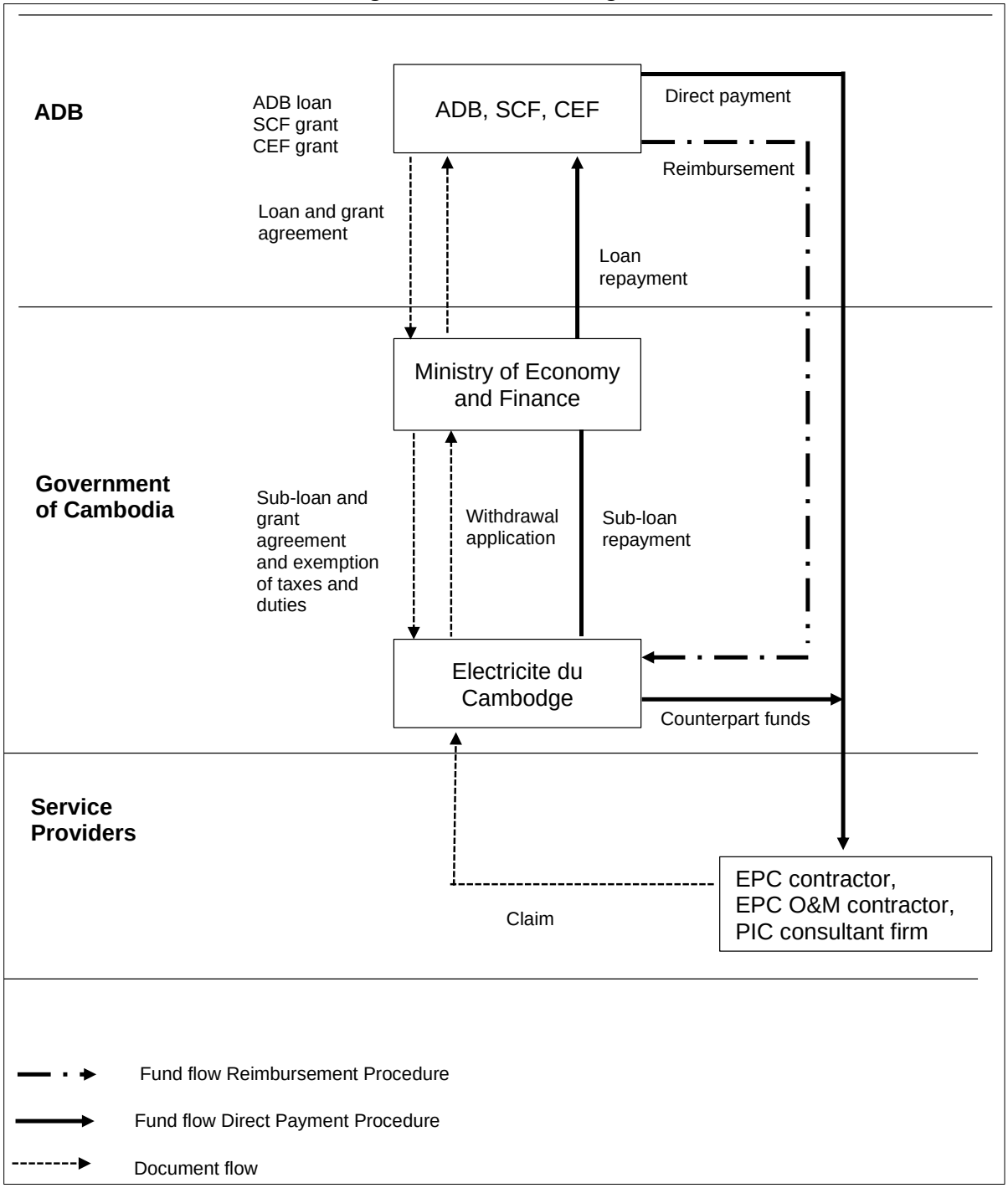

S-Curve ADB COL
140
120
100
80
60
40
20
0
$ million
2020
2021
2022
2023
2024
2025
Year
Contract Awards (cumulative)
Disbursements (cumulative)


S-Curve SCF Grant and CEF Grant
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
$ million
2020
2021
2022
2023
2024
2025
Year
Contract Awards (cumulative)
Disbursements (cumulative)

I. Fund Flow Diagram

17. The project's fund flow diagram provided below.

Figure: Fund Flow Diagram



ADB = Asian Development Bank; CEF=Asian Clean Energy Fund; EPC = engineering, procurement and construction; O&M = operations and Maintenance; SCF = Strategic Climate Fund

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

18. The financial management assessment (FMA) was prepared in February 2020 in accordance with the ADB's Guidelines for Financial Management and Analysis of Projects and Financial Due Diligence: A Methodology Note.[5] The FMA considered the capacity of EDC, the executing agency and implementing agency, including funds-flow arrangements, staffing, accounting and financial reporting systems, financial information systems, and internal and external auditing arrangements, and the performance of the executing agency with the financial management and reporting obligations under previous ADB loan and grant agreements.

19. Based on the assessment, the key financial management risks identified provided in Table 10. It is concluded that the overall pre-mitigation financial management risk is moderate. EDC itself is familiar with ADB requirements and procedures and has satisfactorily implemented previous ADB projects.

20. The government and EDC have agreed to implement an action plan as key measures to address the deficiencies. The financial management action plan is provided in Table 11.

21. The detailed FMA is accessible from the list of linked documents in Appendix 2 of the RRP.

Table 10: Risk Assessment and Risk Management Plan

Risk Description	Risk Assessment	Mitigation Measures or Risk Management Plan
Inherent Risk		
Country-specific – weak PFM system, particularly governance, transparency and accountability of public expenditures	Substantial	ADB continues to support on-going efforts to strengthen PFM through technical assistance, including a proposed Technical Assistance Facility[a]
Entity-specific – shortage of skills in financial management, management accounting, financial reporting and internal audit	Low	EDC staff are familiar with ADB requirements from previous projects. Capacity will be further uplifted with assistance from ADB, by attending trainings. The accounting department is currently fully staffed Spot and random checks of expenditures during review missions.
Overall inherent risk	**Moderate**	
Project Risk		
Implementing Entity – malpractice and abuse of PFM rules by employees	Low	EDC has strengthened internal audit controls in compliance with the Program Action Plan under Loan 3789-CAM. This required auditing of individual projects, which was previously not undertaken, and the provision of training in ADB requirements to all internal audit staff by December 2018.

[5] ADB. 2015. *Financial Management Technical Guidance Note–Financial Management Assessment*. Manila.

Risk Description	Risk Assessment	Mitigation Measures or Risk Management Plan
Funds Flow – government may be unable to meet funding obligations due to budget constraints	Low	Project financing plan has been agreed with the government and restricted to a few project components to ensured availability of counterpart financing
Staffing – EDC has limited staff capability in financial management, accounting, budgeting, internal controls and financial reporting.	Moderate	EDC staff are familiar with ADB requirements from previous projects and have been trained in ADB project accounting and reporting requirements. Further training will be conducted during the project implementation
Accounting policies and procedures – Project accounting procedures introduces operational risk through manual processes.	Low	Use of MS Excel for project financial management rather than accounting software creates some risk. This is mitigated by requirements to transfer all data annually from MS Excel files to EDC's accounting software and internal and external audits of the consistency and accuracy of data entries. Only authorized project managers and finance officers are permitted to enter data.
Internal audit – previously weak internal audit department	Low	The internal audit department has been made fully operational since end-2018 in compliance with the Program Action Plan under Loan 3789-CAM. This required auditing of individual projects, which was previously not undertaken, and the provision of training in ADB requirements to all internal audit staff by December 2018.
External audit – delay in the submission of externally audited project accounts due to limited capacity, annual audit may not meet ADB requirements	Moderate	Under current projects, externally audited project accounts have been submitted within 6–7 months (covenant of 6 months). EDC will apply CPSAS for reporting, in compliance with RGC instructions, from 2020 accounts, which meets ADB requirements for a fair presentation accounting framework. EDC will also provide financial projections in accordance with ADB requirements
Reporting and monitoring – unreliable reports due to errors and limited staff capability in ADB financial reporting requirements	Low	EDC staff are familiar with ADB requirements from previous projects and have been trained in ADB project accounting and reporting requirements. Project accounts are subject to internal and external audit. Further training will be conducted during the project implementation
Information systems – accounting data not adequately safeguarded	Low	Regular back-ups to secured locations are undertaken. Access to financial management software and systems is limited to authorized project manager and financial officers.
Overall Project Risk	**Low**	

Risk Description	Risk Assessment	Mitigation Measures or Risk Management Plan
Overall (Combined) Risk	**Moderate**	

ADB = Asian Development Bank, EDC = Electricité du Cambodge, PFM = public financial management.
[a] ADB. 2019. *Technical Assistance for Strengthening Project Readiness, Procurement and Financial Management in Southeast Asia.* Manila.
Source: Asian Development Bank.

Table 11: Financial Management Action Plan

Areas for Improvement	Mitigation Action	Responsibility	Timeframe
EDC's project financial statements follow the cash-basis in compliance with the Cambodia Public Sector Accounting Standard (CPSAS) and to be audited by external auditor	TOR for new external auditor, to be appointed in 2020, to include: • Project financial statements to be audited in accordance with CPSAS to comply with ADB's requirement for a fair presentation accounting framework including an auditor's opinion • The project financial statements to include a statement of budgeted against actual expenditures. • The project financial statements to include a reasonable assurance by the external auditor that the loan proceeds were used only for the purposes of the project, of compliance with financial covenants contained in the loan agreements and the degree of compliance.	EDC	Before loan effectiveness
Official confirmation of the exemption of payments under ADB projects from withholding tax will be obtained from MEF	• EDC to submit letter to MEF requesting exemption of withholding tax. • MEF subsequently to issue confirmation of exemption from withholding tax in the form of an official letter to EDC.	EDC and MEF	Before loan effectiveness
Financial projections will contain the required information to assess the financial position of EDC and compliance with agreed covenants	• EDC to submit to ADB, on an annual basis by 31 December, summary financial statements (income statement, balance sheet, statement of cash flows) projections for the current and following fiscal year that enable assessment of projected compliance with agreed covenants	EDC	December 2020 and annually thereafter
EDC accounting and internal audit staff will be trained in ADB	• EDC to ensure all staff involved in financial management and accounting for the proposed	EDC	Annually

Areas for Improvement	Mitigation Action	Responsibility	Timeframe
requirements and procedures	project and internal audit staff have received training or will do so within one year of loan effectiveness for existing staff and within one year of joining for new staff		

ADB = Asian Development Bank, CPSAS = Cambodian Public Sector Accounting Standards, EDC = Electricité du Cambodge, MEF = Ministry of Economy and Finance, TOR = terms of reference.
Source: Asian Development Bank

B. Disbursement

1. Disbursement Arrangements for ADB, SCF, and CEF Funds

22. The loans and grant proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time)[6], and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.[7] Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

23. **Direct payment procedure.** Payment for engineering, procurement and construction [EPC] contracts, EPC operations and maintenance [O&M] contract, and project implementation consulting services will be disbursed by ADB through direct payment procedure. EDC will be responsible for (i) preparing disbursements projections, (ii) collecting and retaining supporting documents, and (iii) preparing and sending withdrawal applications to the Ministry of Economy and Finance (MEF) for onwards submission to ADB. Each withdrawal application must include the claim and invoice from the contractor or consultant and approved by the MEF's and EDC's authorized representative.

24. **Reimbursement procedure.** The reimbursement procedure may be used to pay for eligible expenditures as specified under retroactive financing and that have been incurred and paid for by EDC out of its own resources. Under this procedure, ADB's payments will be made to EDC's bank account. This procedure will require submission of full supporting documentation. A signed withdrawal application (WA) must be submitted to ADB together with the required supporting documents. To substantiate the requested disbursement is for eligible expenditures incurred and paid, the following supporting documents must be submitted to ADB together with the WA: i) for consultant service provider advance payment: consultant service provider's invoice (indicating date, amount, and bank account details) and official receipt, bank transfer record or other proof of payment, ii) for contractors advance payment: contractor's invoice (indicating date, amount, and bank account details) and official receipt, bank transfer record or other proof of payment. In addition, the following supporting documents should be retained by EDC for annual audit of project financial statements and/or ADB's review: i) for consultant service provider advance payment: contract terms and conditions which refer to payment of advance, breakdown of amount due, and other documents as required in the contract, and ii) for contractors advance payment: contract terms and conditions which refer to payment of advance, breakdown of amount

[6] The handbook is available electronically from the ADB website (https://www.adb.org/documents/loan-disbursement-handbook).
[7] Disbursement eLearning is available at https://elearn.adb.org/course/view.php?id=221

due, and other documents as required in the contract. Such records[8] should be retained for at least 1 year following receipt by ADB of the final audited project financial statement or 2 years after the loan closing date, whichever is later.

25. Before the submission of the first WA, 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 government, together with the authenticated specimen signatures of each authorized person. The minimum value per WA is stipulated in the Loan Disbursement Handbook (2017, as amended from time to time). Individual payments below such amount should be paid by the borrower and subsequently claimed to ADB through reimbursement, unless otherwise accepted by ADB. The borrower should ensure sufficient category and contract balances before requesting disbursements. Use of ADB's Client Portal for Disbursements[9] system is encouraged for submission of withdrawal applications to ADB.

2. Disbursement Arrangements for Counterpart Fund

26. Counterpart funds will finance the costs for (i) land acquisition and safeguard mitigation measures (EDC), (ii) contingencies (EDC), (iii) taxes and duties (government), and (iv) financial charges during implementation (government). EDC will receive a customs and sales tax exemption from the government on imported goods which is considered as in-kind counterpart fund contribution. Disbursement and liquidation of counterpart fund will follow government procedures.

C. Accounting

27. EDC will maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project following Cambodian Public Sector Accounting Standards. EDC will prepare project financial statements in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

D. Auditing and Public Disclosure

28. Until the project completion date specified in paragraph 3 of Schedule 1 to the Loan Agreement (or any other date as may be agreed by EDC and ADB in writing), EDC will submit (i) by 30 April of each fiscal year unaudited summary financial statements including income statement and statement of cash flow; (ii) by 30 June of each fiscal year audited entity financial statements (as described in para 32 below); and (iii) by 30 November of each fiscal year a letter confirming that EDC has allocated and maintains adequate funds and resources (as described in para 30 below) to cover the Contingency Amount advised to EDC by ADB in due course.

29. Without prejudice to the foregoing or any other provision of this PAM, ADB may, upon its sole discretion, determine that with respect to any anticipated withdrawal request under the Loan, SCF Grant or CEF Grant, it is satisfied that EDC has allocated and maintains adequate funds and resources to cover the Contingency Amount based on the Project Executing Agency's most recently submitted audited financial statements and/or summary financial statements and/or the

[8] Following general business practices, ADB may accept digital form of the records, if appropriate controls are in place to avoid alteration to the original.

[9] The Client Portal for Disbursements facilitates online submission of WA to ADB, resulting in faster disbursement. The forms to be completed by the Borrower are available online at https://www.adb.org/documents/client-portal-disbursements-guide.

confirmation letter. For the avoidance of doubt, such determination will only apply to the specific withdrawal request from the Borrower or Recipient and shall not prejudice the right of ADB to require the full set of evidence in relation to the Contingency Amount for any subsequent request for disbursement under the Loan, SCF Grant or CEF Grant.

30. The Contingency Amount is, (i) as of the date of the Loan Agreement and the date of the first disbursement under the Loan, SCF Grant or CEF Grant, twenty one million two hundred and twenty thousand Dollars ($21,220,000) and (ii) at any later date a lesser amount reflecting any potential gap in the financing of the project and calculated by ADB taking into consideration the project cost savings at a particular stage of the project implementation, the aggregate amount of the Loan, SCF Grant and CEF Grant proceeds drawn down by the Borrower, the total amounts awarded under the EPC Contracts and EPC (O&M) Contract for financing the Works and Services and estimated further contingencies that might be required for the purpose of completion of the project, which amount shall be reduced pro rata to the aggregate amount of Loan, SCF Grant and CEF Grant drawn down under the project as at the date of calculation.

31. EDC will cause the detailed project financial statements to be audited in accordance with Cambodian International Standards on Auditing by an independent auditor acceptable to ADB. The audited project financial statements together with the auditor's opinion will be presented in the English language to ADB within six (6) months from the end of each fiscal year by EDC.

32. The audited entity financial statements, together with the auditor's report, will be submitted in English language to ADB by June 30 of each fiscal year.

33. The audit report for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the loan and grants were used only for the purpose(s) of the project; and (iii) whether the borrower or executing agency was in compliance with the financial covenants contained in the legal agreements (where applicable).

34. 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.

35. The government and EDC have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.[10] ADB reserves the right to require a change in the auditor (in a manner consistent 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

[10] ADB's approach and procedures regarding delayed submission of audited project financial statements:

(i) When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next 6 months, requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.

(ii) When audited project financial statements are not 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 advance accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the loan may be suspended if the audit documents are not received within the next 6 months.

(iii) When audited project financial statements are not received within 12 months after the due date, ADB may suspend the loan.

are substantially delayed. 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.

36. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Access to Information Policy 2018.[11] After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The additional auditor's opinions and audited entity financial statements will not be disclosed.

VI. PROCUREMENT AND CONSULTING SERVICES

37. **Procurement capacity assessment.** The procurement capacity assessment was conducted in January 2020 in accordance with the Guidance Note on Procurement-Procurement Risk Framework of ADB, ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). Based on the assessment the key procurement risk identified are provided in Table 12. It is concluded that the overall pre-mitigation procurement risk of EDC, the executing agency and implementing agency, is moderate. With the risk management plan, procurement risks are mitigated, and the procurement risk assessment is rated as low. MEF and EDC have agreed to implement the risk management plan. The detailed procurement capacity assessment is accessible from the list of linked documents in Appendix 2 of the RRP.

Table 12: Procurement Risk Assessment

Risk	Descriptor	Likelihood Score	Description	Indicative Probability
No e-procurement in Cambodia	Substantial	5	Will not be incorporated during the project implementation	100%
Inadequate Procurement Capacity	Moderate	3	May affect for international open competitive bidding processing and selection of consulting firms	50%
Delay in Release of Counterpart Funds	Low	2	Budget planning and funds transfer delayed	25%

Table 13: Procurement Risk Management Plan

Risk	Risk Assessment	Risk Measures/ Risk Management Plan	Mitigated Risk Assessment
No e-procurement in Cambodia	Substantial	Strong oversight by ADB and project start-up consultants support in bid document preparation, prior reviews, bid evaluation and documentation	Moderate
Inadequate Procurement Capacity especially for international open competitive bidding and consultant selection	Moderate	Strong oversight by ADB and project start-up consultants support in bid document preparation, prior reviews, bid evaluation and documentation An international procurement specialist and a national procurement specialist will be engaged to build procurement capacity of the Project Procurement Unit (PPU) and assist the PPU to carry out procurement for the proposed project.	Low

[11] ADB. 2018. *Access to Information Policy*. https://www.adb.org/documents/access-information-policy.Manila.

Risk	Risk Assessment	Risk Measures/ Risk Management Plan	Mitigated Risk Assessment
		Advance contracting will be initiated for project implementation consultants, EPC contracts and EPC (O&M) contract) Master bidding documents prepared during project preparation will be used for open competitive bidding. The PPU should be provided targeted capacity development for project administration (procurement, financial management and monitoring and evaluation) under the ongoing Capacity Development Technical Assistance Strengthening Capacity for Improved Implementation of Externally Funded Projects in Cambodia (approved May 2017, financed by the Japan Fund for Poverty Reduction).	
Delays in Release of Counterpart Funds	Low	Senior management of EDC to expedite allocation of counterpart funds.	Low
	Moderate		**Low**

A. Advance Contracting and Retroactive Financing

1. Advance Procurement Action

38. ADB provides support to EDC in preparing master bidding documents (EPC contracts for transmission lines and substations, EPC (O&M) contract for BESS, and terms of reference for project implementation consulting services. In addition, ADB engaged project start-up consultants to support EDC in (i) finalizing bid documents, tendering, and evaluating of bids for EPC contracts and EPC (O&M) contract and (ii) finalizing of terms of reference for project implementation consulting services, requesting and evaluating proposals, and selecting project implementation consulting services. The team composition of project start-up consultants is procurement specialist (international and national), environmental and social safeguard specialist (national), transmission line and substation engineer (international), and battery energy storage engineer (international).

39. The government and EDC agreed that advance procurement actions will commence immediately after fact-finding mission in March 2020. It will support timely project implementation with contracts being signed before or immediately after loan effectiveness. The following procurement timeline for transmission lines, substations (EPC contracts) and battery energy storage system (EPC [O&M] contract) is planned:

i) Finalize bid documents: 15 June 2020
ii) Issue invitation to bid: 15 July 2020
iii) Deadline for submission of bids: 30 August 2020
iv) Award of contracts: 30 November 2020

40. The issuance of invitations to bid under advance contracting will be subject to ADB approval.

2. Advance Contracting

41. All advance contracting and retroactive financing will be undertaken in conformity with ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time) using ADB Standard Bidding Documents, issued June 2018. The issuance of invitations to bid under advance contracting will be subject to ADB approval. ADB informed the government and EDC that while advance contracting is part of the normal procedure, approval of advance contracting and retroactive financing does not commit ADB to approve the loan/grant project or to finance the consulting recruitment costs.

42. Advance contracting will be undertaken for EPC contracts for transmission lines and substations and project implementation consulting services. The steps to be concluded in advance will include (i) preparation of procurement plans, bid documents, tendering, and evaluation of bids for equipment and civil works; (ii) approval of procurement plans, bid documents, tendering, and evaluation of bids for equipment and civil works; (iii) endorsement of safeguard documents by EDC and ADB; and (iv) finalization of terms of reference for consulting services, requesting and evaluating proposals, and selecting consulting services.

43. The following contract packages have been identified for advance contracting to undertake procurement before the loan agreement is signed so that project implementation can commence immediately following loan effectiveness:

i) Project implementation consultants;
ii) EPC contract for substations; and
iii) EPC contract for transmission lines.

3. Retroactive Financing

44. Withdrawals from the relevant loan account may be made for reimbursement of eligible expenditures incurred under the project before the effective date, but not earlier than 12 months before the date of the loan (ADB loan) agreement, subject to a maximum amount equivalent to 20% of the total loan (ADB loan). Retroactive financing may be made for reimbursement incurred and paid by EDC for i) advance payment of project implementation consultant contract; ii) advance payment of EPC contract for Substations with GIS Switchgear (Package 1); iii) advance payment of EPC contract for Substations Outdoor Switchyard (Package 2), and iv) advance payment of EPC contract transmission lines (Package 3). EDC should provide sufficient evidence satisfactory to ADB of having incurred the eligible expenditures to be eligible to claim amounts to be retroactively financed (Paragraph 24 and Loan Disbursement Handbook 2017).

45. ADB informed the government and EDC that if retroactive financing will not be approved for the project, then contracts procured under advance action will be signed after loan and grant effectiveness.

B. Procurement of Goods, Works, and Consulting Services

46. EPC contracts for transmission lines and substations, EPC (O&M) contract for BESS, project implementation consulting services firm will be procured in accordance with ADB

Procurement Policy (2017, as amended from time to time)[12] and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).[13]

47. To ensure that there is Value for Money and competitive tension in the procurement process, the procurement for transmission lines, substations, and BESS is split into 4 large packages to be procured through Open Competitive Bidding (OCB) with international advertisement. OCB procedures will be used for (i) EPC contracts for transmission lines and substations, and (ii) EPC (O&M) contract for battery energy storage system. Quality- and cost-based selection will be used to engage project implementation consulting firm. An 18-month procurement plan indicating threshold and review procedures, contract packages and OCB guidelines is provided below. To ensure that there is Value for Money and competitive tension in the procurement process, the procurement for transmission lines, substations, and BESS is split into 4 large packages to be procured through Open Competitive Bidding with international advertisement. The proceeds of the loan, the SCF grant and the CEF grant may be used to procure goods, works, and services under the project from non-member countries of ADB.

48. EPC contractors will be required to submit a coronavirus disease risk management plan showing what type of arrangements the contractor will take to address the risk. Further, the contractor shall not use any asbestos containing materials (ACMs) in the construction such as the building construction for substations.

C. Procurement Plan

<table>
<tr><td colspan="3">Project Name: Cambodia Grid Reinforcement Project</td></tr>
<tr><td colspan="2">Project Number: 53324-001</td><td>Approval Number:</td></tr>
<tr><td colspan="2">Country: Cambodia</td><td>Executing Agency: Electricité du Cambodge (EDC)</td></tr>
<tr><td colspan="2">Project Procurement Classification: B
Project Procurement Risk: Medium</td><td>Implementing Agency: EDC</td></tr>
<tr><td colspan="2">Project Financing Amount:
ADB OCR (Concessional Loan): $127,800,000
Strategic Climate Fund: $4,700,000
Clean Energy Fund: $2,000,000
Government: $28,951,502
EDC: $30,201,519
Total: $193,653,021</td><td>Project Closing Date: 30 June 2025</td></tr>
<tr><td colspan="2">Date of First Procurement Plan:
24 June 2020</td><td>Date of this Procurement Plan:
24 June 2020</td></tr>
<tr><td colspan="2">Procurement Plan Duration (in months): 18</td><td>Advance Contracting: Yes</td><td>e-Procurement: No</td></tr>
</table>

1. Methods, Review, and Procurement Plan

49. Except as ADB may otherwise agree, the following methods shall apply to the procurement of goods, works, non-consulting services, and consulting services.

[12] Available at https://www.adb.org/documents/adb-procurement-policy.
[13] Available at https://www.adb.org/documents/procurement-regulations-adb-borrowers.

Procurement of Goods, Works, and Non-consulting Services	
Method	**Comments**
Open competitive bidding with international advertising for goods	The proposed equipment is not manufactured in Cambodia.

Consulting Services	
Method	**Comments**
Quality and Cost-based Selection	Project Implementation Consultants

2. Lists of Active Procurement Packages (Contracts)

50. The following table lists goods, works, non- consulting services, and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan's duration.

Goods, Works, and Non-consulting Services							
Package Number	**General Description**	**Estimated Value ($m)**	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date (quarter, year)**	**Comments**
Substations with GIS Switchgear (i) SSP2-230/115/22kV Sen Sok Substation (ii) SPP3-115/22 kV RUPP Substation (iii) SPP4-115/22kV Boeung Tompon Substation (iv) SPP5-115/22KV Russei Keo Substation		**47.00**	**International OCB**	**Prior**	**1S2E**	**Q2/2020**	**Advertising:** International **Number of contracts:** Three (3) **Prequalification of Bidders:** No **Domestic Preference:** No **Advance Contracting:** Yes **Bidding Documents:** ADB's SBD for Plant
Substations with Outdoor Switchyard (i) SPP1-230/115kV Dangkor Substation (ii)SKCN1-230/115/22kV Samiki Meanchey Substation (iii) SKCN2-115/22kV Kampong Tralach Substation (iv) SKPC1-230/22kV Thnai Keng Substation (v) SKPC2-230/22kV Skun Substation (vi) STKO-230/115/22kV Samroang Yoang Substation		**58.00**	**International OCB**	**Prior**	**1S2E**	**Q2/2020**	
Transmission Lines Package (230kV Double Circuit Overhead Transmission Lines and 115kV Double Circuit Overhead Transmission Lines and Underground Cables in Phnom Penh and Kampong Chhang Areas)		**19.28**	**International OCB**	**Prior**	**1S2E**	**Q2/2020**	

1S2E=single-stage:two-envelope, kV=kilovolt, OCB=open competitive bidding, Q=quarter

Consulting Services							
Package Number	**General Description**	**Estimated Value ($m)**	**Selection Method**	**Review**	**Type of Proposal**	**Advertisement Date (quarter, year)**	**Comments**
PIC-01	Project Implementation Consultants	3.52	QCBS	Prior	STP	Q2/2020	**Type:** Firm **Assignment:** International **Quality-Cost Ratio:** 80:20 **Prequalification/Short-listing of Firms:** Yes **Advance Contracting:** Yes

QCBS=quality and cost-based selection, STP=simplified technical proposal

3. List of Indicative Packages (Contracts) Required Under the Project

51. The following table lists goods, works, non-consulting services, and consulting services contracts for which the procurement activity is expected to commence beyond the procurement plan duration and over the life of the project.

Goods, Works, Non-consulting and Consulting Services							
Package Number	**General Description**	**Estimated Value ($)**	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date (quarter, year)**	**Comments**
NONE							

4. List of Awarded and Completed Contracts

52. The following table lists the awarded and completed contracts for goods, works, non-consulting and consulting services.

Goods, Works, Non-consulting and Consulting Services					
Package Number	**General Description**	**Contract Value**	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
NONE					

5. Non-ADB Financing

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

Goods, Works, Non-consulting and Consulting Services				
General Description	**Estimated value (cumulative $)**	**Estimated Number of Contracts**	**Procurement Method**	**Comments**
Battery Energy Storage System	6.70	One	OCB International 1S2E	Plant SBD and includes 3 years O&M

1S2E=single-stage:two-envelope, OCB=open competitive bidding

D. Consultant's Terms of Reference (Project Implementation Consultants)

54. **Background.** The Grid Reinforcement Project (the project) will support EDC, the state-owned limited liability company, to improve transmission network capacity and stability. The project will (i) expand and reinforce the electricity transmission infrastructure by constructing 115 kilovolt (kV) and 230 kV transmission lines and associated substations in Phnom Penh, Kampong Chhnang, Kampong Cham, and Takeo provinces and (ii) introduce as a pilot the first utility-scale battery energy storage system to understand the performance of the technology and assess different business models for (a) renewable capacity firming, (b) ancillary services, and (c) transmission congestions relief and investment deferral as a combined set of services.

55. The project is aligned with the following impact: adequate and reliable power supply from environmentally sustainable energy sources ensured. The project will have the following outcome: transmission network capacity and stability improved. The project will finance the following outputs:

56. **Output 1: 115 kilovolt and 230 kilovolt grid infrastructure expanded and reinforced.** The proposed project will support the expansion of 115 kilovolt (kV) and 230 kV overhead and underground transmission lines and associated substations in Phnom Penh, Kampong Chhnang, Kampong Cham, and Takeo provinces.

57. **Output 2: First utility-scale energy storage system provided.** The pilot BESS will be capable of storing 16 megawatt-hour (MWh) of power. This is a desirable size to support the applications of (i) smoothing output at 80% from a 60MW solar park (footnote 3), (ii) providing 0.5 hour of curtailment reserve to address daily power shortcuts, (iii) providing primary frequency control, and (iv) deferring upgrades in transformer capacity at Grid Substation 6. Such stacking of multiple services is a standard feature of BESS installations and the project will enable EDC to test the requirements for and benefits of BESS in providing the combined set of services as a precursor to scaling-up its use in the future.

58. The project will support EDC in implementing the project components with a focus on procurement and contract management, construction supervision, testing and commissioning, implementation and updating and monitoring of social and environmental safeguards, project performance monitoring and evaluation. Project implementation consultants will complement existing staff of EDC, thus ensuring a high degree of implementation efficiency of components financed under the project.

59. **Team composition.** The services of a multidisciplinary team will be required intermittently over a 54-month implementation period and will involve the participation of international specialists (71 person-months) and national specialists (57 person-months). The envisaged composition of the PIC is as follows:

Positions	Number	Person-Months
International		
Team leader, Transmission line and substation engineer	1	18
Civil engineer	1	8
HV Cable specialist	1	8
GIS Substation specialist	1	8
SCADA & Communication engineer	1	8
Battery energy storage system engineer	1	12

Positions	Number	Person-Months
Environment safeguard consultant	1	3
Social safeguard consultant	1	3
Gender and social development consultant	1	3
Subtotal		71
National		
Deputy team leader, Transmission line and substation engineer	1	22
Civil engineer	1	8
Electrical engineer	1	6
Procurement and contract management consultant	1	6
Environment safeguard consultant	1	6
Social safeguard consultant	1	6
Gender and social development consultant	1	3
Subtotal		57
Total		**128**

60. **Scope of work**. The PIC will be responsible for delivering the project on time, within the stated budget and in compliance with specified scope and quality requirements. The PIC team will be based in the EDC office in Phnom Penh and will visit the sites on a regular basis. International and national specialists will work on an intermittent basis, with national specialists assisting the international specialists in delivering the required outputs.

61. The PIC will work closely with EDC and its Project Management Office, the Ministry of Mines and Energy (MME), Ministry of Economy and Finance (MEF), and the Ministry of Environment (MOE). The tasks to be performed as part of the PIC's scope of work will include the following (amongst others):

1. Detailed Design Phase

a. Task 1: Approval of EPC Designs

62. Responsibility: Team leader, deputy team leader, specialist engineers, procurement and contract management consultants.

i. Tasks

a) support EDC in reviewing the specialist design components of the transmission line and substation contracts including foundations and civil works, HV cables, GIS switchgear, SCADA & Communications; and
b) support EDC in processing of variation orders for modified contract values, to reflect the final designs, based on the tendered unit prices.

ii. **Deliverables.** Approved **all documents related to the project.**

b. Task 2: Environmental Safeguard Implementation

63. Responsibility: Team leader, deputy team leader, environment safeguard consultant.

i. Tasks

a) Assist EDC in applying government laws and regulations and ADB Safeguard Policy Statement (SPS) 2009 requirements in finalizing and /or updating of initial environmental examination (IEE) and environmental management plan (EMP).

b) Update the IEE and EMP to take account of detailed designs and engineering of the transmission line and substation infrastructure and battery energy storage system, factoring any new details and developments into the mitigation and monitoring plans, budget and capacity development needs of EDC. Ensure that all relevant requirements of the EMP, including any updates, are adequately addressed. Ensure design and pre-construction mitigation measures as set out in the EMP are addressed.

c) Support EDC in obtaining ADB approval for the updated and final IEE, EMP.

d) Ensure that a grievance redress mechanism (GRM) is in place and that affected people / households, institutions and other relevant stakeholders are informed about procedures to place a complaint for any environmental issues. Assist EDC with: (i) inclusion of GRM focal point contact details in public information booklet; (ii) preparing terms of reference for grievance redress focal points as needed and building capacity of the grievance committee members; (iii) maintaining adequate recording of the complains. Consultant will assist in drafting templates for grievance logs and forms as needed; (iv) responses to complaints from affected people/households and institutions and ensure their resolution in a timely manner; and (v) establishing and regularly updating a database of complaints received and status of their resolution and any bottlenecks, and summarizing the status of the GRM in the periodic and safeguards monitoring reports to be submitted to ADB.

e) Ensure that the EPC contractors prepare their respective site-specific Construction Environmental Management Plans (CEMPs) based on the updated EMP and on actual site conditions prior to mobilizing.

f) Assist EDC in coordinating with the MOE and the local authorities on all relevant clearances, permits, and environmental regulatory compliance issues.

g) Assist EDC in conducting environmental baseline surveys as per EMP monitoring plan

h) Assist EDC with information disclosure, meaningful consultation and participation on an ongoing basis throughput project implementation including dissemination of project information (e.g. project information leaflets / booklets, Frequently Asked Questions flyers, results of environment baseline surveys, environmental safeguards, emergency response plans, community health and safety

measures and grievance redress mechanism; and integrate public views in project planning.

i) Support EDC in drafting, implementing and monitoring a Stakeholder Communication Plan, based on the prepared Stakeholder Communication Strategy, including nominating a focal point for communication with stakeholders, ensuring delivery of relevant project information (including job opportunities available during construction) to stakeholders and obtaining feedback from them, and fostering an understanding and acceptance of the project.

ii. Deliverables. updated, final, approved IEE, EMP, Stakeholder Communication Plan;

c. Task 3: Social Safeguard Implementation

64. Responsibility: Team leader, deputy team leader, social safeguard consultant.

i. Tasks

a) Support EDC that a GRM is in place and that affected people/households, institutions and other relevant stakeholders are informed about it and the procedures to place a complaint for any project-related social issues. Assist EDC with: (i) preparing terms of reference for grievance redress focal points as needed and building capacity of the grievance committee members; (ii) maintaining adequate recording of the complains. Consultant will assist in drafting templates for grievance logs and forms as needed; (iii) responses to complaints from affected people/households and institutions and ensuring their resolution in a timely manner; and (iv) establishing and regularly updating a database of complaints received, status of their resolution including any bottlenecks, and summarizing the status of the GRM in the periodic and safeguards monitoring reports to be submitted to ADB.

b) Following completion of the detailed design, update and submit for EDC and ADB approval and disclosure:

i) The final Land Acquisition and Resettlement Plan (LARP) (per section, if relevant/requested by EDC). Specifically, consultant will help EDC to: (a) finalize census of the affected person; (b) conduct detailed measurement survey of the affected land/assets; (c) finalize socioeconomic survey; (d) conduct replacement cost study; (e) conduct consultations including with vulnerable groups; and (f) update the Project Information Booklet and distribute to the affected persons. Consultant will provide training for personnel responsible for conducting a detailed measurement survey; prepare the terms of reference for replacement cost study of affected land

and assets; prepare guidelines and support EDC in conducting consultations with affected households, including public consultations, focus group discussions and individual consultations with Displaced Persons (DPs) and vulnerable groups.

ii) The final Resettlement Due Diligence Reports (RDDRs).

c) Support EDC in implementing the updated/final LARP approved by EDC and ADB,[14] as needed to ensure compliance with the agreed provisions, loan covenants, ADB SPS and government laws and regulations.

d) Support EDC in following requirements stipulated in the LARF for any negotiated land acquisition, in case expropriation results upon failure of negotiations with landowners/users. Consultant should follow-up with EDC and remind that an independence external party is engaged, and a verification/due diligence report prepared for cases of negotiated land acquisition in line with ADB SPS.[15] Consultant will support EDC in preparing the LARP for subproject in case negotiated settlement fails.

e) Prepare LARP Implementation Compliance Report immediately after completion of the payment of compensation and other entitlement/assistance; support EDC in addressing ADB comments/finalizing and obtaining ADB's approval of the report and its disclosure. This report will serve a basis for ADB's "no-objection" for commencement of construction.

f) Support EDC in drafting, implementing and monitoring a Stakeholder Communication Plan, based on the prepared Stakeholder Communication Strategy, including nominating a focal point for communication with stakeholders, ensuring delivery of relevant project information (including job opportunities available during construction) to stakeholders and obtaining feedback from them, and fostering an understanding and acceptance of the project.

g) Assist with the establishment and maintenance of a database of affected households and institutions, including information on the socio-economic situation of the affected households, their affected assets, and their compensation entitlements and payments.

h) Provide training to Social, Environmental and Public Relations Office on negotiated settlement procedures in line with ADB SPS requirements as needed.

[14] This means payment compensation and other entitlements due to affected persons are fully paid, and Income Restoration Program (if relevant) is in place and supported by adequate budget

[15] Refer to Appendix 2, para 25, page 48–49.

ii. Deliverables. updated, final and approved RDDRs, LARP, Stakeholder Communication Plan, established database of the affected people/households (disaggregated) and institutions.

2. Construction Phase

a. Task 4: Construction supervision of EPC contractors (transmission lines and substations)

65. Responsibility: Team leader, deputy team leader, specialist engineers, procurement and contract management consultant, environment safeguard consultants, social (resettlement) safeguard consultants, gender and social development consultants.

i. Tasks

a) Support EDC in administering the transmission line and substation contracts: certification of invoices, award of extensions of time, certification of completions, processing of variation orders, evaluation of claims, settlement of disputes and the like.
b) Support EDC in undertaking factory inspections and performance tests within the framework of the contracts.
c) Conduct regular site visits and support EDC in monitoring construction, installation, testing, and commissioning of the works; identify any issues/problems during project implementation; propose remedial actions and report outstanding issues.
d) Support EDC in monitoring the specialist design requirements during construction including foundations and civil works, HV cables and jointing, GIS switchgear, SCADA & Communications.
e) Monitor compliance with applicable national labour laws and core labour standards, including but not limited to equal pay for equal work regardless of gender, race or ethnicity, and excluding child labour.
f) Support EDC in coordinating with the EPC contractors in carrying out the upgrades to the existing connecting grid substations to accommodate the connection of the transmission line and substation subprojects to the EDC grid.
g) Support EDC in reviewing and approving CEMPs prior to civil works commencing, supervising and regularly monitoring implementation of EMP, community and occupational health and safety measures and GRM by all parties on the site.
h) Support EDC in reviewing and approving the commissioning test reports submitted by the EPC contractors and attend the commissioning and testing of the transmission line and substation infrastructure.
i) Support EDC in preparing and issuing the provisional acceptance certificate and final taking over certificate for

sections and the whole of the works. Establish a list of outstanding works and deficiencies before taking over the works and submit it to the EPC contractor together with the time frame in which the outstanding works and deficiencies are to be remedied.

j) Support EDC in reviewing and approving the as-built drawings and O&M manuals produced by the transmission line and substation infrastructure contractors.

k) Support EDC in overseeing the completion of the outstanding works and deficiencies and close out the contract on satisfactory completion of the defect's liability period.

ii. Deliverables. Commissioning & testing reports and completion reports for transmission lines and substations.

b. Task 5: Construction supervision of EPC O&M contractor (battery energy storage system)

66. Responsibility: Team leader, deputy team leader, specialist engineers, procurement and contract management consultant, environment safeguard consultants, social (resettlement) safeguard consultants, gender and social development consultants.

i. Tasks

a) Support EDC in administering the battery energy storage system contract: assisting with the approval of designs and drawings, certification of invoices, award of extensions of time, certification of completions, processing of variation orders, evaluation of claims, settlement of disputes and the like.

b) Support EDC in undertaking factory inspections (such as FAT at BESS supplier) and performance tests within the framework of the contract.

c) Conduct regular site visits and support EDC in monitoring construction, installation, testing, and commissioning of the works; identify any issues/problems during project implementation; propose remedial actions and report outstanding issues.

d) Monitor compliance with applicable national labour laws and core labour standards, including but not limited to equal pay for equal work regardless of gender, race or ethnicity, and excluding child labour.

e) Support EDC in coordinating with the EPC contractors for the substation and the battery energy storage system in carrying out the upgrades to the connecting grid substation to accommodate the connection of the battery energy storage system to the substation and the EDC grid.

f) Support EDC in reviewing and approving CEMPs prior to civil works commencing, supervising and regularly monitoring implementation of EMP, community and

occupational health and safety measures and GRM by all parties on the site.

g) Support EDC in reviewing and approving the commissioning test report submitted by the EPC contractor and attend the commissioning and testing of the battery energy storage system.

h) Support EDC in preparing and issuing the provisional acceptance certificate and final taking over certificate for the whole of the works. Establish a list of outstanding works and deficiencies before taking over the works and submit it to the EPC contractor together with the time frame in which the outstanding works and deficiencies are to be remedied.

i) Support EDC in reviewing and approving the as-built drawings and O&M and installation manuals produced by the battery energy storage system contractor.

j) Support EDC in overseeing the completion of the outstanding works and deficiencies and close out the contract on satisfactory completion of the defect's liability period.

k) Monitor compliance of the EPC contractor to undertake operation and maintenance of the battery storage energy system as specified in the contract. Ensure that EDC staff including women are effectively trained by the EPC contractor to operate and maintain the battery storage system at the end of the contract.

l) Support EDC as a supervisor for the complete installation and commissioning process of the BESS on site.

m) Support EDC in terms of project management for the communication with the BESS supplier regarding delivery of components and the timetable for installation and commissioning

ii. Deliverables. Commissioning & testing reports, completion and operation and maintenance reports for battery energy storage system.

c. Task 6: Environmental Safeguard Monitoring

67. Responsibility: Team leader, deputy team leader, environment safeguard consultant.

i. Tasks

a) Assist EDC in implementing IEE, EMP, and GRM. Ensure construction mitigation measures as set out in Environmental Management Plan and Environmental Monitoring Plan are implemented.

b) Assist EDC in drafting and/or updating the Public Information Leaflet /Booklet for anticipated environmental impacts during construction and operation phases, GRM, grievance redress committee, contact persons and any other details as relevant.

c) Provide training to contractors, relevant Project Management Office personnel and facility operators on EMP implementation, provide training and checklist for monitoring parameters and responsibilities; on conducting consultations with affected people/households and communities on ongoing basis during project implementation.

d) Assist EDC with the information disclosure, meaningful consultation and participation on an ongoing basis throughput project implementation including dissemination of project information (e.g. project information leaflets/booklets, Frequently Asked Questions flyers, results of environment baseline surveys, environmental safeguards, emergency response plans, community health and safety measures and grievance redress mechanism; and integrate public views in project planning.

e) Assist EDC in obtaining monthly information from the contractors in a simple report template to report on mitigation activities, environmental issues and corresponding corrective actions proposed or taken, including grievances reported and status of resolution.

f) Assist EDC in environmental monitoring, preparation of project quarterly progress report and semi-annual safeguard reporting during construction phase.

ii. Deliverables. contribution to the quarterly project progress reports, semi-annual safeguard monitoring reports, and other reports as required.

d. Task 7: Social Safeguard Monitoring

68. Responsibility: Team leader, deputy team leader, social (resettlement) safeguard consultant

i. Tasks

a) Assist EDC in preparing semi-annual social safeguard monitoring and safeguard sections of the quarterly project progress reports for submission to ADB.

b) Conduct regular site visits and support EDC in monitoring safeguard compliance during construction and installation works; identify any issues/problems during project implementation; propose remedial actions and report outstanding issues.

c) In close cooperation with environment safeguard consultant, assist EDC to ensure that any temporary measures (i.e. damaged pathways, structures/assets are reinstated to pre-project condition, or compensated for, any trees/crops/income losses that contractor affects during construction beyond acquired corridor of impact etc.) are addressed in compliance with CEMP, details reflected in the

quarterly progress and safeguard monitoring reports, and supporting documents are attached to these reports.

ii. **Deliverables.** contribution to the quarterly reports, semi-annual safeguard monitoring reports, and other reports as required.

e. Task 8: Implementation of Gender and Social Dimensions

69. Responsibility: Team leader, deputy team leader, gender and social development consultant.

i. Tasks

a) Collaborate with EDC Project Management Unit (PMU) members and relevant offices of EDC to get them familiarized with the planned gender activities and their individual responsibilities (implementation, monitoring, reporting) as set out in the Guidance Document for the Implementation of Gender Responsive Activities by EDC.
b) Prepare, update and submit to the PMU annual results-based plans and budgets for implementation of gender activities and ensure the plan is included in the EDC Annual Workplan Budget.
c) Assist the EDC relevant offices in organizing various gender mainstreaming events and reporting.
d) Ensure provision of support to EDC Personnel Office on the development of the gender responsive policies and its implementation.
e) Consult regularly with EDC gender focal point and PMU to monitor and report on implementation of gender activities and find timely measures to address the gender related challenges and issues, which may incumber the achievement set forth in the Guidance Document for the Implementation of Gender Activities by EDC and design and monitoring framework targets.
f) Assist with information disclosure, consultations, and participation with the public including women and men and conducting separate consultations with women, on an ongoing basis throughout project implementation.
g) Work with the EDC, PIC and other relevant stakeholders to gather sex-disaggregated information on the impacts of project interventions on beneficiaries.
h) Assist the PMU and EDC gender focal point to analyze data disaggregated by sex and integrate gender sensitive indicators from the design and monitoring framework.
i) Assist EDC and PMU in preparing monitoring reports for submission to the Government and ADB, including information on progress in implementation of gender measures and completion report.
j) Perform other tasks as may be reasonably required by PMU and ADB.

ii. Deliverables. contribution to the quarterly reports, semi-annual gender progress reports, and other reports as required.

3. All Project Phases

a. Task 9: Project Administration

70. Responsibility: Team leader, deputy team leader with inputs, as required, from other team members.

i. Tasks

a) Set up a project performance monitoring and on-line document management system with access available to EDC, contractors and the PIC; maintain records of communications between EDC, other government agencies, the contractors, and ADB.
b) Support EDC in monitoring loan and grant disbursements, scrutinizing costs, and maintaining project accounts.
c) Support EDC in monitoring project implementation against the project's time schedules and work programs provided by the EPC contractors. Update the time schedules of the project and individual contracts, as necessary.
d) Support EDC in updating the PAM as required, taking into account changes in the project organization, disbursement progress and project time schedule.
e) Support EDC in undertaking other project-related tasks as can be reasonably inferred for the successful completion of the project.
f) Participate in weekly and monthly progress review meetings that will be conducted by EDC together with the EPC contractors

ii. Deliverables. periodic project review and progress reports.

b. Task 10: Contract Management

71. Responsibility: Team leader, deputy team leader, procurement and contract specialist, and inputs, as required from other team members.

i. Tasks

a) Support EDC in handling contract management issues and requests for variations of EPC contracts for transmission lines and substations
b) Support EDC in handling contract management issues and requests for variations of EPC O&M contracts for battery energy storage system
c) Assist EDC in the management of project implementation consulting contract

d) Support EDC in managing contractual complaints throughout project implementation

ii. **Deliverables.** contract implementation progress reports, any issues and requests for contract variation that may arise during the implementation.

c. Task 11: On-the-Job Training and Capacity Building

72. Responsibility: Team leader, deputy team leader, and other team members as required.

i. Tasks

a) Facilitate on-the-job training and capacity building of EDC staff (Phnom Penh and provinces) to strengthen project management with focus on financial management, on procurement and contract management, construction supervision, testing and commissioning, implementation and monitoring of social and environmental safeguards, and project performance monitoring and evaluation.

b) Coordinate on-the-job training and capacity building activities in project management with other ongoing technical assistance support provided by ADB and development partners.

c) Measure the training results through knowledge test surveys (beginning of the implementation of the Grid Reinforcement Project, at mid-term, and at the end)

ii. **Deliverables.** Training materials, results of knowledge test surveys, information incorporated in project progress reports on type of training provided, information on staff that attended etc.

73. **Reporting**. In addition to those deliverables listed above, the following reports will be submitted in accordance with ADB requirements:

i) Inception Report focusing on design activities, to be submitted within 6 weeks of the start of the services.
ii) Implementation Compliance Reports for LARP to be submitted within 15 days after the completion of implementation of LARP for the respective subproject. Updated RDDRs based on detailed engineering design to be submitted within 10 days after final detailed design for respective subproject is completed. These reports will serve a basis for ADB's no objection to commencement of civil works.
iii) Project Quarterly Progress Report to be submitted within 15 days of the end of the quarter, that will include (amongst others):
    a) Introduction and basic data
    b) Utilization of the ADB loan and counterpart funds
    c) Status of project scope/implementation arrangements
    d) Changes in the key assumptions, risks, etc.
    e) Implementation progress
    f) Compliance with the loan assurances

g) Social safeguards compliance, including summary of grievances received and resolved in the reporting period, and gender measures
h) Implementation progress of the gender action plan
i) Status of involuntary resettlement safeguard implementation to date
j) Major project issues, problems and proposed mitigation, status of grievance redress mechanism, including grievances filed and resolution status to date
k) Summary of consultations and issues with affected people/households and communities (including specific issues brought up by women, female-headed households, single parents), in the project area of influence.
l) The negotiated settlement progress documentation.
m) Semi-annual environmental and social safeguards monitoring reports to be submitted within 30 days following the end of successive six-month period during construction phase.
n) Project mid-term review report to be prepared after the midterm review.
o) Project Completion Report

74. **Qualification requirements.** International members of the PIC team should hold qualifications and possess experience appropriate to the nature of their tasks. They should be fluent in the English language, both oral and written, have knowledge of the project management systems that apply on ADB-financed projects, and will preferably have worked in Cambodia and/or in Southeast Asia. The following particular requirements will apply:

i) Team leader, transmission line and substation engineer (international) should have: (a) an engineering degree, preferably post-graduate; (b) at least 15 years' relevant experience in design, construction and commissioning of high voltage (220 kV and above) transmission lines and associated substations in emerging and developing economies; (c) at least 10 years' relevant experience in managing electricity infrastructure projects in emerging and developing economies, preferably experience in reviewing, approving and overseeing design, procurement, construction and commissioning of high voltage (220 kV and above) transmission lines and GIS substations; conducting field tests, and witnessing Factory Acceptance Tests; (d) a knowledge of construction scheduling, cost estimation, testing of construction materials, designing tower and substation foundations including knowledge of drainage system design and construction, about geotechnical investigations and on design, widening and construction of access roads; (e) solid understanding and experience in the implementation new technologies such as battery energy storage systems; (f) experience in contract management on projects funded by multilateral development banks; (g) a knowledge of project, disbursement and monitoring procedures that apply on ADB-financed projects; and (h) proficiency in written and spoken English.

ii) Deputy team leader, transmission line and substation engineer (national) should have: (a) a relevant university degree, preferably post-graduate (in engineering); (b) at least 8 years' relevant experience in high voltage (220 kV and above) electricity infrastructure projects in Cambodia; (c) a knowledge of national requirements related to such projects; and (d) proficiency in written and spoken English.

iii) Specialist engineers (international) should have: (a) engineering degree, preferably post-graduate; (b) at least 10 years' experience in their relevant fields

of design, construction and commissioning of high voltage (220 kV and above) transmission lines and substations in emerging and developing economies; (c) experience in reviewing and approving system designs and test plans, conducting field tests, and witnessing Factory Acceptance Tests; (d) a knowledge of construction scheduling, cost estimation, testing of construction materials, designing tower and substation foundations including knowledge of drainage system design and construction, about geotechnical investigations and on design, widening and construction of access roads; and (e) proficiency in written and spoken English.

iv) Battery energy storage system engineer (international) should have: (a) an engineering degree, preferably post-graduate; (b) at least 8 years' relevant experience in design, construction and commissioning of utility-scale battery energy storage systems; (c) experience in reviewing and approving system design and test plan, conducting field tests, and witnessing Factory Acceptance Tests; (d) a knowledge of construction scheduling, cost estimation, testing of battery energy storage system, and operation and maintenance; and (e) proficiency in written and spoken English.

v) Environmental specialist (international) should have a degree in environment or engineering, and at least 8 years of relevant experience in: (a) environmental management, planning and implementation; (b) conducting environmental assessments and monitoring construction impacts; (c) preparation of reports; (d) working on infrastructure projects, particularly power projects, preferably funded by ADB; and (e) proficiency in written and spoken English.

vi) Resettlement specialist (international) should have a degree in the social sciences and at least 8 years of relevant experience in: (a) social safeguards management, planning and implementation particularly in Southeast Asia, and/or Cambodia; (b) preparing methodology and tools to collect field data and conducting social impact assessment, including from a gender perspective, (c) preparing, implementing and/or monitoring implementation of resettlement and indigenous peoples plans, (d) preparation of social safeguards compliance reports, including reporting on implementation of gender measures; (e) working in infrastructure projects, particularly power projects, preferably funded by ADB; and (f) proficiency in written and spoken English.

vii) Gender and social development specialist (international) should have: (a) a degree in social sciences, development studies, gender or a related discipline; (b) at least 8 years' experience in gender-related work, including (if possible) in the energy sector; (c) familiar with gender-inclusive human resource development policies; (d) experience working on a multilateral development project, preferably funded by ADB; (e) experience in conducting gender analysis and mainstreaming including the development of public communication programs that unpack gender-based stereotypes; (f) capability to work effectively in a team; (g) willingness and ability to travel to the field; and (h) have excellent written and spoken English skills.

viii) Procurement and contract management specialist (national) should have: (a) at least Bachelor's degree in business administration, engineering, procurement, or other related field law or other related fields; (b) demonstrated experience in high value and complex procurement and contract management; (c) minimum general

experience of 10 years; (d) minimum specific experience (relevant to assignment) of 8 years; (e) experience working in Cambodia and/or Southeast Asia is preferred; and (f) proficiency in written and spoken English.

ix) Civil engineer should have: (a) an engineering degree, and (b) at least 8 years of relevant experience in the design and implementation of civil works for transmission projects in developing countries, and (c) a knowledge of substation layout design, construction scheduling, cost estimation, testing of construction materials, designing tower and substation foundations and all overseeing the design and construction of all civil works of the transmission line, and (d) knowledge of drainage system design and construction, and (e) knowledge about geotechnical investigation and (f) knowledge on design and construction of roads and (g) proficiency in written and spoken English.

x) Electrical engineer should have: (a) electrical engineering degree, (b) at least 8 years of relevant experience in substation and transmission projects and (c) proficiency in written and spoken English.

xi) Environmental specialist (national) should have a degree in environment or engineering, and at least 5 years of relevant experience in: (a) environmental management, planning and implementation; (b) conducting environmental assessments and monitoring construction impacts; (c) preparation of reports; (d) working on infrastructure projects, particularly power projects, preferably funded by ADB; and (e) proficiency in written and spoken English.

xii) Resettlement specialist (national) should have a degree in the social sciences and at least 5 years of relevant experience in: (a) social safeguards management, planning and implementation particularly in Southeast Asia, and/or Cambodia; (b) preparing methodology and tools to collect field data and conducting social impact assessment, including from a gender perspective; (c) preparing, implementing and/or monitoring implementation of resettlement and indigenous peoples plans, (d) preparation of social safeguards compliance reports, including reporting on implementation of gender measures; (e) working in infrastructure projects, particularly power projects, preferably funded by ADB; and (f) proficiency in written and spoken English.

xiii) Gender and social development specialist (national) should have: (a) a degree in social sciences, development studies, gender or a related discipline; (b) at least 5 years' experience in gender-related work, including (if possible) in the energy sector; (c) familiar with gender-inclusive human resource development policies; (d) experience working on a multilateral development project, preferably funded by ADB; (e) experience in conducting gender analysis and mainstreaming including the development of public communication programs that unpack gender-based stereotypes; (f) capability to work effectively in a team; (g) willingness and ability to travel to the field; and (h) have excellent written and spoken English skills.

75. **Working arrangements.** EDC will be responsible for overall project implementation and management of the project. EDC will provide free-of-charge to the consultant's office space.

VII. SAFEGUARDS

76. All safeguards documents have been prepared in accordance with ADB's SPS 2009.[16] In compliance with ADB's information disclosure, consultation and participation requirements, the safeguards documents will be posted on ADB's website.[17]

77. Relevant safeguards documents include: (i) IEE; (ii) EMP; (iii) draft LARP; (iv) draft RDDRs; (v) land acquisition and resettlement framework (LARF); (vi) the stakeholder communication strategy; and (vii) summary poverty reduction and social strategy. Due diligence report (DDR) for substations sites acquired through negotiated land acquisition will be prepared by an independent external party in compliance with ADB SPS and submitted to ADB for its due diligence and records.

A. Environment

1. Climate Change Assessment

78. A climate risk and vulnerability analysis was conducted. Cambodia is highly vulnerable to the effects of climate change, in particular from floods, heat/high temperatures, droughts, windstorms, and seawater intrusion. Infrastructure, agriculture, forestry, human health, and coastal zones are the most affected sectors. At the project level, the proposed sites of transmission towers and substations are at risk to impacts of extreme weather events or tropical cyclones, intense precipitation causing floods and prolonged high temperatures which may cause strong winds and intense frequency of lightings which may also cause damages to transmission lines. The climate risk classification is high. It can be mitigated with appropriate measures. Identified and listed adaptation activities are already incorporated in EDC's standard designs for transmission lines and substations as normal good practice. They will also be reflected in the detailed engineering designs. These measures include:

i) Adequate engineering design of the subprojects, such as transmission line and substation footings to be built above the highest recorded flood levels
ii) Applying highest design standards to transmission lines to withstand increases in wind and storm intensity
iii) Reinforcing transmission line structures and building lines underground where feasible
iv) Engineering access roads and transmission infrastructure, particularly in rural locations, to consider increases in precipitation and flood conditions
v) Overhead lines to be located away from trees in the Right-of-Way and subject to periodic pruning
vi) Reduce vulnerability of exposed assets, such as outdoor substation switchgear)

79. The detailed Climate Change Assessment Report is accessible from the list of linked documents in Appendix 2 of the RRP.

2. Environmental Safeguard Categorization

80. The project is confirmed as environment category B in accordance with ADB SPS 2009. The identified impacts are site-specific and can be reduced to an acceptable level through

[16] http://www.adb.org/documents/safeguard-policy-statement
[17] https://www.adb.org/documents/access-information-policy

effective implementation of mitigation measures. No protected areas, significant migratory bird species and flyways or other particularly sensitive environmental receptors have been identified in the project areas of influence.

3. Environmental Safeguard Documentation

81. A draft IEE and EMP that comprises all transmission line and substation subprojects has been prepared and shared with EDC. The IEE and EMP have been prepared based on the feasibility studies of each transmission line and substation subproject. The battery energy storage system will be constructed at the site of the national solar park substation which is financed by ADB (footnote 3) and draft IEE and EMP was prepared in accordance with ADB SPS 2009 safeguard requirements and is being continuously updated. A Climate Change Risk Assessment report was prepared.

82. In a meeting in January 2020, MOE confirmed the domestic environmental approval requirements. MOE requested separate Initial Environmental Impact Assessments (IEIAs) grouped by province or two. EDC is responsible to prepare the terms of reference and engage the consulting firm registered by MOE. The cost for IEIA preparation will be borne by EDC. MOE confirmed that agreement of terms of reference and preparation of IEIAs can commence immediately, for example after fact-finding mission. ADB continued the project preparation consultant services of national safeguard expert to support EDC in this process until project implementation consulting firm has been engaged by December 2020.

4. Environmental Safeguard Implementation

83. The EMP will be included in the bid documents and contract requirements. The project will be implemented in accordance with the conditions of the ADB loan agreement including ADB SPS, 2009 and government environmental regulations and standards. The EMP includes mitigation and monitoring measures for each stage of project implementation (detailed engineering design, construction and operation). The PMU will be supported during implementation by International and National Environment Specialists as part of the PIC services to ensure the following activities are carried out effectively: (a) all government and ADB requirements and procedures relating to environmental safeguards are complied with prior to construction; (b) EMP implementation is monitored and results are reported regularly; (c) sufficient environmental staff resources are in place to undertake EDC's EMP responsibilities; (d) regular monitoring of the Contractor's construction activities to ensure that work is carried out in full compliance with the EMP, and environmental specifications and provisions set out in the construction contract; (d) Grievance Redress Mechanism is effectively established and functioning throughout implementation with systematic recording, resolution and reporting on issues raised; and (e) temporary contractor impacts are minimized and compensated in line with EMP and LARP.

84. The contractor will be required to prepare and implement a CEMP in accordance with the EMP in the construction contract. The EPC contractors will submit monthly progress reports to EDC on EMP implementation, which will form part of quarterly project progress reports submitted to ADB. The environmental management report will identify the work undertaken over the reporting period and document the environmental protection measures that have been carried out, problems encountered (if any), and follow-up actions that were taken (or will be taken) to correct any problems.

85. Mine/UXO removal will be the responsibility of the EPC contractor, though they will not undertake the clearance themselves – they will contract an accredited mine/UXO removal agency in each province. The EPC contractor will contact the Mine Action Planning Unit (MAPU) at the Provincial Hall in each province and provide detailed alignment maps and the CMAA mine/UXO contamination maps. The respective MAPUs will assist in the development of a clearance work plan in each province.

5. Responsibility of Environmental Safeguard Implementation

86. EDC is the main institution involved in the environmental management and monitoring of the project. EDC staff will be supported by project implementation consultants. EDC will ensure compliance to ADB safeguard requirements and coordinate with relevant government agencies and local authorities on permits and clearances as needed, update and finalize the IEE as needed, and handling complaints and/or grievances, if any filed through the GRM.

87. EDC will ensure that the EPC contractors will be informed of their responsibility of complying with the ADB safeguard requirements and the EMP and will monitor the EPC contractors workplan relevant to EMP implementation.

88. During operation, annual maintenance and inspection will be undertaken by provincial EDC technical staff. This will involve one or two people for very short (hours) periods of time. Under normal operating conditions such activities will not require the use of powered mechanical equipment other than a transport vehicle to the site.

89. EDC with support by the project implementation consultants will be responsible for environmental reporting. An environmental monitoring report will be submitted to ADB semi-annually during the project implementation period. The environmental monitoring reports will be publicly disclosed on ADB website.

B. Involuntary Resettlement

1. Social Safeguard Categorization

90. The project is confirmed as category B for involuntary resettlement in accordance with ADB SPS 2009. Construction of the four transmission lines, ten substations, and BESS is expected to have minor involuntary resettlement impact. The construction of the 11.1 km long 115 kV transmission line in Kampong Chhnang province could impact 107 households (539 persons). It is estimated that 0.615 hectare (ha) will be required permanently for the construction of tower footings. The permanent loss of land could impact 28 households (142 persons), including four severely (16 persons) and 16 vulnerable (83 persons). There will be 79 households (395 persons) affected by land use restrictions (15.835 ha) within the right-of-way. It might cause two households having to relocate their house and convert their land to agricultural use. The three remaining transmission lines and four of the ten substations will be constructed on public land in Phnom Penh. The land is free of encumbrances with no adverse permanent or temporary impacts on households, encroachment or squatters. For the remaining six substations to be constructed in Kampong Chhnang, Kampong Cham, and Takeo provinces, EDC will acquire 16.6 ha of privately-owned land from 58 households through negotiated settlement. The battery energy storage system will be constructed at the site of the national solar park substation which is financed by ADB (footnote 3), and for which the land has been acquired by EDC through negotiated land

acquisition in accordance with respective requirements of ADB SPS 2009 and an independent external party was engaged to document negotiation and settlement processes.[18]

2. Social Safeguard Documentation

91. The information on current land title, expected impacts, and safeguard documentation prepared for each subproject is provided in Table 14.

Table 14: Social Safeguard Impacts and Documentation

ID	Subproject Name	Unit	Quantity	Noted	Document
	Expected Land Acquisition				
	Transmission Lines and Substations in Phnom Penh				
TPP1	230 kV transmission line from existing GS5 to proposed Sen Sok substation	m2	1,352	Public land	RDDR
TPP2	115 kV transmission line from proposed Sen Sok to proposed Russei Keo substations	m2	409	Public land	RDDR
TPP3	115 kV transmission line from proposed Boeung Tompon substation to new Olympic substation	m2	655	Public land	RDDR
SPP1	New 230/115 kV Dangkor substation	m2	33,000	Private land	DDR third-party verified
SPP2	New 230/115/22 kV Sen Sok substation	m2	1,800	Public land	RDDR
SPP3	New 115/22 kV RUPP substation	m2	800	Public land	RDDR
SPP4	New 115/22 kV Boeung Tompon substation	m2	1,200	Public land	RDDR
SPP5	New 115/22 kV Russei Keo substation	m2	800	Public land	RDDR
	Transmission Lines and Substations in Kampong Chhang (KCN), Kampong Cham (KPC), and Takeo provinces				
TKCN1	115 kV transmission line from proposed Samiki Meanchey to proposed Kampong Tralach substations	m2	164,500	Private land	LARP
SKCN1	New 230/115/22 kV Samiki Meanchey substation	m2	32,500	Private land	DDR third-party verified
SKCN2	New 115/22 kV Kampong Tralach substation	m2	15,500	Private land	DDR third-party verified
SKPC1	New 230/115/22 kV Thnal Keng substation	m2	32,000	Private land	DDR third-party verified
SKPC2	New 230/22 kV Skun substation	m2	31,000	Private land	DDR third-party verified
STKO1	New 230/115/22 kV Samroang Yoang substation	m2	22,000	Private land	DDR third-party verified

[18] Based on the agreement between ADB and EDC the DDRs are prepared and submitted to ADB for its due diligence and records.

92. A draft LARP has been prepared for the 11.1 km transmission line that will affect 107 households (539 persons). A RDDR has been prepared for the seven subprojects to be constructed on public land.EDC will take land from government organizations that are using these land areas through internal procedures in accordance with the regulations of the Royal Government of Cambodia. A DDR has been prepared for the six substations for which EDC will acquire privately-owned land through negotiated settlement. EDC will engage an independent external party to document negotiation and settlement processes. The third-party verification report will be submitted to ADB for approval. A Land Acquisition and Resettlement Framework has been prepared in case negotiation fails, results in expropriation, and to guide any unexpected land acquisition and resettlement impacts.Under such circumstances, SPS Safeguard Requirement 2: Involuntary Resettlement will be triggered and applied to such subprojects.

93. There are seven (7) subprojects that have been identified as associated facilities of the transmission line and substation subprojects to be financed (Table 15). The results of the due diligence conducted for the associated facilities are reflected in the RDDR.

94. Information disclosure, consultation and participation process as required according to ADB SPS 2009 was initiated in January-February 2020 and will continue during the updating of the RDDRs, LARP, and throughout the project implementation period.

Table 15: Associated Facilities

N°	Subproject Name	Associated Facility
I	**Transmission Lines and Substations in Phnom Penh**	
TPP1	230 kV transmission line from existing GS5 to proposed Sen Sok substation	230kV GS 5 substation
TPP2	115 kV transmission line from proposed Sen Sok to proposed Russei Keo substations	
TPP3	115 kV transmission line from proposed Boeung Tompon substation to new Olympic substation	115 kV Olympic substation
SPP1	New 230/115 kV Dangkor substation	115 kV from GS4 – Toul Pongro TL
		115 GS4 – GS 10 TL
SPP2	New 230/115/22 kV Sen Sok substation	
SPP3	New 115/22 kV RUPP substation	230 kV UGC from NCC to Toul Kork and Beung Kok
SPP4	New 115/22 kV Boeung Tompon substation	
SPP5	New 115/22 kV Russei Keo substation	
II	**Transmission Lines and Substations in Kampong Chhang (KCN), Kampong Cham (KPC) and Takeo (TKO) provinces**	
TKCN1	115 kV transmission line from proposed Samiki Meanchey to proposed Kampong Tralach substations	
SKCN1	New 230/115/22 kV Samiki Meanchey substation	
SKCN2	New 115/22 kV Kampong Tralach substation	
SKPC1	New 230/115/22 kV Thnal Keng substation	230 kV BOT from GS 6 to GS Kampong Cham TL
SKPC2	New 230/22 kV Skun substation	
STKO1	New 230/22 kV Takeo substation	

3. Social Safeguard Implementation

95. The RDDR for the subprojects proposed to be built on public land will be updated in the event of a change in the location of a subproject. Any change in site and/or scope for a particular subproject will require an impact assessment. Should after detailed engineering design, the safeguard requirement 2 on involuntary resettlement be triggered for any of these subprojects, LARP will need to be prepared and implemented for that particular subproject before commencement of civil works in accordance with the LARF.

96. The external third party will participate during the negotiated settlement and prepare DDR for those subprojects sited on privately owned land which EDC will acquire through negotiated settlement. The DDR will be prepared with the records of the negotiated settlement procedures and submitted to ADB after the detailed engineering design, and before commencement of civil works. For this purpose, EDC will engage an independent third party (agency or individual, but not associated with the project or the government) to provide an independent verification of the negotiated settlement agreements reflecting that: (i) consultation/s with landowner/s have been undertaken meaningfully, freely and in good faith and the landowners have made informed decisions on use of land, and (ii) terms and conditions of the agreements have been explained to them and understood and agreed by the landowner/s. The External Party Validation report prepared by the external third party will not be publicly disclosed because transaction will be based on the commercial contract, and not under involuntary acquisition under the Expropriation Law. Procedures for negotiated land acquisition and outline of the DDR for third party verification are included in the LARF. The External Party Validation report will be kept in files by EDC and copy sent to ADB for its concurrence and records. In case if negotiations fail, expropriation will be followed, and land acquisition and resettlement plan will be prepared based on the LARF prepared for the project, and according the ADB SPS (2009).

97. The draft LARP for the transmission line will be updated after the detailed engineering design. Census and survey will be completed covering 100% of the affected persons. Considering the EPC contract modality, finalization and implementation of LARP for the transmission line will be carried out per section based on the final detailed design. This approach will ensure that no physical or economic displacement occurs until (i) compensation at full replacement cost and other entitlements listed in the LARP have been paid to each displaced person; and (ii) a comprehensive income and livelihood rehabilitation program supported by an adequate budget is in place for the transmission line sections that are ready to be constructed.[19] Civil works will commence after ADB concurs and discloses the LARP Implementation Compliance Report for respective sections that are ready for construction.

98. An entitlement matrix was prepared and provides the cost estimates of allowances for affected persons. As part of updated the LARP, a replacement cost study will be conducted to determine the full replacement cost of the affected land and assets (land, trees etc.) and thus, inform the firm. An initial estimated budget for land acquisition and resettlement has been prepared in the draft LARP. It includes the compensation for affected lands and assets at full replacement cost, allowances due to affected persons, and other applicable costs. The estimated budget will be finalized during the detailed engineering design phase and based on the replacement cost study undertaken for the entire transmission line.

[19] ADB SPS 2009 Appendix 2, para 14, page 46.

4. Responsibility of Social Safeguard Implementation

99. EDC will ensure that the final LARP for each section (i) adequately addresses all involuntary resettlement issues pertaining to the subproject, (ii) describes specific mitigation measures that will be taken to address the issues, and (iii) ensures the availability of sufficient resources to address the issues satisfactorily. No physical and economic displacement occurs until compensation in full at replacement cost and all other entitlements are paid to the affected persons in accordance with the final LARP.

100. EDC will be responsible for updating the draft RDDRs and draft LARP, finalizing it based on detailed engineering design and implementing it before the start of construction activities of the subprojects and each section of the transmission line.

101. EDC will continue to provide information and undertake consultations with project affected persons in accordance with ADB SPS 2009 and the guidance that has been prepared in the draft RDDRs draft LARP, LARF, and Stakeholder Communication Strategy. EDC will document and report all consultations and compensation procedures and prepare implementation compliance and/or due diligence reports as soon as all procedures have been completed. EDC will be responsible to employ a third-party to prepare a confidential external validation report for those subprojects that involve negotiated settlement process. The compliance reports concurred by ADB will serve as a basis for “no objection” for the commencement of civil works and will be disclosed on ADB website.

102. EDC will monitor and document the ongoing impacts in order to avoid potential later grievances and prepare and submit semi-annual social safeguard monitoring reports to ADB through the project implementation. EDC will ensure that quarterly project progress reports submitted to ADB include section on social safeguard and reflect progress in the reporting period. Once concurred by ADB, semi-annual safeguard monitoring reports will be disclosed on its website.

103. EDC will be supported by project implementation consultants in applying government laws and regulations, ADB SPS 2009 requirements in all procedures and activities related to the updating, implementation and monitoring of RDDRs and LARP, including consultations, negotiations and payments to affected persons, potential grievances filed by affected persons and their settlement.

C. Indigenous Peoples

104. Based on the social impact assessment conducted as part of due diligence for all the subprojects, the project is assigned category C for indigenous peoples impact as it does not directly or indirectly affects the dignity, human rights, livelihood systems, or culture of Indigenous Peoples, neither it affects the territories, natural or cultural resources they own, use, occupy or claim as their ancestral domain.

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

VIII. GENDER AND SOCIAL DIMENSIONS

106. **Key poverty and social issues.** The poverty and social analysis assessed impacts at the sector level, since identifying specific consumers is challenging in the context of transmission network expansion. About one-third of the population in Kampong Chhnang, Kampong Cham, and Takeo provinces is considered poor. People are mainly engaged in agriculture, cattle raising, handicraft production, and small-scale services. The average monthly household income of Riel 1,303 ($320) in these provinces is 10% lower than Cambodia's average household income. There are still households that do not have access to electricity, Kamong Chnnang (67.7%), Kampong Cham (86.7%), and Takeo (90.8%) provinces, and those who have face frequent and unpredictable power shortages of on average 2 hours per day. Coupled with projected electricity demand growth, further expansion of transmission infrastructure is urgently needed to enable (i) reliable electricity transmission to consumers and (iii) further connect remaining households to the electricity grid. It will contribute to improving quality of life, productivity and economic income diversification as well as provision of adequate school and health services. In addition, many households, especially in provinces outside of Phnom Penh, are often not aware about the dangers of electricity, such as shock, burns, and fire. Gender-based stereotypes related to women's participation in energy sector activities and employment represents a key challenge toward achieving more gender equality in the energy sector.

107. **Gender and development.** Women working mainly in accounting, finance, billing and public relations currently account for 17% of the 5,584 people employed by EDC. There are women in senior and management positions, but they are few. In recent years EDC has taken important steps to contribute to more equality which for example includes promoting women in senior and management positions, providing a scholarship program to encourage women and men to build their technical electrical science capacity at the Institute of Electrical Science or other institutions, and encourage female staff participation in training courses. In general, women working with EDC and those who have been interviewed view EDC as a very good employer.

108. Through this project, EDC will undertake specific activities to (i) promote inclusion and gender equality in the workplace by developing gender-responsive policies, strategies, and organizational culture, (ii) inform communities in the subproject locations about safe use of electricity and to dismantle gender-based stereotypes related to women's participation in energy sector activities and employment, and (iii) provide specialized training to women and men in EDC on utility-scale energy storage system.

109. A "Guidance Document for the Implementation of Gender Responsive Activities by EDC" has been prepared and gender and social development specialists (international and national) will be engaged as part of the project implementation consultant team to guide EDC in the implementation of the activities. The project is categorized as having some gender elements.

Table 16: Guidance Document for the Implementation of Gender Responsive Activities

Activities	Indicators / Targets	Responsibilities	Timeframe
Output 1: 115 kilovolt and 230 kilovolt grid infrastructures expanded and reinforced			
1.1. EDC promotes inclusion and (gender) equality in the workplace by developing gender-responsive policies, strategies, and organizational culture.	1.1.1 Inclusive and equitable Human Resource Strategy developed for EDC including gender provisions integrated in all departments[a]	EDC Personnel Office, PMU, Gender and Social Development Consultant	Q2 2021–ongoing
	1.1.2 New Human Resource Strategy includes a mechanism to support female EDC employee participation in career development training both inside and outside of Cambodia (Target: 80% [equivalent to 760] female staff participation in training activities by 2025)	EDC Personnel Office, PMU, Gender and Social Development Consultant	Q3 2021–ongoing
	1.1.3. EDC Policy on harassment, abuse and exploitation developed and disseminated	EDC Personnel Office, PMU, Gender and Social Development Consultant	Q3 2021–ongoing
	1.1.4. The share of women among all EDC staff (both Phnom Penh and provinces) increases to 22%, disaggregated by age, job function and job site (2019 Baseline: 17%)	EDC Personnel Office, PMU, Gender and Social Development Consultant	Q2 2021–ongoing
	1.1.5 80% or equivalent 4,467 of all EDC employees [of which 760 women, 3,707 men] participate in gender sensitivity training, disaggregated by sex, age and job function	EDC Personnel Office, PMU, Gender and Social Development Consultant	Q2 2021–ongoing
	1.1.6 EDC employees who participated in training demonstrate better understanding and application of gender concepts, disaggregated by sex, age and job function (Baseline and target to be measured via pre-training survey)	EDC Personnel Office, PMU, Gender and Social Development Consultant	
1.2 Both women and men benefit from investment in grid	1.2.1. At least one public consultation occurs in each subproject location to communicate safe use of electricity, and challenge gender bias by exploring gender roles and employment opportunities (2019 Baseline: 0)	PMU, Gender and Social Development Consultant	Q1 2021–Q3 2021

Activities	Indicators / Targets	Responsibilities	Timeframe
infrastructure by supporting efforts to inform about safe use of electricity and to dismantle gender-based stereotypes related to women's participation in energy sector activities and employment.	1.2.2. At least two workshops to exchange experiences on gender mainstreaming in the energy sector featuring women in leadership roles from international and regional energy companies/organizations held.	PMU, Gender and Social Development Consultant	Q2 2021–ongoing
	1.2.3. All public announcements for available positions at EDC are advertised without gender bias (i.e. "women are encouraged to apply") (2019 Baseline: 30% without gender bias) (Target:100% without gender bias)	EDC Personnel Office, PMU, Gender and Social Development Consultant	Q2 2021–ongoing
	1.2.4. Knowledge, Attitude and Perception survey deployed at project start, mid-term and completion to assess behavioral changes related to the roles and employment opportunities for women and men in the energy sector. (2019 Baseline: first survey)	PMU, Gender and Social Development Consultant	
Output 2: First utility-scale energy storage system provided			
2.1. Specialized training on utility-scale energy storage system provided	2.1.1 Training provided to at least 6 EDC staff, of which at least 2 are women on designing, implementing, operating, and maintaining battery energy storage systems	PMU, EPC Contractor	Q2 2021–Q2 2025
Project Management and Gender-Specific Activities:			
3.1. Recruitment of a Social Development Expert (Gender) completed early to ensure participation in detailed design activities. 3.2. Training on GAP implementation and monitoring will be delivered to PMU, PIC and other key implementing partners. 3.3. Sex-disaggregated data will be collected by the Contractor in fulfillment of DMF and GAP reporting requirements.			

DMF = design and monitoring framework; EDC = Electricité du Cambodge; EPC = engineering, procurement and construction; GAP = gender action plan; IES = Institute of Electrical Science; MME = Ministry of Mines and Energy; PIC = project implementation consultant; PMU = Project Management Unit.

[a] Gender provisions may include, but are not limited to, commitments to gender responsive budgeting; harassment-friendly workplace; flexible work hours; childcare; promotion of women to senior positions, etc.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

A. Project Design and Monitoring Framework

Impact the Project is Aligned with

Adequate and reliable power supply from environmentally sustainable energy sources ensured (Rectangular Strategy for Employment, Equity and Efficiency, Phase, IV: Building the Foundation toward Realizing the Cambodia Vision 2050)[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Transmission network capacity and stability improved	By 2026: a. Transmission losses reduced to an average of 1.75% (2019 baseline: 2.3%) b. None of the existing transformers is overloaded, which could otherwise lead to load shedding (2019 baseline: 32% of transformers overloaded and 61% used at almost 90% capacity) c. Construction of the 10 transmission lines and substations enables direct employment of 1,300 people, with nearly 25% of jobs accessible to unskilled workers (2019 baseline: 0%) d. The BESS provides services for (i) 80% output smoothing of the co-located 60 MW solar park, (ii) 15–30 minutes of curtailment reserve, (iii) primary frequency response, and (iv) deferral of transformer upgrades at substation 6 (2019 baseline: 0)	a.–d. EDC operations data and reports	Unforeseen changes in projected electricity demand undermine the project's financial and economic viability.
Outputs 1. 115 kV and 230 kV grid infrastructure expanded and reinforced	By 2025: 1a. 115 kV transmission line expanded by 36.7 cct-km (2019 baseline: 1,532 cct-km) (RFI A) 1b. 230 kV transmission line expanded by 13 cct-km	1a–1d. Quarterly progress reports and project completion reports by EDC	Unforeseen global events such as COVID-19 pandemic delay the construction of transmission lines, substations, BESS,

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	(2019 baseline: 2,376 cct-km) (RFI A) 1c. 115 kV–22 kV substation capacity expanded by 350 MVA (2019 baseline: 1,730 MVA) (RFI A) 1d. 230 kV–115 kV and 230 kV–22 kV substation capacity expanded by 1,475 MVA (2019 baseline: 2,611 MVA) (RFI A) 1e. Inclusive and equitable human resource strategy developed for EDC, including gender provisions for all departments (2019 baseline: no strategy) 1f. The share of women among all EDC staff (both in Phnom Penh and the other project provinces) increases to 22%, disaggregated by age, job function, and job site (2019 baseline: 17%) 1g. At least one public consultation occurs in each subproject location to communicate safe use of electricity, and challenge gender bias by exploring gender roles and employment opportunities (2019 baseline: 0) 1h. At least 50% (at least 2,317 men and at least 475 women) of 5,584 EDC employees (4,635 men, 949 women) report increased knowledge about project management within their area of expertise (2019 baseline: 20%)	1e–1f. Semiannual gender and social development progress reports 1g. Knowledge, attitude, and perception survey results deployed at project start, midterm, and completion to assess behavioral changes related to the roles and employment opportunities for women and men in the energy sector 1h. Training manuals and knowledge test results on project management, procurement, financial management, safeguards, and stakeholder engagement	and associated facilities.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
2. First utility-scale energy storage system provided	2a. 16 MW/16 MWh BESS operational (2019 baseline: no BESS) 2b. Training provided to 6 EDC staff, of which at least 2 are women, on designing, implementing, operating, and maintaining the BESS (2019 baseline: NA)	2a. Quarterly progress reports and project completion reports by EDC 2b. Training manuals and knowledge test results	

Key Activities with Milestones

1. 115 kV and 230 kV grid infrastructure expanded and reinforced

1.1 Procure and award contracts (April 2020–February 2021).
1.2 Prepare detailed engineering design, construct, and commission (February 2021–June 2024).
1.3 Implement environmental management plan and resettlement plan (April 2020–June 2024).
1.4 Provide project management training; implement gender-responsive activities (April 2021–June 2025).

2. First utility-scale energy storage system provided

2.1 Procure and award contract (April 2020–February 2021).
2.2 Prepare detailed engineering design, construct, and commission (February 2021–July 2022).
2.3 Implement environmental management plan and resettlement plan (April 2020–July 2022).
2.4 Provide training to female and male staff of EDC on system procurement, construction oversight, operation and maintenance, and information analysis (April 2021–June 2025).

Inputs

Asian Development Bank: $127,800,000 (loan)
Strategic Climate Fund: $4,700,000 (grant)
Clean Energy Fund under the Clean Energy Financing Partnership Facility: $2,000,000 (grant)
Government of Cambodia: $28,951,502
EDC: $30,201,519

Assumptions for Partner Financing

Not applicable

BESS = battery energy storage system, cct-km = circuit kilometer, COVID-19 = coronavirus disease, EDC = Electricité du Cambodge, kV = kilovolt, MVA = megavolt-ampere, MW = megawatt, MWh = megawatt-hour, NA = not applicable, RFI = results framework indicator.

[a] Government of Cambodia. 2018. *Rectangular Strategy for Employment, Equity and Efficiency: Building the Foundation toward Realizing the Cambodia Vision 2050.* Phnom Penh.

Contribution to the ADB Results Framework:

RFI A: Transmission lines installed (km). Target: 49.7 km. 115 kV–22 kV substation capacity expanded. Target: 350 MVA. 230 kV–115 kV–22 kV substation capacity expanded. Target: 1,475 MVA.
Source: Asian Development Bank.

B. Monitoring

110. **Project performance monitoring.** EDC will establish, within six months from the effective date, a project performance monitoring and evaluation system that shall operate throughout the life of the project. EDC shall ensure that sufficient data is gathered and monitor the indicators set out in the design and monitoring framework for the project. The project performance monitoring and evaluation system will aim to detect any deficiency and discrepancy between the plan, implementation of the project, in using resources efficiently and in order to ensure that timely correction can be made to adjust the design of the project as feasible. The PIC will support EDC

in establishing the monitoring and evaluation system.

111. Disaggregated baseline data for output and outcome indicators gathered during the project processing will be updated and reported quarterly in the project progress reports quarterly prepared and submitted by EDC to ADB and after each ADB review mission. These quarterly reports will provide information necessary to update ADB's project performance reporting system.[20]

112. **Compliance monitoring.** EDC will monitor and ensure the compliance of loan assurances-policy, legal, financial, safeguards, and others. All non-compliance issues, if any, will be updated in quarterly project progress reports together with remedial actions. Each ADB review mission will also monitor the status of compliance with loan assurances, raise the non-compliance issues with the government and agree on remedial actions.

113. **Safeguards monitoring.** The draft IEE, EMP, RDDRs, and LARP will be updated by EDC, with support by the PIC, during detailed engineering design. The updated safeguard documents will be reviewed and concurred by ADB and implemented before commencement of civil works.[21] EDC's Social, Environmental and Public Relations Office will monitor implementation of the safeguard requirements detailed in the loan agreement and described in the safeguard documents. Summary implementation of social and environmental safeguards measures in compliance with loan agreement, the IEE, EMP, RDDRs, LARF, and LARP shall be incorporated with the quarterly project progress reports. EDC will prepare and submit to ADB semi-annual safeguard monitoring reports that will be reviewed and cleared by ADB, and subsequently disclosed on EDC and ADB website. The PIC will support EDC in preparing the safeguard section of the quarterly progress reports as well as semi-annual safeguard monitoring reports. EDC will ensure that all social and environmental safeguard management and monitoring activities are executed in accordance with the IEE, EMP, RDDRs, LARF, LARP and relevant laws and regulations of the government.

114. **Gender and social dimensions monitoring.** Gender and social data will be monitored, collated and analyzed to provide an indication of behavioral change for female and male beneficiaries of the project including internally to EDC and across project affected communities. A gender and social development specialist is included in the PIC to support EDC with the implementation of gender actions under the project and the preparation of social safeguards compliance reports. EDC will ensure that contractors comply to the core labor standards and IFC occupational health and safety guidelines.

C. Evaluation

115. ADB will conduct regular semi-annual review missions to review and discuss project progress and report on the project performance. A midterm review mission will be carried out to assess the likelihood of attainment of the project's immediate objective. Within six (6) months of physical completion of the project, EDC will submit a project completion report to ADB.[22]

[20] Project Administration Instructions No. 5.08.
[21] LARP Implementation Compliance Report before commencement of civil works, for any section ready for construction.
[22] Project Administration Instructions No. 6.07A, para. 10–11; Project completion report template is available at the SEC website.

D. Reporting

116. EDC will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated semi-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, (d) updated implementation plan for the next 12 months; (e) progress achieved on the implementation of financial risk mitigation actions; and (f) effectiveness of project's financial management arrangements (ii) LARP Implementation Compliance Report before commencement of civil works, for any section ready for construction; (iii) semi-annual safeguard monitoring reports[23] and gender dimension progress reports; and (iv) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

117. The ADB Access to Information Policy 2018 seeks to encourage the participation and understanding of people and other stakeholders affected by ADB-assisted activities. Public consultation and information disclosure were initiated during the project preparation stage and will be carried out on an ongoing basis throughout project implementation. The detailed Stakeholder Analysis and Communication Strategy is in Appendix 4.

118. EDC shall: (i) ensure timely disclosure of relevant and adequate information that is understandable and readily accessible to the affected persons and other stakeholders; (ii) conduct public meetings, focus group discussions and individual one-on-one consultation if needed, in an atmosphere free of intimidation or coercion, that is gender inclusive and responsive and tailored to the needs of disadvantaged and vulnerable groups; (iii) ensure incorporation of all relevant views of affected persons and other stakeholders into project design making process, such as project design, mitigation measures, the sharing of development benefits and opportunities and implementation issues; (iv) ensure that the project displaced persons are informed about: (a) resettlement impacts, asset valuation, entitlements, compensation and payment modalities with timelines, (b) rehabilitation and income restoration measures as budgeted in the LARP, and (c) grievance redress mechanism, procedures and timelines for redress of grievances; and (v) ensure liaison is maintained with affected persons and communities for continued consultation during project implementation to identify and address safeguards issues that may arise such as related to land acquisition, environment and civil works.

119. **Grievance redress mechanism.** EDC shall ensure that (i) efficient project-specific grievance redress mechanism is in place and functional to assist the affected persons and other stakeholders in resolving queries, conflicts and complaints, if any, in a timely manner; (ii) all complaints are registered, investigated and resolved in a manner consistent with the provisions of GRM detailed in the LARP and IEE/EMP; (iii) the complainants / aggrieved persons are kept informed about status of their grievances and remedies available to them; and (iv) adequate staff and resources are available for supervising and monitoring the mechanism

120. **Information disclosure.** EDC will ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner,

[23] If time permits, the LARP Implementation Compliance Report/s may be submitted as part of the semi-annual safeguard monitoring report.

in an accessible place, and in a form and language understandable to affected persons and to other stakeholders, including the general public, so they can provide meaningful inputs into project planning, development and implementation. EDC shall (i) ensure that all the safeguards documents including monitoring reports are disclosed by uploading the draft and ADB approved final safeguards documents on EDC and ADB web-sites; (ii) distribute / make accessible the Project Information Booklets containing summary of the projects impacts; and (iii) summarize (draft and final) RDDRs and LARP and (draft and final) IEE and EMP in local language.

X. ANTICORRUPTION POLICY

121. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[24] 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 and/or 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.[25]

122. To support these efforts, relevant provisions will be included in the loan, project and grant agreements and the bidding documents for the project. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and EDC. To ensure transparency and good governance, EDC will publicly disclose on its website information on how loan and grant proceeds are being used. For each procurement contract, EDC will disclose (i) the list of participating bidders, (ii) the name of winning bidder, (iii) basic details on bidding procedures adopted, (iv) the amount of the contract awarded, (v) a list of goods and services purchased, and (vi) the intended and actual utilization of loan proceeds under each contract being awarded.

123. An integrity due diligence was carried out in accordance with Operations Manual Sections C6 (Enhancing the Asian Development Bank's Role in Combating Money Laundering and the Financing of Terrorism) and E1 (Financing Partnerships). The Integrity Disclosure Document is accessible from the list of linked documents in Appendix 2 of the RRP.

124. EDC has been reminded to familiarize themselves with ADB's Integrity Principles and Guidelines.[26] EDC will access ADB's Sanction List and check the eligibility of bidders, consultants, their team members, and suppliers[27] and has been made aware on where, how and what to report if there is and integrity concern or allegation of integrity violation on ADB-related activity.[28]

125. Any individual obtaining information of fraudulent, corrupt or collusive practices shall immediately contact ADB's Office of the Anticorruption and Integrity and report the same:

Contact Office of Anticorruption and Integrity:	• By email: integrity@adb.org or anticorruption@adb.org • By phone: +63-2-8632-5004 • By fax: +63-2-8636-2152 • By mail at the following address (please mark correspondence Strictly Confidential) Office of the Anticorruption and Integrity (OAI), Asian

[24] Anticorruption Policy: https://www.adb.org/sites/default/files/institutional-document/32026/anticorruption.pdf
[25] ADB's Integrity Office website: https://www.adb.org/site/integrity/main
[26] https://www.adb.org/documents/integrity-principles-and-guidelines
[27] https://www.adb.org/sites/default/files/related/79926/adb-sanctions-list-faq.pdf
[28] https://www.adb.org/site/integrity/how-to-report-fraud

	Development Bank ADB Avenue Mandaluyong City 1550 Metro Manila, Philippines • https://www.adb.org/site/integrity/contacts

XI. ACCOUNTABILITY MECHANISM

126. 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 an effort in good faith 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.[29]

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

127. All revisions and/or updates during the course of implementation should be retained in this section to provide a chronological history of changes to implemented arrangements recorded in the PAM, including revision to contract awards and disbursement s-curves.

[29] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/default.asp.

DETAILED COST BREAKDOWN OF SUBPROJECTS

1. New 6.52 km 230 kV transmission line from existing GS5 to proposed Sen Sok substation (TPP1)

Item N°	Description	Unit	Unit Price USD	TPP1				
		USD/EUR 20Mar20	0.9347	New 6.52 km 230 kV transmission line from existing GS5 to proposed Sen Sok substation				
	Source: 230 kV Minebea TL Date: 2017	Escalation factor to 2020	1.0300	230 kV double circuit line				
	230 kV Overhead Transmission Line Component			OH km	**5.00**		**Quantity**	**Total Price USD**
A	**Materials & Equipment**	km	Average span	N° towers	Average span	N° Circuits		
I	**Monopole**	N°	**230**	**21**	**250**	**2**		
1	Monopole 30 m type A Suspension 0-3°	N°	42,328.00				16	677,248
2	Monopole 30 m type B Tension 0-60°	N°	56,004.00				-	-
3	Monopole 30 m type C Tension 0-90°	N°	67,730.00				5	338,650
4	Tower signs	set	42.00				21	882
								1,016,780
II	**Conductor and OPGW**	Sag Factor		Sag Factor	**1.03**	Conductors/ phase	**2**	
1	1272MCM ACSR/AW Bittern	km	6,983.00				62	432,946
2	OPGW 24 core	km	4,893.00				5	24,465
								457,411
III	**Insulators**							
1	Assembly 1: Single post insulator assemblies	set	590.40				126	74,390
2	Assembly 2: Single Tension insulator assemblies	set	590.40				60	35,424
								109,814
IV	**Line Accessories**							
1	Hardware fittings & accessories for ACSR Bittern	set	621.00				186	115,506
								115,506
V	**Earthing Materials**							
1	Terminal connector from galvanized steel wire to L50x4mm	pcs	7.00				42	294
2	Galvanized steel earthing wire	m	0.11				84	9
								303
VI	**OPGW Accessories**							
1	Joint boxes	set	98.00				2	196
2	Hardware fittings & accessories for OPGW	set	224.00				42	9,408
								9,604
							Subtotal	**1,709,419**
VI	**Spare Parts**				3.00%			51,283
							Total	**1,760,701**
B	**Design Services**	km	13,730.00				5.0	**69,000**
1	Project Management							
2	Detailed Construction Drawings							
3	Installation, Operating, Service and Maintenance Manuals							
4	As-Built Drawings, Commissioning and Completion Report							
5	Tower and its foundation design							
C	**Installation included in materials**							
1	Erection of Towers	sets					21	-
2	Stringing of Conductor	cct-km					10	-
3	Installation of Conductor Accessories	sets					5	-
4	Installation of Line Accessories	sets					5	-
5	Installation of Earthing Materials	sets					5	-
6	Installation of OPGW	sets					5	-
7	Tower Foundations	towers					21	-
8	Testing	LS					5	-
9	Mobilisation & Preliminary	LS					5	-
								-
								1,829,701
		USD Estimate			**TPP2 230 kV Overhead Transmission Line**			
					Materials & Equipment		5	1,760,701
			1.0300		**Design Services**			**69,000**
					Installation included in materials			**-**
					Total			**1,829,701**

Item N°	Description	Unit	Unit Price USD		TPP1				
		USD/EUR 20Mar20	0.9347		New 6.52 km 230 kV transmission line from existing GS5 to proposed Sen Sok substation				
	Source: 230 kV Minebea TL Date: 2017	Escalation factor to 2020	1.0300		230 kV double circuit line				
					Circuit length	N° Circuits			
	230 kV Underground Cable Component				**1.00**	2			
A	**Materials & Equipment**								
1	230 kV 1xl200 mm^2 Triplex Type XLPE Power Cable	m	349					6,000	2,094,000
2	230 kV Insulated through Joint for above cable including all related accessories	sets	14,981					40	599,240
3	230 kV Outdoor Cable Sealing End	sets	20,215					2	40,430
4	230 kV GIS Cable Sealing End	sets	15,157					2	30,314
5	Link Box for Earthing at straight through joint including all related accessories	pcs	7,299					40	291,960
6	Link Box for Earthing at cable sealing end including all related accessories	pcs	6,249					2	12,498
7	Fibre Optical Cable including joint boxes and all related accessories	m	3					1,000	3,000
8	Fibre Optical Cable termination box including all related accessories	pcs	11,437					2	22,874
9	High density polyethylene (IIDPE) pipes for230 kV triplex cable installation material including all related accessories	m	69					6,000	414,000
								Subtotal	3,508,316
	Spare Parts	LS							105,249
								Total	**3,613,565**
B	**Design Services**	km	12,942.00					1.0	12,942
C	**Installation**								
1	Check survey	m	15					1,000	15,000
2	Excavation/construction of cable trench with ducts under the road, laying of cables Two triplex cables and one fibre optic cable) and backfilling	m	641					950	608,950
3	Excavation/construction of cable trench at the park/green belt, laying of cables (Two triplex cables and one fibre optic cable) and backfilling	m	458					-	-
4	Excavation/construction of cable trough inside substation, laying of cables (Two triplex cables and one fibre optic cable)	m	715					50	35,750
5	Laying of cables (Two triplex cables and one fibre optic cable) inside GIS substation including necessary cable fixing equipment	m	266					50	13,300
6	Excavation of cables joint bay every 300 m	sets	4,355					3	14,517
7	Installation and jointing of 230 kV insulated/straight through joints including installation of link box and associated earthing works	sets	4,217					3	14,057
8	Installation and terminating of 230 kV outdoor sealing end termination including installation of link box and associated earthing works	sets	2,658					1	2,658
9	Installation and terminating of 230 kV GIS sealing end termination including installation of link box and associated earthing works	sets	2,658					1	2,658
10	Installation of Fibre optic cable inclusive jointing of fibre optic cable joints and all related accessories	m	6					1,000	6,000
									712,889
									4,339,397

TPP1 230 kV Transmission Line		
Overhead TL Monopole	5.00	
Materials & Equipment (inc Installation)		1,760,701
Design Services		69,000
Installation		-
Subtotal		**1,829,701**
Underground Cable	1.00	
Materials & Equipment		3,613,565
Design Services		12,942
Installation		712,889
Subtotal		**4,339,397**
Total		**6,169,098**

2. New 2.44 km 115 kV transmission line from proposed Sen Sok to proposed Russei Keo substations (TPP2)

BoQs								
Item N°	**Description**	**Unit**	**Unit Price USD**	**TPP2**				
		USD/EUR 20Mar20	0.9347	New 2.44 km 115 kV transmission line from proposed Sen Sok to proposed Russei Keo substations				
	Source: 115 kV Minebea TL Date: 2017	Escalation factor to 2020	1.0100	115 kV double circuit line; ~ 1.5 km overhead on monopoles and 1.0 km underground cable				
	115 kV Overhead Transmission Line Component			OH km	**1.50**		**Quantity**	**Total Price USD**
A	**Materials & Equipment (inc Installation)**	km	Average span	N° towers	Average span	N° Circuits		
I	**Monopole**	N°	**230**	**10**	**167**	**2**		
1	Monopole 30 m type A Suspension 0-3°	N°	32,560.00				5	162,800
2	Monopole 30 m type B Tension 0-60°	N°	43,080.00				1	43,080
3	Monopole 30 m type C Tension 0-90°	N°	52,100.00				4	208,400
4	Tower signs	set	42.00				10	420
								414,700
II	**Conductor and OPGW**	Sag Factor		Sag Factor	**1.03**	Conductors/phase	**1**	
1	1272MCM ACSR/AW Bittern	km	6,848.00				9	61,632
2	OPGW 24 core	km	4,798.00				2	9,596
								71,228
III	**Insulators**							
1	Assembly 1: Single post insulator assemblies	set	328.00				60	19,680
2	Assembly 2: Single Tension insulator assemblies	set	328.00				60	19,680
								39,360
IV	**Line Accessories**							
1	Hardware fittings & accessories for ACSR Bittern	set	345.00				120	41,400
								41,400
V	**Earthing Materials**							
1	Terminal connector from galvanized steel wire to L50x4mm	pcs	7.00				20	140
2	Galvanized steel earthing wire	m	0.11				40	4
								144
VI	**OPGW Accessories**							
1	Joint boxes	set	96.00				1	96
2	Hardware fittings & accessories for OPGW	set	224.00				20	4,480
								4,576
							Subtotal	**571,408**
VI	**Spare Parts**				3.00%			17,142
							Total	**588,551**
B	**Design Services**	km	13,198.00				1.5	**20,000**
1	Project Management							
2	Detailed Construction Drawings							
3	Installation, Operating, Service and Maintenance Manuals							
4	As-Built Drawings, Commissioning and Completion Report							
5	Tower and its foundation design							
C	**Installation**							
1	Erection of Towers	sets					10.00	-
2	Stringing of Conductor	cct-km					3.00	-
3	Installation of Conductor Accessories	sets					1.50	-
4	Installation of Line Accessories	sets					1.50	-
5	Installation of Earthing Materials	sets					1.50	-
6	Installation of OPGW	sets					1.50	-
7	Tower Foundations	towers					10.00	-
8	Testing	LS					1.50	-
9	Mobilisation & Preliminary	LS					1.50	-
								-
								608,551

Item N°	Description	Unit	Unit Price USD	TPP2					
		USD/EUR 20Mar20	0.9347	New 2.44 km 115 kV transmission line from proposed Sen Sok to proposed Russei Keo substations					
	Source: 115 kV Minebea TL Date: 2017	Escalation factor to 2020	1.0100	115 kV double circuit line; ~ 1.5 km overhead on monopoles and 1.0 km underground cable					
	115 kV Overhead Transmission Line Component			OH km	**1.50**			**Quantity**	**Total Price USD**
				Circuit length	N° Circuits				
	115 kV Underground Cable Component			**1.00**	2				
A	**Materials & Equipment**								
1	115 kV 3xl000 mm^2 Triplex Type XLPE Power Cable	m	616					2,000	1,232,000
2	115 kV Insulated through Joint for above cable including all related accessories	sets	9,378					13	121,914
3	115 kV Outdoor Cable Sealing End	sets	9,378					2	18,756
4	115 kV GIS Cable Sealing End	sets	10,397					2	20,794
5	Link Box for Earthing at straight through joint including all related accessories	pcs	7,299					13	94,887
6	Link Box for Earthing at cable sealing end including all related accessories	pcs	6,249					2	12,498
7	Fibre Optical Cable including joint boxes and all related accessories	m	3					1,000	3,000
8	Fibre Optical Cable termination box including all related accessories	pcs	11,437					2	22,874
9	High density polyethylene (IIDPE) pipes for115 kV triplex cable installation material including all related accessories	m	69					2,000	138,000
								Subtotal	1,664,723
	Spare Parts	LS							49,942
								Total	**1,714,665**
B	**Design Services**	km	13,198.00					1.0	**13,000**
C	**Installation**								
1	Check survey	m	15					1,000	15,000
2	Excavation/construction of cable trench with ducts under the road, laying of cables Two triplex cables and one fibre optic cable) and backfilling	m	641					950	608,950
3	Excavation/construction of cable trench at the park/green belt, laying of cables (Two triplex cables and one fibre optic cable) and backfilling	m	458					-	-
4	Excavation/construction of cable trough inside substation, laying of cables (Two triplex cables and one fibre optic cable)	m	715					50	35,750
5	Laying of cables (Two triplex cables and one fibre optic cable) inside GIS substation including necessary cable fixing equipment	m	266					50	13,300
6	Excavation of cables joint bay every 300 m	sets	4,355					3	14,517
7	Installation and jointing of 115 kV insulated/straight through joints including installation of link box and associated earthing works	sets	4,217					3	14,057
8	Installation and terminating of 115 kV outdoor sealing end termination including installation of link box and associated earthing works	sets	2,658					1	2,658
9	Installation and terminating of 115 kV GIS sealing end termination including installation of link box and associated earthing works	sets	2,658					1	2,658
10	Installation of Fibre optic cable inclusive jointing of fibre optic cable joints and all related accessories	m	6					1,000	6,000
									712,889
									2,440,554

TPP2 115 kV Transmission Line		
Overhead TL Monopole	1.50	
Materials & Equipment (inc Installation)		588,551
Design Services		20,000
Installation		-
Subtotal		**608,551**
Underground Cable	1.00	
Materials & Equipment		1,714,665
Design Services		13,000
Installation		712,889
Subtotal		**2,440,554**
Total		**3,049,105**

3. New 4.4 km 115 kV transmission line from proposed Boeung Tompon substation to new Olympic substation (TPP3)

Item N°	Description	Unit	Unit Price USD	TPP3				
		USD/EUR 20Mar20	0.9347	New 4.4 km 115 kV transmission line from proposed Boeung Tompon substation to new Olympic substation				
	Source: 115 kV Minebea TL Date: 2017	Escalation factor to 2020	1.0100	115 kV double circuit line; ~ 2.4 km overhead on monopoles and 2.0 km underground cable; Olympic SS now under construction				
	115 kV Overhead Transmission Line Component			OH km	**2.40**		**Quantity**	**Total Price USD**
A	**Materials & Equipment (inc Installation)**	km	Average span	N° towers	Average span	N° Circuits		
I	**Monopole**	N°	**230**	**21**	**120**	**2**		
1	Monopole 30 m type A Suspension 0-3°	N°	32,560.00				6	195,360
2	Monopole 30 m type B Tension 0-60°	N°	43,080.00				1	43,080
3	Monopole 30 m type C Tension 0-90°	N°	52,100.00				14	729,400
4	Tower signs	set	42.00				21	882
								968,722
II	**Conductor and OPGW**	Sag Factor		Sag Factor	**1.03**	Conductors/ phase	**1**	
1	1272MCM ACSR/AW Bittern	km	6,848.00				15	102,720
2	OPGW 24 core	km	4,798.00				3	11,995
								114,715
III	**Insulators**							
1	Assembly 1: Single post insulator assemblies	set	328.00				126	41,328
2	Assembly 2: Single Tension insulator assemblies	set	328.00				180	59,040
								100,368
IV	**Line Accessories**							
1	Hardware fittings & accessories for ACSR Bittern	set	345.00				306	105,570
								105,570
V	**Earthing Materials**							
1	Terminal connector from galvanized steel wire to L50x4mm	pcs	7.00				42	294
2	Galvanized steel earthing wire	m	0.11				84	9
								303
VI	**OPGW Accessories**							
1	Joint boxes	set	96.00				2	192
2	Hardware fittings & accessories for OPGW	set	224.00				42	9,408
								9,600
							Subtotal	**1,299,278**
VI	**Spare Parts**				3.00%			38,978
							Total	**1,338,257**
B	**Design Services**	km	13,198.00				2.4	**32,000**
1	Project Management							
2	Detailed Construction Drawings							
3	Installation, Operating, Service and Maintenance Manuals							
4	As-Built Drawings, Commissioning and Completion Report							
5	Tower and its foundation design							
C	**Installation**							
1	Erection of Towers	sets					21	-
2	Stringing of Conductor	cct-km					5	-
3	Installation of Conductor Accessories	sets					2	-
4	Installation of Line Accessories	sets					2	-
5	Installation of Earthing Materials	sets					2	-
6	Installation of OPGW	sets					2	-
7	Tower Foundations	towers					21	-
8	Testing	LS					2	-
9	Mobilisation & Preliminary	LS					2	-
								-
								1,370,257

Item N°	Description	Unit	Unit Price USD	TPP3					
		USD/EUR 20Mar20	0.9347	New 4.4 km 115 kV transmission line from proposed Boeung Tompon substation to new Olympic substation					
	Source: 115 kV Minebea TL Date: 2017	Escalation factor to 2020	1.0100	115 kV double circuit line; ~ 2.4 km overhead on monopoles and 2.0 km underground cable; Olympic SS now under construction					
	115 kV Overhead Transmission Line Component			OH km	**2.40**			**Quantity**	**Total Price USD**
				Circuit length	N° Circuits				
	115 kV Underground Cable Component			**2.80**	2				
A	**Materials & Equipment**								
1	115 kV 3xl000 mm^2 Triplex Type XLPE Power Cable	m	616					5,600	3,449,600
2	115 kV Insulated through Joint for above cable including all related accessories	sets	9,378					37	346,986
3	115 kV Outdoor Cable Sealing End	sets	9,378					2	18,756
4	115 kV GIS Cable Sealing End	sets	10,397					2	20,794
5	Link Box for Earthing at straight through joint including all related accessories	pcs	7,299					37	270,063
6	Link Box for Earthing at cable sealing end including all related accessories	pcs	6,249					2	12,498
7	Fibre Optical Cable including joint boxes and all related accessories	m	3					2,800	8,400
8	Fibre Optical Cable termination box including all related accessories	pcs	11,437					2	22,874
9	High density polyethylene (IIDPE) pipes for115 kV triplex cable installation material including all related accessories	m	69					5,600	386,400
								Subtotal	4,536,371
	Spare Parts	LS							136,091
								Total	**4,672,462**
B	**Design Services**	km	13,198.00					2.8	**37,000**
C	**Installation**								
1	Check survey	m	15					2,800	42,000
2	Excavation/construction of cable trench with ducts under the road, laying of cables Two triplex cables and one fibre optic cable) and backfilling	m	641					2,750	1,762,750
3	Excavation/construction of cable trench at the park/green belt, laying of cables (Two triplex cables and one fibre optic cable) and backfilling	m	458					-	-
4	Excavation/construction of cable trough inside substation, laying of cables (Two triplex cables and one fibre optic cable)	m	715					50	35,750
5	Laying of cables (Two triplex cables and one fibre optic cable) inside GIS substation including necessary cable fixing equipment	m	266					50	13,300
6	Excavation of cables joint bay every 300 m	sets	4,355					9	40,647
7	Installation and jointing of 115 kV insulated/straight through joints including installation of link box and associated earthing works	sets	4,217					9	39,359
8	Installation and terminating of 115 kV outdoor sealing end termination including installation of link box and associated earthing works	sets	2,658					1	2,658
9	Installation and terminating of 115 kV GIS sealing end termination including installation of link box and associated earthing works	sets	2,658					1	2,658
10	Installation of Fibre optic cable inclusive jointing of fibre optic cable joints and all related accessories	m	6					2,800	16,800
									1,955,921
									6,665,383

					TPP3 115 kV Transmission Line				
				Cost/km	**Overhead TL Monopole**			2.40	
					Materials & Equipment (inc Installation)				1,338,257
					Design Services				32,000
					Installation				-
				405,700	**Subtotal**				**1,370,257**
					Underground Cable			2.80	
					Materials & Equipment				4,672,462
					Design Services				37,000
					Installation				1,955,921
				2,440,554	**Subtotal**				**6,665,383**
					Total				**8,035,640**

4. New 230/115 kV Dangkor substation (SPP1)

Item N°	Description	Unit		SPP1		
				New 230/115 kV Dangkor substation		
				2×240 MVA 230/115 kV transformers; outdoor switchyard; 2 x 230 kV circuits; 4 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
		USD/EUR 08Feb20	0.9347			
	Sources: 230/115 kV JICA GIS Substation & Chamkar Luong ss Date: 2019 & 2017	Escalation factor to 2020:	1.0300			
I	**230/115 kV Substation**					
A	**Transformers**					
1	230/115 kV, 240 MVA Transformer	N°	2,719,200	2	5,438,400	
2	230/115/22 kV, 240 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	2,966,400		-	
3A	230/115/22 kV,160 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,977,600			
3	230/115/22 kV,100/75/40 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,236,000		-	
4	230/22 kV, 75 MVA Transformer	N°	849,750		-	
5	115/22 kV, 75 MVA Transformer	N°	515,000		-	
6	22 kV Earthing Transformer	N°	15,412	1	15,412	
7	22/0.4kV, 400kVA Transformer	N°	25,687	1	25,687	
						5,479,499
B1	**230 kV & 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	41,100	4	164,400	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	41,100	3	123,300	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	15,412	4	61,648	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	12,844	16	205,504	
5	230 kV Current transformer for line & interbus (1 Phase/Set)	N°	5,931	12	71,172	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	5,931	9	53,379	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	5,840	12	70,080	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	5,840	3	17,520	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	1,978	12	23,736	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	30,825	4	123,300	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	30,825	3	92,475	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	10,275	4	41,100	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	10,275	14	143,850	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	2,710	12	32,520	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	2,710	6	16,260	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	5,832	12	69,984	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	5,832	3	17,496	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	697	4	2,788	
						1,330,512
B2	**24 kV Metalclad switchgear, 2,500 A busbar**					
1	Incoming CB cubicle	N°	24,010		-	
2	Outgoing CB cubicle	N°	16,807		-	
3	Bus Section CB cubicle	N°	24,010		-	
4	Station Service Transformer	N°	18,007		-	
5	Instrumentation cubicle	N°	12,005		-	
					-	
C	**Control & Protection**					-
1	Computerised control system	Lot	117,649	1	117,649	
2	230 kV Panels	N°	153,663	4	614,652	
2A	230 kV Controls	Lot	786,860	1	786,860	
3	115 kV Panels	Lot	159,604	1	159,604	
4	Transformer Panels	Lot	57,624	1	57,624	
						1,736,389

Item N°	Description	Unit		SPP1		
				New 230/115 kV Dangkor substation		
				2×240 MVA 230/115 kV transformers; outdoor switchyard; 2 x 230 kV circuits; 4 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
D	**Ancillary Equipment**					
	Power supplies, AC & DC boards	Lot	303,004	1	303,004	
E	**Switchyard**					
	Busbars, earthing, lightning, etc	Lot	978,054	1	978,054	
F	**Comms Equip**					
	Comms, Phones,etc.	Lot	96,033	1	96,033	
						4,443,992
G	**Spare Parts**	Lot		1	266,640	
						10,190,131
			Unit Price USD			
II	**Design Services**	Lot	202,376	1	202,376	
III	**Installation**					
A	**Transformers**					
	230/115/22 kV Transformer	N°	12,922	2	25,844	
	22 kV Earthing Transformer	N°	2,008	1	2,008	
	22/0.4kV, 400kVA Transformer	N°	2,008	1	2,008	
B1	**230 kV& 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	2,063	4	8,252	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	2,063	3	6,189	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	998	4	3,992	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	900	16	14,400	
5	230 kV Current transformer for line (1 Phase/Set)	N°	420	12	5,040	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	420	9	3,780	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	463	12	5,556	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	463	3	1,389	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	231	12	2,772	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	1,247	4	4,988	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	1,247	3	3,741	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	464	4	1,856	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	418	14	5,852	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	219	12	2,628	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	219	6	1,314	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	28,743	12	344,916	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	287	3	861	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	122	4	488	
B2	**24 kV Metalclad switchgear**					
1	Incoming CB cubicle	N°	405	-	-	
2	Outgoing CB cubicle	N°	405	-	-	
3	Bus Section CB cubicle	N°	406	-	-	
4	Station Service Transformer	N°	286	-	-	
5	Instrumentation cubicle	N°	380	-	-	
C	**Control & Protection**	Lot	45,019	1	45,019	
D	**Ancillary Equipment**	Lot	13,344	1	13,344	
E	**Switchyard**	Lot	290,145	1	290,145	
F	**Comms Equip**	Lot	27,937	1	27,937	
G	**Civil Works**	Lot	2,341,985	1	2,341,985	
					3,166,304	
				SPP1 230/115 kV Substation		
				I	**Equipment**	10,190,131
				II	**Design Services**	202,376
				III	**Installation**	3,166,304
						13,558,811

5. New 230/115/22 kV Sen Sok substation (SPP2)

Item N°	Description	Unit	USD Unit Price		SPP2	
					New 230/115/22 kV Sen Sok substation	
					1×360 MVA 230/115 kV transformer; 1×75 MVA 115/22 kV transformer; GIS indoor switchgear; 2 x 230 kV circuits; 2 x 115 kV	
Item N°	**Description**	**Unit**	**Unit Price USD**		**Quantity**	**Total Price USD**
	Source: 115 kV Olympic & HQ SSs					
	Date: 2019	Escalation	1.0000			
	230&115 kV GIS Substation					
A1	**Equipment**					
A1.1	**230 kV dble BB GIS**					
1	Outgoing feeder bay	N°	700,000		2	1,400,000
2	Transformer Incomer Bay	N°	850,000		1	850,000
3	Bus Coupler Bay	N°	700,000		1	700,000
4	Busbar VT Bay	N°	500,000		1	500,000
5	SF6 Gas system	Lot	8,131		1	8,131
A1.1	**123 kV dble BB GIS**					
1	Outgoing feeder bay	N°	237,200		2	474,400
2	Transformer Incomer Bay	N°	230,000		1	230,000
3	Bus Coupler Bay	N°	263,560		1	263,560
4	Load Control Cubicle	N°	6,324		1	6,324
5	SF6 Gas system	Lot	8,131		1	8,131
A1.2	**24 kV sgle BB GIS**					-
1	Transfomer Incomer Bay	N°	62,410		1	62,410
2	Outgoing feeder bay	N°	44,320		8	354,560
3	Bus Sectionaliser	N°	90,837		1	90,837
A1.3	**Transformers**					-
1	230/115 kV, 360 MVA Transformer	N°	2,640,000		1	2,640,000
2	115/22kV, 75MVA Transformer	N°	710,667		1	710,667
3	22kV Earthing Transformer	N°	62,022		1	62,022
4	22/0.4kV, 250kVA Transformer	N°	10,337		1	10,337
A1.4	**LV AC Switchgear**	Lot	38,764		1	38,764
A1.5	**DC Power Supply & Invertor**	Lot	113,808		1	113,808
A1.6	**Control, Protection & Metering**					
1	Automation system	Lot	108,539		1	108,539
2	230 kV line protection	N°	48,100		2	96,200
3	230 kV transformer protection	N°	40,000		1	40,000
4	230 kV Bus Coupler protection	N°	40,000		1	40,000
5	230 kV breaker failure and BB protection	N°	40,000		1	40,000
6	115 kV line protection	N°	25,326		2	50,652
7	115 kV transformer protection	N°	24,551		1	24,551
8	115 kV Bus Coupler protection	N°	21,062		1	21,062
9	115 kV breaker failure and BB protection	N°	28,427		1	28,427
10	22 kV feeder protection	N°	7,322		10	73,220
11	22 kV transformer protection	N°	8,787		1	8,787
12	22 kV Bus Section protection	N°	7,322		1	7,322
13	PQ analyser	Lot	14,472		1	14,472
14	Metering	N°	1,363		10	13,630
A1.7	**SDH Multiplexer**	Lot	271,017		1	271,017
A1.8	**PABX**	Lot	90,339		1	90,339
A1.9	**SCADA**	Lot	5,169		1	5,169
A1.10	**Lightning Protection and Earthing**	Lot	28,727		1	28,727
A1.11	**Power & Control Cabling**	Lot	562,174		1	562,174
A1.12	**Backup Generator**	Lot	26,199		1	26,199
A1.13	**Training & Relay setting**	Lot	104,090		10	1,040,900
						11,115,338
A6	Spare Parts	Lot	268,945	5%		565,478
					Subtotal	**11,680,816**
B1	**Design Services**	Lot	395,708		1	**395,708**
C	**Installation of Plant, Equipment and Machinery**					
A	**Transformers**					
	230/115/22kV, Transformer	N°	585,000		1	585,000
	22 kV Earthing Transformer	N°	13,600		1	13,600
	22/0.4kV, 400kVA Transformer	N°	3,400		1	3,400
B1	**230 kV& 115 kV Switchgear**					
1	230 kV GIS Bays	N°	105,000		5	525,000
2	115 kV GIS Bays	N°	35,500		9	319,500
3	24 kV, switchgear	N°	13,650		3	40,950
C	Control & Protection	Lot	43,708		1	43,708
D	Ancillary Equipment	Lot	12,956		1	12,956
E	Comms Equip	Lot	27,123		1	27,123
F	Civil Works	Lot	2,000,000		1	2,000,000
G	Architectual works	Lot	1,195,405		1	1,195,405
H	Construction	Lot	285,355		1	285,355
I	Training on Site	Lot	34,892		1	34,892
J	H&S Plan	Lot	14,131		1	14,131
					Subtotal	**5,101,020**
					SPP2 Substation	
					Materials & Equipment	11,680,816
					Design Services	395,708
					Installation	5,101,020
					Total	**17,177,544**

6. New 115/22 kV RUPP substation (SPP3)

Item N°	Description	Unit	USD Unit Price		SPP3	
					New 115/22 kV RUPP substation	
					1×75 MVA 115/22 kV transformers; GIS indoor switchgear; 4 x 115 kV circuits	
Item N°	**Description**	**Unit**	**Unit Price USD**		**Quantity**	**Total Price USD**
	Source: 115 kV Olympic & HQ SSs Date: 2019	or to 2020:	1.0000			
	115 kV GIS Substation HQ					
A1	**Equipment**					
A1.1	**123 kV dble BB GIS**					
1	Outgoing feeder bay	N°	162,610		4	650,440
2	Transformer Incomer Bay	N°	162,610		1	162,610
3	Bus Coupler Bay	N°	180,677		1	180,677
4	Load Conrtrol Cubicle	N°	6,324		1	6,324
5	SF6 Gas system	Lot	8,131		1	8,131
A1.2	**24 kV sgle BB GIS**					-
1	Transfomer Incomer Bay	N°	62,410		1	62,410
2	Outgoing feeder bay	N°	44,320		8	354,560
3	Bus Sectionaliser	N°	90,837		1	90,837
A1.3	**Transformers**					-
1	115/22kV, 75MVA Transformer	N°	710,667		1	710,667
2	22kV Earthing Transformer	N°	62,022		1	62,022
3	22/0.4kV, 250kVA Transformer	N°	10,337		1	10,337
A1.4	**LV AC Switchgear**	Lot	38,764		1	38,764
A1.5	**DC Power Supply & Invertor**	Lot	113,808		1	113,808
A1.6	**Control, Protection & Metering**					
1	Automation system	Lot	108,539		1	108,539
2	115 kV line protection	N°	25,326		4	101,304
3	115 kV transformer protection	N°	24,551		1	24,551
4	115 kV Bus Coupler protection	N°	21,062		1	21,062
5	115 kV breaker failure and BB protection	N°	28,427		1	28,427
6	22 kV feeder protection	N°	7,322		10	73,220
7	22 kV transformer protection	N°	8,787		1	8,787
8	22 kV Bus Section protection	N°	7,322		1	7,322
9	PQ analyser	Lot	14,472		1	14,472
10	Metering	N°	1,363		10	13,630
A1.7	**SDH Multiplexer**	Lot	271,017		1	271,017
A1.8	**PABX**	Lot	90,339		1	90,339
A1.9	**SCADA**	Lot	5,169		1	5,169
A1.10	**Lightning Protection and Earthing**	Lot	28,727		1	28,727
A1.11	**Power & Control Cabling**	Lot	562,174		1	562,174
A1.12	**Backup Generator**	Lot	26,199		1	26,199
A1.13	**Training & Relay setting**	Lot	104,090		10	1,040,900
						4,877,426
A6	Spare Parts	Lot	268,945	5%		248,133
					Subtotal	**5,125,559**
B1	**Design Services**	Lot	395,708		1	**395,708**
C	**Installation of Plant, Equipment and Machinery**					
A	**Transformers**					
	230/115/22kV, Transformer	N°	585,000		1	585,000
	22 kV Earthing Transformer	N°	13,600		1	13,600
	22/0.4kV, 400kVA Transformer	N°	3,400		1	3,400
B1	**230 kV& 115 kV Switchgear**					
1	230 kV GIS Bays	N°	105,000			-
2	115 kV GIS Bays	N°	35,500		6	213,000
3	24 kV, switchgear	N°	13,650		10	136,500
C	Control & Protection	Lot	43,708		1	43,708
D	Ancillary Equipment	Lot	12,956		1	12,956
E	Comms Equip	Lot	27,123		1	27,123
F	Civil Works	Lot	2,000,000		0.5	1,000,000
G	Architectual works	Lot	1,195,405		1	1,195,405
H	Construction	Lot	285,355		1	285,355
I	Training on Site	Lot	34,892		1	34,892
J	H&S Plan	Lot	14,131		1	14,131
					Subtotal	**3,565,070**
					SPP3 Substation	
					Materials & Equipment	5,125,559
					Design Services	395,708
					Installation	3,565,070
					Total	**9,086,337**

7. New 115/22 kV Boeung Tompon substation (SPP4)

Item N°	Description	Unit	USD Unit Price	SPP4	
				New 115/22 kV Boeung Tompon substation	
				1×75 MVA 115/22 kV transformer; GIS indoor switchgear; 6 x 115 kV circuits	
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**
	Source: 115 kV Olympic & HQ SSs				
	Date: 2019	or to 2020:	1.0000		
	115 kV GIS Substation HQ				
A1	**Equipment**				
A1.1	**123 kV dble BB GIS**				
1	Outgoing feeder bay	N°	162,610	6	975,660
2	Transformer Incomer Bay	N°	162,610	1	162,610
3	Bus Coupler Bay	N°	180,677	1	180,677
4	Load Conrtrol Cubicle	N°	6,324	1	6,324
5	SF6 Gas system	Lot	8,131	1	8,131
A1.2	**24 kV sgle BB GIS**				-
1	Transfomer Incomer Bay	N°	62,410	1	62,410
2	Outgoing feeder bay	N°	44,320	10	443,200
3	Bus Sectionaliser	N°	90,837	1	90,837
A1.3	**Transformers**				-
1	115/22kV, 75MVA Transformer	N°	710,667	1	710,667
2	22kV Earthing Transformer	N°	62,022	1	62,022
3	22/0.4kV, 250kVA Transformer	N°	10,337	1	10,337
A1.4	**LV AC Switchgear**	Lot	38,764	1	38,764
A1.5	**DC Power Supply & Invertor**	Lot	113,808	1	113,808
A1.6	**Control, Protection & Metering**				
1	Automation system	Lot	108,539	1	108,539
2	115 kV line protection	N°	25,326	6	151,956
3	115 kV transformer protection	N°	24,551	1	24,551
4	115 kV Bus Coupler protection	N°	21,062	1	21,062
5	115 kV breaker failure and BB protection	N°	28,427	1	28,427
6	22 kV feeder protection	N°	7,322	12	87,864
7	22 kV transformer protection	N°	8,787	1	8,787
8	22 kV Bus Section protection	N°	7,322	1	7,322
9	PQ analyser	Lot	14,472	1	14,472
10	Metering	N°	1,363	12	16,356
A1.7	**SDH Multiplexer**	Lot	271,017	1	271,017
A1.8	**PABX**	Lot	90,339	1	90,339
A1.9	**SCADA**	Lot	5,169	1	5,169
A1.10	**Lightning Protection and Earthing**	Lot	28,727	1	28,727
A1.11	**Power & Control Cabling**	Lot	562,174	1	562,174
A1.12	**Backup Generator**	Lot	26,199	1	26,199
A1.13	**Training & Relay setting**	Lot	104,090	11	1,144,990
					5,463,398
A6	Spare Parts	Lot	268,945		277,943
				Subtotal	**5,741,341**
B1	**Design Services**	Lot	395,708	1	**395,708**
C	**Installation of Plant, Equipment and Machinery**				
A	**Transformers**				
	230/115/22kV, Transformer	N°	585,000	1	585,000
	22 kV Earthing Transformer	N°	13,600	1	13,600
	22/0.4kV, 400kVA Transformer	N°	3,400	1	3,400
B1	**230 kV& 115 kV Switchgear**				
1	230 kV GIS Bays	N°	105,000		-
2	115 kV GIS Bays	N°	35,500	8	284,000
3	24 kV, switchgear	N°	13,650	12	163,800
C	Control & Protection	Lot	43,708	1	43,708
D	Ancillary Equipment	Lot	12,956	1	12,956
E	Comms Equip	Lot	27,123	1	27,123
F	Civil Works	Lot	2,000,000	1	2,000,000
G	Architectual works	Lot	1,195,405	1	1,195,405
H	Construction	Lot	285,355	1	285,355
I	Training on Site	Lot	34,892	1	34,892
J	H&S Plan	Lot	14,131	1	14,131
				Subtotal	**4,663,370**
				SPP4 Substation	
				Materials & Equipment	5,741,341
				Design Services	395,708
				Installation	4,663,370
				Total	**10,800,419**

8. New 115/22 kV Russei Keo substation (SPP5)

Item N°	Description	Unit	USD Unit Price	SPP5	
				New 115/22 kV Boeung Tompon substation	
				1×75 MVA 115/22 kV transformer; GIS indoor switchgear; 6 x 115 kV circuits	
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**
	Source: 115 kV Olympic & HQ SSs Date: 2019	or to 2020:	1.0000		
	115 kV GIS Substation HQ				
A1	**Equipment**				
A1.1	**123 kV dble BB GIS**				
1	Outgoing feeder bay	N°	162,610	4	650,440
2	Transformer Incomer Bay	N°	162,610	1	162,610
3	Bus Coupler Bay	N°	180,677	1	180,677
4	Load Conrtrol Cubicle	N°	6,324	1	6,324
5	SF6 Gas system	Lot	8,131	1	8,131
A1.2	**24 kV sgle BB GIS**				-
1	Transfomer Incomer Bay	N°	62,410	1	62,410
2	Outgoing feeder bay	N°	44,320	8	354,560
3	Bus Sectionaliser	N°	90,837	1	90,837
A1.3	**Transformers**				-
1	115/22kV, 75MVA Transformer	N°	710,667	1	710,667
2	22kV Earthing Transformer	N°	62,022	1	62,022
3	22/0.4kV, 250kVA Transformer	N°	10,337	1	10,337
A1.4	**LV AC Switchgear**	Lot	38,764	1	38,764
A1.5	**DC Power Supply & Invertor**	Lot	113,808	1	113,808
A1.6	**Control, Protection & Metering**				
1	Automation system	Lot	108,539	1	108,539
2	115 kV line protection	N°	25,326	4	101,304
3	115 kV transformer protection	N°	24,551	1	24,551
4	115 kV Bus Coupler protection	N°	21,062	1	21,062
5	115 kV breaker failure and BB protection	N°	28,427	1	28,427
6	22 kV feeder protection	N°	7,322	10	73,220
7	22 kV transformer protection	N°	8,787	1	8,787
8	22 kV Bus Section protection	N°	7,322	1	7,322
9	PQ analyser	Lot	14,472	1	14,472
10	Metering	N°	1,363	10	13,630
A1.7	**SDH Multiplexer**	Lot	271,017	1	271,017
A1.8	**PABX**	Lot	90,339	1	90,339
A1.9	**SCADA**	Lot	5,169	1	5,169
A1.10	**Lightning Protection and Earthing**	Lot	28,727	1	28,727
A1.11	**Power & Control Cabling**	Lot	562,174	1	562,174
A1.12	**Backup Generator**	Lot	26,199	1	26,199
A1.13	**Training & Relay setting**	Lot	104,090	11	1,144,990
					4,981,516
A6	Spare Parts	Lot	268,945		-
				Subtotal	**4,981,516**
B1	**Design Services**	Lot	395,708	1	**395,708**
C	**Installation of Plant, Equipment and Machinery**				
A	**Transformers**				
	230/115/22kV, Transformer	N°	585,000	1	585,000
	22 kV Earthing Transformer	N°	13,600	1	13,600
	22/0.4kV, 400kVA Transformer	N°	3,400	1	3,400
B1	**230 kV& 115 kV Switchgear**				
1	230 kV GIS Bays	N°	105,000		-
2	115 kV GIS Bays	N°	35,500	6	213,000
3	24 kV, switchgear	N°	13,650	10	136,500
C	Control & Protection	Lot	43,708	1	43,708
D	Ancillary Equipment	Lot	12,956	1	12,956
E	Comms Equip	Lot	27,123	1	27,123
F	Civil Works	Lot	2,000,000	1	2,000,000
G	Architectual works	Lot	1,195,405	1	1,195,405
H	Construction	Lot	285,355	1	285,355
I	Training on Site	Lot	34,892	1	34,892
J	H&S Plan	Lot	14,131	1	14,131
				Subtotal	**4,565,070**
				SPP5 Substation	
				Materials & Equipment	4,981,516
				Design Services	395,708
				Installation	4,565,070
				Total	**9,942,294**

9. New 11.1 km 115 kV transmission line from proposed Samiki Meanchey to proposed Kampong Tralach substations (TKCN1)

Item N°	Description	Unit	Unit Price EUR	Unit Price USD		TKCN1				
			USD/EUR 08Feb20	0.9347		New 11.1 km 115 kV transmission line from proposed Samiki Meanchey to proposed Kampong Tralach substations				
	Source: 115 kV Kampong Cham to Preak Prasob TL 91 km Date: 2017		Escalation factor to 2020	1.0300		115 kV double circuit line; overhead on steel towers				
	115 kV Overhead Transmission Line					km	**11.10**		**Quantity**	**Total Price USD**
A	**Materials & Equipment**	km	**91.46**	Average span		N° towers	Average span	N° Circuits		
I	**Lattice Steel Towers**	N°	**397**	**230**		**50**	**227**	**2**		
1	Tower type A Suspension 0-2°	N°	5,606.93	6,179.00					37	228,623
2	Tower type B Tension 0-15°	N°	6,618.68	7,294.00					2	14,588
3	Tower type C Tension 0-30°	N°	8,705.00	9,593.00					-	-
4	Tower type D Tension 0-60°	N°	8,971.53	9,886.00					1	9,886
5	Tower type E Dead End	N°	11,216.73	12,360.00					10	123,600
6	Tower type AL Suspension 0-2° 600m	N°	9,239.03	10,181.00					-	-
7	Tower signs	set	38.47	42.00					50	2,100
										378,797
II	**Conductor and OPGW**					Sag Factor	**1.03**	Conductors/ phase	**1**	
8	1272MCM ACSR/AW Bittern	km	6,780.00	6,983.00					69	481,827
9	OPGW 24 core	km	3,314.40	3,652.00					23	83,996
										565,823
III	**Insulators**									
10	Assembly 1: Single suspension insulator Assemblies with arcing horns and armour rods	set	46.40	51.00					222	11,322
11	Assembly 2: Double suspension insulator Assemblies with arcing horns and armour rods	set	73.00	80.00					-	-
12	Assembly 3: Jumper support Assembies without arcing horns and armour rods	set	20.90	23.00					-	-
13	Assembly 4: Single Tension insulator Assembies with arcing horns	set	35.90	40.00					288	11,520
14	Assembly 5: Double Tension insulator Assembies with arcing horns	set	73.00	80.00					24	1,920
15	Assembly 6: Single Inverted Tension insulator Assembies with arcing horns	set	71.90	79.00						-
16	Assembly 7: Double Inverted Tension insulator Assembies with arcing horns	set	97.30	107.00						-
17	Porcelain insulator disc IEC : U70 BLP	discs	13.80	15.00					4,080	61,200
18	Porcelain insulator disc IEC : U140 BLP	discs	16.30	18.00					216	3,888
										89,850
IV	**Line Accessories**									
19	Full tension splices for conductor	set	25.50	28.00					138	3,864
20	Repair sleeves for conductor	set	12.70	14.00					69	966
21	Vibration dampers for conductor	set	19.70	22.00					534	11,748
										16,578
V	**Earthing Materials**									
25	Terminal connector from galvanized steel wire to L50x4mm	pcs	6.30	7.00					500	3,500
26	Galvanized steel earthing wire	m	0.10	0.11					2,000	220
27	Zinc coated steel angle L50x4x500mm	pcs	4.60	5.00					100	500
28	Zinc coated steel angle L50x4x1000mm	pcs	5.80	6.00					100	600
										4,820
VI	**OPGW Accessories**									
29	Joint boxes	set	89.20	98.00					5	490
30	Suspension assembly with accessories	set	41.70	46.00					74	3,404
31	Tension assembly with accessories	set	35.90	40.00					52	2,080
32	Vibration dampers	set	12.50	14.00					200	2,800
33	Earthing clamps	pcs	6.30	7.00					200	1,400
34	Parallel groove clamps	pcs	6.30	6.94					200	1,388
35	Cleats	pcs	6.30	7.00					200	1,400
36	Coiling	set	20.90	23.00					46	1,058
										14,020
									Subtotal	**1,069,888**
VI	**Spare Parts**		3.00%				3.00%			32,097
									Total	**1,101,985**
			Unit Price USD							
B	**Design Services**	km	13,330.00	13,730.00					11	**152,000**
1	Project Management									
2	Detailed Construction Drawings									
3	Installation, Operating, Service and Maintenance Manuals									
4	As-Built Drawings, Commissioning and Completion Report									
5	Tower and its foundation design									
C	**Installation**									
1	Erection of Towers	sets	785.72	763.00					50	38,150
2	Stringing of Conductor	cct-km	6,402.80	6,216.00					22	137,995
3	Installation of Conductor Accessories	sets	0.00	-					11	-
4	Installation of Line Accessories	sets	37.43	36.00					11	400
5	Installation of Earthing Materials	sets	891.73	866.00					11	9,613
6	Installation of OPGW	sets	3,575.78	3,472.00					11	38,539
7	Tower Foundations	towers	8,256.28	8,016.00					50	400,800
8	Testing	LS	1,697.02	1,648.00					11	18,293
9	Mobilisation & Preliminary	LS	12,427.99	12,066.00					11	133,933
										777,722
										2,031,707

10. New 230/115/22 kV Samiki Meanchey substation (SKCN1)

Item N°	Description	Unit		SKCN1		
				New 230/115/22 kV Samiki Meanchey		
				1×160 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
		USD/EUR 08Feb20	0.9347			
	Sources: 230/115 kV JICA GIS Substation & Chamkar Luong ss Date: 2019 & 2017	Escalation factor to 2020:	1.0300			
I	**230/115 kV Substation**					
A	**Transformers**					
1	230/115 kV, 240 MVA Transformer	N°	2,719,200		-	
2	230/115/22 kV, 240 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	2,966,400	-	-	
3A	230/115/22 kV,160 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,977,600	1	1,977,600	
3	230/115/22 kV,100/75/40 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,236,000		-	
4	230/22 kV, 75 MVA Transformer	N°	849,750		-	
5	115/22 kV, 75 MVA Transformer	N°	515,000		-	
6	22 kV Earthing Transformer	N°	15,412	1	15,412	
7	22/0.4kV, 400kVA Transformer	N°	25,687	1	25,687	
						2,018,699
B1	**230 kV & 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	41,100	4	164,400	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	41,100	2	82,200	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	15,412	4	61,648	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	12,844	14	179,816	
5	230 kV Current transformer for line & interbus (1 Phase/Set)	N°	5,931	12	71,172	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	5,931	6	35,586	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	5,840	12	70,080	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	5,840	3	17,520	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	1,978	12	23,736	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	30,825	2	61,650	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	30,825	2	61,650	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	10,275	2	20,550	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	10,275	8	82,200	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	2,710	6	16,260	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	2,710	3	8,130	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	5,832	6	34,992	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	5,832	3	17,496	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	697	2	1,394	
						1,010,480
B2	**24 kV Metalclad switchgear, 2,500 A busbar**					
1	Incoming CB cubicle	N°	24,010	1	24,010	
2	Outgoing CB cubicle	N°	16,807	8	134,456	
3	Bus Section CB cubicle	N°	24,010	1	24,010	
4	Station Service Transformer	N°	18,007	1	18,007	
5	Instrumentation cubicle	N°	12,005	1	12,005	
					212,488	
C	**Control & Protection**					424,976
1	Computerised control system	Lot	117,649	1	117,649	
2	230 kV Panels	N°	153,663	4	614,652	
2A	230 kV Controls	Lot	786,860	1	786,860	
3	115 kV Panels	Lot	159,604	1	159,604	
4	Transformer Panels	Lot	57,624	1	57,624	
						1,736,389

Item N°	Description	Unit		SKCN1		
				New 230/115/22 kV Samiki Meanchey		
				1×160 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
D	**Ancillary Equipment**					
	Power supplies, AC & DC boards	Lot	303,004	1	303,004	
E	**Switchyard**					
	Busbars, earthing, lightning, etc	Lot	978,054	1	978,054	
F	**Comms Equip**					
	Comms, Phones,etc.	Lot	96,033	1	96,033	
						4,548,936
G	**Spare Parts**	Lot		1	272,936	
						6,840,571
			Unit Price USD			
II	**Design Services**	Lot	202,376	1	202,376	
III	**Installation**					
A	**Transformers**					
	230/115/22 kV Transformer	N°	12,922	-	-	
	22 kV Earthing Transformer	N°	2,008	1	2,008	
	22/0.4kV, 400kVA Transformer	N°	2,008	1	2,008	
B1	**230 kV& 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	2,063	4	8,252	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	2,063	2	4,126	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	998	4	3,992	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	900	14	12,600	
5	230 kV Current transformer for line (1 Phase/Set)	N°	420	12	5,040	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	420	6	2,520	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	463	12	5,556	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	463	3	1,389	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	231	12	2,772	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	1,247	2	2,494	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	1,247	2	2,494	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	464	2	928	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	418	8	3,344	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	219	6	1,314	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	219	3	657	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	28,743	6	172,458	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	287	3	861	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	122	2	244	
B2	**24 kV Metalclad switchgear**					
1	Incoming CB cubicle	N°	405	1	405	
2	Outgoing CB cubicle	N°	405	8	3,240	
3	Bus Section CB cubicle	N°	406	1	406	
4	Station Service Transformer	N°	286	1	286	
5	Instrumentation cubicle	N°	380	1	380	
C	**Control & Protection**	Lot	45,019	1	45,019	
D	**Ancillary Equipment**	Lot	13,344	1	13,344	
E	**Switchyard**	Lot	290,145	1	290,145	
F	**Comms Equip**	Lot	27,937	1	27,937	
G	**Civil Works**	Lot	2,341,985	1	2,341,985	
					2,958,204	
				SKCN1 230/115/22 kV		
				I	**Equipment**	6,840,571
				II	**Design Services**	202,376
				III	**Installation**	2,958,204
						10,001,151

11. New 115/22 kV Kampong Tralach substation (SKCN2)

Item N°	Description	Unit		SKCN2		
				New 115/22 kV Kampong Tralach		
				1×50 MVA 115/22 kV transformer; outdoor switchyard; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
		USD/EUR 08Feb20	0.9347			
	Sources: 230/115 kV JICA GIS Substation & Chamkar Luong ss Date: 2019 & 2017	Escalation factor to 2020:	1.0300			
I	**230/115 kV Substation**					
A	**Transformers**					
1	230/115 kV, 240 MVA Transformer	N°	2,719,200		-	
2	230/115/22 kV, 240 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	2,966,400		-	
3A	230/115/22 kV,160 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,977,600			
3	230/115/22 kV,100/75/40 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,236,000		-	
4	230/22 kV, 75 MVA Transformer	N°	849,750	-	-	
5	115/22 kV, 75 MVA Transformer	N°	515,000	1	515,000	
6	22 kV Earthing Transformer	N°	15,412	1	15,412	
7	22/0.4kV, 400kVA Transformer	N°	25,687	1	25,687	
						556,099
B1	**230 kV & 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	41,100	-	-	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	41,100	-	-	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	15,412	-	-	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	12,844	-	-	
5	230 kV Current transformer for line & interbus (1 Phase/Set)	N°	5,931	-	-	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	5,931	-	-	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	5,840	-	-	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	5,840	-	-	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	1,978	-	-	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	30,825	2	61,650	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	30,825	2	61,650	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	10,275	2	20,550	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	10,275	8	82,200	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	2,710	6	16,260	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	2,710	3	8,130	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	5,832	6	34,992	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	5,832	3	17,496	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	697	2	1,394	
						304,322
B2	**24 kV Metalclad switchgear, 2,500 A busbar**					
1	Incoming CB cubicle	N°	24,010	1	24,010	
2	Outgoing CB cubicle	N°	16,807	4	67,228	
3	Bus Section CB cubicle	N°	24,010	1	24,010	
4	Station Service Transformer	N°	18,007	1	18,007	
5	Instrumentation cubicle	N°	12,005	1	12,005	
					145,260	
C	**Control & Protection**					290,520
1	Computerised control system	Lot	117,649	1	117,649	
2	230 kV Panels	N°	153,663		-	
2A	230 kV Controls	Lot	786,860		-	
3	115 kV Panels	Lot	159,604	1	159,604	
4	Transformer Panels	Lot	57,624	1	57,624	
						334,877

Item N°	Description	Unit		SKCN2		
				New 115/22 kV Kampong Tralach		
				1×50 MVA 115/22 kV transformer; outdoor switchyard; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
D	**Ancillary Equipment**					
	Power supplies, AC & DC boards	Lot	303,004	1	303,004	
E	**Switchyard**					
	Busbars, earthing, lightning, etc	Lot	978,054	1	978,054	
F	**Comms Equip**					
	Comms, Phones,etc.	Lot	96,033	1	96,033	
						2,306,810
G	**Spare Parts**	Lot		1	138,409	
						3,001,318
			Unit Price USD			
II	**Design Services**	Lot	202,376	1	202,376	
III	**Installation**					
A	**Transformers**					
	230/115/22 kV Transformer	N°	12,922	1	12,922	
	22 kV Earthing Transformer	N°	2,008	1	2,008	
	22/0.4kV, 400kVA Transformer	N°	2,008	1	2,008	
B1	**230 kV& 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	2,063	-	-	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	2,063	-	-	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	998	-	-	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	900	-	-	
5	230 kV Current transformer for line (1 Phase/Set)	N°	420	-	-	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	420	-	-	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	463	-	-	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	463	-	-	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	231	-	-	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	1,247	2	2,494	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	1,247	2	2,494	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	464	2	928	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	418	8	3,344	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	219	6	1,314	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	219	3	657	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	28,743	6	172,458	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	287	3	861	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	122	2	244	
B2	**24 kV Metalclad switchgear**					
1	Incoming CB cubicle	N°	405	1	405	
2	Outgoing CB cubicle	N°	405	4	1,620	
3	Bus Section CB cubicle	N°	406	1	406	
4	Station Service Transformer	N°	286	1	286	
5	Instrumentation cubicle	N°	380	1	380	
C	**Control & Protection**	Lot	45,019	1	45,019	
D	**Ancillary Equipment**	Lot	13,344	1	13,344	
E	**Switchyard**	Lot	290,145	1	290,145	
F	**Comms Equip**	Lot	27,937	1	27,937	
G	**Civil Works**	Lot	2,341,985	1	2,341,985	
					2,923,259	
				SKCN2 115/22 kV Substation		
				I	**Equipment**	3,001,318
				II	**Design Services**	202,376
				III	**Installation**	2,923,259
						6,126,953

12. New 230/115/22 kV Thnal Keng substation (SKPC1)

Item N°	Description	Unit		SKPC1		
				New 230/115/22 kV Thnal Keng substation		
				1×160 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
		USD/EUR 08Feb20	0.9347			
	Sources: 230/115 kV JICA GIS Substation & Chamkar Luong ss Date: 2019 & 2017	Escalation factor to 2020:	1.0300			
I	**230/115 kV Substation**					
A	**Transformers**					
1	230/115 kV, 240 MVA Transformer	N°	2,719,200		-	
2	230/115/22 kV, 240 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	2,966,400	-	-	
3A	230/115/22 kV,160 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,977,600	1	1,977,600	
3	230/115/22 kV,100/75/40 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,236,000		-	
4	230/22 kV, 75 MVA Transformer	N°	849,750		-	
5	115/22 kV, 75 MVA Transformer	N°	515,000		-	
6	22 kV Earthing Transformer	N°	15,412	1	15,412	
7	22/0.4kV, 400kVA Transformer	N°	25,687	1	25,687	
						2,018,699
B1	**230 kV & 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	41,100	4	164,400	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	41,100	2	82,200	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	15,412	4	61,648	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	12,844	14	179,816	
5	230 kV Current transformer for line & interbus (1 Phase/Set)	N°	5,931	12	71,172	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	5,931	6	35,586	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	5,840	12	70,080	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	5,840	6	35,040	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	1,978	12	23,736	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	30,825	2	61,650	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	30,825	2	61,650	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	10,275	2	20,550	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	10,275	8	82,200	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	2,710	6	16,260	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	2,710	3	8,130	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	5,832	6	34,992	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	5,832	6	34,992	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	697	2	1,394	
						1,045,496
B2	**24 kV Metalclad switchgear, 2,500 A busbar**					
1	Incoming CB cubicle	N°	24,010	1	24,010	
2	Outgoing CB cubicle	N°	16,807	8	134,456	
3	Bus Section CB cubicle	N°	24,010	1	24,010	
4	Station Service Transformer	N°	18,007	1	18,007	
5	Instrumentation cubicle	N°	12,005	1	12,005	
					212,488	
C	**Control & Protection**					424,976
1	Computerised control system	Lot	117,649	1	117,649	
2	230 kV Panels	N°	153,663	4	614,652	
2A	230 kV Controls	Lot	786,860	1	786,860	
3	115 kV Panels	Lot	159,604	1	159,604	
4	Transformer Panels	Lot	57,624	1	57,624	
						1,736,389

Item N°	Description	Unit		SKPC1		
				New 230/115/22 kV Thnal Keng substation		
				1×160 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
D	**Ancillary Equipment**					
	Power supplies, AC & DC boards	Lot	303,004	1	303,004	
E	**Switchyard**					
	Busbars, earthing, lightning, etc	Lot	978,054	1	978,054	
F	**Comms Equip**					
	Comms, Phones,etc.	Lot	96,033	1	96,033	
						4,583,952
G	**Spare Parts**	Lot		1	275,037	
						6,877,688
			Unit Price USD			
II	**Design Services**	Lot	202,376	1	202,376	
III	**Installation**					
A	**Transformers**					
	230/115/22 kV Transformer	N°	12,922	-	-	
	22 kV Earthing Transformer	N°	2,008	1	2,008	
	22/0.4kV, 400kVA Transformer	N°	2,008	1	2,008	
B1	**230 kV& 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	2,063	4	8,252	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	2,063	2	4,126	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	998	4	3,992	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	900	14	12,600	
5	230 kV Current transformer for line (1 Phase/Set)	N°	420	12	5,040	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	420	6	2,520	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	463	12	5,556	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	463	6	2,778	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	231	12	2,772	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	1,247	2	2,494	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	1,247	2	2,494	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	464	2	928	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	418	8	3,344	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	219	6	1,314	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	219	3	657	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	28,743	6	172,458	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	287	6	1,722	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	122	2	244	
B2	**24 kV Metalclad switchgear**					
1	Incoming CB cubicle	N°	405	1	405	
2	Outgoing CB cubicle	N°	405	8	3,240	
3	Bus Section CB cubicle	N°	406	1	406	
4	Station Service Transformer	N°	286	1	286	
5	Instrumentation cubicle	N°	380	1	380	
C	**Control & Protection**	Lot	45,019	1	45,019	
D	**Ancillary Equipment**	Lot	13,344	1	13,344	
E	**Switchyard**	Lot	290,145	1	290,145	
F	**Comms Equip**	Lot	27,937	1	27,937	
G	**Civil Works**	Lot	2,341,985	1	2,341,985	
					2,960,454	
				SKPC1 230/22 kV Substation		
				I	**Equipment**	6,877,688
				II	**Design Services**	202,376
				III	**Installation**	2,960,454
						10,040,518

13. New 230/22 kV Skun substation (SKPC2)

Item N°	Description	Unit		SKPC2		
				New 230/22 kV Skun substation		
				1×75 MVA 230/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
		USD/EUR 08Feb20	0.9347			
	Sources: 230/115 kV JICA GIS Substation & Chamkar Luong ss Date: 2019 & 2017	Escalation factor to 2020:	1.0300			
I	**230/115 kV Substation**					
A	**Transformers**					
1	230/115 kV, 240 MVA Transformer	N°	2,719,200		-	
2	230/115/22 kV, 240 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	2,966,400		-	
3A	230/115/22 kV,160 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,977,600			
3	230/115/22 kV,100/75/40 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,236,000		-	
4	230/22 kV, 75 MVA Transformer	N°	849,750	1	849,750	
5	115/22 kV, 75 MVA Transformer	N°	515,000		-	
6	22 kV Earthing Transformer	N°	15,412	1	15,412	
7	22/0.4kV, 400kVA Transformer	N°	25,687	1	25,687	
						890,849
B1	**230 kV & 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	41,100	4	164,400	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	41,100	2	82,200	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	15,412	4	61,648	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	12,844	14	179,816	
5	230 kV Current transformer for line & interbus (1 Phase/Set)	N°	5,931	12	71,172	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	5,931	6	35,586	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	5,840	12	70,080	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	5,840	3	17,520	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	1,978	12	23,736	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	30,825	-	-	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	30,825	-	-	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	10,275	-	-	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	10,275	-	-	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	2,710	-	-	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	2,710	-	-	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	5,832	-	-	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	5,832	-	-	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	697	-	-	
						706,158
B2	**24 kV Metalclad switchgear, 2,500 A busbar**					
1	Incoming CB cubicle	N°	24,010	1	24,010	
2	Outgoing CB cubicle	N°	16,807	8	134,456	
3	Bus Section CB cubicle	N°	24,010	1	24,010	
4	Station Service Transformer	N°	18,007	1	18,007	
5	Instrumentation cubicle	N°	12,005	1	12,005	
					212,488	
C	**Control & Protection**					424,976
1	Computerised control system	Lot	117,649	1	117,649	
2	230 kV Panels	N°	153,663	4	614,652	
2A	230 kV Controls	Lot	786,860	1	786,860	
3	115 kV Panels	Lot	159,604	1	159,604	
4	Transformer Panels	Lot	57,624	1	57,624	
						1,736,389

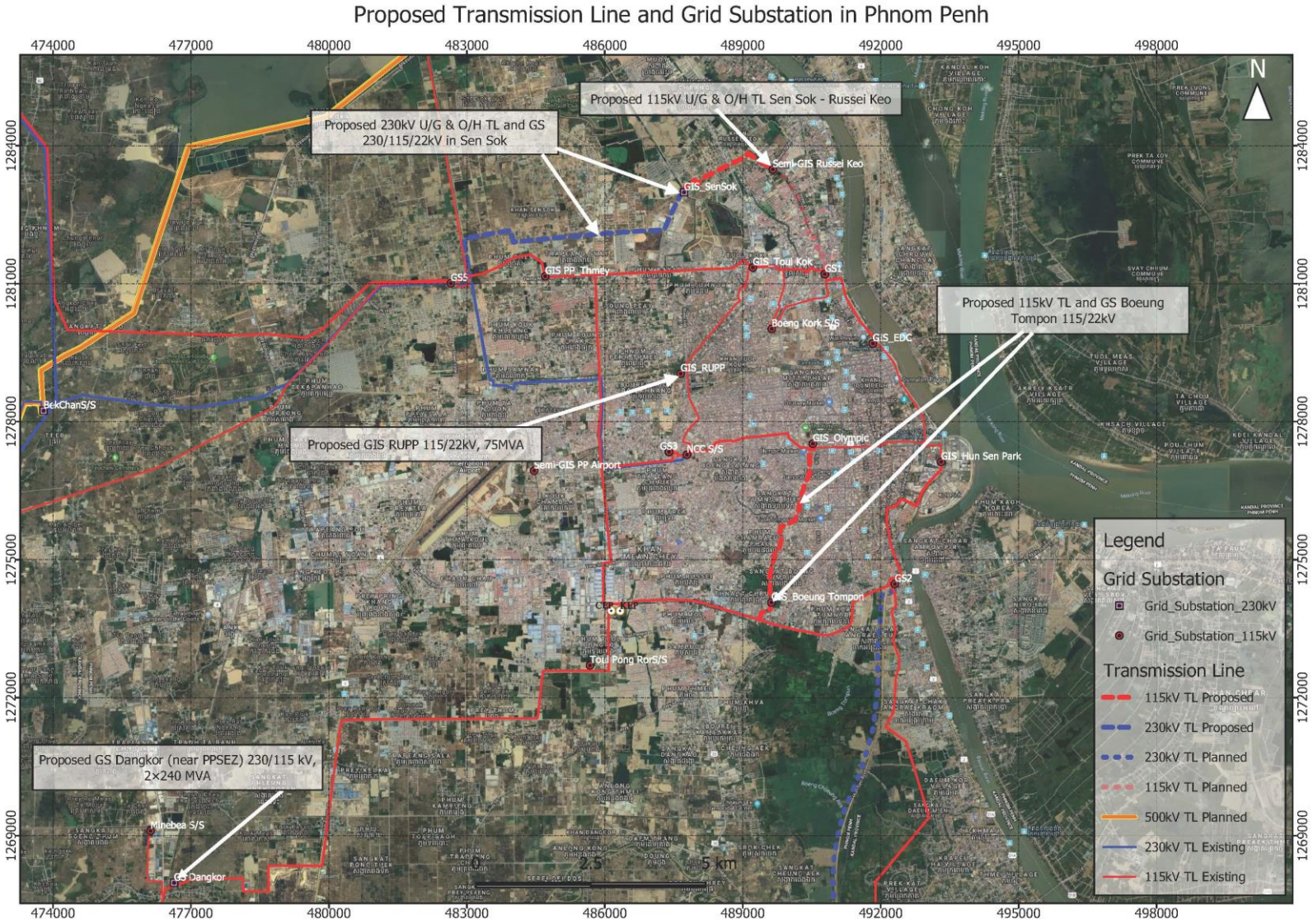
Item N°	Description	Unit		SKPC2		
				New 230/22 kV Skun substation		
				1×75 MVA 230/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
D	**Ancillary Equipment**					
	Power supplies, AC & DC boards	Lot	303,004	1	303,004	
E	**Switchyard**					
	Busbars, earthing, lightning, etc	Lot	978,054	1	978,054	
F	**Comms Equip**					
	Comms, Phones,etc.	Lot	96,033	1	96,033	
						4,244,614
G	**Spare Parts**	Lot		1	254,677	
						5,390,140
			Unit Price USD			
II	**Design Services**	Lot	202,376	1	202,376	
III	**Installation**					
A	**Transformers**					
	230/115/22 kV Transformer	N°	12,922	-	-	
	22 kV Earthing Transformer	N°	2,008	1	2,008	
	22/0.4kV, 400kVA Transformer	N°	2,008	1	2,008	
B1	**230 kV& 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	2,063	4	8,252	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	2,063	2	4,126	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	998	4	3,992	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	900	14	12,600	
5	230 kV Current transformer for line (1 Phase/Set)	N°	420	12	5,040	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	420	6	2,520	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	463	12	5,556	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	463	3	1,389	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	231	12	2,772	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	1,247	-	-	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	1,247	-	-	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	464	-	-	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	418	-	-	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	219	-	-	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	219	-	-	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	28,743	-	-	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	287	-	-	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	122	-	-	
B2	**24 kV Metalclad switchgear**					
1	Incoming CB cubicle	N°	405	1	405	
2	Outgoing CB cubicle	N°	405	8	3,240	
3	Bus Section CB cubicle	N°	406	1	406	
4	Station Service Transformer	N°	286	1	286	
5	Instrumentation cubicle	N°	380	1	380	
C	**Control & Protection**	Lot	45,019	1	45,019	
D	**Ancillary Equipment**	Lot	13,344	1	13,344	
E	**Switchyard**	Lot	290,145	1	290,145	
F	**Comms Equip**	Lot	27,937	1	27,937	
G	**Civil Works**	Lot	2,341,985	1	2,341,985	
					2,773,410	
				SKPC2 230/22 kV Substation		
				I	**Equipment**	5,390,140
				II	**Design Services**	202,376
				III	**Installation**	2,773,410
						8,365,926

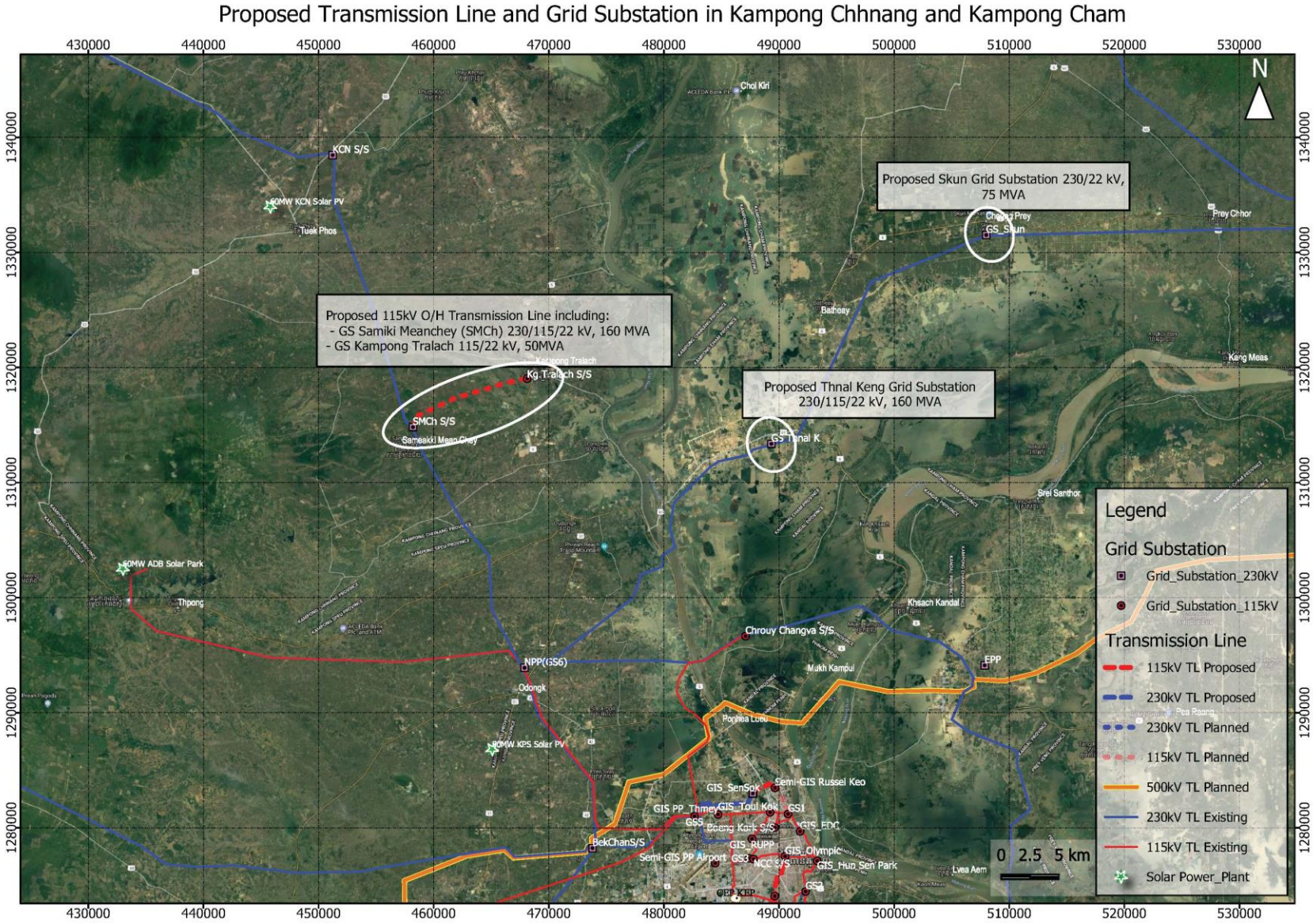
14. New 230/115/22 kV Samroang Yoang substation (STKO1)

Item N°	Description	Unit		STKO1		
				New 230/115/22 kV Samroang Yoang		
				1×240 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
		USD/EUR 08Feb20	0.9347			
	Sources: 230/115 kV JICA GIS Substation & Chamkar Luong ss Date: 2019 & 2017	Escalation factor to 2020:	1.0300			
I	**230/115 kV Substation**					
A	**Transformers**					
1	230/115 kV, 240 MVA Transformer	N°	2,719,200		-	
2	230/115/22 kV, 240 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	2,966,400	1	2,966,400	
3A	230/115/22 kV,160 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,977,600			
3	230/115/22 kV,100/75/40 MVA, 3-phase, Oil immersed, ONAN/ONAF multi-winding transformer	N°	1,236,000		-	
4	230/22 kV, 75 MVA Transformer	N°	849,750		-	
5	115/22 kV, 75 MVA Transformer	N°	515,000		-	
6	22 kV Earthing Transformer	N°	15,412	1	15,412	
7	22/0.4kV, 400kVA Transformer	N°	25,687	1	25,687	
						3,007,499
B1	**230 kV & 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	41,100	4	164,400	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	41,100	2	82,200	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	15,412	4	61,648	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	12,844	14	179,816	
5	230 kV Current transformer for line & interbus (1 Phase/Set)	N°	5,931	12	71,172	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	5,931	6	35,586	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	5,840	12	70,080	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	5,840	3	17,520	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	1,978	12	23,736	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	30,825	2	61,650	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	30,825	2	61,650	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	10,275	2	20,550	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	10,275	8	82,200	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	2,710	6	16,260	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	2,710	3	8,130	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	5,832	6	34,992	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	5,832	3	17,496	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	697	2	1,394	
						1,010,480
B2	**24 kV Metalclad switchgear, 2,500 A busbar**					
1	Incoming CB cubicle	N°	24,010	1	24,010	
2	Outgoing CB cubicle	N°	16,807	8	134,456	
3	Bus Section CB cubicle	N°	24,010	1	24,010	
4	Station Service Transformer	N°	18,007	1	18,007	
5	Instrumentation cubicle	N°	12,005	1	12,005	
					212,488	
C	**Control & Protection**					424,976
1	Computerised control system	Lot	117,649	1	117,649	
2	230 kV Panels	N°	153,663	4	614,652	
2A	230 kV Controls	Lot	786,860	1	786,860	
3	115 kV Panels	Lot	159,604	1	159,604	
4	Transformer Panels	Lot	57,624	1	57,624	
						1,736,389

Item N°	Description	Unit		STKO1		
				New 230/115/22 kV Samroang Yoang		
				1×240 MVA 230/115/22 kV transformer; outdoor switchyard; 4 x 230 kV circuits; 2 x 115 kV circuits		
Item N°	**Description**	**Unit**	**Unit Price USD**	**Quantity**	**Total Price USD**	
D	**Ancillary Equipment**					
	Power supplies, AC & DC boards	Lot	303,004	1	303,004	
E	**Switchyard**					
	Busbars, earthing, lightning, etc	Lot	978,054	1	978,054	
F	**Comms Equip**					
	Comms, Phones,etc.	Lot	96,033	1	96,033	
						4,548,936
G	**Spare Parts**	Lot		1	272,936	
						7,829,371
			Unit Price USD			
II	**Design Services**	Lot	202,376	1	202,376	
III	**Installation**					
A	**Transformers**					
	230/115/22 kV Transformer	N°	12,922	-	-	
	22 kV Earthing Transformer	N°	2,008	1	2,008	
	22/0.4kV, 400kVA Transformer	N°	2,008	1	2,008	
B1	**230 kV& 115 kV Switchgear**					
1	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, single-pole (individual) operation. with supporting structure	N°	2,063	4	8,252	
2	230 kV, 3-pole, 2,000A, 40kA, SF6 gas Circuit breaker, three(3)-pole operation, with supporting structure	N°	2,063	2	4,126	
3	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector with earthing switch, with supporting structure	N°	998	4	3,992	
4	230 kV, 3-pole, 2,000 A, 40 kA, Disconnector without earthing switch, with supporting structure	N°	900	14	12,600	
5	230 kV Current transformer for line (1 Phase/Set)	N°	420	12	5,040	
6	230 kV Current transformer for transformer (1 Phase/Set)	N°	420	6	2,520	
7	230 kV Capacitor type voltage transformer for line (1 Phase/Set)	N°	463	12	5,556	
8	230 kV Capacitor type voltage transformer for busbar (1 Phase/Set)	N°	463	3	1,389	
9	192 kV, 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	231	12	2,772	
10	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. single-pole (individual) operation, with supporting structure	N°	1,247	2	2,494	
11	115 kV 3-pole 2.000 A 40 kA, SF6 gas Circuit breaker. three-pole operation, with supporting structure	N°	1,247	2	2,494	
12	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector with earthing switch, with supporting structure	N°	464	2	928	
13	115 kV 3-pole, 2,000 A, 31.5 kA, Disconnector without earthing switch, with supporting structure	N°	418	8	3,344	
14	115 kV Current Transformer for line (1 Phase/Set)	N°	219	6	1,314	
15	115 kV Current Transformer for transformer (1 Phase/Set)	N°	219	3	657	
16	115 kV Capacitor type voltage Transformer for line (1 Phase/Set)	N°	28,743	6	172,458	
17	115 kV Capacitor type voltage Transformer for busbar. (1 Phase/Set)	N°	287	3	861	
18	96 kV 10 kA Surge arrester, discharge class 3, with surge counter and A.C. leakage meter (1 Phase/Set)	N°	122	2	244	
B2	**24 kV Metalclad switchgear**					
1	Incoming CB cubicle	N°	405	1	405	
2	Outgoing CB cubicle	N°	405	8	3,240	
3	Bus Section CB cubicle	N°	406	1	406	
4	Station Service Transformer	N°	286	1	286	
5	Instrumentation cubicle	N°	380	1	380	
C	**Control & Protection**	Lot	45,019	1	45,019	
D	**Ancillary Equipment**	Lot	13,344	1	13,344	
E	**Switchyard**	Lot	290,145	1	290,145	
F	**Comms Equip**	Lot	27,937	1	27,937	
G	**Civil Works**	Lot	2,341,985	1	2,341,985	
					2,958,204	
				STKO1 230/115/22 kV		
				I	**Equipment**	7,829,371
				II	**Design Services**	202,376
				III	**Installation**	2,958,204
						10,989,951

LOCATION MAPS




Proposed Transmission Line and Grid Substation in Kampong Chhnang and Kampong Cham
Proposed Skun Grid Substation 230/22 kV, 75 MVA
Proposed 115kV O/H Transmission Line including:
- GS Samiki Meanchey (SMCh) 230/115/22 kV, 160 MVA
- GS Kampong Tralach 115/22 kV, 50MVA
Proposed Thnal Keng Grid Substation 230/115/22 kV, 160 MVA
KCN S/S
50MW KCN Solar PV
Tuek Phos
Chol Kiri
Prey Chhor
Batheay
Kang Meas
Srei Santhor
Khsach Kandal
Kg.Tralach S/S
SMCh S/S
Sameakki Mean Chey
50MW ADB Solar Park
Thpong
Chrouy Changva S/S
NPP(GS6)
Odongk
Mukh Kampul
EPP
Porhoa Leu
50MW KPS Solar PV
GIS_SenSok
Semi-GIS Russel Keo
GIS PP_Thmey
GIS_Toul Kok
GS1
GS5
Boeng Kark S/S
GIS_EDC
BekChanS/S
GIS_RUPP
GIS_Olympic
Semi-GIS PP Airport
GS3
NCC S/S
GIS_Hun Sen Park
Lvea Aem
GS2
EP KEP
Legend
Grid Substation
Grid_Substation_230kV
Grid_Substation_115kV
Transmission Line
115kV TL Proposed
230kV TL Proposed
230kV TL Planned
115kV TL Planned
500kV TL Planned
230kV TL Existing
115kV TL Existing
Solar Power_Plant
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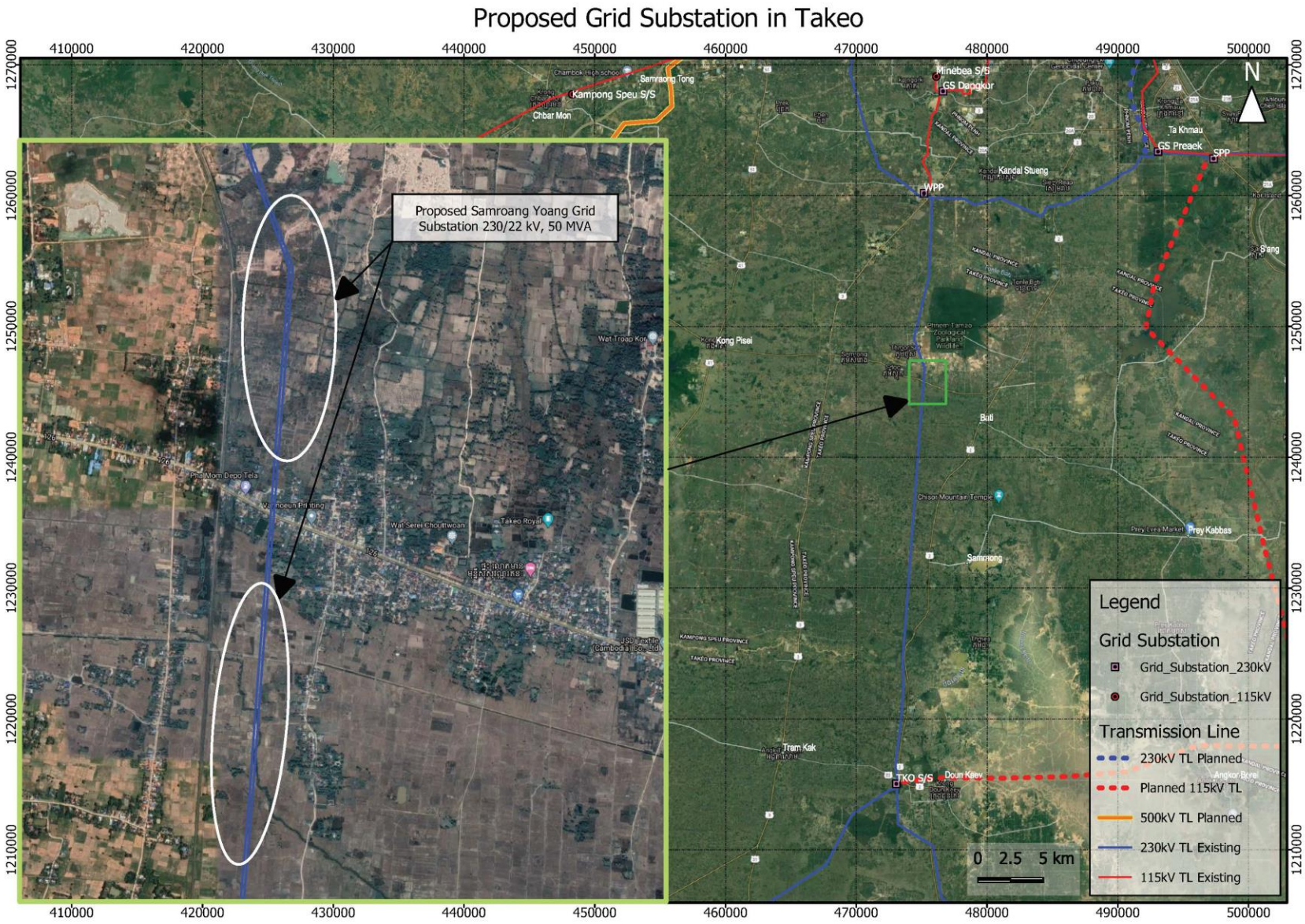
Proposed Grid Substation in Takeo
Proposed Samroang Yoang Grid Substation 230/22 kV, 50 MVA
Kampong Speu S/S
Samraong Tong
Chbar Mon
Minebea S/B
GS Dangkor
Ta Khmau
GS Preaek
SPP
WPP
Kandal Stueng
Kong Pisai
Bati
Chisor Mountain Temple
Prey Kabbas
Samrong
Tram Kak
TKO S/S
Doun Kaev
N
Legend
Grid Substation
Grid_Substation_230kV
Grid_Substation_115kV
Transmission Line
230kV TL Planned
Planned 115kV TL
500kV TL Planned
230kV TL Existing
115kV TL Existing
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STAKEHOLDER ANALYSIS AND COMMUNICATION STRATEGY

A. Purpose of Stakeholder Analysis

1. As stated in the ADB Guide to Participation,[1] stakeholder participation supports good governance, citizenship, and accountability. It promotes innovation, responsiveness, and sustainability, which will directly enhance development effectiveness. Consultation and participation of various stakeholders can lead to improved development results, when people understand how resources are allocated and how they can be involved to better share the benefits from a project. If stakeholders are well informed and engaged in meaningful consultations, they will be able to participate and express their views, comments and recommendations, which then can become valuable for project developers during project design and implementation.

B. Stakeholder Definition

2. The construction of the four transmission lines, 10 substations and battery energy storage system t will affect various groups of people in different ways, directly or indirectly, in different phases of a project cycle, from project identification, planning and design through its implementation to operation. There are also groups of people that are not affected by a project, but who have various interests in project formulation, implementation and outcome.

3. Stakeholder can therefore be defined as an individual, group, or institution/agency that is (i) affected by a project and/or its outcome, or (ii) has an interest in the project and/or its outcome.

C. Stakeholder Identification

4. For a sustainable planning, implementation and operation of a specific project, it is essential to identify the different stakeholders and understand their roles and interests in the project. By identifying the stakeholders and understanding how they are going to be impacted and/or involved in the project, necessary communication with different stakeholder groups can be planned and implemented. Communication with project stakeholders will help project planners and implementers to reduce risks, avoid unexpected conflicts and negative developments, and maximize project benefits for various stakeholders.

5. Project stakeholders can be identified through asking:

i) Who is affected by the project? and
ii) Who holds interest in the project?

6. To answer these questions and identify the respective stakeholder groups, the purpose and the expected impacts (positive and negative, including risks) of the project need to be clarified: Who is the project for? For whose needs? For whose interests? By whom is the project planned and constructed? Who has the power to influence on the project, its design, planning, implementation and operation? Who will benefit from the project? Who will be impacted by the project and in which ways?

D. Affected Stakeholders

[1] ADB. 2012. *Strengthening Participation for Development Results.* Manila.

7. Various groups of people will be affected by a project in different ways. Affected person (AP) is according to ADB definition:

Any person or persons, household, firm, or public or private institution who on account of a development project would have their; (i) standard of living adversely affected; (ii) right, title or interest in all or any part of a house, land (including residential, commercial, agricultural, plantations, forest and/or grazing land), water resources or any other moveable or fixed assets acquired, possessed, restricted or otherwise adversely affected, in full or in part, permanently or temporarily; and/or (iii) business, occupation, place of work or residence, or habitat adversely affected, with or without displacement.

8. Affected people therefore include; (i) persons affected directly by the right-of-way or construction work area; (ii) persons whose agricultural land or other productive assets such as trees and standing crops are affected; (iii) persons whose businesses are affected and who might experience loss of income due to the project impact; (iv) persons who lose work/employment as a result of the project impact; and (v) people who lose access to community resources/property as a result of the project.

9. Project-affected people may include those directly or indirectly affected:

i) people owning land and/or assets that are impacted by the project;
ii) people using land and other natural resources in the project area;
iii) people in project adjoining areas (construction impacts, potential labour force, etc.); and
iv) local (community based) organisations.

10. These affected stakeholders encompass the local communities situated in or near the project sites. People in the local communities will be affected by the construction to a varying degree, depending on the individual location of their houses and lands. Some households may experience impacts from the project on their lives and livelihoods through loss of land, plants, and/or assets due to the transmission lines and substations construction. Benefits from the project should also be available for affected communities, e.g. employment opportunities during construction and operation, and electricity access for all households. In the Stakeholder Analysis, the affected people are identified as (i) Local Communities, and within these a specific group of (ii) Affected Households.

E. Stakeholders with Interests but not affected by the Project

11. Stakeholders who are not affected by the project, yet have some type of interest in it may include:

i) government authorities and agencies (national, regional, local);
ii) commercial enterprises such as contractors, suppliers, customers;
iii) local, national and international NGOs;
iv) the media; and
v) universities, research institutes.

12. Their interests in a project are various and may be driven by e.g. national, regional and/or local development goals, political power, environmental concerns, minority rights, land rights etc. of a certain group affected by a project, commercial business interests, public information and fraud prevention interest, etc.

F. Why Stakeholders need to be Involved

13. A variety of stakeholder groups are directly or indirectly, of necessity or by their own will and interest involved in an energy development project. However, project planners and implementers in general do not pay sufficient attention to different relevant stakeholders. Lack of information sharing and communication with stakeholders may lead to complications, late changes in project design and delays in the course of the project implementation, if unexpected problems emerge in the project site due to lacking information sharing of the local conditions, or when the project executing agency's attention to environmental and social impacts is in public questioned by civil society organizations and media, due to lack of information sharing of the project.

14. Such upcoming problems can be avoided and mitigated in advance if relevant stakeholders are involved early in project design and throughout project planning and implementation. Even after the project construction, communication with relevant stakeholders in monitoring the operation can contribute to early alert of any problem and prompt maintenance.

G. Identified Potential Stakeholder Groups

15. A variety of stakeholders with professional or other interests at different administrative levels and locations are involved in different phases of the project (stakeholders with interests). Also, various groups of people are affected in the actual geographical location of the project (affected stakeholders). Table 1 below provides a brief overview of all the potential stakeholder groups.

Table 1. Identified Potential Stakeholders

Level of category	Stakeholder group, role and interest
National level	
National level government agencies with defined mandates, roles and tasks in development of projects	**Electricité du Cambodge (EDC)**, the national electricity utility (state-owned enterprise), and its **Procurement Unit,** project executing agency.
	Ministry of Economy and Finance (MEF), recipient of ADB loan and responsible for repayment.
	Ministry of Environment (MOE), approving ISEIA required according to the Law on Environmental Protection and Natural Resource Management and its sub-decrees.
	Ministry of Mines and Energy (MME) plays an important role in energy investments and production, including hydropower and other renewable energy schemes.
	Ministry of Water Resources and Meteorology (MOWRAM). Potential soil erosion caused by the project civil works construction will be of concern for the Ministry, therefore consultation with relevant departments of MOWRAM will facilitate formulation of mitigation measures.
National level project specific implementation units with defined mandates, roles and tasks	The **Project Management Unit (PMU**) and the **Project Implementation Unit (PIU)** of EDC are responsible for project management and implementation.
	The **Social and Environmental Public Relations Office (SEPRO)** of EDC has the task to communicate about social and environmental issues with project stakeholders,

Level of category	Stakeholder group, role and interest
	including affected households, and to monitor environmental and social aspects during project implementation. SEPRO together with EDC **Procurement Unit** manage land acquisition for projects.
Province level	
Province level government agencies with defined mandates, roles and tasks	**Provincial Governor** has a role to facilitate communication between project planners and implementers and local communities, including the affected people.
Police and military	**The police department** owns large land areas in the vicinity of some of the proposed sites and need to be involved in land acquisition for the project. **The police and military bases** in the area have to be informed of the project in order to avoid any national security concerns.
District level	
District level government agencies with defined mandates, roles and tasks	**District Governor** has a role to facilitate communication between Project planners and implementers and local communities, including the affected people.
	District Cadastral Office has a central role in informal grievance redress mechanism over land conflicts: Once a complaint is filed to a commune, it will request the district cadastral office for necessary land data/ mapping and assistance in resolving the land conflict.
Commune and Village level	
Commune and Village level leaders with the role to represent communities and inform them	**Commune councils** and **Commune chiefs** represent local communities and facilitate their communication with project planners and implementers.
	Village chiefs represent village community and facilitate its communication with other entities.
Communities	**Project-affected households** that will lose land, crops, trees and/or assets due to the project. The primary stakeholder group to be affected by the Project and interest to be informed and consulted early and during all phases of the Project.
	Local communities affected by the project in various ways need to be informed and consulted about the Project early and being updated of the Project development throughout the project time.
Community-based and associated organizations	**Savings groups**, such as community forestry groups may have interest in the Project depending on the affected areas.
	Religious organizations; monasteries, temples, pagodas. Monks/abbots often have a mediator role in conflicts within a community, and they can facilitate in land conflicts.
	Micro-finance institutes: Land ownership (certificates) issued by the commune and district offices are often deposited as collateral with a micro-finance institute. By

Level of category	Stakeholder group, role and interest
	consulting with the latter, the number of land parcels in the proposed site used as collateral can be identified. This can help to identify the landowners and to avoid unexpected conflicts after the land purchase.
Other Stakeholders with various interests	
Private sector	**Entrepreneurs and businesses**, such as construction contractors, equipment and transportation providers and others have potential business interests in the Project.
	Land brokers/ real estate agents may be interested in acting as contractors to EDC for land negotiation and purchase; in that case, close cooperation with EDC's SEPRU and Procurement Unit is needed.
NGOs	**Non-governmental Organizations** (NGOs), including environmental NGOs and advocates, may have interest and concerns over the project's environmental/ land/ community impacts and their mitigation.
Media	**Newspapers, radio, TV, websites**, etc. play a role in delivering an image and information of the project to the public; they may also be allied with NGOs in raising concerns about the project.
Academia	**National and international universities and research institutes** may have scientific/research interest in the project, its design, implementation, impacts and outcome.
International Stakeholders	**INGOs, international media and various international organizations** may have similar interests as national media, NGOs and other organizations.

H. Purpose of Stakeholder Communication Strategy

16. The purpose of the Communication Strategy is to guide the project owner in conducting meaningful information sharing with concerned stakeholders.

17. Project development has several phases including (i) project planning and design, (ii) implementation of the agreed design, which involves the civil works construction, and (iii) monitoring that the implementation proceeds complying with agreed standards and safeguards and (iv) monitoring during the project operation.

18. Early communication with different stakeholders can contribute to avoiding adverse impacts, unexpected problems and conflicts related to e.g. land acquisition and access to project construction and operation areas.

I. Communication Context

19. The Stakeholder Communication Strategy is prepared to serve as a guide for meaningful information sharing, consultations and participation of different concerned stakeholders.

20. The intention of this strategy is to prevent misconceptions on project impacts, project implementation process, and doubts or misconceptions on the project that may cause delays in project implementation. The Stakeholder Communication Strategy covers the following issue areas: (i) Land acquisition and resettlement; (ii) Environment; and (iii) Civil works construction.

J. Objective

21. The Stakeholder Communication Strategy provides reliable project information and engages stakeholders in proactive and meaningful communication and consultation during the project planning, preparation and implementation.

K. Specific Objectives

i) to ensure that all stakeholders are well-informed, consulted and provided possibility to contribute to decision-making in all phases of the project; and
ii) to increase the level of awareness of various stakeholders in the project area by engaging them in meaningful consultations, decision-making and participation through addressing key issues that may be raised during project implementation related to land acquisition, environment, and civil works construction.

STAKEHOLDER COMMUNICATION STRATEGY MATRIX									
Strategic Elements						Work Plan Elements			Evaluation
Objectives	**Key Risks/ Challenges**	**Stakeholders**	**Current and Desired Attitudes**	**Messages/ Information**	**Activity/ Channels**	**Timing/ Implementation**	**Responsibility**	**Resources Needed**	**Expected Outcomes**
To ensure reliable and regular flow of information and decision-making by engaging concerned stakeholders in consultations	Managing expectations of the affected households (i.e. fair compensation and transparency during project implementation)	Affected households Project-area Commune chiefs Project-area Village chiefs	Stakeholders understand and support the project and its impacts; Stakeholders continue to support project so that delays in project implementation are avoided.	Project benefits; Project impacts (positive and negative); Project implementation schedule and process; Land acquisition process and entitlements; Communication channels, processes and feedback mechanism.	Communication Strategy implemented; Public consultation meetings; Meetings between project implementers and local leaders; Small group meetings with affected households; Village leaders and Commune offices; Public notice boards; Media (radio, newspapers)	During detail design and prior to start of civil works / construction Regular monthly meetings with PMU, local leaders and contractor(s); Quarterly monitoring	EDC PMU & PIU EDC SEPRU Construction Supervision Consultant	PMU Staff Logistics and materials	Affected people understand the project and its impacts, both positive and negative; Expressed support to project implementation; Minimized and/or reduced complaints related to the project.
Land acquisition and resettlement issues									
To ensure reliable information sharing and active consultations with the affected households, communities and local leaders; To address issues/	Managing expectations from affected households; Possible complaints from affected households if expectations on compensation are not met (i.e., fair compensation,	Affected households Village leaders Gov. agencies NGOs Media	Stakeholders support project implementation to prevent delays in civil works; Concerns raised by affected households, local communities, local	ADB Safeguard Policy; Project Description (project areas, implementation period & design, length and width of transmission line, number of affected households,	Consultation meetings; Village leaders, Commune councils; Public consultation meetings in villages /commune centres with affected people and local leaders;	During detail design Before civil works/ construction start; Regular (monthly) meetings with PMU, local leaders and contractor(s); Whenever need arises to discuss and	PMU /PIU responsible staff SEPRU & Procurement Unit Environmental & Social Supervision consultant	Included in the Land Acquisition and Resettlement Plan	Affected people understand the project and its impacts, both positive and negative; Affected households, local leaders and communities support the Project implementation

concerns on resettlement.	transparency, etc.) NGOs and other organisations might complain or raise issues using media/ other communication channels if concerns are not addressed.		leaders and organisations are addressed; Local gov. support	etc.); Project implementation schedule and process; Implementation of RP (compensation, procedures, etc.); Affected households; Grievance redress mechanism.	Consultations with affected households; Printed information; Public notice boards; Commune office notice board; Grievance redress mechanism	address any key concerns raised by affected households, local leaders, communities or organisations.			; Complaints are addressed in a transparent and prompt manner to prevent complaints that could cause delays in project implementation.
Objectives	**Key Risks/ Challenges**	**Stakeholders**	**Current and Desired Attitudes**	**Messages/ Information**	**Activity/ Channels**	**Timing/ Implementation**	**Responsibility**	**Resources Needed**	**Expected Outcomes**
Environmental issues									
To ensure reliable information is shared with affected communities, their leaders, and local Gov. units; To discuss and address potential environmental impacts from the project.	Possible complaints from local leaders /communities if environmental issues are not addressed; Non-compliance of contractors on ADB safeguards policy (as stated in the EMP).	Affected communities and their leaders; Local Gov. agencies; Nat. Gov. Agencies (MOE); Contractors; Env. NGOs.	Stakeholders support project implementation which prevent delays; Mitigation measures as stated in the EMP are implemented; Concerns raised by affected households /communities are addressed,	ADB SPS (environment); Environmental issues/ concerns and mitigation measures; Contractors compliance with ADB safeguards measures as stated in the EMP.	Capacity building/orientation with PMU and contractors; Consultation meetings with concerned agencies, local Gov., contractors, local communities and village leaders; Site visits during monitoring.	During detail design and prior to start of civil works/ construction; Regular meetings with PMU and village leaders (monthly or bimonthly); Whenever need arises to discuss and address any key concerns raised by affected households, local leaders, communities or organisations.	PMU responsible staff; Environmental & Social Supervision consultant; Contractors.	Included in the EMP	Compliance with safeguards policy (as stated in the EMP) by contractors and other stakeholders; Environmental impacts/issues are properly addressed; Absence of complaints.

Objectives	Key Risks/ Challenges	Stakeholders	Current and Desired Attitudes	Messages/ Information	Activity/ Channels	Timing/ Implementation	Responsibility	Resources Needed	Expected Outcomes
Civil works construction									
Local people are informed during the entire construction process, they know about the work schedules, risks, hazards, restricted access, and work opportunities; Local people will have work opportunities in the construction and operation of the SP.	Accidents and discontent among local communities due to misconceptions and lacking/ deficient information.	Contractors; Village and Commune chiefs; Local communities.	Local people understand and support the project and civil works construction.	Work schedules; Availability of contractor representatives; Work opportunities; Risks and hazards; Restricted access.	Information notices in Commune office, local media; Regular meetings with local leaders, contractor and PMU.	Before civil works/ construction start; Regular monthly/ bimonthly meetings with PMU, local leaders and contractors; Throughout the construction time.	Contractors; Commune and village chiefs; Monitoring by PMU/ Construction Supervision Consultant.	Included as Contractor responsibility in the civil works contracts	Local people well informed throughout the construction period and they support the project.