

# **Procurement of Goods**

**National Competitive Bidding  
(Volume 2)**

**Procurement of:**

**Supply of Protection and Control System for 220kV  
Transmission Lines Sataplia & Adjameti**

**NCB No: IDA/TGSP/G/NCB/07-2015**

**Purchaser: Georgian State Electrosystem**

**Project: Transmission Grid Strengthening Project**

**Project: P147348**

**Country: Georgia**

**Issued on: December 24, 2015**

## **Volume 2**

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## Section II. Bid Data Sheet (BDS)

The following specific data for the goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Clause Reference	A. General
ITB 1.1	The reference number of the Invitation for Bids is : <i>IDA/TGSP/G/NCB/07-2015</i>
ITB 1.1	The Purchaser is: <i>JSC Georgia State Electrosystem (GSE)</i>
ITB 1.1	The name of the NCB is: <i>Supply of Protection and Control System for 220kV Transmission Lines Sataplia &amp; Adjameti</i> The identification number of the NCB is: <i>IDA/TGSP/G/NCB/07-2015</i> The number and identification of lots (contracts) comprising this NCB is: <i>Not Applicable</i>
ITB 2.1	The Borrower is: <i>Georgia</i>
ITB 2.1	Loan amount: <i>US\$ 61.88 mln</i>
ITB 2.1	The name of the Project is: <i>Transmission Grid Strengthening Project</i>
ITB 4.1	Maximum number of members in the JV shall be: <i>Not Limited</i>
IITB 4.4	A list of debarred firms and individuals is available on the Bank's external website: <a href="http://www.worldbank.org/debarr">http://www.worldbank.org/debarr</a> .
	<b>B. Contents of Bidding Documents</b>
ITB 7.1	For <u>Clarification of bid purposes</u> only, the Purchaser's address is: Requests for clarification should be submitted through the Georgian E-Government Procurement System.  Requests for clarification should be received by the Employer no later than: <i>10 days</i> prior to the deadline for submission of bids.
ITB 7.1	The Employer will promptly publish its response at the Georgian E-Government Procurement System.

	<b>C. Preparation of Bids</b>
<b>ITB 10.1</b>	The language of the bid is: <i>English</i> All correspondence exchange shall be in <i>English</i> language
<b>ITB 11.1 (j)</b>	The Bidder shall submit the following additional documents in its bid: <i>Bidders schedule of item by item commentary of technical compliance to specifications</i>
<b>ITB 13.1</b>	Alternative Bids <i>shall not be</i> considered
<b>ITB 14.5</b>	The prices quoted by the Bidder <i>shall not be</i> subject to adjustment during the performance of the Contract
<b>ITB 14.6</b>	Prices quoted for contract shall correspond at least to <i>100%</i> percent of the items specified for contract. Prices quoted for each item of a lot shall correspond at least to <i>100%</i> percent of the quantities specified for this item.
<b>ITB 14.7</b>	The Incoterms edition is: <i>2010</i>
<b>ITB 14.8 (iii)</b>	Final destination Place: <i>SS Kutaisi, SS Tskaltubo, SS Zestaponi</i>
<b>ITB 15.1</b>	The prices shall be quoted by the bidder in: <i>Georgian Lari (GEL)</i>
<b>ITB 16.4</b>	Period of time the Goods are expected to be functioning (for the purpose of spare parts): <i>Three years</i>
<b>ITB 17.2 (a)</b>	Manufacturer's authorization is: <i>Required</i>
<b>ITB 17.2 (b)</b>	After sales service is: <i>Required</i>
<b>ITB 18.1</b>	The bid validity period shall be <i>90 (ninety)</i> days.
<b>ITB 18.3 (a)</b>	The bid price shall be adjusted by the following factor(s): <i>Not Applicable</i>
<b>ITB 19.1</b>	A <i>Bid Security shall not be</i> required. A Bid-Securing Declaration <i>shall be</i> required. The Bid-Securing Declaration shall be for the following period of time: <i>1 (one) year</i> starting on the date of the bid opening stated in ITB 25.1. Bidders are reminded that the format of the Bid-Securing Declaration should be in accordance with the form of Bid-Securing Declaration included in Section IV. Bid-Securing Declaration shall be valid for 28 days beyond the validity of the Bid (i.e., 90 days + 28 days = 118 days).

<b>ITB 19.3 (d)</b>	Other types of acceptable securities: <i>None</i>
<b>ITB 19.9</b>	If the Bidder incurs any of the actions prescribed in subparagraphs (a) or (b) of this provision, the Borrower will declare the Bidder ineligible to be awarded contracts by the Purchaser for a period of <b><u>1 (one)</u></b> year.
<b>ITB 20.2</b>	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: <b><i>Written Power of Attorney of the signatory.</i></b>
<b>D. Submission and Opening of Bids</b>	
<b>ITB 21.1</b>	<p>Bidders shall submit their bids electronically through Georgian E-Government Procurement System.</p> <p>Government procurement procedures SHALL NOT apply for this procurement. Bid submission and bid opening will take place electronically using Georgian E-Government Procurement System with certain modifications. Major modifications to the Georgian E-Procurement System are:</p> <ul style="list-style-type: none"> <li>- Functionality of the three rounds of e-Reverse auction is removed. Rounds will not be applicable.</li> <li>- The estimated cost of the contract is disclosed in the E-Procurement system and bidders can submit a bid price, which could be below or above the estimated cost, however pricing the bid is the responsibility of the bidder, which shall be based on the current market prices and any other factors which may influence the pricing of the proposed works.</li> </ul> <p>Please note that bidding is conducted under National Competitive Bidding (NCB) procedures as specified in the World Bank’s Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits &amp; Grants by World Bank Borrowers, January 2011, revised July 2014 (“Procurement Guidelines”).</p>
<b>ITB 21.2 and 21.3</b>	<i>Not Applicable</i>
<b>ITB 22.1</b>	Bidders shall follow the electronic bid submission procedures of Georgian E-Government Procurement System.
<b>ITB 22.1</b>	Bidders <b><i>shall submit</i></b> their bids <b><i>electronically</i></b> through Georgian E-Government Procurement System
<b>ITB 25.1</b>	<p>ITB Clause 25.1 is modified to read the following:</p> <p>Bid opening will take place electronically using Georgian E-Government Procurement System with certain modifications. Major modifications to the Georgian E-Procurement System are:</p> <ul style="list-style-type: none"> <li>- Functionality of the three rounds of e-Reverse auction is removed. Rounds will not be applicable.</li> </ul> <p>The estimated cost of the contract is disclosed in the E-Procurement</p>

	<p>system and bidders can submit a bid price, which could be below or above the estimated cost, however pricing the bid is the responsibility of the bidder, which shall be based on the current market prices and any other factors, which may influence the pricing of the proposed works.</p> <p>The Minutes of the Bid Opening will be uploaded in the E-Procurement System following the bid opening.</p>
<b>ITB 25.3</b>	<p>The Letter of Bid and Price Schedules shall be initialed by representatives of the Purchaser conducting Bid opening.</p> <p><i>Not Applicable</i></p>
	<b>E. Evaluation and Comparison of Bids</b>
<b>ITB 32.2(a)</b>	<p>Bids will be evaluated for each item and the Contract will comprise the item awarded to the successful Bidder. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. An item not listed in the Price Schedule shall be assumed to be not included in the bid, and provided that the bid is substantially responsive, the average price of the item quoted by substantially responsive bidders will be added to the bid price and the equivalent total cost of the bid so determined will be used for price comparison</p>
<b>ITB 32.4</b>	<p>The adjustments shall be determined using the following criteria, from amongst those set out in Section III, Evaluation and Qualification Criteria:</p> <ul style="list-style-type: none"> <li>(a) Deviation in Delivery schedule: <i>Not Allowed</i></li> <li>(b) Deviation in payment schedule: <i>Not Allowed</i></li> <li>(c) The availability in the Purchaser's Country of spare parts and after- sales services for the equipment offered in the bid: <i>No</i></li> </ul>
	<b>F. Award of Contract</b>
<b>ITB 37.1</b>	<p>The maximum percentage by which quantities may be increased is: <i>None</i></p> <p>The maximum percentage by which quantities may be decreased is: <i>None</i></p>

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## **Section III. Evaluation and Qualification Criteria**

*This Section contains all the criteria that the Purchaser shall use to evaluate a bid and qualify the Bidders. in accordance with ITB 32 and ITB 34, no other factors, methods or criteria shall be used.*

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## 1. Evaluation (ITB 32)

### 1.1. Evaluation Criteria (ITB 32.4)

The Purchaser's evaluation of a bid may take into account, in addition to the Bid Price quoted in accordance with ITB Clause 14.8, one or more of the following factors as specified in ITB 32.2(e) and in BDS referring to ITB32.4, using the following criteria and methodologies.

- (a) Delivery schedule. (as per Incoterms specified in the BDS)

*The Goods specified in the List of Goods are required to be delivered before the final date, as specified in Section VII, Schedule of Requirements. No credit will be given to deliveries before the latest date, and bids offering delivery after the final date shall be treated as nonresponsive.*

- (b) Deviation in payment schedule. *N/A*

- (c) Availability in the Purchaser's Country of spare parts and after sales services for equipment offered in the bid. *N/A*

An adjustment equal to the cost to the Purchaser of establishing the minimum service facilities and parts inventories, as outlined in BDS 32.6, if quoted separately, shall be added to the bid price, for evaluation purposes only.

- (d) Specific additional criteria. *N/A*

### 1.2. Multiple Contracts (ITB 32.4) – *N/A*

## 2. Qualification (ITB 34)

### 2.1 Qualification Requirements (ITB 34.1)

After determining the lowest-evaluated bid in accordance with ITB 33.1, the Purchaser shall carry out the post-qualification of the Bidder in accordance with ITB 34, using only the requirements specified. Requirements not included in the text below shall not be used in the evaluation of the Bidder's qualifications.

- (a) Financial Capability

If Bidder is Manufacturer:

- (i) ***The successful Bidder*** shall furnish documentary evidence that the turnover during the last 3 years constituted for in average 48 million GEL (Georgian Laris).

If Bidder is not Manufacturer:

- (ii) ***The successful Bidder*** shall furnish documentary evidence that the turnover during the last 3 years constituted for in average 2 million GEL (Georgian Laris).



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(iii) If a Bidder is not a manufacturer, but is offering the Goods on behalf of the Manufacturer under Manufacturer's Authorization Form (Section IV, Bidding Forms), the Manufacturer shall demonstrate the above qualifications a (i).

(b) Experience and Technical Capacity

If Bidder is Manufacturer:

(i) ***The successful Bidder*** must demonstrate that it has at least 5 (five) years of experience in production and/or supply of goods as required under this IFB.

(ii) ***The successful Bidder must*** have at least 2 successfully completed contracts for similar goods over the last 3 (three) years. References from beneficiaries on successful completion of contracts are mandatory.

If Bidder is not Manufacturer:

(iii) If a Bidder is not a manufacturer, but is offering the Goods on behalf of the Manufacturer under Manufacturer's Authorization Form (Section IV, Bidding Forms), the Manufacturer shall demonstrate the above qualifications b(i).

(iv) ***The successful Bidder must*** have at least 2 successfully completed contracts for similar goods over the last 3 (three) years. References from beneficiaries on successful completion of contracts are mandatory.

The details of Manufacturer's experience in production and/or supply of goods shall include:

- Name and address of Purchaser with contact details as e-mail address/phone no., etc.
- Contract no. and date.
- Equipment's/items ordered/supplied & installed with their respective quantities.
- Scheduled completion date and actual completion date.

# **Section VII. Schedule of Requirements**

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## **Notes for Preparing the Schedule of Requirements**

The Schedule of Requirements shall be included in the bidding documents by the Purchaser, and shall cover, at a minimum, a description of the goods and services to be supplied and the delivery schedule.

The objective of the Schedule of Requirements is to provide sufficient information to enable bidders to prepare their bids efficiently and accurately, in particular, the Price Schedule, for which a form is provided in Section IV. In addition, the Schedule of Requirements, together with the Price Schedule, should serve as a basis in the event of quantity variation at the time of award of contract pursuant to ITB 37.1.

The date or period for delivery should be calculated from the date from which the Supplier's delivery obligations start (i.e., contract signature) and until goods are delivered in the Final destination.

## 1. List of Goods and Delivery Schedule

Line Item N°	Description of Goods	Quantity	Physical unit	Final Destination Place as specified in BDS	Delivery Date*		
					Earliest Delivery Date	Final Date	Bidder's offered Delivery date [to be provided by the bidder]
<b>1.</b>	<b>Protection Relays and Bay Control Units for 220 kV OHLs</b>						
<b>1.1</b>	<b>Substation Tskaltubo</b>						
1.1.1	<b>Cabinet for Protection and Control of 220 kV OHL Sataplia 2</b>					180 days from the date of contract signature	
1.1.1.1	Line differential protection 220LDIF	1	pc	SS Tskaltubo	N/A		
1.1.1.2	Line distance protection 220LDIST	1	pc	SS Tskaltubo	N/A		
1.1.1.3	Teleprotection equipment for 220LDIF and 220LDIST including fibre optic connection acc. IEEE C37.94 to TDM multiplexer	1	lot	SS Tskaltubo	N/A		
1.1.1.4	BCU for the 220 kV line feeder (functionality in one relay above or separate)	1	pc	SS Tskaltubo	N/A		
1.1.1.5	Other required relays and auxiliary relays (please specify separately)	1	lot	SS Tskaltubo	N/A		

1.1.1.6	Cabinet with swing frame for relays and BCUs of the feeder incl. all accessories and internal cabling, fully wired and tested	1	lot	SS Tskaltubo	N/A		
1.1.1.7	All required equipment for time synchronization of the cabinet	1	lot	SS Tskaltubo	N/A		
<b>1.2</b>	<b>Substation Kutaisi</b>						
<b>1.2.1</b>	<b>Cabinet for Protection and Control of 220 kV OHL Sataplia 2</b>					180 days from the date of contract signature	
1.2.1.1	Line differential protection 220LDIF	1	pc	SS Kutaisi	N/A		
1.2.1.2	Line distance protection 220LDIST	1	pc	SS Kutaisi	N/A		
1.2.1.3	Teleprotection equipment for 220LDIF and 220LDIST including fibre optic connection acc. IEEE C37.94 to TDM multiplexer	1	lot	SS Kutaisi	N/A		
1.2.1.4	BCU for the 220 kV line feeder (functionality in one relay above or separate)	1	pc	SS Kutaisi	N/A		
1.2.1.5	Other required relays and auxiliary relays (please specify separately)	1	lot	SS Kutaisi	N/A		
1.2.1.6	Cabinet with swing frame for relays and BCUs of the feeder incl. all accessories and internal cabling, fully wired and tested	1	lot	SS Kutaisi	N/A		

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1.2.1.7	All required equipment for time synchronization of the cabinet	1	lot	SS Kutaisi	N/A		
<b>1.2.2</b>	<b>Cabinet for Protection and Control of 220 kV OHL Ajameti-3</b>					180 days from the date of contract signature	
1.2.2.1	Line differential protection 220LDIF	1	pc	SS Kutaisi	N/A		
1.2.2.2	Line distance protection 220LDIST	1	pc	SS Kutaisi	N/A		
1.2.2.3	Teleprotection equipment for 220LDIF and 220LDIST including fibre optic connection acc. IEEE C37.94 to TDM multiplexer	1	lot	SS Kutaisi	N/A		
1.2.2.4	BCU for the 220 kV line feeder (functionality in one relay above or separate)	1	pc	SS Kutaisi	N/A		
1.2.2.5	Other required relays and auxiliary relays (please specify separately)	1	lot	SS Kutaisi	N/A		
1.2.2.6	Cabinet with swing frame for relays and BCUs of the feeder incl. all accessories and internal cabling, fully wired and tested	1	lot	SS Kutaisi	N/A		
1.2.2.7	All required equipment for time synchronization of the cabinet	1	lot	SS Kutaisi	N/A		
<b>1.3</b>	<b>Substation Zestaponi</b>						
<b>1.3.1</b>	<b>Cabinet for Protection and Control of 220 kV OHL Ajameti-3</b>	1	pc	SS Zestafoni	N/A	180 days from the date of contract signature	

1.3.1.1	Line differential protection 220LDIF	1	pc	SS Zestafoni	N/A		
1.3.1.2	Line distance protection 220LDIST	1	lot	SS Zestafoni	N/A		
1.3.1.3	Teleprotection equipment for 220LDIF and 220LDIST including fibre optic connection acc. IEEE C37.94 to TDM multiplexer	1	pc	SS Zestafoni	N/A		
1.3.1.4	BCU for the 220 kV line feeder (functionality in one relay above or separate)	1	lot	SS Zestafoni	N/A		
1.3.1.5	Other required relays and auxiliary relays (please specify separately)	1	lot	SS Zestafoni	N/A		
1.3.1.6	Cabinet with swing frame for relays and BCUs of the feeder incl. all accessories and internal cabling, fully wired and tested	1	lot	SS Zestafoni	N/A		
1.3.1.7	All required equipment for time synchronization of the cabinet	1	lot	SS Zestafoni	N/A		
<b>2</b>	<b>Upgrading of the 220 kV Busbar Protection</b>						
<b>2.1</b>	<b>Upgrading busbar protection in substation Tskaltubo</b>					180 days from the date of contract signature	
2.1.1	Supply of additional relay fully compatible to SEL-487B	1	pc	SS Tskaltubo	N/A		

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2.1.2	Supply of all required materials and equipment to install the relay in the existing cabinet and to integrate it into the busbar protection	1	lot	SS Tskaltubo	N/A		
<b>2.2</b>	<b>Upgrading busbar protection in substation Kutaisi</b>					180 days from the date of contract signature	
2.2.1	Supply of additional relay fully compatible to SEL-487B	1	pc	SS Kutaisi	N/A		
2.2.2	Supply of all required materials and equipment to install the relay in the existing cabinet and to integrate it into the busbar protection	1	lot	SS Kutaisi	N/A		
<b>2.3</b>	<b>Upgrading busbar protection in substation Zestaponi</b>						
2.3.1	Supply of additional input/output cards/modules for the existing Siemens busbar protection or replacement of the existing busbar protection with a new busbar protection, fully wired and configured to be installed in Zestaponi by GSE but commissioned by the vendor.	1	pc	SS Zestafoni	N/A		



2.3.2	Supply of all required materials and equipment to install the relay in the existing cabinet and to integrate it into the busbar protection	1	lot	SS Zestafoni	N/A		
<b>3</b>	<b>Upgrading of the protection telecommunication equipment</b>						
<b>3.1</b>	<b>Upgrading of the existing SONET multiplexer, type SEL-ICON in Tskaltubo</b>					180 days from the date of contract signature	
3.1.1	Supply of Access Submodules Data Nx64F	2	pcs	SS Tskaltubo	N/A		
3.1.2	Supply of Standard Single-Mode SONET SFP for less than 40 km for existing SEL-ICON multiplexer	1	pcs	SS Tskaltubo	N/A		
<b>3.2</b>	<b>Upgrading of the existing SONET multiplexer, type SEL-ICON in Kutaisi</b>					180 days from the date of contract signature	
3.2.1	Supply of Access Submodules Data Nx64F	4	pcs	SS Kutaisi	N/A		
3.2.2	Supply of Standard Single-Mode SONET SFP for less than 40 km for existing SEL-ICON multiplexer	1	pcs	SS Kutaisi	N/A		

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3.2.3	Quattro Module Supply of Quattro Modules for up to four access submodules, e.g. Nx64F submodules.	2	pcs	SS Kutaisi	N/A		
<b>3.3</b>	<b>Upgrading of the existing SONET multiplexer, type SEL-ICON in Tskaltubo</b>					180 days from the date of contract signature	
3.3.1	Supply of Access Submodules Data Nx64F	2	pcs	SS Tskaltubo	N/A		
3.3.2	Supply of Standard Single- Mode SONET SFP for less than 40 km for existing SEL- ICON multiplexer	1	pc	SS Tskaltubo	N/A		
<b>4</b>	<b>Upgrading of the SCADA data telecommunication equipment</b>						
<b>4.1</b>	<b>Upgrading of the existing SDH multiplexer, type hit 7025 in Tskaltubo</b>					180 days from the date of contract signature	
4.1.1	Supply of Access SFP STM- 4 line module L 4.1	1	pc	SS Tskaltubo	N/A		
<b>4.2</b>	<b>Upgrading of the existing SDH multiplexer, type hit 7035 in Kutaisi</b>					180 days from the date of contract signature	
4.2.1	Supply of Access SFP STM- 4 line module L 4.1	1	pc	SS Kutaisi	N/A		
4.2.2	Supply of Optical STM-4 Interface Card: 1 × STM-4	1	pc	SS Kutaisi	N/A		

\*Delivery date will start from the contract signature date till the goods are delivered at the final destination place.

## 2. List of Related Services and Completion Schedule

Service	Description of Service	Quantity <sup>1</sup>	Physical Unit	Place where Services shall be performed	Final Completion Date(s) of Services
<b>1.</b>	<b>Design works</b>				
1.1	Design of the updating of P&C systems. Integration into the related existing documentation.	1	lot	Onshore	Within 30 days following written notification of the Purchaser
1.2	Design of the cabling between the primary equipment connection boxes and the protection and control equipment in the cabinets in the containers. Integration into the related existing wiring diagrams and cable schedules.	1	lot	Offshore	Within 180 days after contract signature
<b>2</b>	<b>Training and Factory Acceptance Test (FAT) (if required)</b>				
2.1	Training for protection and control IEDs (Please provide detailed specification and prices/cost breakdown separately) 5 training days (incl. FAT) including all travel costs and expenses of the trainees	1	lot	Onshore	Within 30 days following written notification of the Purchaser

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2.2	Factory Acceptance Test of Protection & Control IEDs etc. (Please provide detailed specification and prices/cost separately) With attendance of GSE engineers in the frame of the training	1	lot		
<b>3</b>	<b>Special assistance for Installation and Commissioning</b>				
<b>3.1</b>	<b>Assistance for configuration, data entry, modification of pictures in existing SMCS</b>				
3.1.1	Tskaltubo and Kutaisi	1	lot	SS Tskaltubo, SS Kutaisi	Within 30 days following written notification of the Purchaser
3.1.2	Zestaponi	1	lot	SS Zestaponi	Within 30 days following written notification of the Purchaser
<b>3.2</b>	<b>Assistance for installations including verification of correctness of installation works, cost including work days and all expenses</b>				
3.2.1	Tskaltubo	1	lot	SS Tskaltubo	Within 30 days following written notification of the Purchaser

3.2.2	Kutaisi	1	lot	SS Kutaisi	Within 30 days following written notification of the Purchaser
3.2.3	Zestaponi	1	lot	SS Zestaponi	Within 30 days following written notification of the Purchaser
<b>3.3</b>	<b>Assistance for Commissioning of the line P&amp;C, cost including work days and all expenses</b>				
3.3.1	Tskaltubo	1	lot	SS Tskaltubo	Within 30 days following written notification of the Purchaser
3.3.2	Kutaisi	1	lot	SS Kutaisi	Within 30 days following written notification of the Purchaser
3.3.3	Zestaponi	1	lot	SS Zestaponi	Within 30 days following written notification of the Purchaser
<b>3.4</b>	<b>Implementation works and Commissioning of the line busbar protection incl. integration in P&amp;C of the substation, cost including work days and all expenses</b>				

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3.4.1	Tskaltubo	1	lot	SS Tskaltubo	Within 30 days following written notification of the Purchaser
3.4.2	Kutaisi	1	lot	SS Kutaisi	Within 30 days following written notification of the Purchaser
3.4.3	Zestaponi	1	lot	SS Zestaponi	Within 30 days following written notification of the Purchaser
<b>4</b>	<b>Others (Please provide detailed specification and prices/cost separately)</b>				
4.1					
4.2					

1. If applicable

### 3. Technical Specifications

#### Overview

GSE is going to implement two new 220 kV overhead lines,

- OHL Sataplia-2, from substation Tskaltubo 220 to substation Kutaisi 220
- OHL Ajamenti-3, from substation Kutaisi 220 to substation Zestaponi 500.

In the substations Tskaltubo 220 and Kutaisi 220 substation monitoring and control systems (SMCS) of the manufacturer SEL (Schweitzer Engineering Laboratories Inc., Pullman, USA) are implemented.

Most of the protection relays in these substations are also manufactured by SEL.

In the substation Zestaponi 500 a SMCS of the manufacturer Siemens AG, SICAM-PAS is installed.

Most of the protection relays in this substation are also manufactured by Siemens.

The differential protection of the OHLs Ajameti-1 and Ajameti-2 will at the time of realization of Ajameti-3 already be of type SEL-411L.

#### Design parameters and applicable standards

##### Design parameters

- Current Transformer secondary current:
  - Tskaltubo and Zestaponi: 1 A
  - Kutaisi: 5 A
- Voltage Transformer secondary voltage:
  - Tskaltubo, Zestaponi, Kutaisi: 100 V (phase to phase)

##### Applicable Standards

The equipment shall fulfil the requirements of the following standards as applicable.

Item	Standard
Relays General	IEC 60255 and related specific parts for common and functional requirements or equivalent IEEE standards (IEEE C37.xx series)
Definition of functionalities, ANSI Standard Device Numbers	ANSI /IEEE Standard C37.2

Item	Standard
Substation internal communication protocol	IEC 61850
External tele-control protocol	IEC 60870-5-104
Relay - multiplexer connectivity, optical interface standard	IEEE C37.94
Degrees of protection provided by enclosures (IP Code)	ANSI/IEC 60529

### Cabinets

The cabinets for the digital protection and control systems shall be equipped with two digital protection relays with integrated or separate BCU:

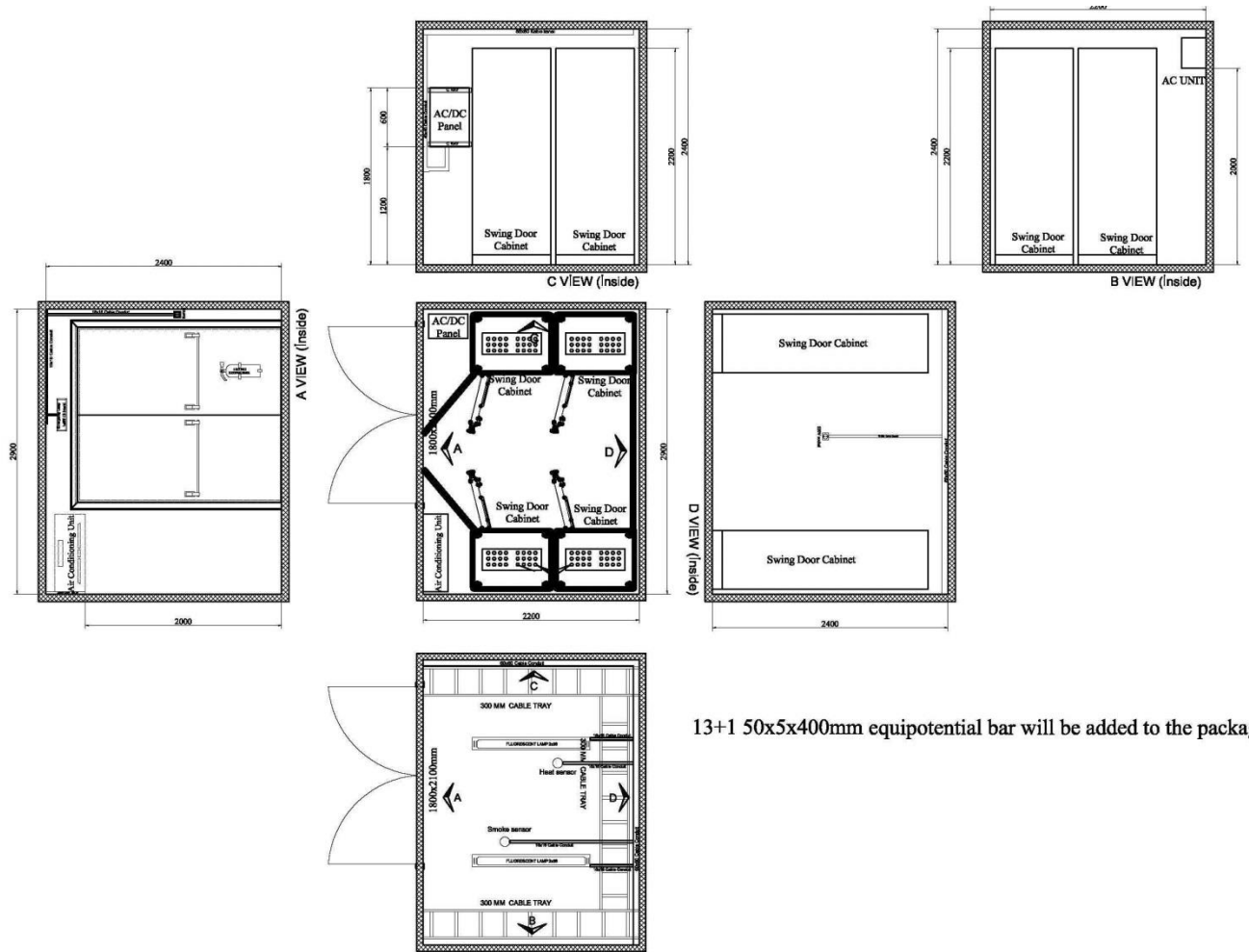
- a) Line differential protection relay
- b) Line distance protection relay
- c) Bay control unit or bay control functionality in one of the protection relays.

Cabinets shall be fully assembled, wired and tested.

The protection class of the indoor cabinets shall be IP41 as a minimum. The cabinets will be installed in outdoor containers in Tskaltubo and Kutaisi and in the substation building in Zestaponi.

The dimensions of the cabinets to be installed in the outdoor containers in Tskaltubo and Kutaisi to be installed in the substation building in Zestaponi shall be 2200 mm / 800 mm / 600 mm (height/ width/ depth).





### Typical Outdoor Container in Tskaltubo and Kutaisi

Cabinets shall be of the free- and self-standing metal enclosed type, with hinged doors. The front doors shall have a glass window, so that the front panels of the IEDs are visible for the alarm LEDs and the display unit.

The rear of the cabinets shall be closed, suitable for back to back or back to wall mounting. Swing frames shall provide free access to all installed equipment. The swing frame shall allow pulling out for at least 100° for easy access to the cabinets internal cabling as well as to other devices, which might be installed at the backside. Some form of restraining shall be provided. Each door shall be equipped with a lock and removable keys. All locks shall be keyed in the same way.



Typical cabinet for 220 kV line bay

The cabinets shall be coordinated with the existing cabinets, particularly with regard to size, doors, arrangements of plates, lamps, labels and colour etc.

All cabinets shall have hinged doors with fully concealed hinges and allowing the door to swing through not less than 105 degrees from the closed position. Devices shall be provided to limit the swing and prevent damage to hinges and equipment.

The arrangement of equipment inside the cabinets as well as the design of the cabinets themselves shall provide adequate space for inspection and maintenance of wiring, terminals and the installed equipment.

The interior of each cabinet shall be lit by 20 - 40 Watt fluorescent lamps or equivalent LEDs, which shall be ON only when the door is open. This illumination shall be connected to the AC and DC (two independent lamps) auxiliary of the installation so that in case any of failure of one of the auxiliaries the service personnel will continue with his work.

A grounding bus of copper bar not less than 5 x 30 mm shall be provided inside along the back of the cabinets. Provisions shall be made for two connections, by cable lugs, of the cabinets ground buses (each end) to the substation general grounding grid.

The cabinets shall be supplied complete with the necessary amount of mini-circuit-breakers, terminal blocks, wiring and other miscellaneous devices; for terminal blocks a spare capacity of 15 % shall be provided. All input and output contacts of BCUs, protection relays and annunciation devices shall be wired to terminals, even if they are not used in the initial configuration. Terminal blocks shall be of the continuous row type, rated for not less than 600 Volts with clamp type terminals. Terminal blocks shall be provided with integral type barriers, end plates, labeling caps and mounting channels. Terminals for current transformer secondary leads shall be easily distinguishable from common terminals and shall provide short-circuiting devices at all terminal blocks. All terminal blocks shall carry labels with

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reference to feeders, panels, etc. All instruments, relays, circuit-breakers, coils, contactors and similar features shall be suitable for the apparatus controlled or the purpose intended.

All relays and BCUs shall be clearly labeled in relation to their functions and to the equipment to be protected or supervised. It shall be understood that all auxiliary facilities shall be provided as necessary, i.e. for testing, adjustment, resetting, etc. even if not explicitly specified hereafter, and deemed necessary to complete the work.

Where appropriate, each item shall be equipped with all necessary auxiliary switches, contactors and mechanisms for indication, protection, measuring, control, and interlocking, supervisory and other services. All auxiliary switches and mechanisms shall be mounted in approved and accessible positions. They shall be grouped as far as possible in accordance with their functioning. The switches and other physical components/devices shall be clearly labeled and indicated identically in the cabinets and drawings.

All the wiring inside the cabinet and for the whole interface to other cabinets (alarms, protection, auxiliaries) and high-voltage equipment shall properly be identified with indelible marking (ferrules) at both ends of the wiring. Marking should correspond with the schematic drawing.

The function of the relay/BCU and the name of the protected feeder shall be indicated at the front of the relay/BCU.

All operation indicators shall be clearly visible and should be positioned between 1000 mm and 1,800 mm above the floor level. The manual reset facility shall be capable of being operated conveniently by a person standing at floor level without removing or opening the relay/BCU covers.

Adequate test and isolation facilities shall be provided within the protection scheme(s), so that recommended maintenance test procedures can be carried out in a safe and convenient manner.

The Contractor shall locate and arrange the terminal blocks in that way, that external cable connections can be made in a neat and proper manner. The cabinets shall allow sufficient room for incoming/outgoing cable cores to be neatly and conveniently channeled to their respective terminals.

## **Line differential protection**

### **Analog channels**

#### **Analog channels in line differential protection terminal:**

- It should have 6 current channels, with nominal current of 1 A (Tskaltubo and Zestaponi) or 5 A (Kutaisi). Starting point and ending point of current windings

should be placed on the relay fasteners, so star connection must be assembled from outside (star connection in relay must not be factory by manufactured). Polarity of vector diagram should be changeable by software.

- It should have 6 voltage channels, with 100 V of nominal voltage (phase to phase). Starting point and ending point of voltage windings should be placed on the relay fasteners, so star connection must be assembled from outside (star connection in relay must not be factory manufactured)

### **Supply voltage**

#### **Supply voltage of line differential protection terminal:**

Supply voltage of line differential protection terminal should be alternating and direct. (universal 220V)

### **Binary inputs and outputs**

#### **Binary inputs and outputs in line differential protection terminal:**

- Should have at least 32 binary inputs on 220 V direct voltage.
- Should have 24 nominally open and at least 2 nominally closed binary outputs on 220 v direct voltage.

### **Differential protection**

#### **Differential protection functions in line differential protection relay (ANSI: 87L):**

- Must work on phase to earth and phase to phase faults. (Must have the opportunity to choose the phase)
- Differential protection's pick up terms should be zero and negative sequence currents.
- Must have differential protection's interlocking function on harmonics and capacity currents compensation function.

### **Distance protection**

#### **Distance protection functions in line differential protection relay (ANSI: 21/21N):**

- Must work on phase to earth and phase to phase faults.
- Must have the opportunity to implement both circular and square characteristics (selectable).
- Must have at least 5 distance protection zones.
- Must have the capability to prevent distance protection function from false actions, during high active load. The feature shall permit load to enter a predefined area of the phase-distance characteristic without causing a trip.

### **Zero sequence current protection**

#### **Zero sequence current protection function in line differential protection relay (ANSI 67N):**

- Must have the opportunity to implement at least 4 zero sequence steps.
- Must have the direction unit and the opportunity to implement time delay by Steps.

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### **Negative sequence current protection**

**Negative sequence current protection function in line differential protection relay (ANSI 46):**

- Must have the opportunity to implement at least 2 steps.
- Must have the opportunity to implement time delay by Steps.

### **Overvoltage and undervoltage protection**

**Overvoltage and undervoltage protection in line differential protection relay (ANSI 59/27):**

- Must have the opportunity to implement at least 2 steps, by controlling the voltage in all 3 phases separately.
- Must have the opportunity to implement time delay by steps.

### **Backup overcurrent protection**

**Backup overcurrent protection function in line differential protection relay (ANSI51/51N):**

- Must have the opportunity to implement at least 2 steps, for phase to phase fault protection.
- Must have the opportunity to implement at least 2 steps, for phase to earth fault protection.

### **Instantaneous overcurrent protection function**

**Instantaneous overcurrent protection function in line differential protection relay (ANSI 50):**

- Must have the opportunity to implement at least 1 step, for phase to phase fault protection.

### **Voltage and current circuit disorder determining function**

**Voltage and current circuit disorder determining function in line differential protection relay (ANSI 78/68): (ANSI : 78 Phase Angle Measuring or Out-of-Step Protective Relay, 68 Blocking Relay / Power Swing Blocking)**

- Must be able to determine disorder in voltage and current circuits during maximal and minimal load regime.
- Must have the opportunity to interlock main protections by voltage circuit disorder and activate backup overcurrent protections.

### **Protection from fluctuations**

**Must have an opportunity of protection from fluctuations in line differential protection relay (ANSI 78/68)**

- Must be able to find a power fluctuation and interlock distance protection zones separately by it.

### **Switch on to Fault (SotF) protection**

**Switch on to Fault (SotF) protection function in line differential protection relay:**

- Protection must prevent switching on the line, (by hand or by auto-reclosing) in case of any kind of fault.

### **Acceleration by communication (Tele-Protection)**

#### **Acceleration by communication in line differential protection relay, must be performed.**

- Flexible 87L communication, fiber optic connection to existing ICON multiplexers, IEEE C37.94 encoding
- Shall also support Permissive, Blocking, and Direct Transfer Trips compliant with IEEE C37.94 Standard for optical connection to communications multiplexers, independent from 87L communication

### **Breaker failure**

#### **Breaker failure function in line differential protection relay (ANSI 50BF):**

- (Inside BF) With current control and with 2 steps of time delay. First step with re-tripping and second with final tripping opportunity.

### **Synchrocheck**

#### **Synchrocheck function in line differential protection relay (ANSI 25):**

- Synchrocheck must be possible during 3 phase auto-reclosing.

### **Auto-reclosing**

#### **Auto-reclosing function in line differential protection relay (ANSI 79-1 / 79-3):**

- 1 phase auto-reclosing must be possible: from differential protection, from first zone of distance protection, from first step of zero sequence current protection and during acceleration from communication.
- 3 phase auto-reclosing must be possible: from differential protection, from all zones of distance protection, from steps of zero sequence current protection and during acceleration from communication.

### **Fault distance**

#### **Fault distance determining function in line differential protection relay (ANSI 21FL):**

- Must be able to calculate fault distance, with inductive resistance.

### **Fault recording**

#### **20. Fault recording function in line differential protection relay; Disturbance recorder / Event recorder (ANSI 95DR / 95ER):**

- Must be able to make digital and analog records.
- Must be able to memories at least 8 fault records, fault record duration at least 6 seconds.

### **Communication**

#### **Line differential protection's communication possibilities:**

- Must have 1 front port and some on the back (LAN (optical), COM-port, or something else).
- Must have an optical port for differential protection, compatible with IEEE C37.94 for connection to the existing SEL-ICON multiplexers.

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## **Line distance protection**

### **Analog channels**

#### **Analog channels in line distance protection relay:**

- It should have 6 current channels, with nominal current of 1 A in Tskaltubo and Zestaponi and 5 A in Kutaisi. Starting point and ending point of current windings should be placed on the relay fasteners, so star connection must be assembled from outside (star connection in relay must not be factory by manufactured). Polarity of vector diagram should be changeable by software.
- It should have 6 voltage channels, with 100 V of nominal voltage (phase to phase). Starting point and ending point of voltage windings should be placed on the relay fasteners, so star connection must be assembled from outside (star connection in relay must not be factory manufactured).

### **Supply voltage**

#### **Supply voltage of line distance protection relay:**

Supply voltage of line distance protection relay should be alternating and direct. (universal 220 V AC and DC)

### **Binary inputs and outputs**

#### **Binary inputs and outputs in line distance protection relay:**

- Should have at least 32 binary inputs on 220 V DC.
- Should have 24 nominally open and at least 2 nominally closed binary outputs on 220 V DC.

### **Distance protection**

#### **Distance protection functions in line distance protection relay (ANSI 21/21N):**

- Must work on phase to earth and phase to phase faults.
- Must have the opportunity to implement both circular and square characteristics (selectable).
- Must have at least 5 distance protection zones.
- Must have the function to prevent distance protection from false actions, during high active load.

### **Zero sequence current protection**

#### **Zero sequence current protection function in line distance protection relay (ANSI 67N):**

- Must have the opportunity to implement at least 4 zero sequence steps.
- Must have the direction unit and the opportunity to implement time delay by Steps.

### **Negative sequence current protection**

#### **Negative sequence current protection function in line distance protection relay (ANSI 46):**

- Must have the opportunity to implement at least 2 steps.
- Must have the opportunity to implement time delay by Steps.

### **Overvoltage and undervoltage protection**

#### **Overvoltage and undervoltage protection function in line distance protection relay (ANSI 59 / 27):**

- Must have the opportunity to implement at least 2 steps, by controlling the voltage in all 3 phases separately.
- Must have the opportunity to implement time delay by steps.

### **Backup overcurrent protection**

#### **Backup overcurrent protection function in line distance protection relay (ANSI 51/51N):**

- Must have the opportunity to implement at least 2 steps, for phase to phase fault protection.
- Must have the opportunity to implement at least 2 steps, for phase to earth fault protection.

### **Instantaneous overcurrent protection function**

#### **Instantaneous overcurrent protection function in line distance protection relay (ANSI 50):**

- Must have the opportunity to implement at least 1 step, for phase to phase fault protection.

### **Voltage and current circuit disorder determining function**

#### **10. Voltage and current circuit disorder determining function in line distance protection relay (ANSI 78 / 68):**

- Must be able to determine disorder in voltage and current circuits during maximal and minimal load regime.
- Must have the opportunity to interlock main protections by voltage circuit disorder and activate backup overcurrent protections.

### **Protection from fluctuations**

#### **Must have an opportunity of protection from fluctuations in line distance protection relay (ANSI 78 / 68):**

- Must be able to find a power fluctuation and interlock distance protection zones separately by it.

### **Switch on to Fault (SotF) protection**

#### **Switch on to Fault (SotF) protection function in line differential protection relay:**

- Protection must prevent switching on the line, (by hand or by auto-reclosing) in case of any kind of fault.

### **Acceleration by communication**

#### **Acceleration by communication in line distance protection relay must be performed.**

- Shall comply with IEEE C37.94 Standard for optical connection to communications multiplexers.
- Shall support Permissive, Blocking, and Direct Transfer Trips



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## **Breaker failure**

### **Breaker failure function in line distance protection relay (ANSI 50 BF):**

- (Inside BF) With current control and with 2 steps of time delay. First step with re-tripping and second with final tripping opportunity.

## **Synchrocheck**

### **Synchrocheck function in line distance protection relay (ANSI 25):**

- Synchrocheck must be possible during 3 phase auto-reclosing.

## **Auto-reclosing**

### **17. Autoreclosing function in line distance protection relay (ANSI 79-1 / 79-3):**

- 1 phase auto-reclosing must be possible: from distance protection, from first zone of distance protection, from first step of zero sequence current protection and during acceleration from communication.
- 3 phase auto-reclosing must be possible: from distance protection, from all zones of distance protection, from steps of zero sequence current protection and during acceleration from communication.

## **Fault distance**

### **18. Fault distance determining function in line distance protection relay (ANSI 21FL):**

- Must be able to calculate fault distance, with inductive resistance.

## **Fault recording**

### **Fault and event recording function in line distance protection relay (ANSI 95DR / 95ER):**

- Must be able to make digital and analog records.
- Must be able to memories at least 8 fault records, fault record duration at least 6 seconds.

## **Communication**

### **Line distance protection's communication possibilities:**

- Must have 1 front port and some on the back (LAN (optical), COM-port, or something else).
- Must have an optical port for distance protection, compatible with IEEE C37.94 for connection to the existing SEL-ICON multiplexers.

## **Bay Control Units (BCU)**

### **BCUs in Tskaltubo and Kutaisi Substations**

220 kV bay units in the substations "Kutaisi 220" and "Tskaltubo 220" are realized with SEL equipment. Particularly in the line distance protection relays (SEL-421) bay control is realized along with protection functions, signalization and operational interlocking. It is

required, that the bay control of the overhead lines “Ajameti-3” and “Sataplia-2” in Kutaisi and of the overhead line “Sataplia-2” in Tskaltubo” will be performed by a combined intelligent electronic device (IED) like the SEL-421 type relay or with a separate BCU, fully compliant to the installed SEL protection and relay equipment.

The manufacturer has to consider that the integration into the existing bay controls systems and the central SMCS, including circuits and interlocking (communication) has to be performed by him. In case a relay of different type and manufacturer is offered the Bidder has to consider this.

### **BCUs in Zestaponi Substation**

220 kV bay units in substation “Zestafoni 500” are realized with Siemens equipment. It is required, that bay control of overhead line “Ajameti-3” be performed with a Siemens 6MD terminal or with a similar digital terminal of a different firm. In case a terminal of another firm is used, than manufacturer must perform integration of circuits and interlocking (communication), with 6\_MD terminals.

The Bidder has to consider that the integration into the existing bay controls systems and the central SMCS, including circuits and interlocking (communication) has to be performed by him. In case a relay of different type and manufacturer is offered the Bidder has to consider this.

### **Busbar Protection**

The busbar protection systems in the substations have to be extended because no additional line feeder can be integrated in the existing installation. The existing installations are

- Tskaltubo: SEL-487B, 1 relay
- Kutaisi: SEL-487B, 2 relays
- Zestaponi: Siemens with no free terminals

The busbar protections have to be upgraded by the Contractor and the new lines have to be integrated.

### **Busbar Protection in Tskaltubo Substation**

The busbar protection of 220 kV is realized with 1 SEL digital relay of type SEL-487B. There is no additional space in the relay for adding the bay of “Sataplia-2” to the circuit. Adding a third additional relay is required, it has to be fully compatible to the existing relays of type SEL-478B.

The Bidder has to consider that the integration and configuration of all busbar protection has to be performed by the manufacturer of the offered system or an experienced system integrator. In case a relay of different type and manufacturer is offered, the Bidder has to consider this.

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In case a different type of relays of another manufacturer is used for expanding the busbar differential protection, the manufacturer must perform the integration of the circuits and communication with existing busbar protection terminals and with existing BCUs.

### **Busbar Protection in Kutaisi Substation**

The busbar protection of 220 kV is realized with 2 digital relays of type SEL-487B. In the first relay busbar protection of phases A and B is performed and of phase C in the second relay.

There is no sufficient additional space in the relays for adding the bays of “Sataplia-2” and “Ajameti-3” to the circuit.

Adding a third additional relay is required, it has to be fully compatible to the existing relays of type SEL-478B.

The Bidder has to consider that the integration and configuration of all busbar protection has to be performed by the manufacturer of the offered system or an experienced system integrator. In case a relay of different type and manufacturer is offered, the Bidder has to consider this.

In case a different relay of another manufacturer is used for expanding the busbar differential protection, the manufacturer must perform the integration of the circuits and communication with existing busbar protection terminals and with existing BCUs.

### **Busbar Protection in Zestaponi Substation**

Busbar protection of 220 kV is realized with Siemens equipment. No additional space is considered in the terminal for an additional bay. Because of this it is necessary to extend busbar differential protection for the bay of “Ajameti-3”, with Siemens equipment (additional module) or by replacing of the entire busbar protection by equipment of another manufacturer.

The Bidder has to consider that the integration and configuration of all busbar protection has to be performed by the manufacturer of the offered system or an experienced system integrator. In case a relay of different type and manufacturer is offered, the Bidder has to consider this.

In case a different relay of another manufacturer is used for expanding the busbar differential protection, the manufacturer must perform the integration of the circuits and communication with existing busbar protection terminals and with existing BCUs.

## **Telecommunication Equipment**

### **Protection communication**

The following required additional modules (Quattro Modules and NX64F modules), to be installed in the existing multiplexers are to be supplied:

- Tskaltubo 220: 2 x Nx64F-Modules

- Kutaisi 220: 4 x Nx64F-Modules 2 x Quattro-Modules
- Zestaponi 500: 2 x Nx64F-Modules

To establish the telecommunication connection of the ICON multiplexers over the new OPGW on the Sataplia, two additional line modules have to be installed in the existing multiplexers in Tskaltubo and in Kutaisi, one in each. The OHL has a length of 25.6 route-km. Standard line module (SONET) SFPs for distance below 40 km are required, for the existing line modules.

### **SCADA data communication**

To establish the telecommunication connection of the existing SDH multiplexers, type Nokia/Siemens Networks, hiT 7025 and hiT 7035 over the new OPGW on the Sataplia, two additional line modules, type SFP STM-4 L-4.1 for up to 40 km distance have to be installed in the existing multiplexers in Tskaltubo and in Kutaisi, one in each.

In Kutaisi also an additional optical STM-4 interface card (1 x STM-4) for hiT 7025/7035 multiplexer is required.

### **Additional Requirements**

1. Digital protection system's cabinet must be equipped with regime key for switching BF on/off and for opening startup circuits.
2. Control of protection system's every function must be performed separately.
3. 220 kV circuits of substation "Zestafoni 500" should be updated, with consideration of "Ajameti-3".
4. Line protection relays on both ends of the line should be of the same.
5. Manufacturer must test all the purchased equipment.
6. 220 kV busbar differential protection circuits of substation "Zestafoni 500" should be updated, with consideration of "Ajameti-3".
7. Interlocking logic must be corrected in every BCU, with consideration of "Ajameti-3".

### **Services to be rendered by the Vendor**

#### **Factory Acceptance Test (FAT)**

The manufacturer shall perform a Factory Acceptance Test (FAT) prior to delivery to site.

The test protocols have to be submitted prior to delivery to site.

GSE will decide whether engineers of GSE will attend the FAT, which should be coordinated with the training at manufacturer's premises.

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### **Assistance for Installation and Commissioning**

The installation of the pre-assembled and internally wired P&C cabinets in the outdoor containers in Kutaisi, Tskaltubo and in the control building in Zestaponi as well as the cabling to the terminal boxes of the primary equipment will be done by GSE.

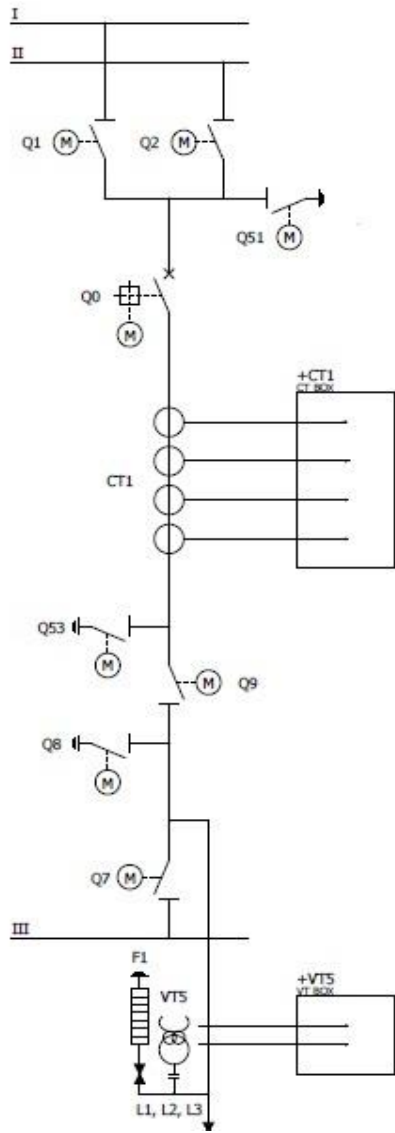
The Bidder shall render the following services:

- Commissioning of the protection relays and bay control units together with GSE engineers
- Integration of the protection relays and bay control units into the existing substation monitoring and control system (SMCS) including interlocking.
- Integration of the new lines into the busbar protection (busbar differential protection)

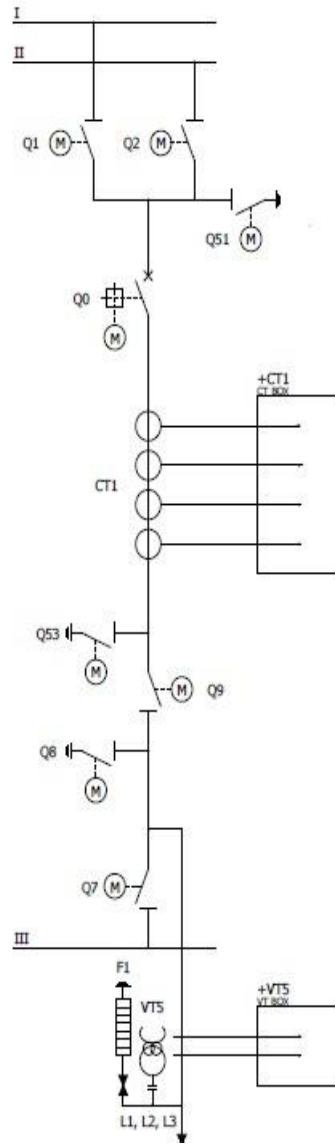
### **Training (if required):**

The Bidder shall offer the following training:

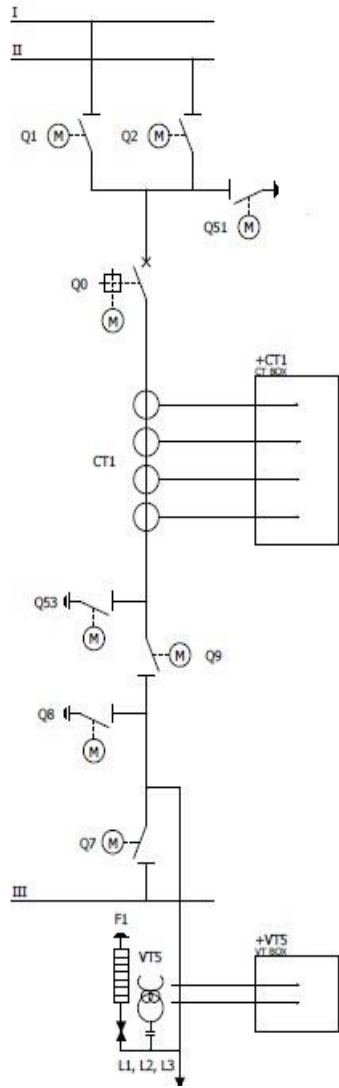
- Theoretical training and configuration training at manufacturer's premises for 5 trainees (all cost to be included in the contract price)
- Additional on-the-job training during commissioning



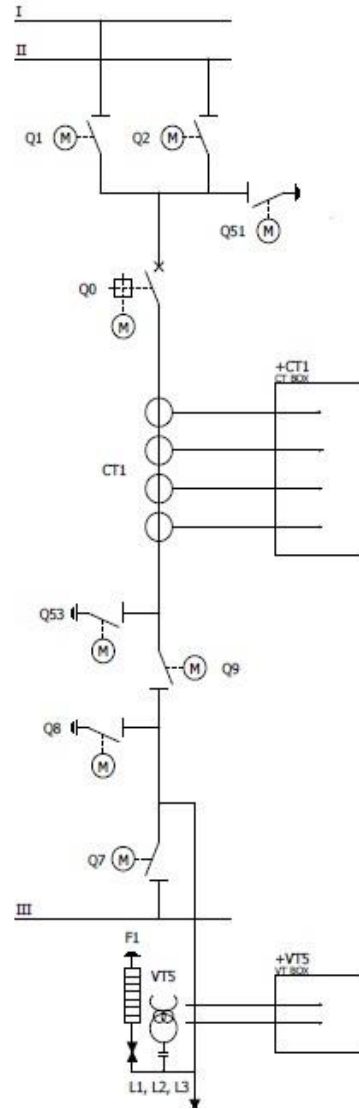
Sataplia-2 in Kutaisi



Sataplia-2 I Tskaltubo



Ajameti-3 in Zestaponi



Ajameti-3 in Kutaisi

## Technical Data Sheet

		REQUESTED	TENDERED
	<b><u>Protection and Control - Functional Requirements</u></b>		
	<b><u>Main Protection</u></b>		
	<b><u>Main Protection</u></b>		
	<b>220 kV OHL</b>	<b>220LDIF</b>	<b>Explicit confirmation of all requested functions is required</b>
1	Line differential protection (compensation of capacitive current) with communication via optical link	87L	
		Communication with remote end relay via multiplexer (SONET) with teleprotection communication in S/S acc. IEEE C37.94	
2	Line distance protection (capacitive current compensation)	21 $\geq$ 5 zones  $\geq$ 5 zones to be confirmed explicitly	
3	Line distance protection of full scheme non-switched type for phase/earth and phase/phase faults and with up to five measuring zones	21N $\geq$ 5 zones  $\geq$ 5 zones to be confirmed explicitly	
4	Fault Locator	21FL	
5	Over current protection (3 - phase instantaneous)	50	
6	Phase-Angle Measuring / Power Swing Detection / Blocking	78 / 68	
7	4 step residual directional overcurrent protection	67N - 4 steps  4 steps to be confirmed explicitly	
8	Over current with time delay	51 - 2 steps  2 steps to be confirmed explicitly	
	Earth fault over current with time delay	51N - 2 steps  2 steps to be confirmed explicitly	
9	Over voltage protection	59	
10	Single phase reclosing	79-1 phase phase selection possibility	
11	Three phase reclosing	79-3 phases	
12	Synchro check functionality	25	
13	Breaker failure protection	50BF	



14	For transfer bay protections: 6 bays switchover capability	---	
15	Test switch	Test switch	
16	Disturbance Recorder, Event Recorder	95DR, Disturbance Recorder	
		95ER, Event Recorder	
17	3 phase current measuring- 2 analog inputs	2 x 3 phase and neutral current measuring (OHL)	
18	3-phase busbar Voltage measuring- analog inputs 3-phase line Voltage measuring- analog input	1 x 3 phase voltage measuring from VT of the OHL and selected phase to phase or phase to neutral voltage for synchrocheck (VT of other OHL or Busbar or Transformer) with automatic voltage selection	<b>Offered configuration to be stated explicitly:</b>
19	Communication via IEC61850, GOOSE communication	IEC 61850	
		GOOSE	
20	Time synchronisation	Time synchronisation	
	<b><u>Back-up, Distance Protection and Bay Control</u></b>		
	<b>220 kV OHL</b>	<b>220LDIST</b>	<b>Explicit confirmation of all requested functions is required</b>
1	Line distance protection (capacitive current compensation)	21 - 5 zones	
		5 zones to be confirmed explicitly	
2	Line distance protection of full scheme non-switched type for phase/earth and phase/phase faults and with up to five measuring zones.	21N - 5 zones	
		5 zones to be confirmed explicitly	
	Teleprotection for 500 kV and 220 kV OHL	Communication with remote end relay via multiplexer (SONET) with teleprotection communication in S/S acc. IEEE C37.94	
3	Fault Locator	21 FL	
4	3 phase instantaneous overcurrent protection	50	
5	Phase-Angle Measuring / Power Swing Detection / Blocking	78 / 68	
6	4 (3) step residual directional overcurrent protection	67N - 4 steps	
		4 steps to be confirmed explicitly	
7	Ground fault protection	---	
8	Over current with time delay	51 - 2 steps	
		2 steps to be confirmed explicitly	
	Earth fault over current with time delay	51N - 2 steps	
		2 steps to be confirmed explicitly	
9	Thermal over load protection	---	
10	Over voltage protection	59	
11	Single phase reclosing	79-1 phase	

Section VII Schedule of Requirements

12	Three phase reclosing	79-3 phases	
13	Synchro check functionality	25	
14	For transfer bay protections: 6 bays switchover capability	---	
15	Breaker failure protection	50BF	
16	Test switch	Test switch	
17	Disturbance Recorder, Event Recorder	95DR, Disturbance Recorder	
		95ER, Event Recorder	
18	3 phase current measuring- 2 analog inputs	2 x 3 phase and neutral current measuring (OHL)	
19	3-phase busbar Voltage measuring - analog inputs 3-phase line Voltage measuring - analog input	1 x 3 phase voltage measuring from VT of the OHL and selected phase to phase or phase to neutral voltage for synchrocheck (VT of other OHL or Busbar or Transformer) with automatic voltage selection	<b>Offered configuration to be stated explicitly:</b>
20	Communication via IEC61850, GOOSE communication	IEC 61850	
		GOOSE	
21	Time synchronisation	Time synchronisation	
22	Bay Control Functions and Local HMI in case of Relay/Bay Control Unit Combination	BCU	
23	Additional binary I/O	Additional binary I/O	
24	Control, Interlock, Indication and Alarming for 15 elements	control & interlocking & indication & alarming 9 elements	
	<b>220/110 kV Busbar Protection for Tskaltubo</b>	<b>220BB</b>	<b>Explicit confirmation of all requested functions is required</b>
1	Busbar differential protection for double busbar system	87B (for 2 bussystem)	
2	Overcurrent protection with time delay for each bay	51/51N for each bay	
3	Overvoltage protection	59	
4	Undervoltage protection	27	
5	Breaker Failure Protection	50BF	
6	Test switch	Test switch	
7	Disturbance Recorder	95DR	
8	Event Recorder	95ER	
9	Communication via IEC61850, GOOSE communication	IEC 61850 GOOSE	
10	Time Synchronisation	Time Synchronisation	
11	CT secondary side	1A	
	<b>220/110 kV Busbar Protection for Kutaisi</b>	<b>220BB</b>	<b>Explicit confirmation of all requested</b>

			<b>functions is required</b>
1	Busbar differential protection for double busbar system	87B (for 2 bussystem)	
2	Overcurrent protection with time delay for each bay	51/51N for each bay	
3	Overvoltage protection	59	
4	Undervoltage protection	27	
5	Breaker Failure Protection	50BF	
6	Test switch	Test switch	
7	Disturbance Recorder	95DR	
8	Event Recorder	95ER	
9	Communication via IEC61850, GOOSE communication	IEC 61850	
		GOOSE	
10	Time Synchronisation	Time Synchronisation	
11	CT secondary side	5A	
	<b>220/110 kV Busbar Protection for Zestaponi</b>	<b>220BB</b>	<b>Explicit confirmation of all requested functions is required</b>
1	Busbar differential protection for double busbar system	87B (for 2 bussystem)	
2	Overcurrent protection with time delay for each bay	51/51N for each bay	
3	Overvoltage protection	59	
4	Undervoltage protection	27	
5	Breaker Failure Protection	50BF	
6	Test switch	Test switch	
7	Disturbance Recorder	95DR	
8	Event Recorder	95ER	
9	Communication via IEC61850, GOOSE communication	IEC 61850	
		GOOSE	
10	Time Synchronisation	Time Synchronisation	
11	CT secondary side	1A	

		REQUESTED	TENDERED
<b><u>Protection and Control - General Requirements</u></b>	-		
<b>BAY CONTROL UNITS</b>			
Manufacturer			
Product Name			
Power Supply	V-DC	AC and DC	
Power Consumption	W		
LED Indicators		yes, pls. specify no.	
Watchdog		yes	
Key-operated Local/Remote Switch	type	yes, pls. specify type.	
Interlock switch		yes	
Substation Communication		IEC 61850 Fibre Optic	
Serial Interface for PC	type	yes, pls. specify type.	
Digital inputs		yes, pls. specify no.	
Digital outputs		yes, pls. specify no.	
Analogue inputs 1A (Tskaltubo/Zestaponi) and 5A (Kutaisi)		yes, pls. specify no.	
Analogue inputs 100/√3V		yes, pls. specify no.	
Analogue inputs 4..20mA		yes, pls. specify no.	
Analogue outputs		yes, pls. specify no.	
Time tagging:			
Accuracy		+/- 1msec	
Resolution		≤1msec	
Measurement Accuracy:			
Directly measured	%	0,5	
Calculated	%	1	
<b>COMMON FEATURES FOR NUMERICAL RELAYS</b>			
Front panel HMI-keybord		yes	
Interfaces			
PC, serial	type		
Substation control system (SMCS)	type	IEC 61850 Fibre Optic	
<b>System</b>			
LED indicator power ON		yes	
LED indicators freely programmable	No.		
Watchdog		yes	
Binary I/O data acquisition cycle time	ms		
Analogue I/O data acquisition cycle time	ms		

Fault Recording		yes	
<b>Front Panel LCD Display for:</b>			
Chronological events		yes	
Fault values		yes	
Protection status		yes	
Protection settings		yes	
<b>Self-Supervision of the following Functional Blocks</b>			
Analogue measuring system		yes	
Digital input conversion system		yes	
I/O logic points		yes	
ROM memory		yes	
RAM memory		yes	
EEPROM memory		yes	
Processor		yes	
Operation system software		yes	
Protection functions software		yes	
Communication system software		yes	
Watchdog and self-monitoring software		yes	
Power supply		yes	
Internal clock		yes	
<b>DISTANCE RELAY</b>			
<b>General</b>			
Manufacturer			
name			
country of manufacturing			
Applicable standards	IEC		
Type		numerical	
Product Name			
Type test			
carried out		yes	
date	dd-mm-yy		
testing laboratory			
name			
country			
<b>Technical Data</b>			
<b>General</b>			
Full scheme, on-line, non switched		yes	
DC Infeed			
rated voltage		220	
tolerances requested		+10/-15	
power consumption			
Rated current (Tskaltubo and Zestaponi)		1	

Section VII Schedule of Requirements

Rated current (Kutaisi)		5	
permissible overload			
continuously x IN	x IN	2 x	
for 1 s	x IN	100	
Rated voltage (phase-earth )	V	$100/\sqrt{3}$	
permissible overload			
continuously x UN	x UN	1,2	
Burden			
current circuits at IN (maximum)	VA		
voltage circuits (maximum)	VA		
Protection class of relay housing	IP	IP 52	
<b>Architecture</b>			
Algorithms used are in service at least 5 years		yes	
test protocols provided		yes	
Filter to work with capacitive voltage transformers		yes	
delay to this filter	ms		
Teleprotection			
relay able to work having provided all software			
permissive underreach		yes	
permissive overreach		yes	
permissive transferred acceleration		yes	
blocking		yes	
unblocking		yes	
Power swing blocking relay included		yes	
Weak infeed and echo feature		yes	
Fuse failure relay built- in		yes	
Indicators for phases, earth and zones		yes	
Event recording / built-in fault locator		yes	
accuracy			
storage		upto ....	
Four groups of setting parameters		yes	
Fault recording (minimum 6 system faults)		yes	
Self - monitoring		yes	
Online test features		yes	
Back-up O/C & E/F		yes	
Overload		yes/no	
<b>Protection Measuring Units</b>			
Starting			
kind of starting			
under impedance		yes	
reactance		yes	
overcurrent		yes	
voltage restraint overcurrent		yes	
other		yes/no	

Number of starting elements (minimum )			
phase to phase	No.		3 x 3
phase to earth	No.		3 x 3
Measuring			
shape of characteristic			
phase to earth			mho and polygon
phase to phase			mho and polygon
Healthy voltage reference			yes
Voltage memory for busbar faults			yes
Switch onto fault protection included			yes
Number of zones (minimum)			
directional	No.		5
non-directional	No.		5
Time setting			
zone 1	ms		10 to 4000
in steps of	ms		10
zone 2	ms		up to 4000
in steps of	ms		10
other zones	ms		up to 4000
in steps of	ms		15
characteristic angle	deg		40 - 90
Shortest tripping time of zone 1 up to trip impulse to CB (including tripping relay)	ms		20
<b>Other Performance Data</b>			
Date of first commercial operation of the offered unit	dd-mm-yy		
Reference list attached			yes
<b>Supporting Documents</b>			
Relevant literature enclosed			yes
Relevant drawings enclosed			yes
<b>LINE DIFFERENTIAL RELAY</b>			
<b>General</b>			
Manufacturer			
name			
country of manufacturing			
Applicable standards	IEC		
Type			numerical
Type number			
Type test			
carried out			yes
date	dd-mm-yy		
testing laboratory			
name			

## Section VII Schedule of Requirements

country			
<b>Technical Data</b>			
DC Infeed			
rated voltage	V	220	
MCB provided		yes	
DC/DC converter included		yes	
tolerances requested	%	+10/-15	
power consumption	W		
Rated current (Tskaltubo and Zestaponi)		1	
Rated current (Kutaisi)		5	
permissible overload			
continuously x IN	x IN	2	
for 1 s	x IN	100	
Burden			
current circuits at IN (maximum)	VA		
Tripping time at 5 times setting current (including tripping relay)	ms	max.40	
Current setting range			
Measuring principle			
Single-Phase and Three-Phase Tripping		yes	
End to end communication via fibre optic and multiplexer		yes	
End to end communication supervision		yes	
Back-up distance protection		no	
Interface port for retrieval of data provided		yes	
Protection class of relay housing	IP	IP52	
<b>Other Performance Data</b>			
Date of first commercial operation of the offered unit	dd-mm-yy		
Reference list attached		yes	
<b>Supporting Documents</b>			
Relevant literature enclosed		yes	
Relevant drawings enclosed		yes	



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## 4. Drawings

These Bidding Documents includes *no* drawings.

## 5. Inspections and Tests

The goods shall be inspected by manufacturer.

Upon completion of the inspection and testing of the Goods or components thereof, Supplier shall submit to Purchaser, a **factory inspection report** with a detailed description of the results indicating that the Goods are in compliance with the Technical Specifications.

## Section IX. Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

<b>GCC 1.1(i)</b>	The Purchaser's country is: <b><i>Georgia</i></b>
<b>GCC 1.1(j)</b>	The Purchaser is: <b><i>JSC Georgia State Electrosystem (GSE)</i></b>
<b>GCC 1.1 (o)</b>	The Final Destinations Place are: <b><i>SS Kutaisi, SS Tskaltubo, SS Zestafoni</i></b>
<b>GCC 4.2</b>	The version edition of Incoterms shall be <b><i>2010</i></b>
<b>GCC 5.1</b>	The language shall be: <b><i>English</i></b>
<b>GCC 8.1</b>	For <b><u>notices</u></b> , the Purchaser's address shall be:  Attention: <i>Guranda Machaidze, Procurement Specialist</i> Address: <i>2 Baratashvili Str,</i> Floor/ Room number: <i>Floor III, Room 304</i> City: <i>Tbilisi</i> ZIP Code: <i>0105</i> Country: <i>Georgia</i> Telephone: <i>(995 32) 251 02 64</i> Facsimile number: <i>(995 32) 298 37 04</i> Electronic mail address: <a href="mailto:maya.pitskhelauri@gse.com.ge">maya.pitskhelauri@gse.com.ge</a> ; <a href="mailto:guranda.machaidze@gse.com.ge">guranda.machaidze@gse.com.ge</a> ;
<b>GCC 9.1</b>	The governing law shall be the law of: <b><i>Georgia</i></b>
<b>GCC 10.2</b>	The rules of procedure for arbitration proceedings pursuant to GCC Clause 10.2 shall be as follows:  In the case of a dispute between the Purchaser and a Supplier, the dispute shall be referred to adjudication or arbitration in accordance with the laws of the Purchaser's country.

<p><b>GCC 13.1</b></p>	<p>Details of Delivery and other Documents to be furnished by the Supplier are:</p> <ol style="list-style-type: none"> <li>1. Two originals and three copies of the Supplier's invoice, showing the Purchaser as a Party responsible for payments, the Contract number, the Goods description, lot numbers, quantity, unit price and total amount. Invoices must be signed in original and stamped or sealed with the company stamp/seal,</li> <li>2. Electronic copy of waybill (If Goods Forwarded by Supplier / Manufacturer by rail/truck),</li> <li>3. Three copies of Packing list identifying contents of each package,</li> <li>4. One original and three copies of the Manufacturer's/Supplier's warranty certificate,</li> <li>5. One original and three copies of the Certificate of origin covering all items supplied,</li> <li>7. Certified copied of Certificates of Conformity to the standards mentioned in the Section VI, Technical Specifications, if required, of Georgia.</li> </ol> <p>The above documents shall be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.</p>
<p><b>GCC 15.1</b></p>	<p>The prices charged for the Goods supplied <i>shall not</i> be adjustable.</p>
<p><b>GCC 16.1</b></p>	<p>The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:</p> <p>Payment for Goods and Services supplied from within the Purchaser's country shall be made in Georgian Lari (GEL), as follows:</p> <ol style="list-style-type: none"> <li>(i) <b>Advance Payment:</b> Twenty (20) percent of the Contract Price shall be paid within thirty (30) days of signing of the Contract against a simple receipt and a bank guarantee for the equivalent amount and in the form provided in the bidding documents or another form acceptable to the Purchaser.</li> <li>(ii) <b>On Acceptance:</b> Payment of eighty (80) percent of the Contract Price shall be made within thirty (30) days following receipt of the Goods, upon submission of claim supported by the acceptance certificate issued by the Purchaser, as per delivery schedule specified in Section VII, Schedule of Requirements.</li> </ol>
<p><b>GCC 16.5</b></p>	<p>The payment-delay period after which the Purchaser shall pay interest to the supplier shall be <b>60</b> days.</p> <p>The interest rate that shall be applied is <b>5% per annum</b>.</p>
<p><b>GCC 18.1</b></p>	<p>A Performance Security <i>shall be required</i>.</p>

	Performance Security shall be: <b>10% of the Contract Price.</b>
<b>GCC 18.3</b>	<p>If required, the Performance Security shall be in the form of: <b>Bank Guarantee.</b></p> <p>If required, the Performance Security shall be denominated in the currency of the <b>Contract Price.</b></p>
<b>GCC 18.4</b>	Discharge of the Performance Security <b>shall</b> take place: <b>Not Applicable</b>
<b>GCC 23.2</b>	The packing, marking and documentation within and outside the packages shall be: <b>standard packing &amp; marking</b>
<b>GCC 25.2</b>	<p>Incidental services to be provided are:</p> <ul style="list-style-type: none"> <li>(a) performance or supervision of on-site assembly and/or start-up of the supplied Goods;</li> <li>(b) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;</li> <li>(c) training of the Purchaser's personnel (if required), at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.</li> </ul>
<b>GCC 26.1</b>	<p>The inspections and tests shall be:</p> <p>Supplier shall notify Purchaser at least 20 days prior to the beginning of any tests to be performed on the Goods. Purchaser reserves the right to observe during the course of a normal working day the process of manufacturing, quality assurance standards and testing of the Goods at the manufacturing plant. Inspection by the Purchaser at the manufacturing site shall not disturb Supplier's normal production procedure. The Purchaser will bear the cost of travel and stay of his experts during the inspections and tests.</p> <p>The goods shall be inspected by manufacturer. Upon completion of the inspection and testing of the Goods or components thereof, Supplier shall submit to Purchaser, a <b>factory inspection report</b> with a detailed description of the results indicating that the Goods are in compliance with the Technical Specifications</p>
<b>GCC 26.2</b>	<p>The Inspections and tests shall be conducted at:</p> <p>First test shall be conducted at Manufacturer's plant and final test at Goods' final destination site.</p>

<b>GCC 27.1</b>	The liquidated damage shall be: 0.5% per week
<b>GCC 27.1</b>	The maximum amount of liquidated damages shall be: 10%
<b>GCC 28.3</b>	The period of validity of the Warranty shall be: <b>24 months</b>  For purposes of the Warranty, the place(s) of final destination(s) shall be: Final project site destination as stated in the list of goods and delivery schedule.
<b>GCC 28.5</b>	The period for repair shall be: <b>30 days</b>  The period for replacement shall be: <b>4 months</b>