**Annex 1**

**GIEC**

**Terms of Reference**

**Engineering Consultancy Services for Construction of Gardabani Hydropower Plant**

These Terms of Reference cover various different services including preparing detailed engineering design, all of which for the Gardabani HPP project in the Gardabani region of Georgia (Gardabani municipality) located at the raw water supply channel to Thermal Power Plants.

**Background**

GIEC has preliminary studied the feasibility of construction of Gardabani HPP with approximate capacity of 1.9MW, which is located in Gardabani Region of Georgia near thermal power units Nos 3, 4 and 9. The Site is located on a landplot is for industrial purposes and designated for energy use.

According to the pre-feasibility layout and in order to carry water from the settling pond to the Powerhouse (305 masl-293 masl) the existing double line concrete penstock should extend with new 400 m penstock. Upstream concrete penstocks there are existing underground pipelines that were designed to supply technical water to TPP units and future use of these underground pipelines in current project shall be studied and reported under present contract.

The powerhouse shall be located approximate at an elevation of 293 above sea level. The usable gross head between the water intake elevation and turbine jet elevation of 293 m above sea level shall be around 12 m with a net head of close to 10 m. The installed turbine capacity for the given design discharge is estimated to be around 1.9 MWel. A further economically feasible increase in installed capacity shall be verified by the consulting engineers.

**Objectives**

This assignment aims at the following:

* Drawing up of detailed project design
* Drawing up of detailed cost estimates
* Construction organization plan
* Assisting the client during the procurement process (Optional)
* Inspection and Testing Services (Optional)

**Tasks and Deliverables**

**Task 1: Detailed Design Works**

All detailed design works shall be performed to standards that will be satisfactory for the Client to obtain an unconditional construction permit in Georgia and further operate the plant in accordance with applicable Codes and Standards. HPP engineering and design shall cover all necessary structural items from water intake to tailrace channel, optimal specifications for turbines, generators, electrical equipment and other equipment or facilities. Engineering and design should also include all access roads, supporting buildings, equipment and accessories necessary to support HPP.

**Tasks 1: Deliverables**

* basic parameters
* Hydraulic report
* Alternative Analysis
* technical design
* existing channel technical survey report
* existing channel water distribution survey report of water consumption for other users
* existing pipelines infrastructure survey report which can be used within the project for derivation
* electricity generation report
* Scope of works and materials
* Construction organization
* Detailed Geological report for penstock and powerhouse building
* Topography survey
* Grid connection (transmission line Voltage and connection scheme)
* Prepare detailed drawings for (including but not limited to):
	+ HPP water intake head station with weir structure;
	+ Settling pond;
	+ Penstock including specific facilities to be installed alongside (Anker and interim supports in pipeline bending and conjunctions and discharge valves (if necessary);
	+ HPP power house (based on unit installation drawings received from the selected manufacturer of turbine-generators sets).
	+ Power house tailrace channel
	+ Transmission line drawings
* HPP auxiliary consumption power supply scheme and electrical design (including but not limited to single line diagram, etc).
* Detailed design of substation (List of all electrical equipment)
* Prepare bill of quantities (BoQ) of works;
* Make detailed cost calculations based on BoQ as per prepared design with the aim to define estimated cost of construction.
* Prepare detailed design explanatory note in a form of a separate book along with the drawings.

**Task 2: Assistance in Procurement**

**2.1 Assisting client in getting proposals and negotiating deals for all necessary HPP equipment and supplies**

* Pressure pipes including specific facilities to be installed alongside, (Anker and interim supports in pipeline bending and conjunctions and discharge valves (if necessary);
* Turbine generator set and hydro-mechanical equipment;
* Electro-mechanical equipment;

**Task 3: Inspection and Testing Services**

 The Consultant shall witness, and report on, testing of plant and equipment, on site or in the factory, as may be requested by the client.

**3.1 Takeover Services**

* Witnessing performance testing of the plant;
* Provide assistance to the client in interpretation and acceptance of test results;
* Preparation of lists of any defects (punch list) to be rectified by the construction contractor prior to issue of preliminary or final acceptance certificates.

**Task 3: Deliverables**

* Final status report;
* Plant and equipment testing reports;
* Punch list.

 **Requirements**

* The Designer is obliged to prepare Detailed Design of Gardabani HPP and power evacuation system (transmission line, grid connection etc)
* Engineering design shall take into account existing facilities and in no case newly designed HPP shall not jeopardize save and reliable operation of thermal power units. Further development plants of the Client for thermal power plant shall be taken into consideration by the Designer.
* Detailed Design Report shall be delivered to the client in hardcopy (3 copies) and a soft version (MS Excel; MS Word; MS Project; PDF); drawings (ArcGIS or DWG and PDF); all the documents should be in Georgian and English