

**PRICE OFFER
FOR
BODORNA**





GUGLER Water Turbines GmbH

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SUBJECT:	PRICE OFFER_final
CUSTOMER:	 Kostava I Line 33a, Tbilisi, Georgia
DATA OF OFFER:	17.03.2017
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Many thanks for your esteemed invitation to quote for the equipment for the **Bodorna Hydropower Project in Georgia**. We are pleased to submit you our final offer as follows:

We offer the following advantages:

- **Experience: more than 100 Kaplan Pit Turbines supplied since 1987**
- **Gugler was first introduced pit type concept in small hydro**
- **More than 1000 water turbines installed worldwide, including in Georgia**
- **Gugler exists since year 1919**
- **Fast After Sales Service ; support by our subsidiary in Turkey**
- **Remote monitoring via internet**
- **Model tested runner geometry**



A. SCOPE OF SUPPLY AND SERVICES

1. TECHNICAL SPECIFICATION OF MACHINERY

1.1 **GUGLER KAPLAN-PIT TURBINE** with horizontal shaft; 4-blade runner; coupled via gear box to the generator; adjustable runner blades and wicket gate; designed for the following data:

Technical data:			
Turbine:			
Units	pc.	1	
Nominal net head	H_N	8,1	m
Nominal discharge	Q_A	32	m ³ /s
Maximum discharge	Q_{Amax}	35	m ³ /s
Max. Turbine output	P_T	2556	kW
Turbine speed	n_1	203,3	rpm
Runaway speed	n_D	569	rpm
Runner outlet diameter	D_2	2240	mm
Permissible suction head:	h_s	-2,7	m
Materials of the turbine parts:			
Turbine casing	S355J2+N		
Draft tube	S355J2+N		
Runner blades	G-X4CrNi 13-4		
Runner Hub	EN-GJS-500-7		
Discharge Ring	EN-GJS-500-7		
Shaft	C 45 E		
Turbine bearings	roller bearing in housing with low-maintenance lubrication		
Labyrinth	Stainless steel and red brass RG7		
Guide vanes	G-X4CrNi 13-4		
Bottom ring	EN-GJS-500-7		
Guide vane levers	S355J2+N		
Guide gate links	S355J2+N		
Turbine colour	RAL 5021		

Only the data points 20 % to 100 % of the following output and efficiency tabulation are relevant for the guarantee.



OUTPUT AND EFFICIENCY TABULATION

Q_T [%]	Turbine Discharge [m ³ /s]	Net Head [m]	Turbine Efficiency [%]	Turbine Output [kW]	Gear box %
20	6,4000	8,10	82,40	419,0	95,0
30	9,6000	8,10	88,70	676,6	96,3
40	12,8000	8,10	91,40	929,6	97,5
50	16,0000	8,10	92,90	1.181,1	97,8
60	19,2000	8,10	93,50	1.426,5	98,1
70	22,4000	8,10	93,90	1.671,4	98,3
80	25,6000	8,10	94,00	1.912,1	98,4
90	28,8000	8,10	93,70	2.144,3	98,5
100	32,0000	8,10	93,00	2.364,8	98,5
109,4	35,0000	8,10	91,90	2.555,9	98,5





TECHNICAL SPECIFICATION

Turbine pit:

Steel S 355 welded, consisting of: drive pit, guiding noses, external intake cone with stay vanes and connecting flange for the wicket gate bottom ring, internal bearing housing with flange for the connection of the runner hub connecting cone, supports and frames for generator and gear box, taps for the connection of pressure transducers for the Index Measuring; all connecting flanges and surfaces are machined.

Draft tube cone:

Steel S 355J2+N welded, straight, bipartite, front part as dismantling connection piece with shawl flange and inspection hole, rear part as cradle equipped with holding flange and wall anchors.

Draft tube tail piece and Inlet Cone liner:

Made of concrete by means of form work supplied and erected at site by the civil constructor according to the design of the turbine supplier.



Turbine shaft:

Hollow shaft made of steel C 45 E

Turbine shaft bearing:

The guide bearing consists of a spherical roller bearing for low-maintenance grease lubrication. The axial bearing is integrated in the generator or the gear box. Including all grease conduits featuring good accessibility, sealing and temperature sensors.
Common automatic grease lubrication system – see Pos.1.1.2

Bearing sealing:

Special low-maintenance shaft sealing system, consisting of a sealing casing with fivefold arranged radial sealing rings and a splash proof centrifugal ring in the leakage water chamber. Leak water can flow out freely from the seal housing through leak water chambers and channels. Lock water is not necessary! The sealing can be changed without having to dismantle the turbine shaft.



Runner blades:

Four blades made of low wear chrome nickel steel casting G-X4CrNi 13.4, shape fully machined on CNC milling machines; fitted on the runner hub by means of thrust collars and screws; supported in the hub by bronze sleeves and sealed with maintenance-free sealing rings

Runner hub:

Consisting of a runner hub, made of spheroidal cast iron EN-GJS-500-7, runner adjusting mechanism and runner covers, sealed with maintenance-free sealing rings, bronze sleeves for the incorporation of the runner blades; fixed on the turbine shaft by means of an oil pressured shrink fit; including oil filling

Runner hub connecting cone:

This part is made of steel S 355 and connected to the bearing housing of the turbine pit. The cone is prepared for the incorporation of the guide bearing and the bearing sealing. In the area of the wicket gates the shape is globular machined.

Discharge ring:

Steel S 355J2+N; globular machined on the outlet side

Adjusting bar:

Blank shaft made of C 45 E, guided towards the outside through the turbine and gear shaft.

Runner adjustment:

Oil-hydraulic servo cylinder is directly flanged at the front side of the driven second shaft end of the gear box; pressured oil is feed through a rotating union; including transducer for position recognition, perforated disc with speed recognition and indicating scale for position of runner angle of attack. The end positions of the actuator are mechanically limited by means of stops.

Guide vanes(wicket gates):

Spheroidal cast iron EN-GJS-500-7, mounted in maintenance-free plain bearing bushes; wicket gates spigots with slipped on bronze bush; sealing by means of doubly arranged lip seals and toroidal ring sealing. Bearing bushes and seals can be exchanged without having to dismantle the wicket gates. As safety measure against jamming the wicket gates are fixed by means of toque limited locking devices. Incl. position markings for the control and adjustment of the position.

Bottom ring for guide vanes:

Spheroidal cast iron EN-GJS-500-7, globular ,machined in the area of the wicket gates.

Gate operating ring:

Steel S 355; with V-groove for the incorporation of the steel balls as bearing



Guide vane levers with links:

Steel S 355; mounted torque limited by means of releasable locking devices, every second link with spring assembly

Wicket Gate adjusting mechanism:

Double-acting hydraulic cylinder, fixed on the floor by means of brackets, including transducer for position recognition

Gear box coupling:

Rigid, bi-partite shaft coupling fixed to the turbine and gear shaft by means of locking devices

Signalling lines:

Electric wiring for the bearing temperature sensors, position acquisition and speed sensor are provided in an easily accessible terminal box on the upper side of the turbine pit.

General corrosion protection specification:

If it is technically possible, the turbine will be hot dip galvanized. This mainly depends on size, since hot dip galvanizing is limited by the size of available zinc baths.

Turbines which are too large for hot dip galvanization will be treated with ZINGA film galvanizing system.

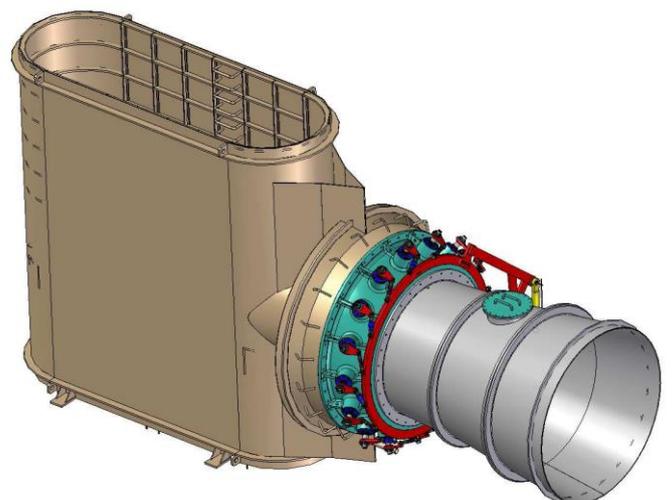
This is a special paint with very high solid zinc content providing corrosion protection comparable to hot dip galvanizing.

Hot-dip galvanised surfaces in contact with water:
no additional treatment

Hot dip galvanized surfaces in contact with air & condensating water:
Lubercryl 1K AA01: 30 µm DFT
Lubercryl 2K HS AS80: 70 µm DFT
Total: 100 µm DFT

Surfaces in contact with water:
Aquazinga: 80 µm DFT
Mist coat of Zingaceram ZM EP MIO HS: 25 µm DFT
Zingaceram ZM EP MIO HS: 120 µm DFT
Zingaceram ZM EP MIO HS: 120 µm DFT
Total: 345 µm DFT

Surfaces in contact with air & condensating water:
Zinga: 60 µm DFT
Mist coat of Zingalufer: 25 µm DFT
Zingalufer: 55 µm DFT
Lubercryl 2K HS AS80: 100 µm DFT
Total: 240 µm DFT





Supporting surfaces:

Priming coat (Zinga or Aquazinga) as used in adjacent areas

Machined and functional surfaces:

Temporary conservation with Tectyl 506 EH or similar

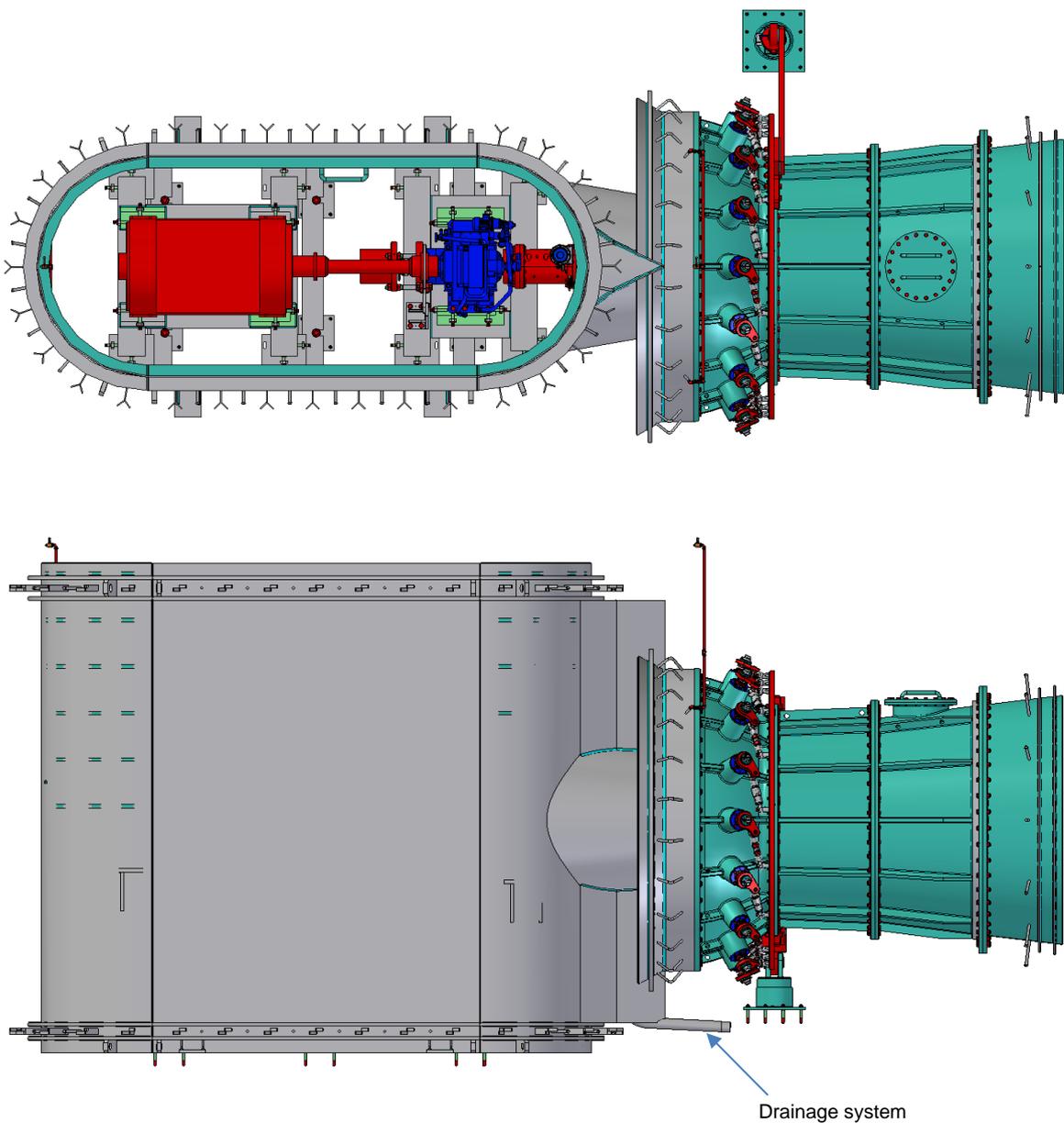
Stainless material:

Usually no additional coating. In some cases the same system as for hot dip galvanized surfaces may be used for aesthetic reasons.

Surfaces to be embedded in concrete:

no treatment

Protection caps and railings for pits, pulleys, disc flywheels, rotating parts etc. are not included within the scope of supply





1.1.1 1 pc. **DISK BRAKE SYSTEM**

To brake the turbine unit from 20 % of the nominal speed and used as holding brake. Consisting of two independent halves with facing spring loaders and hydraulic cylinders as well as the disk. The brake lining support is held by guide bolts which absorb brake energy. The lining support is hydraulically retracted during operation of the brakes. Any lining wear can quickly be manually compensated. The friction lining is glued and riveted onto the lining support.

1.1.2 1 Pc. **AUTOMATIC GREASE LUBRICATION SYSTEM**

Used for automatic lubricating of the turbine bearing. Consisting of a grease pump, powered electrically, manifolds with meters, electronic pulse generators, control equipment and the necessary connections and mountings. Suitable for 0 and 00 grease (NLGI-class). All components are manufactured from high quality corrosion resistant materials.



Symbolic picture

1.1.3 1 Pc. **DRAINAGE AND DEWATERING SYSTEM**

Drainage

Adequate drainage piping will be provided for removing any leakage that may occur on the turbine. Necessary piping to carry the drainage water to the station sump will be provided.

De-Watering

Adequate unit dewatering equipment capable of working off the discharge occurring when emptying the conduits, the spiral, the suction tube. To be able to discharge a total amount of 50 l/sec. Consisting of two motor pumps, starter, valves, stainless steel pipes required for emptying of the de-watering sump will be provided. All the conduits, flanges and connections are of stainless steel.

The laying of the piping from the de-watering sump into the tailrace canal will be arranged by the client's civil works contractor. The delivery pipe shall be led to the tail water side above the max. flood level. It shall prevent the leakage of water at standstill and under all conditions of operation.

The operation of the pump will be automatic by means of float control. The pump float control will include alarm contacts to sound in the event of the water level rising higher or falling lower than intended.

Each pump is equipped with a level gauge for minimum and maximum level which can be switched on and off and regulated by the turbine control system.



1.2 1 Pc. **SPUR GEAR BOX (supplier: Eisenbeiss / Austria)**

<u>Technical Data:</u>	
Turbine power:	2.556 kW
Turbine speed:	203,3 1/min
Turbine runaway speed:	569 1/min
Generator speed:	750 1/min
Gear ratio:	1: 3,69
Application factor KA:	2,00
Tooth root safety factor SF:	2,096
Pitting resistance safety factor SH:	1,456
Scuffing safety factor SB:	2
Ambient temperature:	+0°C to 45°C
Application:	Kaplan Turbine

1.3 **THREE-PHASE SYNCHRONOUS GENERATOR**

Brushless synchronous alternator with built-in self-exciter machine, regulation system, in brushless design, self-regulated, self-ventilated, roller bearings.

Units	pc.	1
Make		Marelli, Italy
Generator output	kVA	2900
Generator voltage	V	6300
Power factor	-	0,85
Ambient temperature	°C	40
Altitude max.	m	<1000
Connection	-	Star
Voltage regulation accuracy	%	+/- 1
Voltage adjusting range	%	+/- 10
Generator speed	rpm	750
Overspeed (max. 5 min)	rpm	2100
Frequency	Hz	50
Insulation class	-	F
Temperature rise	-	Class B
Protection	-	IP23
Cooling	-	IC01
Type	-	B3
Bearing type	-	roller bearing
Bearing life time	h	100.000
Automatic voltage regulator	-	MEC 100 B from Marelli
Specification standard	-	IEC 60034
Shaft rotation	-	optional
Phase sequence	-	right
Cable outlet	-	optional
Painting	-	RAL 3000



Generator efficiencies: (Marelli/Italy)

Load	Power factor $\cos \phi = 0,85$	Power factor $\cos \phi = 1$
100%	96,7%	97,3%
75%	96,8%	97,4%
50%	96,5%	97,1%
25%	94,9%	95,7%

Accessories:

- Power factor regulator, installed
- Voltage regulator, installed
- Potentiometer for voltage adjustment, loose
- Voltage regulation at lowering of frequency
- Temperature sensor PT 100 in stator winding, 2 pcs. per phase
- Regreasing device
- Cable outlet with blind cover
- Bearing temperature supervision PT 100, 1 pcs. per bearing
- Mech. overspeed protection for rotor
- VT's and CT's for measurement and protection
- Vibration sensors for bearings
- Reinforced bearing covers for additional axial loads
- Base frame

Test run:

the following not witnessed tests are included:

- ⇒ No-load characteristic
- ⇒ Short circuit characteristic
- ⇒ Heating test - resistance method
- ⇒ H.V. test 2 min.
- ⇒ Centrifugal test 2 min.
- ⇒ Insulation measuring
- ⇒ Adjusting of voltage- and p.f. regulator

Documentation, consisting of 2 sets (english):

- ⇒ Working manual incl. wiring diagrams
- ⇒ List of spare parts
- ⇒ Test certificates
- ⇒ Alternator dimension drawing



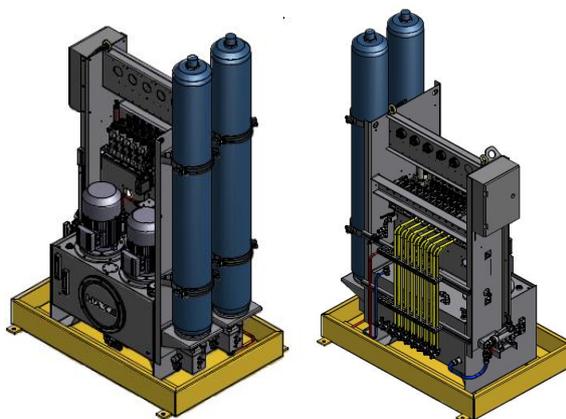
1.4 HYDRAULIC UNIT

The hydraulic power unit is used for the adjustment of the actuators of a Kaplan turbine.

In compact structural shape for the erection on the ground nearby the turbine. The operating pressure will be worked off from the pressure accumulator until the minimum pressure is reached. Only when an underflow of the adjusted minimum pressure takes place, the pressure accumulator will be refilled by a pump. An actuation of the hydraulic cylinder for the starting of the plant during no-grid conditions is possible by means of a hand-pump.

Units	pc.	1
Make		Hainzl or. Hawe / Austria
Type	-	Hydraulic power unit
Medium oil		mineral oil ISO VG46
Operating temperature		35°C - 50°C
Ambient temperature		-10°C – 40°C
Operating pressure	bar	70/250
Motor voltage	V	400V / 50Hz
Valve voltage	V	24 VDC
Proportional signals	mA	4-20mA
Main parts:		
Proportional valve		
Directional control valve		
One-way restrictor		
Double check valve		
2xGear pump		
Three phase motor		
Hand pump		
Bladder accumulator		
Memory safety block		
Oil tank with filler necks and oil-level indicator		
Pressure relief valve		
Temperature switch		
Pressure switch		
Hydraulic pipes		hot-dip galvanized

The unit is ready for operation and lacquered, with connections for the hydraulic piping, the hydraulic pipes itself in the length required up to the inlet valve and turbine as well as the first oil filling.



Symbolic pictures



1.5 DOCUMENTATION

In English language, consisting of:

1. Installation drawings
2. General assembly drawings
3. Sub assembly drawing and necessary details
4. Schematic wiring diagrams
5. Spare part lists for all delivered equipment
6. Manuals for operation & maintenance

1.6 RECOMMENDED SPARE PARTS

Recommended spare parts for operation and maintenance of the hydro generating unit and its auxiliaries:

- Turbine: sensors, seals (excl. mechanical face seal)
- Generator: sensors, seals, rotating diodes (excl. bearings and AVR)
- HPU: sensors, seals, valves, filters, pump
- Gear box: sensors, seals, pump

A final list will be provided when detail engineering is completed.

The prices for recommended spare parts are only valid when shipped together with the main equipment.

If the spare parts are listed optionally, they must be ordered not later than 3 months after signature of the contract for the offer to remain valid.

If the spare parts are ordered at a later date, prices have to be revised and transport has to be charged separately.

1.7 1 Set SPECIAL TOOLS

1 Set pumps and installation devices for mounting and demounting of the runner onto and from the turbine shaft; consisting of 1 high pressure pump, 1 hydraulic pump, 1 hollow plunger cylinder and accessories like flange, threaded spindle and hoses.



2. SPECIFICATION OF THE CONTROL AND ELECTRICAL EQUIPMENT



2.1 UNIT CONTROL AND PROTECTION SYSTEM

Digital turbine control system DTG (Digital Turbine Governor) is designed as an integrated system for small hydro power plants. It is based on the programmable logic controller (PLC) with specific communication and input / output modules for processing the signals. CPU is provided with all necessary algorithms for the control and monitoring of turbine, generator and power plant auxiliaries. In addition, PLC prepares data for communication to the supervisory control system (SCADA, remote control center).

The functions of turbine control system are implemented in order to provide start of the unit, run to the rated speed, unit control during synchronization, power regulation or water level regulation of the unit during parallel operation with network and speed regulation during no load operation. Turbine system can be controlled manually from a control panel. Automatic control is realized by setting reference points locally on operator panel (OP) or remotely from SCADA.

Digital turbine control system is situated in one cubicle with two doors.

No. of cubicles: 1
 Cubicle manufacturer: ELSTEEL
 Dimension of cubicle: (600+600) x 600 x 2100 (WxDxH)

Unit control and protection panel			
Equipment	pcs.	Manufacturer	
Cubicle	1	Elsteel	
PLC	CPU module	1	Siemens
	Profibus DP communication processor	1	Siemens
	Counter module	1	Siemens
	Power module	3	Siemens
	Terminal module for AUX1 supply screw connection	3	Siemens
	Digital input module; 8DI; 24 V DC	9	Siemens
	Digital output module; 8DO; 24 V DC	5	Siemens
	Analog input module; 4AI; 2 wire current signal	2	Siemens
	Analog input module; 2AI; RTD	6	Siemens
	Analog output module; 2AO; voltage/current signal	1	Siemens
	Modbus communication module	1	Siemens
	Profibus/Modbus connector	1	Siemens
	Profinet connector	4	Siemens
	Universal terminal module	5	Siemens
Micro memory card; 64 kB	1	Siemens	
Touch Panel	1	Siemens	
Network analyzer SENTRON PAC	1	Siemens	
Multifunction generator protection relay	1	Siemens	
Multifunction paralleling device Woodward	1	Woodward	
Multifunction line protection relay	1	Siemens	
Test switch	1	ABB	



Auxiliary	set	Schneider Electric
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Unit controller functions:

- Turbine governor
 - turbine opening control
 - speed control
 - power/head pond level control
- Start / stop / fast stop sequence
- Power factor / reactive power control
- Power unit monitoring (temperature, speed, oil unit)

Mode of operation:

- Manual/test mode – control of each part of turbine/generator system by operator over operator panel
- Automatic sequence mode – automatic mode with stopping between control phases. Transition from one control step to another should be allowed by operator.
- Full automatic mode – automatic control mode only by control system

Synchronization system is made of automatic synchronizer, manual synchronizer with double voltmeter; double frequency meter and LED phase display. Manual synchronizer allows operator manual synchronization during test phase or in case of malfunction of automatic synchronizer.

Automatic synchronizer is working fully automatically. It is adjusting voltage and speed of the generator and closing the generator circuit breaker if conditions are fulfilled.

Generator voltage is adjusted by giving higher/lower commands to excitation system. Generator speed is adjusted by giving faster/slower commands to turbine governor.

The 7UM62 is a numerical multifunction machine protection relay from the SIPROTEC 4 family and provides a combination of protection functions especially for large electrical machines or power station blocks. A variety of protective functions is provided and freely selectable by the user. The 7UM62 device possesses two serial interfaces: front interface for connecting a PC and system interface for connecting to a control system.

2.2 AC (400 VAC) and DC (24 VDC) system

Main equipment in the cubicle:

Equipment	pcs.	Manufacturer
Cubicle (1000x600x2100mm) with auxiliary equipment	1	Elsteel
Surge arrester	2	Dehn+Sohne
Current Transformer 300/5A	3	Schneider Electric
Multimeter SENTRON PAC 3200, with communication module	1	Siemens
Undervoltage protection relay	2	Schneider Electric
NSX circuit breaker 400A with TM-D 400 A and motor	1	Schneider



mechanism		Electric
NSX circuit breaker 160A with TM-D 125 A and motor mechanism	1	Schneider Electric
NSX circuit breaker 100A with TM-D 63 A and motor mechanism	1	Schneider Electric
NSX circuit breaker 100A with TM-D 63 A	1	Schneider Electric
NSX circuit breaker 250A with TM-D 250 A	1	Schneider Electric
MCB, 3poled, 16-63A	Set	Schneider Electric
MCB, 1poled, 6-12A	Set	Schneider Electric
Motor protection circuit breakers	Set	Schneider Electric
Contactors set	Set	Schneider Electric
Equipment		
Surge arrester	1	Dehn+Sohne
TEBECHOP 3000, rectifier	n+1	Benning
MCU 2500 Control unit with communication module	1	Benning
Shunt	1	Schneider Electric
Ampermeter	1	Schneider Electric
Battery, 24V, 150Ah	set	Fiam
Contactore	1	Schneider Electric
MCB, 2poled, 3-10A	set	Schneider Electric

REMARK:

Whole AC and DC system will be define during detail design.

2.3 WATER LEVEL MEASUREMENT

No. of cubicles: 1
 Cubicle manufacturer: ELSTEEL
 Dimension of cubicle: 500 x 700 x 250 mm (WxDxH)

Equipment in cubicle:

Water level measurement panel		
Equipment	pcs.	Manufacturer
Head water level measurement cubicle with auxiliary equipment	1	Elsteel
SIMATIC DP, IM151-8 PN/DP CPU FOR ET200S	1	Siemens
SIMATIC DP, POWER MODULE PM-E FOR ET 200S; 24V DC	1	Siemens



SIMATIC DP, ELECTRONIC MODULE ET200S, 4AI	1	Siemens
SIMATIC DP, TERMINAL MODULE TM-P15S23-A1 FOR ET 200S FOR POWER MODULES 15MM WIDE	1	Siemens
SIMATIC DP, 5 TERMINAL MODULES TM-E15S24-01 FOR ET 200S FOR ELECTRONIC MODULES 15MM WIDE	1	Siemens
SIMATIC S7, MICRO MEMORY CARD P. S7-300/C7/ET 200, 3.3 V NFLASH, 512 KBYTES	1	Siemens
SCALANCE X101-1, IE MEDIA CONVERTER	1	Siemens
Hydrostatic level transmitter	1	Nivelco

2.4 SCADA SYSTEM

Proposed SCADA system will be installed on Operator Station in Control Room and allows operator to control and monitor all parts of control system in automatic and automatic sequence mode. All necessary information (alarms, process values, ...) will be stored in logs or archives. Link between SCADA and control system is based on Ethernet plant station bus.

Control room		
Equipment	pcs.	Manufacturer
PC (HP PRODESK 400)	1	HP
Monitor (HP Display 22" P221 LED Backlit Full HD)	1	HP
Printer (HP LaserJet PRO Color M251n)	1	HP
WINCC SYSTEMSOFTWARE	1	Siemens
UPS (Eaton 1000 VA 5E1100iUSB)	1	Eaton

2.5 MEDIUM VOLTAGE SWITCHGEAR

- Medium voltage switchgear SM6 6.3kV, 630A, 20kA(1s) in the following configuration:
 - 1x generator circuit breaker feeder
 - 1x power transformer connection feeder
 - 1x station service transformer
- Medium voltage switchgear SM6 35kV, 630A, 16kA(1s) in the following configuration:
 - 1x power transformer feeder
 - 1x measurement feeder
 - 1x outgoing feeder

2.7 TRANSFORMER

- Main Transformers



1 piece three phase transformer, oil-immersed (Al) type with the basic data as follows:

Technical Data:

Rated Power: 3000 kVA
 Rated voltage at primary: 35 kV \pm 2x2,5%
 Rated voltage at secondary: 6,3 kV
 Frequency: 50 Hz
 Vector group: YNd11

Earthing resistor for power transformer:

Type	-	NTD.XL
Operation Voltage	kV	$35 / \sqrt{3}$ (\pm 10%)
Resistance Value @ 25°C	W	20 (\pm 10%)
Rated Fault Current	A	1000
Rated Time "On"	Sec.	5
Rated Continuous Current	A	100
Current Transformer (s)	1 pc.	1000/1A 5P20 30 VA 1pc.

- Station service transformer
 1 piece three phase transformer, two winding, core type, dry :
 Rated Power: 100 kVA
 Rated voltage at primary: 6,3 kV \pm 2x2,5%
 Rated voltage at secondary: 400/230 V
 Frequency: 50 Hz
 Vector group: Dyn11

2.8 GENERATOR STAR POINT CUBICLE

No of cubicles: 1
 Cubicle manufacturer: ELSTEEL
 Dimension: 600 x 600 x 1000 mm (WxDxH)
 Equipment in auxiliary supply cubicles:

Generator star point cubicle		
Equipment	pcs.	Manufacturer
Cubicle 600 x 600 x 1000 mm	1	Elsteel
Current transformer	6	Končar
Voltage transformer	1	Končar
Resistor	1	Končar
Auxiliary equipment	1	

2.9 DIESEL GENERATOR



100KVA / 50Hz Diesel Generator 0,4kV will be provided

2.10 POWER HOUSE INDOOR WIRING AND EARTHING

All necessary control and power cables inside of the power house but without the electrical installation cables (lighting system, etc.) and earthing, including also the necessary cable-routes.

2.11 DOCUMENTATION, PARAMETRIZATION AND FACTORY TESTING

Documentation in English language, consisting of:

- * single line schematic
- * switchboard scheme
- * circuit diagram
- * equipment list
- * clamp plan
- * cable list
- * release scheme (protection)
- * description of the equipment
- * program documentation for PLC

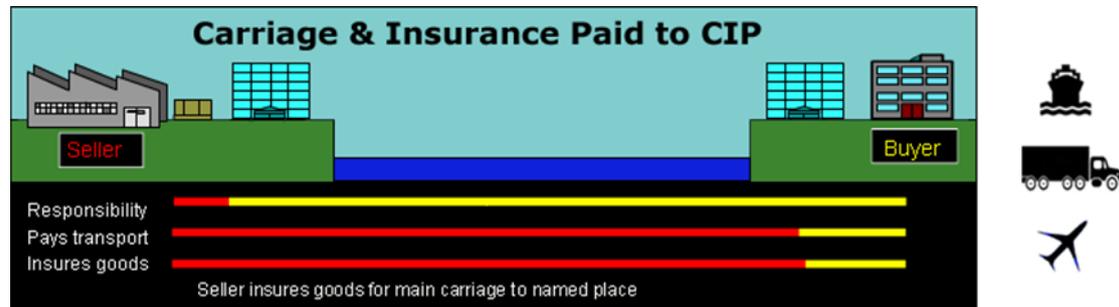
END CUSTOMER OBLIGATIONS:

- Signal cable between power house and intake
- Power supply of the intake
- Lightening and earthing system as well as necessary material
- Civil works
- All cable trays and ducts
- Connection between power house and substation



3. FREIGHT CHARGES

Costs for freight and packing CIP Georgian site according to Incoterms 2010.



4. INSTALLATION & COMMISSIONING incl. TRAINING

Seller will provide Mechanical and Electrical personnel for installation, testing and commission of supplied equipment and will provide the necessary special tools for the installation.

We assume that our site personnel can use the sanitary facilities provided by the Civil Contractor /Employer.

The installation and assembling at site shall start upon following conditions:

- Receipt of undamaged equipment at site.
- Total erection of civil works is done as per drawings set.
- Power house crane in operation.
- Energy supply as line charged.
- Availability of water in the river (full or part flow down to 50 % of the design flow for one turbine)

Testing of the equipment shall be in accordance to the test program to be agreed with Employer. Routine tests for generator and electrical equipment are included. However type tests to be agreed upon with Employer may be carried out and can be offered at additional costs.

Training of operating and maintenance personnel will take place during installation, testing and commissioning of the equipment by Seller' personnel. The scope of the training will allow the operation and maintenance personnel to operate and maintain the equipment.

All these works are foreseen to be performed for all units at the same time or one after the other, without time interruption.

Commissioning of the equipment will be completed with a 24 hours test run to test and adjust the equipment. Afterwards equipment shall be ready for commercial operation and shall be taken over provisionally by Employer and a Provisional Certificate of Commissioning shall be issued and signed.



Costs for installation and commissioning of:

Equipment	Item A.
1 Turbine	1.1
1 Drainage and dewatering system	1.1.3
1 Gear box	1.2
1 Generator	1.3
1 Hydraulic power unit	1.4
1 Electrical Equipment Supervision of Installation	2
1 Electrical Equipment Commissioning and Training	2
6 Travelling time	
6 Flight ticket and free transfers from Linz (Austria) - installation site - Linz	
Installation personel for complied installation and commissioning	

147.600,00



B. PRICES

PRICE SCHEDULE - 1. MACHINERY

Item	Description	Quantity no.	Price per Unit EUR	Total Price EUR
1.1	TURBINE	1	580.000,00	580.000,00
1.1.1	DISK BRAKE	1	8.000,00	8.000,00
1.1.2	AUTOMATIC GREASE LUBRICATION SYSTEM	1	3.200,00	3.200,00
1.1.3	DRAINAGE AND DEWATERING SYSTEM	1	19.100,00	19.100,00
1.2	GEAR BOX	1	123.600,00	123.600,00
1.3	GENERATOR Marelli	1	160.700,00	160.700,00
1.4	HYDRAULIC POWER UNIT	1	28.500,00	28.500,00
1.5	DOCUMENTATION	1	3.500,00	3.500,00
1.6	SPARE PARTS	1	30.170,00	optional
1.7	SPECIAL TOOLS	1	8.200,00	optional
1.	GROUP TOTAL		EUR	926.600,00



PRICE SCHEDULE - 2. CONTROL AND ELECTRICAL EQUIPMENT

Item	Description	Quantity no.	Price per Unit EUR	Total Price EUR
2.1	UNIT CONTROL AND PROTECTION SYSTEM	1	42.500,00	42.500,00
2.2	AUXILIARY SUPPLY SYSTEM	1	11.300,00	11.300,00
2.3	WATER LEVEL MEASUREMENT	1	4.300,00	optional
2.4	SCADA SYSTEM	1	16.500,00	16.500,00
2.5	MEDIUM VOLTAGE SYSTEM 6,3KV	1	47.000,00	47.000,00
	MEDIUM VOLTAGE SYSTEM 36KV	1	54.300,00	54.300,00
2.6	MAIN TRANSFORMERS	1	46.000,00	46.000,00
	NEUTRAL GROUNDING RESISTOR	1	14.200,00	14.200,00
	STATION SERVICE TRANSFORMER	1	9.900,00	9.900,00
2.7	GENERATOR STAR POINT CUBICLE	1	5.900,00	5.900,00
2.8	DIESEL GENERATOR	1	20.100,00	20.100,00
2.9	POWER AND CONTROL CABLES	1	21.200,00	21.200,00
2.10	ENGINEERING + DOCUMENTATION + TESTS	1	27.100,00	27.100,00
1.	GROUP TOTAL		EUR	316.000,00

PRICE TABULATION

1.	MACHINERY	EUR	926.600,00
2.	ELECTRICAL EQUIPMENT	EUR	316.000,00
3.	FREIGHT CHARGES	EUR	70.000,00
4.	INSTALLATION & COMMISSIONING M+E	EUR	147.600,00
	TOTAL CONTRACT PRICE	EUR	1.460.200,00
	Discount	EUR	70.200,00
	FINAL CONTRACT PRICE	EUR	1.390.000,00



C. TERMS OF PAYMENT

Our standard terms of payment are as indicated below, however we are ready to discuss any other acceptable payment conditions:

25 % of Total Contract Price shall be paid in advance at sight against presentation of the following documents:

- Down Payment Invoice stating 25 % of the Total Contract Price

For 75 % of the Total Contract Price an irrevocable and confirmed Letter of Credit shall be opened and confirmed by an Austrian Bank in favor of GUGLER Water Turbines GmbH within one month after contract signature. For this GUGLER Water Turbines GmbH will submit a draft of a Letter of Credit (L/C).

Payment through L/C shall be as follows:

25 % of Total Contract Price shall be paid 4 months after signature of contract against the following documents:

- Commercial Invoice stating 25 % of the Total Contract Price
- Receipt of delivery of courier, confirming dispatch of turbine design (general arrangement drawings, assembly and subassembly drawings)

45 % of Total Contract Price shall be paid at sight on delivery against presentation of the following documents:

- Commercial Invoice stating 45 % of the Total Contract Price
- Packing List
- CMR Truckway Bill

5 % of Total Contract Price shall be paid at sight against presentation of:

- Commissioning Certificate or Provisional Certificate of Commissioning according to paragraph 8. ("Installation and Commissioning") and 10. ("Official Acceptance") of the Contract Conditions signed by the Seller and the Buyer
- Commercial Invoice

In case installation and/or commissioning of the equipment cannot be finished within three months from the date of last freight document (CMR) due to reasons beyond the seller's responsibility, the final payment of the Contract Price automatically becomes due and shall be paid against presentation of the final invoice only at latest three months from date of last delivery.

If any additional works are necessary at site these shall be paid immediately after successful commissioning against presentation of the Invoice.

The amounts of the payments are to be transferred immediately as the full amounts stated in the invoices without deduction of any fees. The Buyer will assume all bank fees regarding the opening and confirmation of the Letter of Credit as well as bank transfer fees.



D. GENERAL CONTRACT CONDITIONS

1. SCOPE OF SUPPLY

The scope of supply is limited to Seller's scope mentioned in this Contract. Supplies and performances shall be strictly in accordance to the conditions and descriptions specified in present technical specifications and general terms of contract. The scope of supply includes generally design, engineering, fabrication, factory acceptance tests, delivery CIP site, installation, commissioning and training of personnel.

2. QUALITY CONTROL - INSPECTION, TESTING AND TRAINING

Quality control, inspection and testing during the manufacturing, erection and prior to the commissioning of the plant, will be mandatory. The Seller will carry out inspection and control of technical specification, designed parameters throughout the manufacturing of the equipment. Before dispatch, the equipment will be examined by the Seller and sent only after successfully passing the tests.

The following procedure will be applicable:

During the manufacturing:

The Seller shall carry out the quality control and the examination in accordance with the Seller's quality control practice and the quality control program.

During the erection / commissioning:

The Seller shall furnish the Buyer with the usual erection and installation instructions and the relevant drawings in order to be able to inspect the shipment. The Seller will provide the training of the staff which will be operating and maintaining the plant during installation and commissioning. Training will be executed in English language.

Standards:

All supplied equipment is designed and manufactured based on ISO and IEC standards. The Electrical Equipment will be designed and manufactured according to the relevant IEC standards. If there are any special local laws or operational requirements (technical conditions of the energy delivery contract, grid codes, grid topology, protection parameters etc.) Seller has to be notified as early as possible such that these issues can be discussed and the equipment specifications can be adapted accordingly.

If this is not the case, Seller cannot assume any responsibility for any technical or organizational problems during commissioning, neither can Seller accept any cost arising from changes necessary to the equipment in order to fulfil local regulations.

3. TERMS OF DELIVERY

CIP Georgian site, excluding duty and taxes. The delivery will be carried out according to the Incoterms (latest issue). Partial deliveries are permitted.

4. TIME OF DELIVERY

A detailed time table for the delivery will be co-ordinated with the Buyer.



- Delivery of general arrangement drawings with estimated weights, forces and dimensions required for civil design of power house: 8 weeks after receipt of down payment.
- Equipment: Ready for dispatch 9 months after receipt of the Down Payment and opening of a workable L/C for the agreed amount within one month after contract signature. In case L/C opening will be delayed the delivery time will be extended to the same extent the delay occurs. If the L/C opening is delayed more than two months after contract signature the Seller has the right to stop the performance and cancel the contract. If a shorter delivery time is required, we are glad to check with generator supplier if this is possible.
- Time for transport up to CIP site: 2-3 weeks
- Works at site like assembling, installation and adjustment for the concrete works and commissioning: Start within 4 weeks after the Buyer's written notification of when installation can begin.

The installation and assembling at site shall start upon following conditions:

- Receipt of undamaged equipment at site.
- Total erection of civil works is done as per drawings set.
- Appropriate crane in ready for operation and working environment at site is clean.
- Energy supply as line charged.
- Availability of water in the river (full or part flow down to 50 % of the design flow for one turbine)

In case of unforeseeable circumstances or circumstances outside of the control of Seller and its suppliers, such as all cases of force majeure, which impede compliance with the agreed period of delivery, the latter shall be extended in any case for the duration of such circumstances; these include in particular armed conflicts, official interventions and prohibitions, delays in transport and customs clearance, damages in transit, shortage of energy and raw materials, labour disputes, defective goods of a larger or important piece of work, default on performance by a major sub-supplier or sub-contractor.

Liquidated damages: In case the equipment will be not delivered within the time period agreed in clause 4 for reasons solely attributable to Seller, Seller shall be pay an amount of 1 % (one percent) of the Total Contract Price per every full week of delay, but limited to an amount not more than 5 % (five percent) of the Total Contract Price as liquidated damages for delay.

5. WEIGHTS

The weights of the equipment and the shipment will be confirmed after the detail design work is done. Any indication of weight is not binding until release of the final installation plans. The heaviest weight indicated forms the basis for the dimensioning of the temporary hoists and the cranes necessary for unloading, heaving of the equipment into the relevant installation place and installation of the equipment.

6. TRANSPORTATION AND HOISTING

The transportation to CIP Georgian site is included in the offer. The Buyer is responsible to provide and maintain proper access to the site for a normal 40 tons truck. The Buyer shall organize at his expense customs clearing of the equipment, as well as the unloading and storage at site. The Buyer shall provide temporary hoists and other equipment needed for the unloading of the truck at site and the heaving of the equipment into the relevant installation place. The above activities are not included in the contract prices and are within the Buyer's responsibility.



7. EXCLUSIONS

All the conduits and civil & concreting works are not included in Seller's scope of delivery.

The Buyer has to provide and will be responsible for:

- Three-phase current connection with zero wire needed during the installation phase.
- Chase, base and anchoring plates in the building construction according to Seller's details.
- Empty and protective pipes, cable trays, channels and pits needed for the installation of the connecting and joining cables for the turbine, generator, governor, water level transducer, hydraulic aggregate etc.
- Signal and power cable between power house and intake.
- Lighting, lightning, fire fighting and grounding systems; air conditioning.
- Clean water.
- Crane.
- Applications/Permissions required in relation to construction, grid connection and operation
- Support for working visa at site
- Office space, sanitary rooms, telephone and internet.

8. INSTALLATION AND COMMISSIONING

The Seller shall execute the assembly, installation, commissioning of the equipment at site and has to provide the required qualified craftsmen and helpers. Seller's engineers, acting as supervisor, will be present for the installation, commissioning and training. All these works are foreseen to be performed for all units at the same time or one after the other, without time interruption.

The Seller will provide all normal hand and special tools needed to execute mechanical and electrical works. It is the Buyer's obligation to provide temporary hoists, moving slides and other necessary equipment. For the installation work it is essential to have all components supplied at the place of installation. The Buyer shall give written notification of when installation can begin. The Buyer is responsible that necessary building work is far enough advanced to permit installation to begin at the appointed time. It is indispensable that all conditions essential for the completion of the installation and commissioning works exist.

If the equipment cannot be transported to or received at the job site or if installation and commissioning cannot be completed within 90 days after date of freight document (CMR) for reasons beyond Seller's control and responsibility, the equipment is considered as accepted by the Buyer and the outstanding payment- minus costs not accrued for supervision- shall be become due immediately.

The times and costs stated under the item "(Supervision for) Installation and Commissioning" of the Contract are to be understood as guiding figures only which can be achieved under favourable working conditions. Should the mentioned estimated periods not be kept due to circumstances outside of Seller's control and responsibility, then the costs arising from the exceeded time will be calculated with rates mentioned under the paragraph „OPTIONAL COSTS“. The costs will be accounted to the Buyer according to the actual expenditures accrued.



9. OPTIONAL COSTS

In case installation, training and commissioning at site are exceeded for reasons outside of control of Seller, the following day rates will be charged:

1 day rate for a mechanical engineer	European Unit (EUR)	930,00
1 day rate for an electrical engineer	European Unit (EUR)	980,00
1 day rate for a commissioning engineer	European Unit (EUR)	1.150,00
1 day rate for a generator engineer	European Unit (EUR)	1.200,00

The day rates are based on an actual working day of eight hours for five days a week, from Monday through Friday. For every hour overtime if the working period exceeds the eight hours working day a 50 % surcharge will be applied. For every hour overtime on Saturdays, Sundays and Holidays a 100 % surcharge will be applied.

The above mentioned rates include all labour costs. Travelling time is to be regarded as working time. Travelling costs for air tickets, train, bus or rent car and accommodation costs will be accounted for according to the actual expenses accrued supported by vouchers and documentary evidence. Office space, sanitary rooms, telephone and internet shall be provided by Buyer.

10. OFFICIAL ACCEPTANCE

Immediately after the conclusion of the installation and commissioning the equipment has to be accepted and taken over by the Buyer if the conducted commissioning shows that the Contract is fulfilled according to the terms of the Contract.

In case the plant is ready for operation but some minor works are pending without affecting the commercial operation of the plant, a Provisional Take-over Protocol / Provisional Acceptance Protocol shall be drawn up and signed by the parties, which will allow Buyer to operate the plant. In said Provisional Take-over Protocol / Provisional Acceptance Protocol will be mentioned the pending works and the time period Seller shall finish these minor works.

Once all pending works and performance tests as per Contract have been completed a Final Certificate of Commissioning/Final Acceptance Protocol has to be drawn up in which the parties confirm that the equipment complies with the conditions set forward in the Contract for final take-over, and which states from which date the equipment is taken over. The Final Certificate of Commissioning/Final Acceptance Protocol shall be issued by the supplier and signed by both parties.

If the commissioning and/or an agreed performance test cannot be carried out within three months from the date of the freight document (CMR) for reasons which lie outside of the Seller's control and responsibility e.g. lack of water, grid problems etc. the equipment has nevertheless to be approved and taken over by the Buyer and a Provisional Certificate of Commissioning / Provisional Take-over Protocol shall be drawn up and signed and pending payment shall be released. Nevertheless Seller is obliged to perform the performance test at a later stage prior written notification by Buyer that full flow is available for the test. Any additional cost to be incurred by Seller shall be reimbursed by Buyer.

11. DOCUMENTATION

Within eight weeks after receipt of down payment the Seller will submit outline drawings of the equipment to be furnished together with estimated weights, external forces, anchoring details and



overall dimensions, to facilitate preparation of the structures into which the equipment is to be incorporated.

As final documentation the Seller will submit operation manuals, spare part catalogues, workshop manuals, maintenance instructions, schematic wiring diagrams, general assembly drawings and sub-assembly drawings. The Seller shall furnish the Buyer with the usual erection and installation instructions and the relevant drawings.

In general the documentation is in English language. Translations of documentation in other languages will be charged to the Buyer.

12. PRICES

Prices are expressed in EURO and to be understood as fixed prices during the duration of the contract. However should the steel or copper price increase by more than 5% until end of validity of offer our prices will be adjusted accordingly.

13. TAXES AND BANK CHARGES

The Seller will assume all exportation taxes of material from their country of origin. The Buyer will directly assume all taxes due in his country such as material importation taxes, local taxes; custom duties, port taxes and disembarkation taxes, withholding taxes, fees for working visa and all other taxes related to the present contract. All clearing agent charges for clearing material at the port as well as documentation shall be taken care of by the Buyer. The Buyer will assume all bank fees regarding the opening and confirming of the letter of credit.

14. CHANGE OF RESPONSIBILITY

The Buyer assumes the responsibility of the goods as soon as these have been delivered according to the terms of delivery. Upon arrival of the equipment on the site, the Buyer takes all necessary measures to assure a perfect storing of the equipment and particularly with regard to theft, damages caused, for example, by inclemency, humidity and/or fire, etc. An all risk insurance policy is to be taken out by the Buyer covering delivered material in the amount of total contract value. The Buyer will transmit to Seller the respective insurance certificate before start of installation.

15. LIMITATION OF LIABILITY

The Seller is liable for the fulfilment of its contractual obligations under this contract and only for damages caused by Seller either by wilful intent or gross negligence. The proof of gross negligence is incumbent on the Buyer.

Seller is obliged to maintain a public liability insurance to cover claims for damages on equipment and persons of Buyer and other third parties. Any such claims for damages are subject to a limitation of period of two years after the completion of the commissioning and the amount is limited with the public liability insurance.

Notwithstanding any other provision in this contract the liability is excluded for costs of litigation incurred by the Buyer due to indictments from third parties as well as indirect and consequential damages such as profit loss, interruption of the operation, loss of business information, loss of contracts, loss of production and/or financial losses of any kind whatsoever and whether caused by our breach of contract, tort, breach of statutory duty or otherwise howsoever. The overall liability of the Seller for liquidated damages for delay and performances is limited to the amount equivalent to 5 % of the total



contract price and shall be considered as full and final compensation for delay and deficiencies in performance.

16. WARRANTY

16.1 General Warranty

All goods indicated in the scope of supply by the Seller are warranted to be new, free from defects in workmanship and materials and in conformity with the technical specifications and standards provided in the present contract. The warranty period is 24 months from the date of commissioning or 27 months from the date of readiness of shipment whichever occurs earlier. Extension of warranty period is available at additional costs and upon conclusion of a service contract.

The Buyer has to inspect immediately each delivery upon arrival to check its completeness with regard to the packing list provided and to check if these are free from obvious defects and/or transport damages. Obvious defects and damages shall be reported immediately to the Seller describing in detail the defects / damages.

The warranty applies solely to the arising faults which evidently fall under the Seller's range of responsibility. The Buyer must explain in writing technically-wise and clearly the reasons for request the application of warranty.

Excluded from this warranty are normal wear and tear, improper treatment, defects resulting from inadequate or non-compliance of the instructions in the operation and maintenance manuals, improper installation in the event that the installation has not been executed or not authorized by the Seller, use of equipment outside the design parameters, insufficient lubrication, defects in the foundation, disregard of the Seller's instructions or repairs or additions to the products by Buyer or third parties not authorised by Seller. The warranty will not apply for any circumstances outside one's control.

Any defect under this warranty shall be corrected by the Seller in the fastest possible means. The warranty and/or compensation of damages are fulfilled either by repair or replacement of the defective equipment or by granting a reasonable price reduction at Seller's choice. The warranty is limited to the repair or replacement of damaged equipment at the place where made, or to repair in place equipment proven defective and does not cover consumables such as light bulbs, fuses, oils, lubricants and filters nor all costs incurred to uninstall and/or reinstall the defective equipment as well as cost for transport.

For repairs at site the Buyer will make the plant available at a mutually convenient time and will provide proper access to the plant. The Buyer will also provide free of charge the use of lifting equipment, station power, standard tools and helpers. All other items of equipment and materials required for the repairs shall be furnished by the Seller.

The Seller is free from executing any warranty obligations for the time where either the equipment has not been taken over with a signed Provisional or Final Certificate of Commissioning or the Contract Price has not been paid in full.

16.2 Efficiency and output guarantee

The efficiency values and the outputs, given in the technical specification are guaranteed according to the relevant IEC-Regulation 62006 "Hydraulic machines - Acceptance Tests of Small Hydroelectric Installations". The performance of the equipment is proven by means of reading the power output at generator meter and is shown at the control system.

If an additional efficiency test are to be carried out, the Buyer shall bear the cost for the test. As per IEC-Regulation 62006, the Buyer and the Seller can agree mutually, if required, on one of the prescribed methods to measure the performance of the equipment. The tests must be carried out within the terms of the guarantee and must be arranged and paid by the Buyer. In case of dispute, both parties have the right to refer to the applicable clauses of the relevant IEC-Regulations. A simplified



measuring method can be arranged between the Buyer and the Seller. In case of doubt both parties have the right to consult the relevant IEC-regulations. The third party shall be nominated by mutual agreement.

In case of a the shortfall in efficiency fall short, measured by the method accepted by both parties after deduction of a measuring tolerance of 3 %, the Seller has the obligation and right, within the warranty period, to carry out all required and possible modification to meet the agreed performance values. The Seller shall be released from this obligation if the Buyer has not given him opportunity to analyze and to correct the problem.

Thereafter, and if the Seller is not able to rectify the problem within five months, the Buyer has the right to demand liquidated damages of 1 % of the contract price for each percentage point of shortfall of the middle arithmetical efficiency of the guaranteed limit range of admission ,however not more than 5 % of the Total Contract Price.

16.3 Cavitation guarantee

The runner will be guaranteed against deterioration due to cavitation for a period of 8000 hours of operation or two years after commissioning of the turbine, whichever occurs first, as long as the runner has been operated within the designed limits.

The cavitation pitting evaluation will be made in accordance with the relevant IEC-Regulations 60609 “Cavitation pitting evaluation in hydraulic turbines, storage pumps and pump-turbines”.

Erosion or damage caused by solid particles or sand and corrosion caused by aggressive chemical substances in water or by galvanic or electrolytic action do not fall in the cavitation guarantee.

Under this guarantee the Seller undertakes to repair the resulting damages. All areas where the depth of pitting exceeds 3 mm shall be restored to their original contours by welding with stainless steel and grinding to the damage a smooth surface equal in finish to the adjacent undamaged areas. After repairs of cavitation the Seller agrees that the pitting guarantees are renewed from the date the Buyer agrees that repairs have satisfactorily been completed. In case of local cavitation damage caused or aggravated by any contour errors, the Seller shall make the modifications necessary in the turbine parts to prevent its reoccurrence.

17. FORCE MAJEURE

Should either party be prevented wholly or in part from fulfilling any of its obligations under this contract for reasons of force majeure, such obligation shall be suspended to the extent and for as long as such obligation is affected by force majeure and the party claiming under this section shall be entitled to such an extension of time to fulfil such obligation as may be reasonably necessary in the circumstances.

Such circumstances shall be for example, but not limited to any of the following events: political insecurity, armed conflicts, strikes, lock - out, floods, fire, epidemics, earthquakes, inaccessibility to the site, defective goods of a larger or important piece of work, default on performance by a major sub-supplier and any other phenomenon justified and agreed upon.

Circumstances outside one's control will immediately be notified by registered mail to other party. The date of receipt of said advice, which shall be confirmed by the receiving party, shall be considered the date of notification.

If after ninety (90 days) from the date of notification, the notifying party shall still be prevented, for reasons beyond its control, from performing its obligations under this contract, the parties shall consult



each other with the aim to determine the further course of actions appropriate under these circumstances.

18. CANCELLATION

Cancellation of the contract is possible: (i) when any party substantially breach this Contract and remain in this situation after fifteen days that the other party had claimed to resolve the default, (ii) with the written mutual agreement of both parties; or (iii) foreseen by law.

Should the Buyer decide to cancel the project without fault of the Seller, the Seller shall be entitled to compensation. The Seller shall immediately stop the production upon receipt of the cancellation. In case of insolvency or impending insolvency, Seller has the right to cancel.

If the Buyer decides to suspend the works or any part thereof for a certain period, the Seller shall, upon written order by the Buyer, suspend the progress of the works or any part thereof for such period, and in such manner which he considers necessary and shall, during such suspension, properly protect and secure the work so far as it is necessary. The resulting extra costs shall be paid by the Buyer.

19. COMMUNICATION, MODIFICATIONS

Modifications to this contract and its appendixes shall only be introduced with consent and express approval in writing of both contracting parties.

If modifications cause any additional cost or change in the term of delivery, both parties will discuss such matter and agree in writing the way of payment of the additional costs and the new term of delivery.

Any correspondence, documents, instructions, notices and other communications in connection with this contract shall be made in English language. In case contract will be established in English and local language, the English version will prevail.

The Buyer reserves the right to visit the Seller's factory and witness any examinations as far as it is possible in the workshop. The Seller shall give due notice, approx. 7 days before the execution of any examination. During the inspection and/or the examination the Buyer reserves the right to demand the replacement of the faulty materials or the improvement of the goods according to the specification, in case the goods are not in accordance with the specifications stipulated herein.

Communications shall be notified by e-mail and fax to other party to the following e-mail addresses:

Of the Seller:

a.gugler@guqler.com ; which is property of Mr. Alois Gugler

Fax: 0043-7234-83902

Of the Buyer:

.....; which is property of Mr.....

The date of receipt of said e-mail and fax, which shall be confirmed by the receiving party, shall be considered the date of notification.

20. ARBITRATION

Any dispute arising from the execution of the contract shall be settled amicably by mutual agreement between the two parties. If however the parties fail to agree all disputes arising out of or in connection



with the present contract shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with said Rules and under the application of the Swiss laws. The provisions of the United Nations Convention on contracts for the international sale of goods ("The Vienna Convention") are hereby excluded from the contract. The legal venue of the arbitration will be at the Chamber of Commerce in Zurich, Switzerland. English language shall be applied for arbitration.

21. CONFIDENTIALITY

All drawings, specifications, manufacturing data and other information furnished by Seller to Buyer pursuant to this proposal or any contract resulting from this proposal shall, at all times, remain the sole property of Seller, shall be considered for all purposes confidential proprietary information of Seller and shall be deemed to have been transmitted in confidence on the condition that the same are to be held in strict confidence by Buyer and not to be reproduced, copied or used for any purpose, other than in connection with the use of the equipment or goods specified herein, or for any purpose detrimental to Seller.

22. DOCUMENT PRIORITY

If the documents in the contract contain mutually conflicting terms, the following documents shall apply in the following order:

- a. The contract document.
- b. The tender/offer.
- c. Given technical specifications.
- d. Acknowledged drawings.
- e. The invitation to tender with underlying documentation/the inquiry with underlying documentation.

23. COMING INTO FORCE

The contract shall come into force after its signature.

24. ASSIGNMENT

Neither party shall be entitled to assign in whole or partially this contract without prior written approval by the other party.

This contract consists of (...) pages and it was constituted and signed in two (2) uniform copies – in English language. Annexes/Appendixes attached to this contract are integral part of this contract.

25. VALIDITY OF THE OFFER

This offer is valid until 15th of May 2017.

We have gained extensive experience in the execution of more than 1000 water turbines all over the world for over 96 years.

Yours sincerely,

GUGLER Water Turbines GmbH

Patrick Hamberger