

# water to wire

Electromechanical Specialists for Small & Medium Hydro Power Plants

# **Altman Power**

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# WATER TO WIRE SOLUTIONS FOR HYDRO ELECTRIC POWER PLANT

Technical Collaboration With Gugler Water Turbines GmbH Austria



# About Us

ALTMAN is an aftermarket EPC company having technical collaboration with Gugler Water Turbine GmbH. Altman Power was launched in the Power Sector with the objective to operate as a complete engineering solution provider for small & medium Hydro Electric Projects from concept to commissioning of Electro Mechanical packages. ALTMAN has an established diverse services capabilities strengthened by technical collaboration with GUGLER WATER TURBINES GmbH Austria for undertaking renovation modernization and upgradation contracts in Asian Power Space.

ALTMAN's today is a virtual who's who in the Indian Power sector having established one of the preferred supplier rendering Design, Supply, Manufacture, Erection, Testing and Commissioning of Electro Mechanical Equipments for Small Hydro Power Projects on EPC basis from Concept to Commissioning. We have created a niche for ourselves in the field of Small Hydro Power Sector in India and overseas within a short span of time due to the unmatched quality and on time delivery offered to our customers. Our quest for perfection in our work has earned us accreditations from Assam Power Generation Corporation Limited , Arunachal Pradesh State Electricity Board, Bihar State Hydro Electric power Corporation and Sikkim Power & Energy department to name a few.





# A. Plant Renovation Modernisation & Revamping Services

# Abstract

Altman Power provides a broad spectrum of services designed to bring existing idle power plant assets back to service restoring efficiency performance levels and /or upgrade them to the latest technology. In addition to enhancing service reliability and overall performance, our rehabilitation and upgrading measures help to minimize forced outages and cut on comprehensive downtime costs. Our in-depth site analysis offers an opportunity to identify possible defects affecting the original system performance and tackle them in the context of the project, resulting in enhanced performance. Alongside we aim at equipment life extension and reduced shutdown frequency through retrofitting and modernization measures bringing additional benefits at cost of ownership.

#### **Altman's Range of Services**

- Plant general assessment from initial site survey up to detailed report with recommended solutions
- Repowering of conventional plants
- Replacement of existing equipment
- Plant Recommisioning
- Hybridisation with addition of storage/ integration with renewables
- Modernisation: modifications to improve old equipment's performance and/or reliability and/or extend lifecycle
- Retrofit solutions for equipment upgrades
- Cyber security
- Integrated plant support through remote monitoring
- Customised training

#### How you can benefit from Us

Our strategy is rooted in our belief that Customers should be provided comprehensive, wideranging support to achieve full operational reliability, from each single piece of equipment up to their power plant as a whole. Our Service and Retrofit offering is designed to achieve optimized asset management throughout the entire plant lifespan.

A tailored approach is the foundation of every project we undertake: We bring extensive knowledge of hydro power plant equipment and to our partnerships with Technnological Partner like Gugler Water Turbines Gmbh , added to our experienced teams can handle projects involving Altman's proprietary technology as well as components from other manufacturers.

Our highly qualified staff work in synergy with our Customers to provide all-round assistance with every aspect of the rehabilitation process, from initial site survey through to project completion.



Commitment and competence are core practices in our interaction with Customers as well as in the services we offer. Ensuring a successful delivery of each project through a customer-focused, highlyspecialised approach is our guiding philosophy as we work towards enabling our Customers achieve their goals.

# **Our approach**

Upgrades can have a significant impact on power plant assets turbine-generator and balance of plant equipment. Effective rehabilitation assessments are organized into the following analysis stages:

#### **Initial Plant Survey**

This is the first step of site analysis. It is aimed to collect all available technical information, including reports on malfunction conditions and recurring problems, maintenance and outage records. The survey must include detailed discussion with operation and maintenance staff on past history.

#### Inspection

It consists in a plant walkthrough during normal operation to carry out visual inspections including with measuring instruments. This stage of analysis should also include a performance test establishing a baseline to set the scope of any possible Performance Guarantee and Upgrade Contract.

#### Testing

Its main purpose is to perform an assessment of Plant Conditions and Residual Life by means of NDT, visual/functional/dimensional checks & Electrical Tests of Generator and other Electrical equipment involved in the Rehabilitation project.

Every project must start from an integrated assessment of critical power plant components and systems to provide:

- Comparison between design and upgraded performance
- Knowledge of equipment limitations and explore solutions
- Guidance for operational improvements
- Evaluation of regulatory concerns





Altman's plant assessment covers all of the following areas:

## **Component Evaluation**

#### Turbine

- Turbine parts design & water conducting system
- Flow-accelerated corrosion areas
- Increased operational flexibility/availability/ efficiency
- Guide Vane / Injector Charecterestics
- TWL & Suction Head Limits
- Output and efficiency gains

#### Generator

- Operation during maximum output
- Capability curves and cooling limitations
- Magnetic saturation limits

#### **Balance of Plant**

- Performance of Individual Components
- Plant layout assessment for integration of new components and equipment
- Extension, refurbishment and replacement of the auxiliaries of the power plant
- Fitness for service

#### **I&C - Digital Solutions**

- Instrument monitoring & maintenance solutions
- Control systems upgrading & cybersecurity
- Digitalisation

# **Modelling & Analysis**

Altman Power can carry out a detailed power plant analysis under multiple operational and ambient conditions, incorporating the following elements:

- Original design
- Model calibration to as-is equipment condition
- OEM and model-based upgrade potential for major equipment
- Balance of plant systems and components capability
- Real-time performance monitoring and operational optimization of power plants

# Plant Assessment Report

plant assessment report provides the following evaluations:

• Current vs. upgraded plant performance







- Equipment and operational limitations/recommendations
- Business case development support
- Safety assessment
- Plant residual life assessment

# Detailed descriptions of project examples from our service portfolio can be found in the following specific sections:

Turbine Retrofit Renovation & Modernisation Complete Revamp Plant Upgrade

Landmark project

#### **Myntriang Phase 1&2**



Customer : Assam Power Generation Corporation Limited (Karbi Anglong Assam State , India) Rehabilitation of PHASE 1 & 2 Type: Rehabilitation Type of Contract:

#### **Project Main Characteristics**

• GUGLER FRANCIS-SPIRAL TURBINE with horizontal shaft; runner mounted directly on the Generator shaft; adjustable guide vanes; designed for the following data

#### **Technical data**

- Net Head: = 64 m
- Rated discharge: = 2.8 m3/s
- Turbine output: = 1580 kW

#### **Project Identification & Summary**

- Units were out of service for over 5 years
- Altman carried out dismantling and inspection for two units I & II to find out root cause of failures and subsequently repair and restoration by modification, refurbishment and commissioning.

#### **Major Issues**

- Severe Thrust Failure wear of Thrust collar, Journal Bearing and Thrust Pads
- High Temperature problem at NDE brg
- Altman carried out CFD analysis for Pressure Balancing Calculation to ascertain adequate pressure balancing pipes
- Modification of Pressure balancing system with connection of additional Pressure Balancing pipes and arrangements of continuous monitoring of Pressure at Thrust chamber with trip



• Upgrade of PLC and SCADA automation

#### Performance Improvement Plan that successfully achieved increases in:

- Power Output
- Efficiency
- Availability
- All of the plant Equipment was overhauled and refurbished for Power Plant Lifetime Extension.

#### Rehabilitation works mainly involved:

- Generator
- Turbine Pressure Balancing Retrofits
- Balance of Plant (Lubrication System &OPU)
- Electrical AVR and automation part
- Full Automation through SCADA

#### **Activities at Altman Works**

- 1) Grinding Thrust Collar to design surface finish
- 2) Rebabbitting of thrust pads and journal bearing based on calculation of final dimension of thrust pads
- 3) NDT at affected area (DPT, UT, HARDNESS).
- 4) Dynamic balancing of total rotating bodies
- 5) Indigenous development and manufacturing of critical spares like Labyrinth Seal, Wearing Ring.
- 6) Modification of Lubrication System

#### **Our Capital Overhaul Offering (One Stop Solution to Revive Defects in Old Plants)**

- Major overhaul
- RUNNER REPAIR & BALANCING
- Spare parts supply
- Major Overhaul
- Installation of new excitation system
- Spare parts supply
- NDT, Hydraulic tests
- Supply of a new control system: Distributed Control System (DCS), & SCADA
- Replacement of wearing rings
- Repair of under water parts
- Polishing and truth check of guide vanes
- Repair grinding of shaft gland
- Retrofit of labrynth glands







• Dry Calibration of guide apparatus

#### **Electrical and Automation equipment**

- Excitation transformer replacement
- Machine switch replacement
- Installation of Bus-bar protection
- AT cable replacement











# **B.** Engineering Procurement Construction

Altman Power EPC is featured by in house capability of Turbine manufacturing for Small and Medium Hydro Power Plants with design engineering collaboration with an eminent global leader in small and medium hydro power manufacturer. With our combined design and implementation skill, we propose various alternatives of turbine layouts with high end technology for fully automatic mode with remote dial up in both isolatied and also grid mode making total water to wire solution.

## **Francis Turbine**

Francis turbine is an inward flow reaction turbine, which combines radial and axial flow concepts. In Francis turbines, water comes to turbine under immense pressure water and its energy is extracted by turbine blades.

Power : 200 kW to 15000 kW Head : 20 m to 250 m Maximum efficiency: 93%





# **Pelton Turbine**

Pelton turbine is a water impulse turbine. Pelton wheel extracts energy from impulse of moving water. Water flows along the tangent to path of Runner. Pelton turbines are widely used throughout the world for high head hydro sites and especially suited for very low flow.

Power	: 200 kW to 25000 kW
Head	: 50 m to 1000 m
Diameter	: 0.3 m to 2.4 m
Jet	: 1 to 6



# **Horizontal Double Jet**





# Kaplan Turnine

Kaplan turbine is an inward flow reaction turbine, where water changes pressure, as it is moves through the turbine and give up its energy. Power is recovered from both

Power : 250 kW to 15000 kW Head : 1.5 M to 38 M Diameter: 500 mm to 4500 mm

Vertical Four Blades



Horizontal Tubular





# CONDITION MONITORING INSTRUMENTATION

#### COMPLETE SOLUTION OF SCADA AND PLC FOR THE POWER PLANTS

### Accomplishments

#### EPC

- Design, Engineering, Supply, erection, testing and commissioning of Electro- mechanical component of 2X400 kW Bogdang MHS of Ladakh Renewable Energy DevelopmentAgency. Targeted Commissioning on Nov' 2021
- Design, Engineering, Supply, erection, testing and commissioning of Electro- mechanical component of 2X250 kW Tsati MHS of Ladakh Renewable Energy DevelopmentAgency. Targeted Commissioning on June' 2021
- Design, Engineering, Supply, erection, testing and commissioning of Electro- mechanical component of 2X300 kW Henache MHS of Ladakh Renewable Energy DevelopmentAgency. Targeted Commissioning on July' 2021
- Design, Engineering, Supply, erection, testing and commissioning of Electro- mechanical component of 2X400 kW Chalunkha MHS of Ladakh Renewable Energy Development Agency. Targeted Commissioning on Nov' 2021
- Design, Engineering, Supply, erection, testing and commissioning of Electro- mechanical component of 2X800 kW TaksangGomphaNallah MHS of Hydro Power Development Corporation Arunachal PradeshLimited.
- Design, Engineering, Supply, erection, testing and commissioning of Electro- mechanical component of 2X1700 kW Taksang Chu MHS of Hydro Power Development Corporation Arunachal PradeshLimited.
- Design, Engineering, Supply, erection, testing and commissioning of Electromechanical component of 2X500 kW GhatteKhola MHS, Nepal ofGGSUHEP. Supply & Manufacturing has started.
- Design, Engineering, Supply, erection, testing and commissioning of Electro mechanical component of 2X775 kW Gadi Gad MHS, Nepal of SPNPL.





#### **COMPLETION CERTIFICATE**



#### **AUTHORISATION CERTIFICATE**

<b>GUGIER</b>	
TECHNOLOGY FOR HYDROPOWER PLANTS	
	GUGLER Water Turbines GmbH Gewerbeweg 3
ALTMAN POWER LLP	A-4102 Goldwörth - AUSTRIA tel: 0043-7234-83902 fox: 0043-7234-83902-20
DD12, 1363, Rajdanga Main Rd, Kolkata West Bangal India	email: info@gugler.com www.gugler.com
Zip: 700107	Our reference: ag
Attn: U Basu Roy Vice President (Hydro Business Unit)	548. 20.00.2010
	"To whom it may concern"
Ref: Authorization letter	
Dear Mr.Basu Roy :	
In my function as Managing Director of the company GL domiciled at Gewerbeveg 3. 4102 Goldwörth-Austia, re water turbines (Francis, Kaplan, Pelton) up to 25 MV p elector-mechanical equipment for hydropower plants, I I intention to cooperate with the company Altman Power Rajdanga Main Rd, Kolkata, West Bengal, India on new for renovation, modernization and upgradation of existin	JGLER Water Turbines GmbH, enown supplier of all types of er unit as well as all required hereby confirm our interest and LLP, domiciled at DD12, 1363, hydropower projects as well as g hydropower stations.
Messr. Altman Power is hereby authorized to market an	d offer our products in India.
Look forward to a successful cooperation with you.	
Sincerely yours,	
GUGLER WATER TURBINES GmbH	
for the	
Alois Gugler Managing Director	
Bank: BAWAG Linz + BLZ: 14000 + Konto-Nr.: 46710-002-711 + IBAN: 47701400	046710002711 - SwifiBIC: BAWAATWW
Sitz der Gesellschaft: Goldwörth - Landesgericht Linz FN 266501p	- UD Nr. ATU61929444



## **Renovation Modernisation and Revamping**

- Renovation & Modernization of 2X1.5 MW Francis Type Units make Gugler, Austria , at Myntriang -II Hydro Power Project under APGCL, Assam, India. Commissionged successfully.
- Renovation & Modernization of 2X3 MW Francis Type Units make Gugler, Austria, at Myntriang -I Hydro Power Project under APGCL, Assam,India.Job has started.

#### **Altman Teams Accomplishment in the Past**

- Erection, testing & commissioning of 2X50 MW Hydro Turbine (Vertical Francis) at arbiLangpi HEP, Govt. of Assam under FUJI Electric, Japan..
- Overhaul & Maintenance for R & M of 2 x 35 MW Periyar Hydro under Tamil Nadu Electricity Board under VA Tech Hydro Ltd.
- Overhaul & Maintenance for R & M of 3 x 20 MW Maithon Hydroelectric Power Project under DVC.
- Renovation & Modernization of 3X9.0 MW Jaldhaka Stage-I Hydel Project, West Bengal Stateelectricity.
- Renovation & Modernization of 2X2.0 MW Massanjore Hydro Electric Project, West Bengal State Electricity,India
- Overhauling & Maintenance of 3X2.8 MW Umtru Hydro Power Project, Meghalaya State Electricity Board, India.
- Overhauling & Maintenance of 3X5.0 MW Valmikinagar Hydel Project under BHSPC, Fuji make, Horizontal bulbturbine.



# **TURNKEY SOLUTIONS FOR HYDRO POWER PROJECT**



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