

Compact Hydro



ANDRITZ HYDRO

Worldwide leader in hydropower business



The ANDRITZ GROUP is a global market leader for customized plant, process technologies and services for the hydropower, pulp and paper, metals, and other industries (solid/liquid separation, feed and bio-fuel). The Group is headquartered in Graz, Austria and has a staff of approx. 13,000 employees worldwide. ANDRITZ operates more than 150 production sites, service and sales companies all around the world.

In a world trying to join forces to reduce emissions of greenhouse gases and pollution, we in ANDRITZ HYDRO support our customers in their environmental efforts by providing technologies that maximize generation of energy from hydropower.

Hydropower is the most important renewable resource of energy by far. According to the IEA (International Energy Agency), only one third of realistic hydropower potential has been developed and so, a large amount of new hydropower projects are to be expected in the future.

ANDRITZ HYDRO is one of the worldwide leaders in the supply of electromechanical equipment and services 'From water to wire' for hydropower plants. Our range of products and services cover the supply of equipment and services for new hydropower plants as well as for the refurbishment and overhaul of existing facilities. ANDRITZ HYDRO is the global leader in the market of small hydropower stations.

One of our goals is to provide innovative technology for the best return on investment and benefit to our customers. ANDRITZ HYDRO is constantly improving the energy efficiency of its equipment and technologies through continued Research & Development.

Our commitment to serve our customers locally all around the world and our proven experience and state-of-the-art technologies are reasons why you can be assured to obtain the best energy application from us.

Highlights

- More than 170 years of experience in turbines, which represents over 30,000 units with more than 400,000 MW installed
- More than 120 years of experience in electrical equipment
- Complete range up to 800 MW
- Leading in service and rehabilitation
- World leader for small hydropower plants

COMPACT HYDRO

The best solution up to 30 MW

Based on the experience and know-how gained through intensive Research & Development activities for hydropower plants, ANDRITZ HYDRO has developed a modular design concept for the equipment to be included in small hydropower plants.

COMPACT HYDRO provides solutions with products and services for all types of small hydro power plants up to an output of 30 MW per unit including complete electro-mechanical installation ('From water to wire').

The modular design by COMPACT HYDRO minimizes the number of components and sizes, covering all types of turbines with a wide range of applications. It also allows an economic development of small hydro power potentials with power houses perfectly fitting into the landscape.

Highlights

- Clean and renewable energy
- Low environmental impact
- Modular equipment design
- Single source of supply
- Workshop assembly
- Short periods of implementation
- Low investment cost
- Optimized annual energy production

All these characteristics improve your return on investments.

Every week, another two COMPACT HYDRO units start producing energy somewhere around the world.

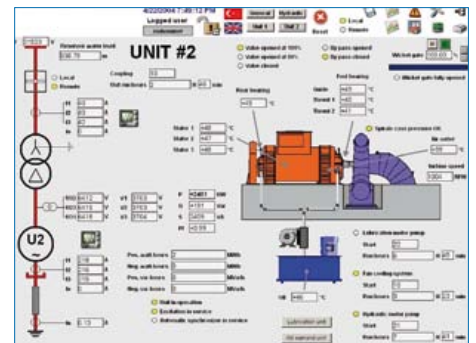
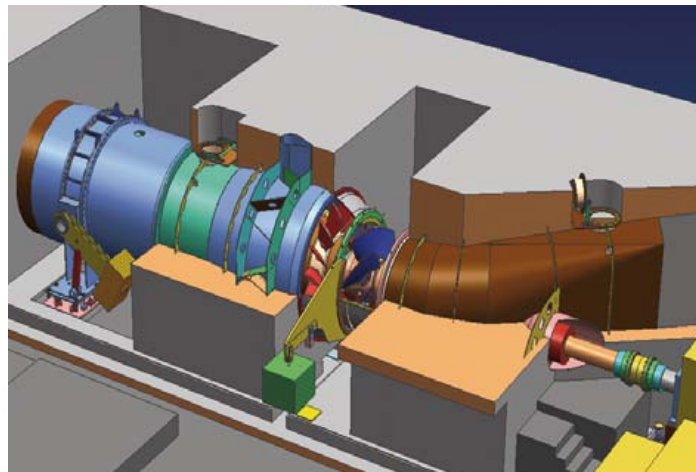


From water to wire

COMPACT HYDRO's 'From water to wire'-concept covers the electromechanical equipment including turbine, gear, generator, inlet valve, control-protection-measuring systems as well as complete mechanical and electrical balance of plant equipment.

Highlights

- Single source responsibility
- Simplification of interfaces
- Short total installation time
- Short commissioning time
- Only one software and hardware solution for the unit
- Single source training of customer's operating personal

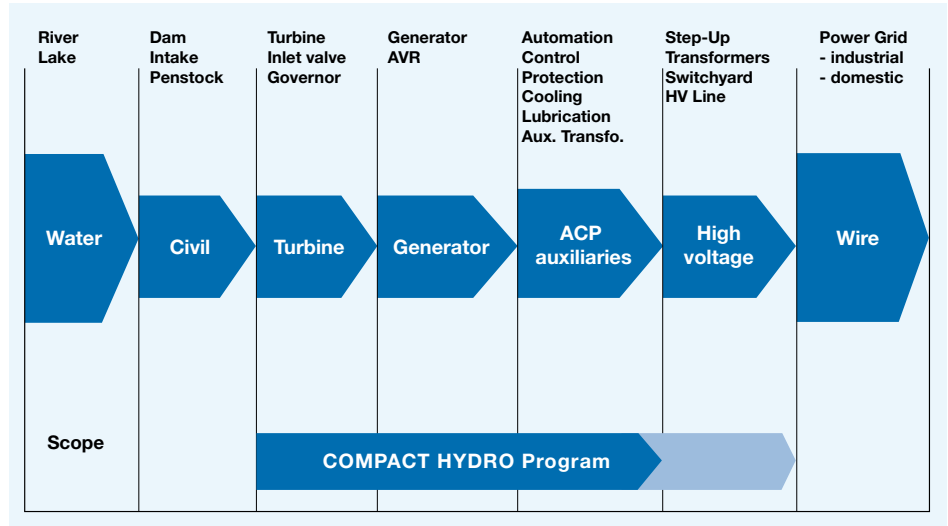


Services

Customers consulting services begin at the project feasibility stage with support continuing throughout the implementation phase and training of the operators.

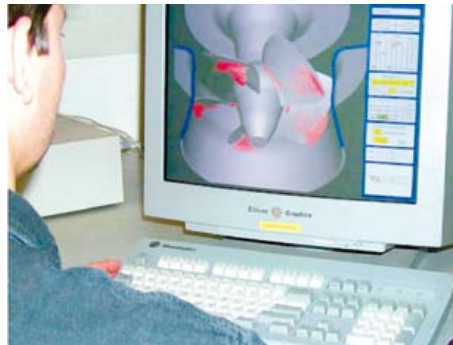
ANDRITZ HYDRO is bound to advise customers competently and handle their projects with particular care.

COMPACT HYDRO solutions are complemented with a wide range of services such as project management, engineering, manufacturing, quality control, transport, installation, commissioning and training.



Project management

We take care of the contract progressing considering our customer's specific needs. We provide project management expertise used to develop teamwork with customers and consulting engineers.



Layout optimization

We provide solutions for the layout of the plant to optimize the number and type of units, plant capacity, annual energy production, dimensions of the power plant and many other parameters.



Quality

For us, quality is the priority. All our sites around the world are qualified to ISO 9000 and handle their projects taking particular care to monitor the results of each phase of progress.

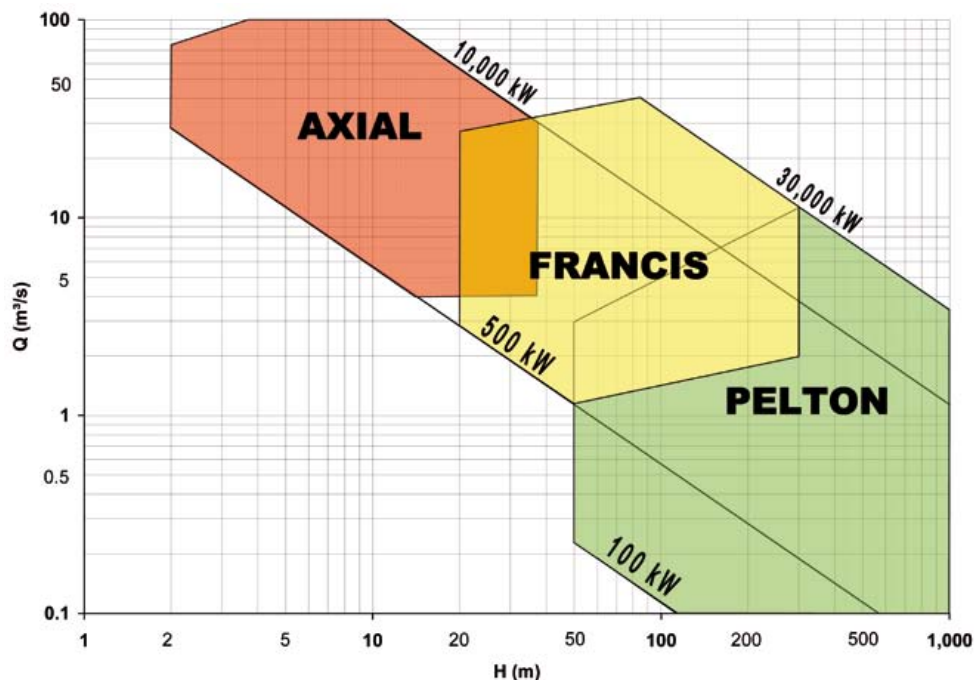
Products

Single source solution

Our COMPACT HYDRO program covers a wide application range with different arrangements. Due to the modular design special concepts have been developed resulting in optimized energy production, short delivery times, reduce site erection based upon workshop pre-assembling and minimizing civil construction costs.

Application range

Head	H	up to	1,000 m
Flow	Q	up to	100 m³/s
Output	P	up to	30 MW



Pelton Turbines

Technical data:

- Head up to 1,000 m
- Output up to 30 MW

We provide a full range of Pelton units to match all high-head applications:

- Horizontal axis with 1 to 3 nozzles
- Vertical axis with 2 to 6 nozzles
- Inner or outer actuated nozzles



Francis Turbines

Technical data:

- Head up to 300 m
- Output up to 30 MW

We can meet all specific requirements with customized units based on an extensive set of modules including:

- Single or double discharge runners
- Horizontal or vertical axis
- Spiral or flume intakes



Axial-Flow Turbines

Technical data:

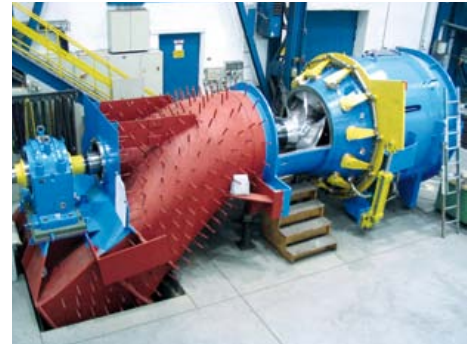
- Head up to 35 m
- Output up to 10 MW

Our program includes:

- 3 to 6 bladed runners
- Double or single regulated
- Horizontal, inclined or vertical axis

The complete range is covered:

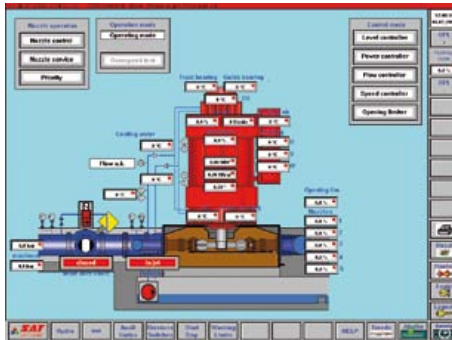
- Belt driven
- Bevel gear driven
- Bulb
- ECO Bulb™
- PIT
- Spiral case or semi spiral case Kaplan
- S-Type
- CAT



Electrical equipment

Following the modular concept of the mechanical equipment, we also implement the same approach with the electrical balance of plants:

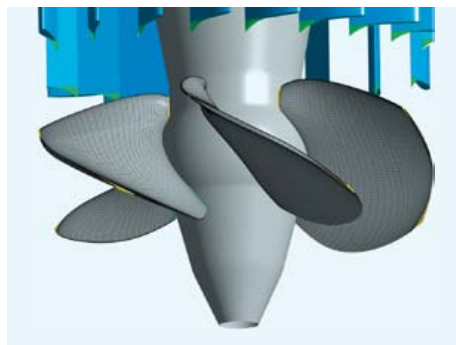
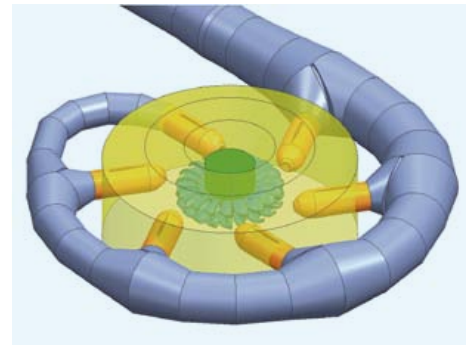
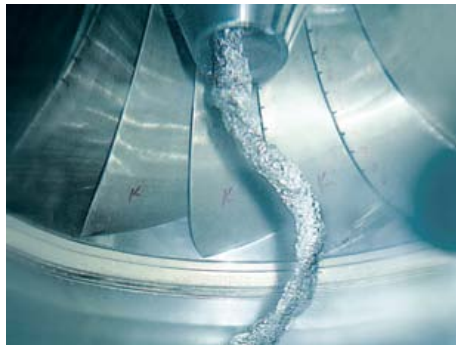
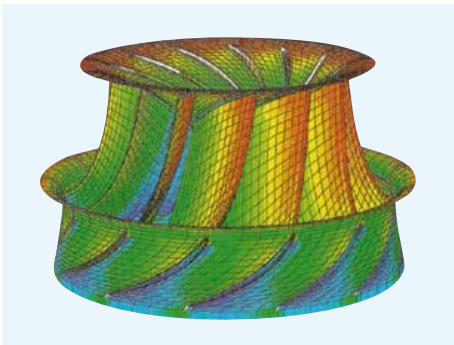
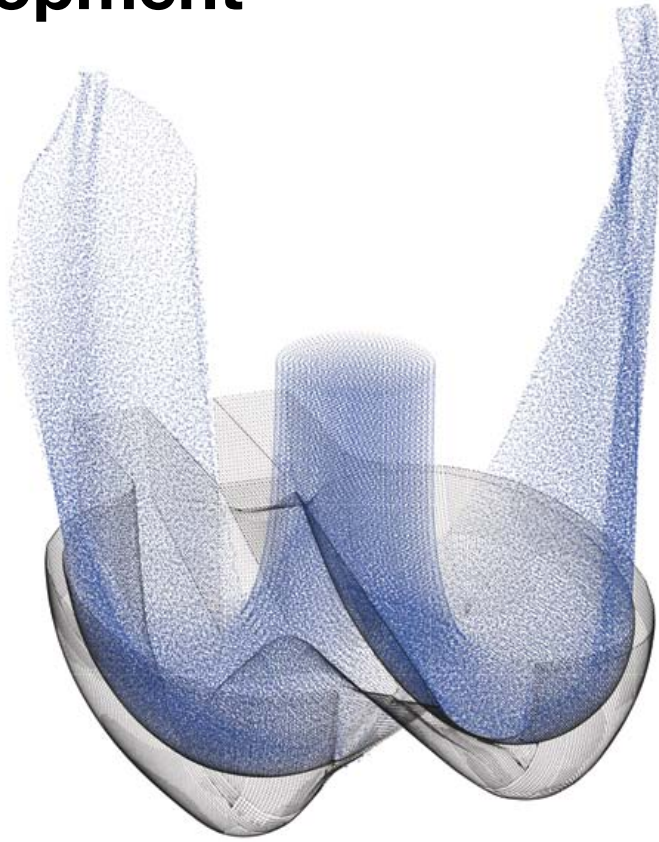
- Generators with AVR
- Control-protection-measuring system
- Digital turbine governor
- SCADA
- AC-DC distribution
- Auxiliary transformer
- LV and MV-switchgear
- Main transformer



Research & Development

Our efforts in research & development keep us at the front line of innovation to offer our customers maximum user benefit.

Research findings from our model test laboratories, numerical flow simulation, electronics and electro technology innovations are all combined into optimal overall solutions. It is this comprehensive approach to product innovation which keeps the COMPACT HYDRO range on the forefront of technology.



In harmony with nature

In the face of gradual global warming and increasing environmental pollution, nations worldwide have joined forces to reduce emissions of greenhouse gases. These are considered as a possible cause of climate change and measures to curb the use of scarce commodities are to be implemented.

As an environmentally friendly and renewable energy source, hydropower is increasingly becoming a focal point of global interest. For general public acceptance today, hydroelectric power plants must unquestionably meet environmental and water protection requirements.

Hydropower is the leading source of renewable energy, supplying the world with about one-fifth of its electricity. It is clean, leaves behind no waste, and neither emits pollutants nor significant amounts of dangerous greenhouse gases. Every kWh generated from hydropower compared to fossil sources of energy prevents about one kilogram of CO₂ emission.

We strongly commit to the sustained protection of the environment in parallel with economic growth and social progress.

COMPACT HYDRO plants harmonize optimally with the environment also in areas where landscape protection takes priority.



Ecology-oriented

Our COMPACT HYDRO ranges proves that water power can become even more environmentally compatible. Our latest designs pay particular attention to eliminating water pollution.

The global world leader in COMPACT HYDRO



UMBATA HPP, Canada
2 Axial S-Type
 $D_1 = 2,200$ mm
 $P = 2 \times 11.7$ MW, $H = 34.1$ m



LAS VACAS II HPP, Guatemala
2 horizontal 3 nozzle Pelton
 $D_1 = 1,310$ mm
 $P = 2 \times 10.7$ MW, $H = 285.6$ m



IRARA HPP, Brazil
3 horizontal Francis
 $D_2 = 1,650$ mm
 $P = 3 \times 10.5$ MW, $H = 31.5$ m



ELANDSRAND HPP, South Africa
1 horizontal 2 nozzle Pelton
 $D_1 = 675$ mm
 $P = 3.8$ MW, $H = 620$ m

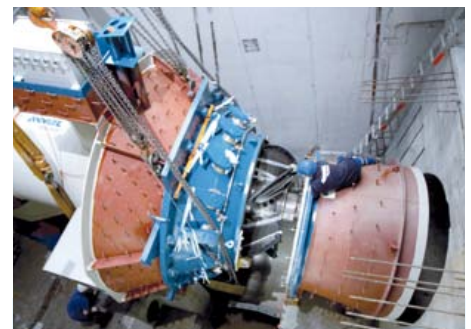


LAMAS IV HPP, Turkey
2 vertical 5 nozzle Pelton
 $D_1 = 1,210$ mm
 $P = 2 \times 10.8$ MW, $H = 325$ m



**KRIEBSTEIN HPP,
Germany**

2 Axial CAT vertical
 $D_1 = 1,600 \text{ mm}$
 $P = 2 \times 3.7 \text{ MW}, H = 22.8 \text{ m}$



**GSTATTERBODEN
HPP, Austria**

1 Axial Bulb
 $D_1 = 1,950 \text{ mm}$
 $P = 2.0 \text{ MW}, H = 9.4 \text{ m}$



**ELEOUSSA HPP,
Greece**

2 Axial PIT
 $D_1 = 3,150 \text{ mm}$
 $P = 2 \times 3.3 \text{ MW}, H = 5.7 \text{ m}$



**SAMAL HPP -
India**

5 Axial S-Type
 $D_1 = 2,800 \text{ mm}$
 $P = 5 \times 4.8 \text{ MW}, H = 11.8 \text{ m}$



**THAC TRANG HPP,
Vietnam**

2 horizontal Francis
 $D_2 = 663 \text{ mm}$
 $P = 2 \times 3.0 \text{ MW}, H = 115 \text{ m}$

