

HPP



TURNING WATER
INTO POWER

HPP

Company Profile



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HPP IN FEW KEY FIGURES

- | **115** Years of history
- | **300** Power stations installed in **40** countries
- | **500** MW of generation installed
- | **1** Manufacturing plant in **France**
- | **30** Employees
- | **22** Country representatives
- | **15 to 20** Projects per year
- | **100 % Hydro Expert**



Private investors

HPP

TURNING WATER
INTO POWER

TURBINES



elléo

TURNING WATER
INTO POWER

HYDRO SCREWS

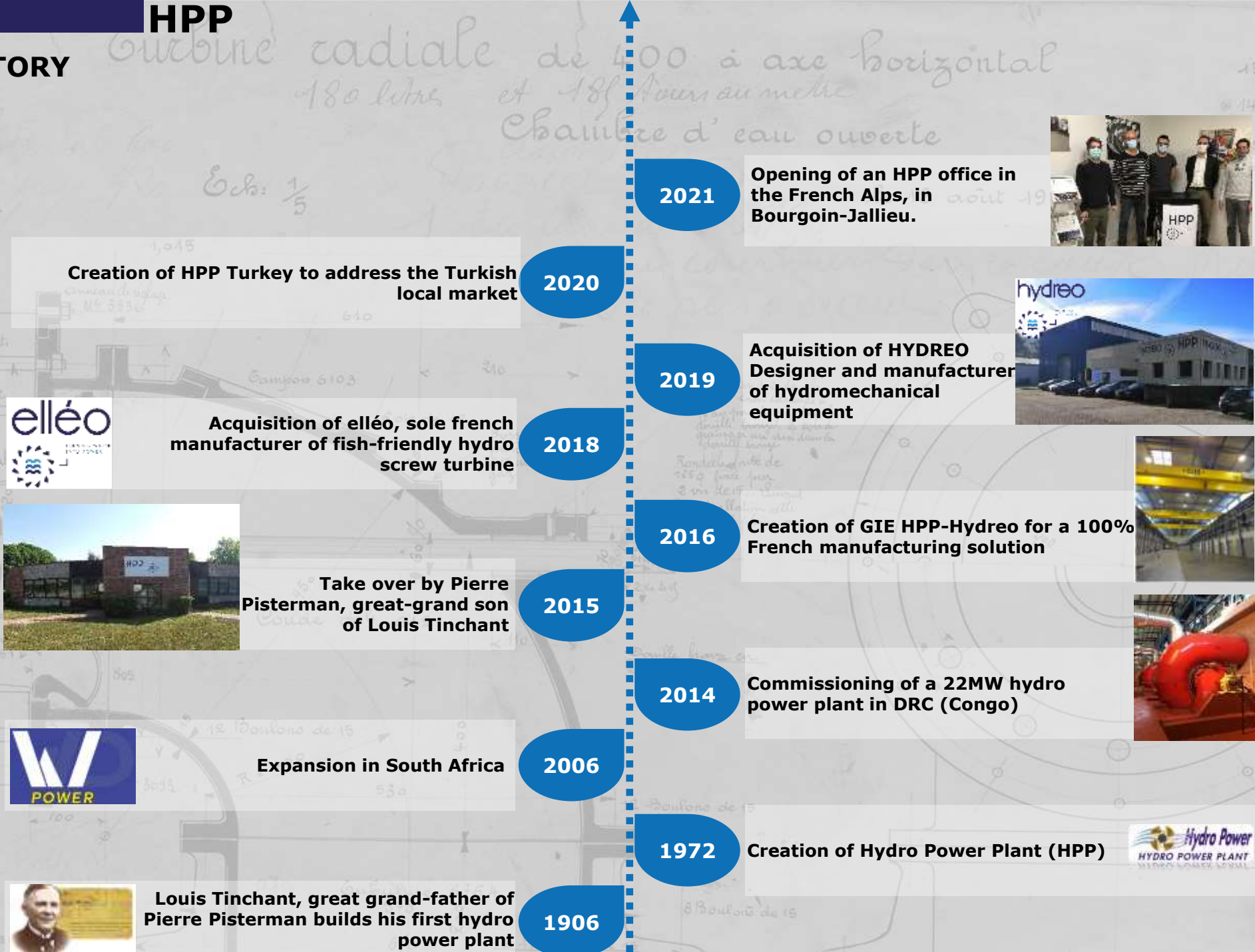
hydreo

WORKING
WITH WATER

HYDROMECHANICS

From « **Water to Wire** », HPP is a leading French manufacturer and supplier for hydro generating and hydro-mechanical equipment for small to medium hydro power plants.

*Greenfield, power upgrade, refurbishment, HPP is **your relevant partner** for a long term relationship: hydro turbines, but not only...*



***HPP has a unique goal: provide a reliable and performing solution:
EVERY kWh COUNTS !***

Design

HPP know-how is focused on:

- ✓ **Kaplan** turbines
- ✓ **Francis** turbines
- ✓ **Pelton** turbines
- ✓ **Cross-flow** turbines
- ✓ **Hydro screws**

from 5 kW to 15 MW per unit

Manufacturing

HPP has its manufacturing facility in France with 4500 m² and 100 tonnes of lifting capacity

HPP has a strict quality control policy

HPP is certified

- ✓ **ISO 9001:2015**
- ✓ **ISO 14001:2015**
- ✓ **ISO 45001:2018**

Installation & Commissioning

HPP supervises every step from component delivery to commissioning

HPP has a skilled assembly team

HPP ensures all follow-up and associated quality control

HPP provides a full training program

Services

HPP offers a range of services that extends far beyond turbine supply

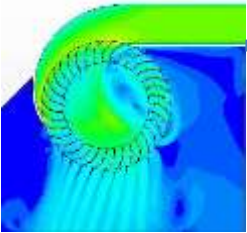
- ✓ Feasibility studies
- ✓ Consulting
- ✓ Refurbishment
- ✓ Runner's replacement
- ✓ Power upgrade
- ✓ Operation and maintenance



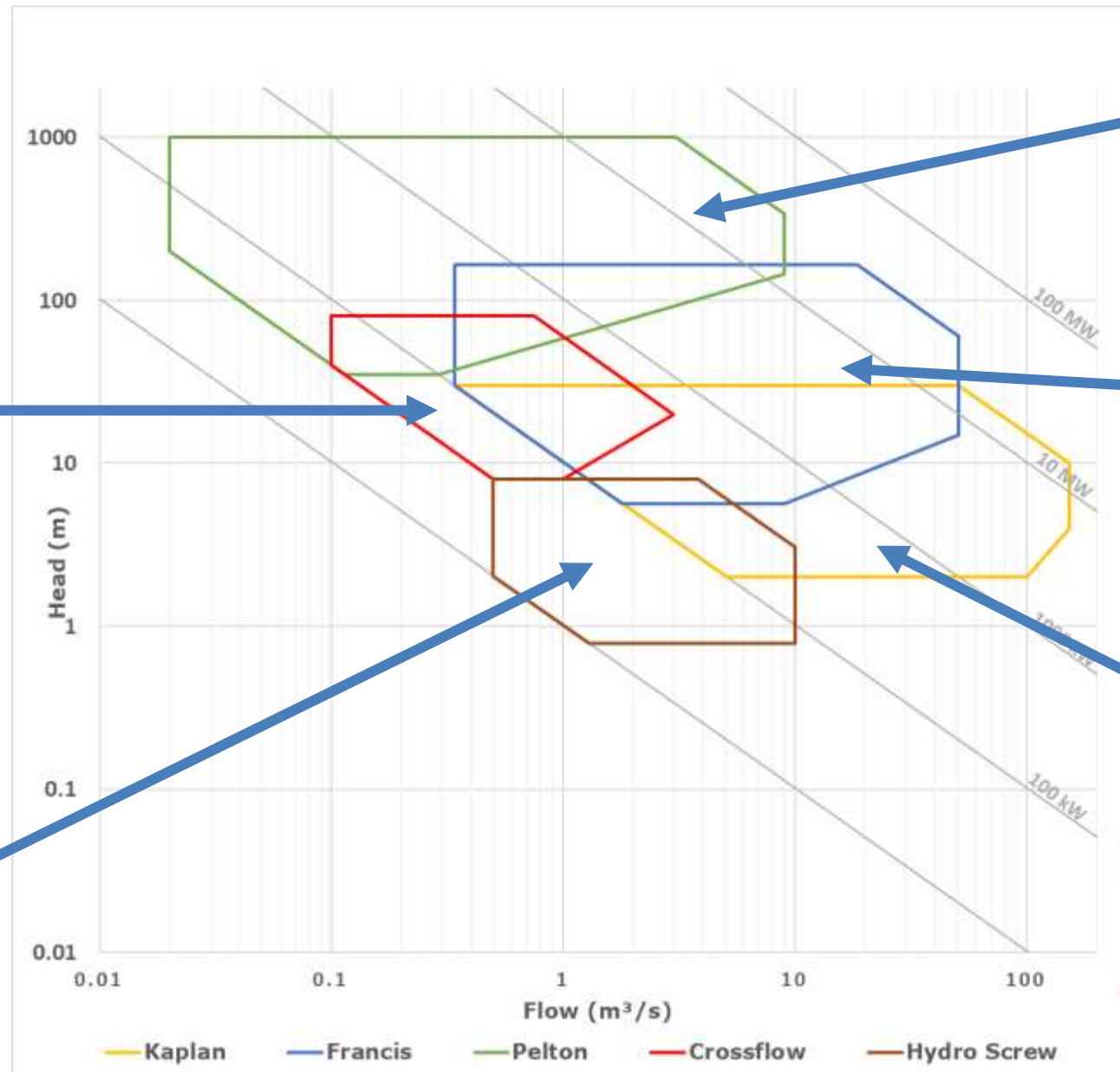
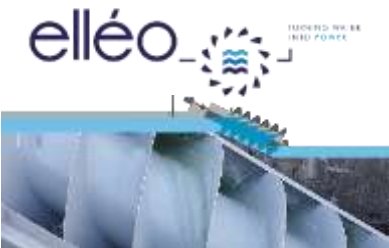
EXPERTISE

- ✓ HPP designs and manufactures hydroelectric turbines from **5 kW** to **15 MW per unit**.
- ✓ HPP supports its customers towards the best turbine choice for their hydroelectrical power plant, taking into account all the technical and economic parameters.

Crossflow



Hydro Screw



Pelton



Francis



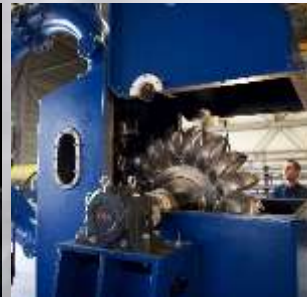
Kaplan



- | Power : from 20 kW to 15 MW per unit
- | Rated net head : from 25 m to 1000 m
- | Runner diameter : from 300 mm to 3000 mm
- | Number of jets : from 1 to 6

HPP Pelton runners can achieve more than 91.5% efficiency

- | Vertical
- | Horizontal
- | Cantilever / Separated shaft line
- | Double
- | 100% Inox
- | Drinking water systems



**TURBINE
DESIGN**

**CIVIL WORKS
DESIGN**

**MANUFACTURING
FOLLOW-UP & QUALITY
CONTROL**

**INSTALLATION
FOLLOW-UP &
SUPERVISION**

**COMMISSIONING
CONTROL, QUALITY, TESTS &
TRAINING**



SAMPLE PROJECTS

PROJECT 1224 – AFRICA

- Rated net head: 240 m
- Flow rate per turbine: 3.5 m³/s
- Turbine: Horizontal 3 jets Pelton
- Pelton diameter: 1490 mm
- Rotation speed: 428 rpm
- Plant capacity per turbine: **2 x 7500 kW**
- Off-grid

PROJECT 1146 – MIDDLE-EAST

- Rated net head: 440 m
- Flow rate per turbine: 0.60 m³/s
- Turbine: Horizontal 2 jets Pelton
- Pelton diameter: 1150 mm
- Rotation speed: 750 rpm
- Plant capacity: **2 x 2250 kW**

PROJECT 1413-2 – SCOTLAND

- Rated net head: 71.15 m
- Flow rate: 0.87 m³/s
- Turbine: Vertical 6 jets Pelton
- Pelton diameter: 675 mm
- Rotation speed: 500 rpm
- Plant capacity: **550 kW**

SAMPLE PROJECTS

PROJECT 1380 & 1512 – FRANCE

- Rated net head: 123.12 m & 93.5 m
- Flow rate per turbine: 1.5 m³/s & 1.65 m³/s
- Turbine: vertical Pelton 5 jets
- Pelton diameter: 885 mm & 913 mm
- Rotation speed: 500 rpm & 428 rpm
- Plant capacity: **2 x 1500 kW & 2 x 1300 kW**

PROJECT 1313 – FRANCE

- Rated net head: 415 m
- Flow rate per turbine: 1.05 m³/s
- Turbine: vertical Pelton 3 jets
- Pelton diameter: 837 mm
- Rotation speed: 1000 rpm
- Plant capacity: **3900 kW**

PROJECT 1633 – FRANCE

- Rated net head: 80.4 m
- Flow rate per turbine: 0.47 m³/s
- Turbine: vertical Pelton 4 jets
- Pelton diameter: 614 mm
- Rotation speed: 600 rpm
- Plant capacity: **340 kW**

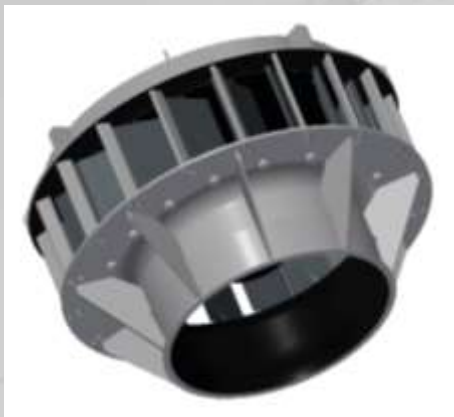
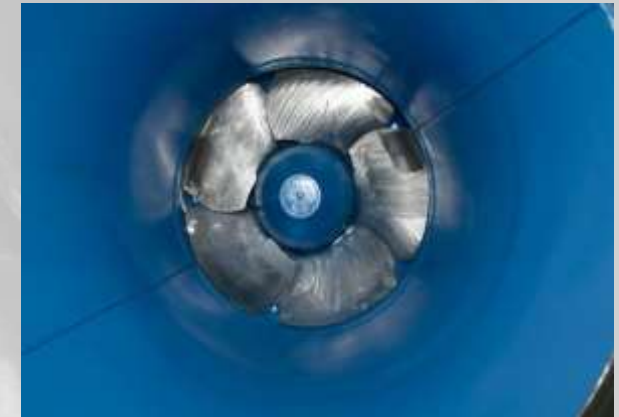


KAPLAN EXPERTISE

- | Power : from 100 kW to 10 MW per unit
- | Rated net head : from 1.5 m to 35 m
- | Runner diameter : from 500 mm to 5000 mm

HPP Kaplan runner can achieve more than 94% efficiency

- | Vertical shaft
- | Horizontal shaft
- | Pit
- | Bulb
- | Syphon
- | Inclined
- | Elbow / S-type
- | Single regulated / Double regulated
- | Drinking water systems



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SAMPLE PROJECTS

PROJECT 982 – SOUTH AFRICA

- Rated net head: 15.34 m
- Flow rate per turbine: 30 m³/s
- Turbine: Horizontal double regulated pit Kaplan
- Runner diameter: 2500 mm
- Rotation speed: 200 rpm
- Plant capacity : **3 x 4000 kW**

PROJECT 1326 – FRANCE

- Rated net head: 11 m
- Flow rate: 15 m³/s
- Turbine: Horizontal double regulated S-type Kaplan
- Runner diameter: 1650 mm
- Rotation speed: 300 rpm direct drive
- Plant capacity: **1450 kW**

PROJECT 1054 – FRANCE

- Rated net head: 9 m
- Flow rate: 12 m³/s
- Turbine: Vertical single regulated Kaplan
- Runner diameter: 1600 mm
- Rotation speed: 272 rpm direct drive
- Plant capacity: **850 kW**



FRANCIS EXPERTISE

- | Power : from 50 kW to 15 MW per unit
- | Rated net head : from 15 m to 250 m
- | Runner diameter : from 200 mm to 2000 mm

HPP Francis runners can achieve more than 94% efficiency

- | Vertical shaft
- | Horizontal shaft
- | Double Francis
- | Cantilever / Separated shaft line
- | Spiral casing
- | Open-flume
- | Drinking water systems



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SAMPLE PROJECTS

PROJECT 1481 - FRANCE

- Rated net head: 31.5 m
- Flow rate: 1.55 m³/s
- Turbine: Horizontal Francis
- Runner diameter: 550 mm
- Rotation speed: 750 rpm
- Plant capacity: **400 kW**

PROJECT 792 – MADAGASCAR

- Rated net head: 31 m
- Flow rate per turbine: 10 m³/s
- Turbine: Vertical Francis
- Runner diameter: 1380 mm
- Rotation speed: 375 rpm
- Plant capacity: **2 x 3000 kW**

PROJECT 889 - AFRICA

- Rated net head: 58 m
- Flow rate per turbine: 11 m³/s
- Turbine: Double horizontal Francis
- Runner diameter: 2 x 960 mm
- Rotation speed: 600 rpm
- Plant capacity: **4 x 5400 kW**
- Off-grid



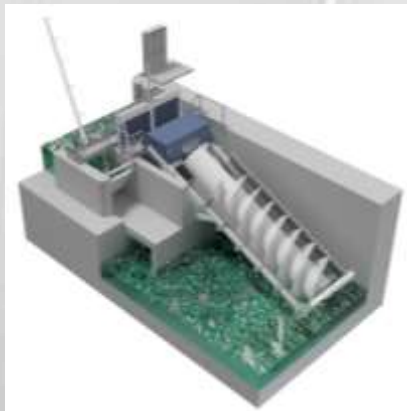


- | Power : up to 150 kW per unit
- | Rated net head : up to 10 m
- | Flow maximum : 10 m³/s par unit
- | Diameter : until 4500 mm

Elléo hydrodynamic screws can achieve more than 82% efficiency

- | Concrete anchored trough
- | Self-supporting trough
- | Series-mounted screws
- | Parallel-mounted screws
- | Ecological flow usage

FISH-FRIENDLY!



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SAMPLE PROJECTS

**PROJECT E098 - Hydrostadium (EDF) in Chavaroché**

- Rated net head: 4.10 m
- Flow rate: 2.75 m³/s
- Diameter: 2800 mm
- Plant capacity: **82 kW**

PROJECT E184 - Decommissioned locks from Rhône to Rhin : 5 power plants

- Rated net head: between 2.1 m and 2.8 m
- Flow rate: from 1.9 to 3 m³/s depending on the locks
- Diameter of the 5 Archimedean screws:
 - ✓ 1 x 2300 mm
 - ✓ 4 x 2800 mm
- Plant capacity: **between 36 and 55 kW**

PROJECT 1955 – Moulin (France)

- Rated net head: 2.2 m
- Flow rate: 2.1 m³/s
- Diameter: 2200 mm
- Plant capacity: **37 kW**



GENERATOR AND ALTERNATOR



- | Grid connected
- | Off-grid – Islanded grid – Auto-consumption
- | Black Start

The generator is a key component which transforms mechanical energy into electrical energy.

Specified by HPP in accordance with the turbines parameters, it is selected following rigorous requirements amongst major suppliers.

- | Synchronous - Asynchronous
- | Permanent magnets – Cylindrical rotor – Salient poles
- | Horizontal – Vertical
- | From 0.4 kV to 13 kV
- | 50 Hz – 60 Hz – Variable speed
- | Low-speed – High-speed – from 60 to 1500 rpm
- | With or without hydraulic thrust



**AUTOMATION SYSTEM &
ELECTRICAL EQUIPMENT**

- | Local control – Remote control
- | Grid connected
- | Off-grid

All automation and control systems are designed entirely by HPP and manufactured in France with equipment from world-class suppliers (ABB, Schneider, Siemens, Allen-Bradley). All equipment high and low voltage are manufactured from major suppliers.

- | Monitoring & control and protection cabinets
- | Human Machine Interface - HMI
- | SCADA
- | Data historization
- | Remote operations
- | Predictive maintenance

- | Low voltage: 400V / 690V
- | High voltage protection: 3kV / 6.6kV / 11kV / 24kV / 33kV
- | Protection relays
- | Transformers: power and auxiliaries
- | Lightning arrester panels
- | Measuring / Metering system (CT and VT)





Hydreo, affiliate of HPP, is the French specialist of **hydro-mechanical** and intake equipment for weir and hydro power plants.

Successor of the extensive know-how from the Establishments G.Viry, Hydreo draws **more than half a century of experience** on turbines and hydro-mechanical equipment design and manufacturing.

Hydreo in few key figures:

- ✓ 50 years of experience in technical hydro-mechanics (former Ets Viry)
- ✓ Design, manufacturing, installation and commissioning **100% French**
- ✓ A technical and specialized engineering design office
- ✓ A 4500 m² facility featuring:
 - A metal-welding workshop,
 - A machining workshop (milling, turning)
 - An assembling and testing workshop
 - A paint shop
 - 100 tonnes of lifting capacity
 - 9 meter under hook

HYDROMECHANICS:

- | Trash racks – Trash racks cleaners – Protection log boom
- | Flap gates – Radial gates – Slide gates – Sluice gates
- | Stop logs
- | Pressure relief valves (PRV)
- | Actuation systems: Hydraulic – Electric



HPP : EQUIPMENT AND SERVICES SUPPLIER

Feasibility Study

- | Site identification / Appraisal
- | Layout proposition (civil works - turbine)
- | Economic estimate (CAPEX, OPEX)
- | Pre-feasibility / Feasibility report

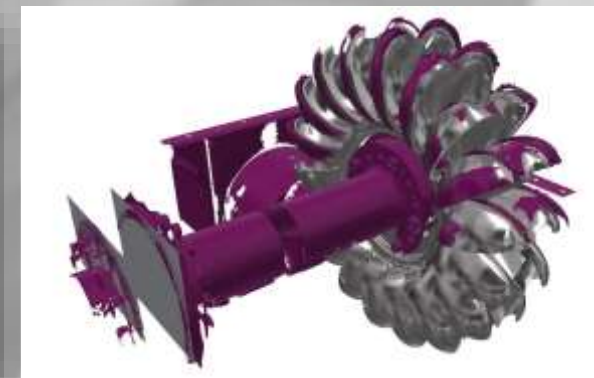
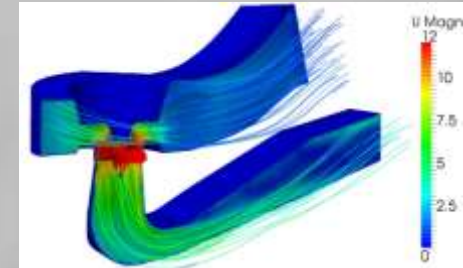
Rehabilitation

On every turbine type

- | Existing equipment assessment
- | Alternative layout
- | Runner refurbishment – **3D Scan**
- | New runner in existing civil works
- | Power and generating capacity upgrade
- | Renovation of monitoring and control system

Operation & Maintenance

- | Remote control
- | Customized Scada
- | Technical support
- | Monitoring and day-to-day operations



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HPP Website



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HPP List of references



HPP Corporate Video



HYDREO Website



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Hydreo List of references





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