



JLA HYDRO

HYDRAULIC TURBINES

HYDROELECTRIC EQUIPMENTS • BANKI-CROSSFLOW TURBINE MANUFACTURER
• HYDROPOWER EXPERTISE • AUTOMATION AND CONTROL •



THE POWER
OF WATER

www.jlahydro.be

Introduction

▶ **JLA Hydro** is a Belgian company specializing in design, manufacture and installation of tailor-made Banki/Cross-Flow hydro generators. **JLA Hydro** turbines are designed for heads ranging between 2.5 and 80-metres and flow rates from 30 to 1600 litres per second, generating to powers from 2 to 400 kilowatts with a speed ranging from 100 to 1200 rpm.

Backed by its global experience, the **JLA Hydro** team of engineers and technicians is working on the installation of run of river hydroelectric plants. It provides turnkey hydro generators for grid connected or off-grid sites, according to the customer needs. Since its inception in 1980, the company has constantly evolved and strengthened its brand and expertise to increase its potential.

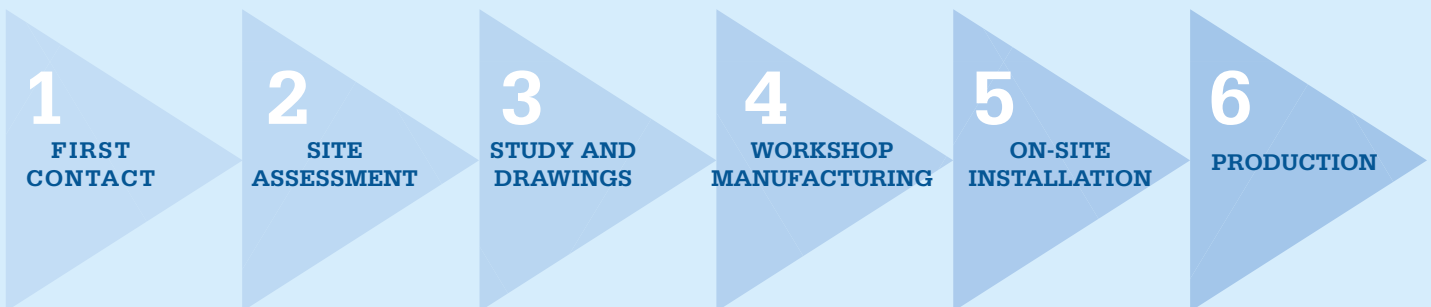
With a focus on customer satisfaction, **JLA Hydro** has become a successful company thanks to its solid experience in the field of hydropower. **JLA Hydro** develops and manufactures reliable and sturdy equipment that ensures a consistent performance across a wide flow range.

The reputation of this Belgian company has been built on two models, the *JLA29* and *JLA52*. Many customers of all sizes (private, institutions, NGOs, governments) have been convinced by the simplicity of installation and maintenance of these powerful machines.

JLA Hydro offers full hydro generators to equip plants that are being renovated or greenfield sites. The skills of its engineers are used to find the best technical solution based on the site characteristics and the customer requirements.

Built in the workshops of the company in Belgium, JLA turbines receive a rigorous quality control throughout the machining and assembly processes. The balancing of the rotating parts also meets the strict requirements in this field of application.

JLA Hydro has never stopped developing its skills in order to enrich its product and service offer. Several R & D projects are already at the design stage, such as the development of a line of *Pelton* turbines.



A few figures

More than **35** years
of expertise in hydropower

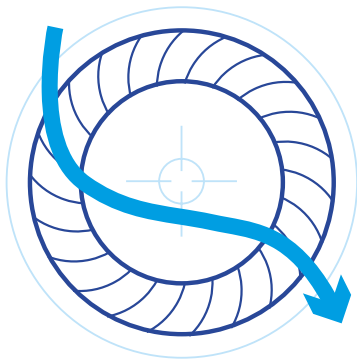
1 machining/assembly workshop and

1 design office

More than **100** plants worldwide

+ 4000 kilowatts
of cumulative installed power

► How it works

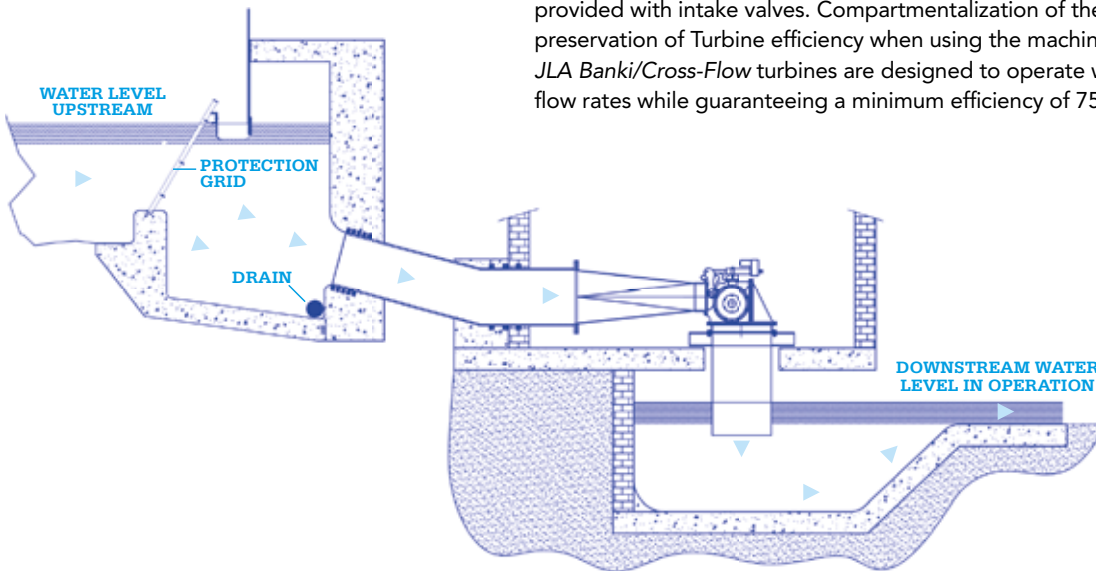


Sectional view of Cross-Flow rotor

The operation principle of the *Banki/Cross-Flow* Turbine was invented in 1903 by Australian engineer Michell. It is a machine characterized by relative simplicity and great robustness. Its specificity lies in the double effect exerted by the flow of water in the rotor (see picture). Water is supplied through a penstock pipe to the admission valve there it is injected into the horizontal axis cylindrical rotor. It is then discharged either at atmospheric pressure or through a draft tube that is partially immersed and leads to suction in the turbine outfall, thus allowing full use of the available head.

The rotor consists of thirty curved blades, which are fixed and parallel to the axis of rotation. The water passes twice through the rotor peripheral blades. Radial centripetal and radial centrifugal flows successively cause the rotation of the rotor. Thanks to this design, the rotor is completely unaffected by leaves, twigs, pond weed, plastic waste, etc. These are ejected after half a turn under the combined effect of the water flow and centrifugal force.

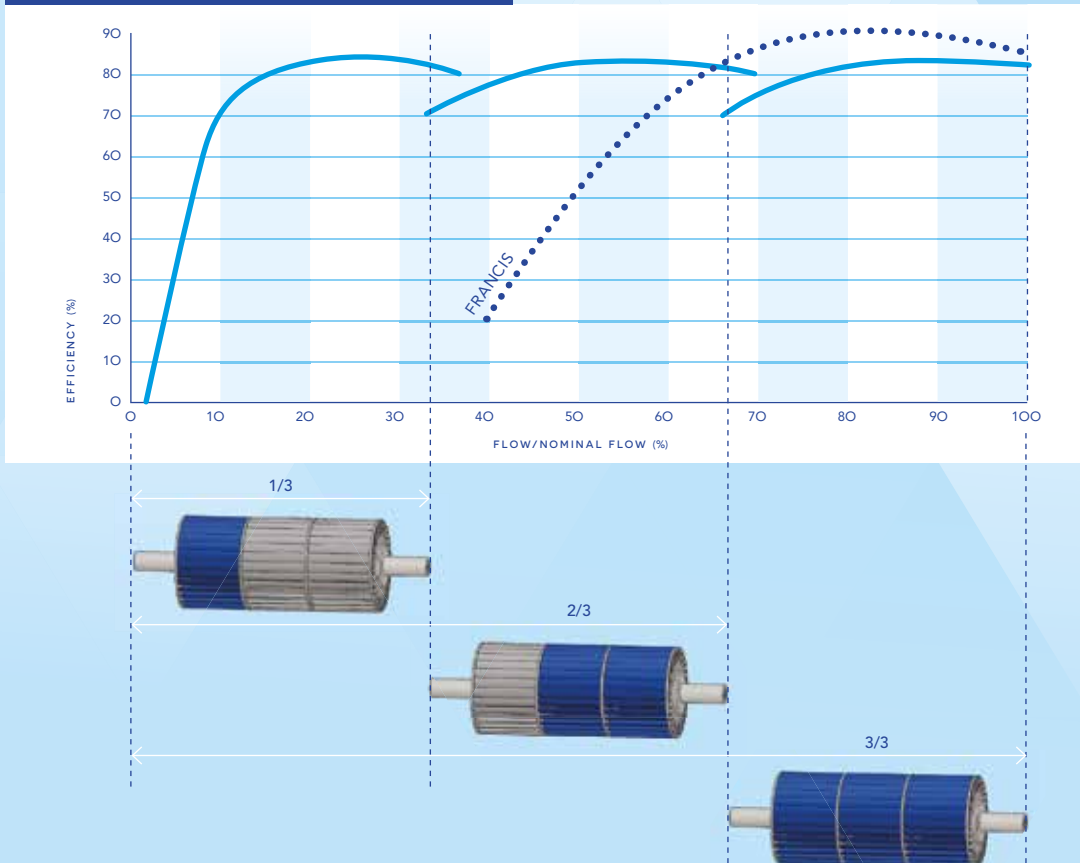
A *Banki/Cross-Flow* turbine may be composed of one or two compartments provided with intake valves. Compartmentalization of the injection ensures preservation of Turbine efficiency when using the machine at partial flows. *JLA Banki/Cross-Flow* turbines are designed to operate with a wide range of flow rates while guaranteeing a minimum efficiency of 75% to 80%.



Advantages

- ▶ Compact unit
- ▶ Durability
- ▶ Sturdiness and mechanical reliability
- ▶ Dimensional stability of the materials
- ▶ Simplicity and low cost of maintenance
- ▶ Good operation at low and variable flow rates
- ▶ Guaranteed minimum efficiency of 75% to 80% with a wide range of flow rates
- ▶ Unaffected by leaves, plastic waste, pondweed, etc.
- ▶ Installation possible from 2.5 metres of head
- ▶ Vertical or horizontal water intake
- ▶ Quick and easy installation
- ▶ Less civil work than for other types of turbines
- ▶ Competitive prices
- ▶ 2 year warranty, extendable to 5 years with maintenance contract

Efficiency of a Crossflow turbine



Regulation system for off-grid operation

- ▶ For the installation of hydro generators in off-grid sites, **JLA Hydro** has developed an electronic speed control card with control of the load: Electronic Load Controller. This equipment is installed directly in the cabinet and allows control of the hydro generator frequency on sites that are not connected to the national grid. For sites that are connected to the network, it also limits overspeed when the grid disconnects.

Main features

- ▶ PID control algorithm with adjusted parameters (according to the inertia of the turbine generator unit)
- ▶ Regulation by energy dissipation in «ballast» electric loads
- ▶ Highly accurate frequency regulation, even in case of sudden load variation on the user grid.
- ▶ Power section composed of large-sized thyristors
- ▶ Standardized design, facilitating repairs and supply of spare parts



Description

- ▶ JLA turbines are built to last and be operated continuously for decades with minimal maintenance.

The design and manufacture of the components are exclusively done in Belgium.

The hydro generator is sized according to the characteristics of the site.

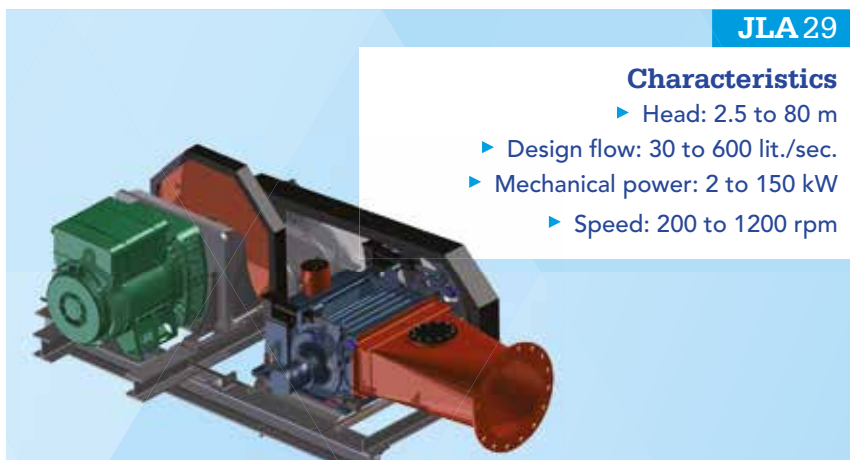
JLA Hydro provides a full set consisting of:

- ▶ Banki/Cross-flow turbine, «Made in Belgium»
- ▶ Pipework parts for connection to the penstock pipe and the tailrace
- ▶ Transmission system (with flywheel if necessary)
- ▶ Metallic support frame
- ▶ Induction or synchronous generator
- ▶ Turbine control system (electrical, hydraulic or manual)
- ▶ Electrical cabinet (grid connection or off-grid site) with remote management interface
- ▶ Frequency regulation system (off-grid site)
- ▶ Drawings and user manual
- ▶ Commissioning and training of supervisors



Service and maintenance:

- ▶ Periodic lubrication of bearings and sealing systems
- ▶ Annual inspection of the rotor through an opening in the cover
- ▶ Cleaning of the protection grid



JLA 29

Characteristics

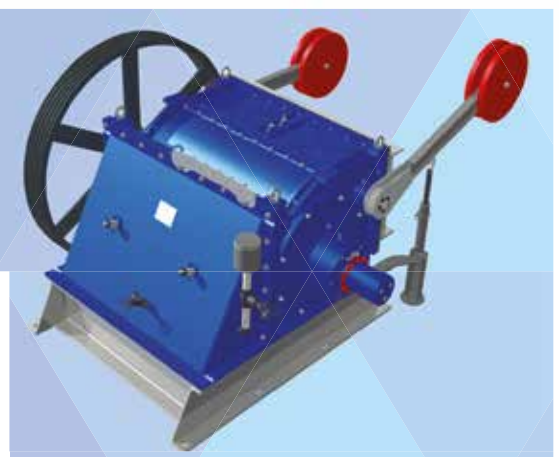
- ▶ Head: 2.5 to 80 m
- ▶ Design flow: 30 to 600 lit./sec.
- ▶ Mechanical power: 2 to 150 kW
- ▶ Speed: 200 to 1200 rpm



JLA 52

Characteristics

- ▶ Head: 4.5 to 25 m
- ▶ Design flow: 500 to 1600 lit./sec.
- ▶ Mechanical power: 2 to 400 kW
- ▶ Speed: 100 to 400 rpm



Some projects

Sahasinaka HPS

MADAGASCAR

- ▶ Turbine: JLA29
- ▶ Gross head: 24 m
- ▶ Net head: 22.4 m
- ▶ Design flow: 450 lit./sec.
- ▶ Mechanical power output: 76.1 kW
- ▶ Electrical power output: 65.8 kW
- ▶ Commissioning: November 2013
- ▶ Funding: European + private funds
- ▶ Connection: Off-grid
- ▶ Electrification of Sahasinaka Village (Madagascar)
- ▶ Project of connection for 2 other villages
- ▶ Site intended for 3 JLA29



Moulin de la Ribière

ST SULPICE LAURIÈRE / FRANCE

- ▶ Turbine: JLA29
- ▶ Gross head: 37 m
- ▶ Net head: 29.5 m
- ▶ Design flow: 445 lit./sec.
- ▶ Mechanical power output: 99.5 kW
- ▶ Electrical power output: 94 kW
- ▶ Commissioning: May 2015
- ▶ Funding: Private funds, company
- ▶ Connection: National network



Centrale Hydroval

POIX ST HUBERT / BELGIUM

- ▶ Turbine: JLA52
- ▶ Gross head: 12.5 m
- ▶ Net head: 11 m
- ▶ Design flow: 2 * 1050 lit./sec.
- ▶ Mechanical power output: 2 * 87.2 kW
- ▶ Electrical power output: 2 * 80.2 kW
- ▶ Commissioning: August 2000
- ▶ Funding: Private funds, company
- ▶ Connection: National network



References

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- ▶ Orban
- ▶ Coster
- ▶ Dony sprl
- ▶ Centrale Zoude s.a.
- ▶ Moulin Cobru
- ▶ Moulin de Jauche
- ▶ Colard
- ▶ Moulin de Vaux
- ▶ Immo Ponrol sa
- ▶ Vandergucht
- ▶ Moulin du Valdieu
- ▶ Moulin d'Heure
- ▶ La Soye
- ▶ La Civanne
- ▶ Blanchy
- ▶ Hotel Ulftaler Schenke
- ▶ Les Aubes de la Biesmes
- ▶ Moulin d'Anlier
- ▶ Les Amerois
- ▶ Château d'Halloy
- ▶ Château de Bousval
- ▶ La Hague
- ▶ Malmedy
- ▶ Grand Moulin 1
- ▶ Grand Moulin 2

FRANCE

- ▶ Richard
- ▶ Haxaire
- ▶ Centrale hydroélectrique de Taulignan
- ▶ Moulin de Kerveno
- ▶ Vernet
- ▶ Miserandini
- ▶ Hugonnet sarl
- ▶ Arnaud
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- ▶ Centrale des Sauvas
- ▶ Moulin de Lancay
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- ▶ L. Marchesani
- ▶ Centrale du Bonhomme
- ▶ Usine Bellevue
- ▶ Moulin de La Hogue
- ▶ Le Mouliot
- ▶ Moulin Caillet
- ▶ Moulin d'Amont
- ▶ Centrale de Bellevaux
- ▶ La Besseyre
- ▶ Station Gandhi
- ▶ 3B Energies
- ▶ Auberge du Vieux Moulin
- ▶ Moulin Gathion
- ▶ Centrale Talaron
- ▶ Moulin de la Ribière
- ▶ Manufacture d'orgue Richaud
- ▶ Moulin du Cros
- ▶ La truite des torrents (Peillen)
- ▶ Pont du Roi



EUROPE

- ▶ Wind Water Solar - Ireland
- ▶ Ugbrooke Park - UK
- ▶ Bowden Mill - UK
- ▶ Morden Mill - UK
- ▶ Electricida Ruiz Guinea - Spain
- ▶ Lera Hydro Scheme - UK
- ▶ Orastie Hydro Project - Romania
- ▶ Huckworthy - UK
- ▶ Santa Fiora Molini - Italy
- ▶ Portworthy Phase 1 - UK
- ▶ Portworthy Phase 3 - UK
- ▶ Becky Falls - UK
- ▶ Teiliu Bach - UK

AFRICA

- ▶ Nyakabanda HPS
Rwanda
- ▶ Antétézambato HPS
Madagascar
- ▶ Ndoluma project - D.R. Congo
- ▶ Water Management Committee of Dzogbegan - Togo
- ▶ Kabwé Major Seminary
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- ▶ Sahasinaka Hydro project
Madagascar
- ▶ Ampasimaneva HPS
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- ▶ Ambato - Madagascar
- ▶ Domaine de Katalé - D.R. Congo
- ▶ Bitale - D.R. Congo
- ▶ Ryarusera - Burundi
- ▶ Kigwena - Burundi

ASIA

- ▶ Kallar HPS
Kerala-India
- ▶ Hemingford I HPS
Sri Lanka
- ▶ Hemingford II HPS
Sri Lanka
- ▶ Omkoi HPS
Thailand

AUSTRALIA

- ▶ Johnsen - Australia





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JLA HYDRO SPRL

Rue Ernest Matagne 30 / 5530 Assesse / Belgium

T: +32 (0) 83 68 91 19

info@jlahydro.be

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