IREM Ecowatt Hydro

ENERGY AND SAVING FROM THE WATER

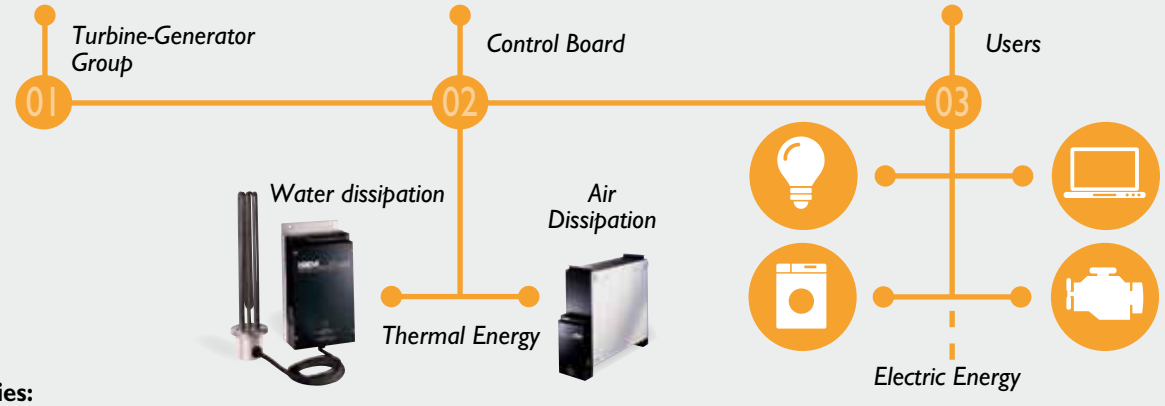
Hydro Turbines

Ecowatt Hydro Turbines

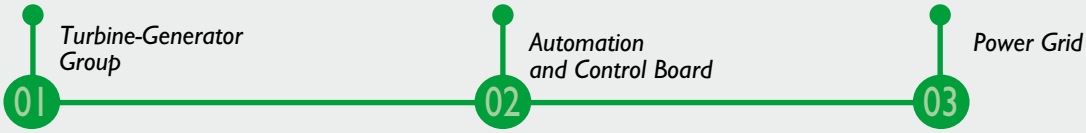
Water is the ideal renewable power source, used by man since the beginning of time. **Ecowatt Hydro Turbines**, with over fifty years of experience in the field, transform the kinetic energy of the water into precious electricity in a clean way and in full respect for the environment.

"S" series (230/400Vac) and "D" series (24Vdc) are the ideal solution for those places where electrical energy is not available from the domestic power grid while "A" models are suitable for producing energy that may be then transferred to the power grid. **Ecowatt Hydro Turbines** solve the problem of energy supply in many situations, for example in isolated houses, alpine refuges and pastures, missions and small villages. They also ensure the operation of electric and electronic equipment for remote signalling, remote control and water purification. Besides the use on streams, these plants may be integrated in aqueducts, having natural waterfall, in order to recover the energy which often has to be dissipated through special and expensive equipment and then transform an expensive service in a source of profit.

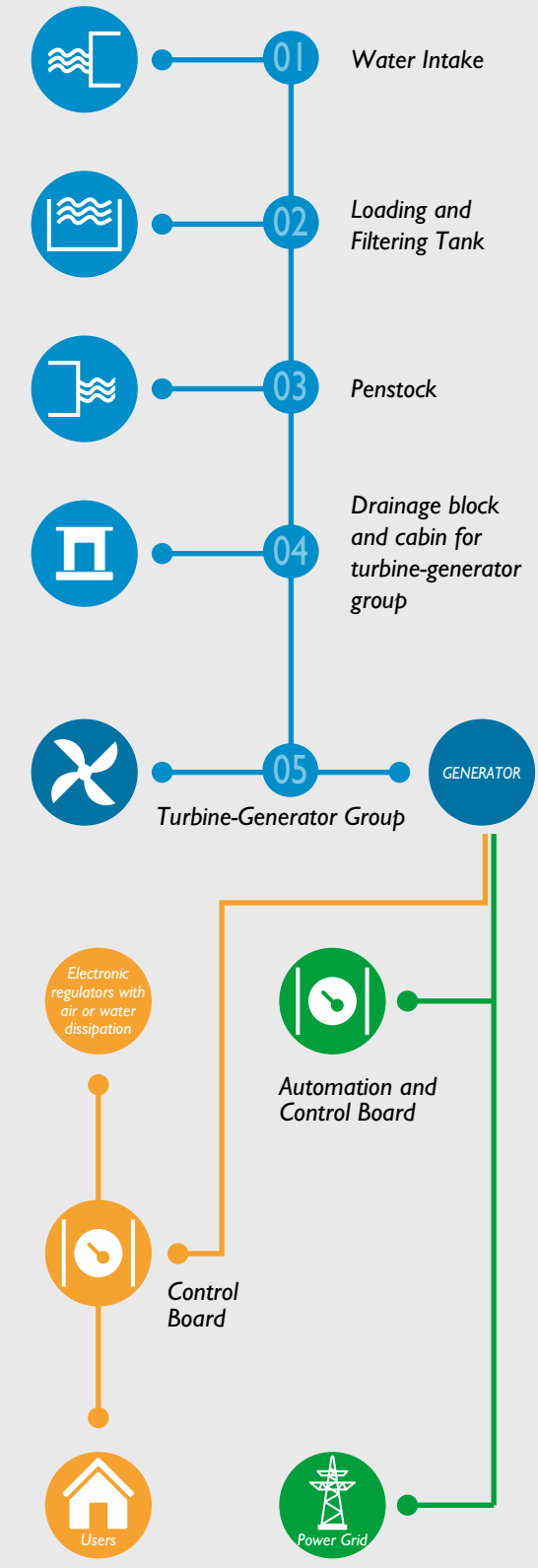
Ecowatt Hydro Turbines provide a considerable contribution to ecology, since they help to avoid the burning of vast quantities of fossil fuel and hydrocarbons, which are held to be widely responsible for air pollution and the greenhouse effect.



"S" series:
Stand-alone Plant



"A" series:
Grid-connected Plant



Ecowatt Hydro Turbines are designed to ensure simple and effective operation in order to reduce the corrective steps during installation, start-up and routine maintenance to a minimum.

As for **"A" series**, the plant operates automatically, ensuring the switching and the release of the turbine-generator group depending on the mains availability. The different automation levels depends on water conditions and user's needs.

All the driving devices for the different automatisms are made through electric actuators thus avoiding the use of pneumatic or hydraulic systems which are generally more expensive, require a frequent servicing, also causing environmental pollution due to their fluids.

As for **"S" series**, the plant operates with a constant power supply. The turbine-generator group constantly transforms hydraulic energy into electric power, regardless of the requirements of the electric users.

An electronic regulating system continuously monitors and controls the connected loads and dissipates the energy in excess by means of resistances in air or water.

This energy can be recovered as heat, either for direct heating of the premises, or for the production of hot water in order to obtain a system of co-generation.

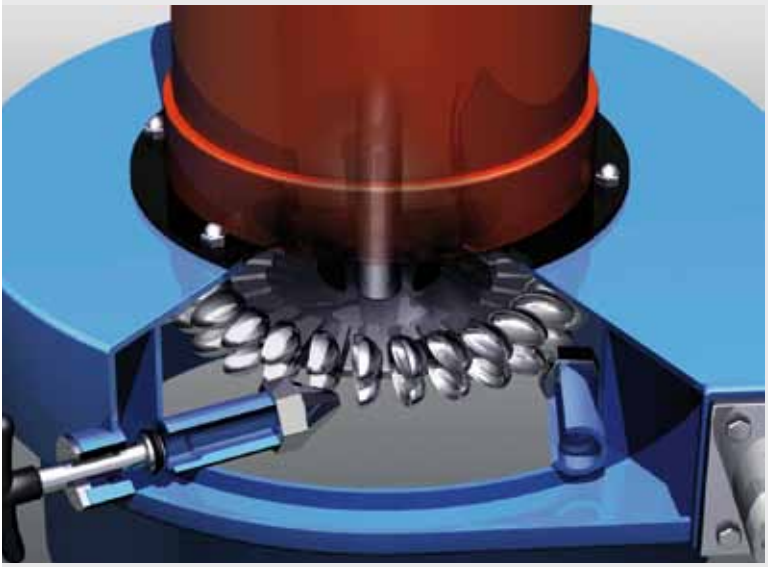
24Vdc **"D" series** models are aimed at managing the battery charge.

A manual or automatic secondary regulation makes it possible to modify the water flow to adapt the turbine to seasonal variations.

Ecowatt Hydro Turbines are highly reliable industrial products. They have been designed for easy installation even in difficult areas. To obtain a good installation some simple, but necessary building works are required. IREM provides the necessary technical sheets for a proper installation and instructions manual for managing the plant. The installation, connection, start-up and maintenance of the **Ecowatt Hydro Turbines** do not require the presence of specialised technicians. The system, which requires no specific adjustment, can be easily started up by an electrician and a plumber thanks to the technical documentation.

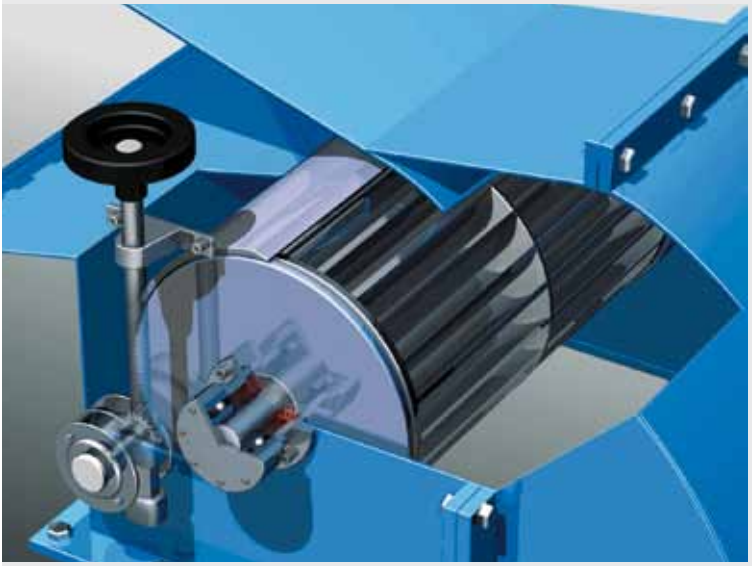
Only "A" series requires the presence of IREM technicians.

Pelton Turbines
TP series

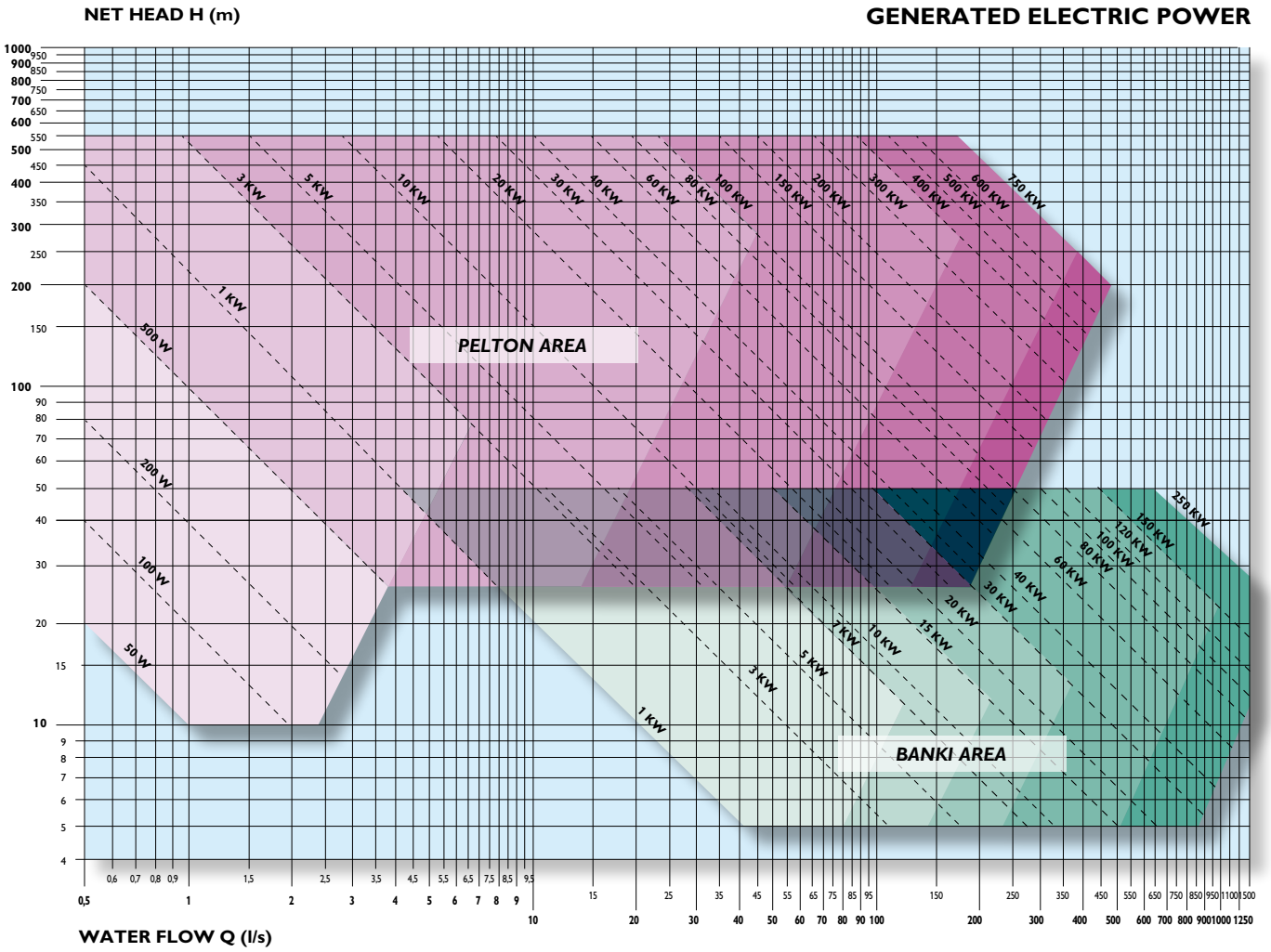


These are suitable for heads from 20 m to 550 m and effective flow rates ranging from 0.5 l/s to 450 l/s. The buckets are made of precision cast stainless steel. All Pelton turbines are equipped with six nozzles controlled by special flow regulation valves which help the efficiency of the system. The runner is directly splined onto the generator shaft, in order to give an improved global output. All the main mechanical parts are in stainless steel. Accurate anti-corrosion processes are applied to all the surfaces.
On demand, the whole distributor may be realized in stainless steel (necessary for specific applications, like plants using drinking water).

Banki or Cross-flow Turbines
TB series



These are suitable for heads from 5 m to 50 m and effective flow rates ranging from 10 l/s to 1.500 l/s. They offer an excellent solution that reconciles quality, performance and costs. Runner and mechanical parts are made of stainless steel. The transmission between turbine and generator by means of a cogged belt ensures the necessary flexibility of the system and optimizes the transmission itself. The flow rate is controlled by a special floodgate which allows variations from 10 to 100%. The operation may be either manual or automatic through electric actuator.



TP and TB series

The data concerning net head and available water flow are fundamental for calculating the power output of **Ecowatt Hydro Turbines**.
By intersecting the X co-ordinate, which shows the head in metres, with the Y co-ordinate, which shows the flow in litres per second, the resulting point will be found between different diagonal sections indicating the electrical power generated, expressed in kW.

TPD

Turbine-Generator Group

Pelton turbine with 4 or 6-nozzle distributor. The nozzles may be fixed or adjustable through ON/OFF valves for the manual regulation of the flow. This group is equipped with a 24Vdc permanent magnet generator and is suitable for R500 regulating system and battery charger.

TPS

Turbine-Generator Group

Pelton turbine, with 6-nozzle distributor. Each nozzle may be fixed, fitted for ON/OFF regulation ball valves or needle valve for flow regulation from 0 to 100%.

Each valve may be regulated manually or fitted for electric actuator. This permits to have tailored models that suit to the specific needs of the installation.

This group is equipped with synchronous, brushless, self-excited, single/three phase, 4 poles, 230/400V 50/60Hz generators directly splined to the turbine shaft.

Different voltage and frequency are available on demand.

TPS groups have been designed to be installed with RMP electronic regulators, suitable for manual or automatic installations.

TPA

Turbine-Generator Group

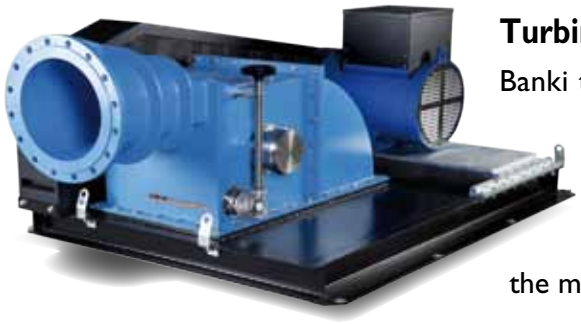
Pelton turbine, with 6-nozzle distributor. Each nozzle may be fixed, fitted for ON/OFF regulation ball valves or needle valve for flow regulation from 0 to 100%.

Each valve may be regulated manually or for electric actuator. This permits to have tailored models that suit to the specific needs of the installation.

This group is equipped with asynchronous, three phase, 2 to 10 poles, 400V 50/60Hz generators.

Different types of generator are available on demand.

TPA groups have been designed for parallel connection to the power grid. They operate in automatic plants (start, stop and regulation) controlled by QPR electric boards. The level of automation may be tailored according to the specific requirements of the installation.



TBS

Turbine-Generator Group

Banki turbine may regulate the flow from 10 to 100% by means of manual or electric system. TBS groups are equipped with single/three phase, synchronous, self-exciting, brushless generator, with 4 poles, 230/400 V, 50/60 Hz. Different types of generator are available on demand. The use of a cogged driving belt reduces the maintenance at the minimum.

TBA

Turbine-Generator Group

Banki turbine may regulate the flow from 10 to 100% by means of manual or electric system. TBA groups are equipped with three phase, asynchronous generator, with 4 to 6 pole, 400 V, 50/60 Hz. Different types of generator are available on demand. The use of a cogged driving belt reduces the maintenance at the minimum.

Electronic Regulator RMP

Electronic Regulator RMP

Automation and control board QPR

Control board QCM QCT

Regulators and electric boards

R500 Electronic Regulators are essential for "D" series models. They regulate the load and manage the battery charge according to the connected loads (24Vdc).

RMP Electronic Regulators are essential for "S" series models. They are single-phase 230Volt 50/60 Hz regulators, equipped with 2kW resistances for air or water dissipation and with 2,5, 10 or 12kW resistances for water dissipation. Being modular parts, these may be connected either to single or three-phase systems having different ratings and to any turbine type.

QCM and QCT Control boards for "S" series models provide the electric operation parameters of the plant. Single/three phase control boards are supplied with instruments, alarms and protective devices.

QPR Automation and control boards are designed for "A" series models (parallel operation to the power grid). They manage the plant automation and are supplied with protective devices, power factor correction and all instruments necessary to ensure the good operation of the turbine-generator group. A remote control may be supplied on demand.

IREM. Positive energy, without interruption. Since 1947.

IREM is a manufacturing company of electromechanical and electronic equipment for the control of the mains power in the following sectors:

- powering of discharge lamps for professional applications;
- protection of electric users against line disturbances;
- luminous flux regulation in lighting plants;
- power generation by hydroelectric turbines.

Since its foundation in 1947, IREM has gained wide recognition due to the reliability and innovative content of its higt-tech products. A reliable company deserving the Oscar-ward. In 1992, in Los Angeles, Mario Celso - founder of IREM - was granted the "Scientific-Technical Award" by the Academy of Motion Picture Arts and Sciences.

Two production plants, a philosophy based on "quality upgranding" as the company's primary concern and direct export exceeding 70% of the global turnover are a warranty of continuity and development.

Experience, quality and professional skill: these are the factors that permitted IREM to achieve in 1993 the certification of its quality system in compliance with UNI EN ISO 9001 standard, a further confirmation of IREM commitment to constant improvement to ensure the maximum satisfaction of the customer and its capacity to guarantee:

• a constant quality standard
• precision and repeatability of all working processes
• dropping of acceptance control at the customer's plant
• identification and traceability of a product through the years.

In year 2000, IREM obtained the certification of its environment management system according to UNI EN ISO 14001 standard.This certification is a firm demonstration of the company's will to protect the environment not just through its products, but also via precise patterns of behaviour.

In 2014, the company management system has obtained the certification of conformity to BS OHSAS 18001 Standard which sets out the minimum requirements for occupational health and safety management.

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