

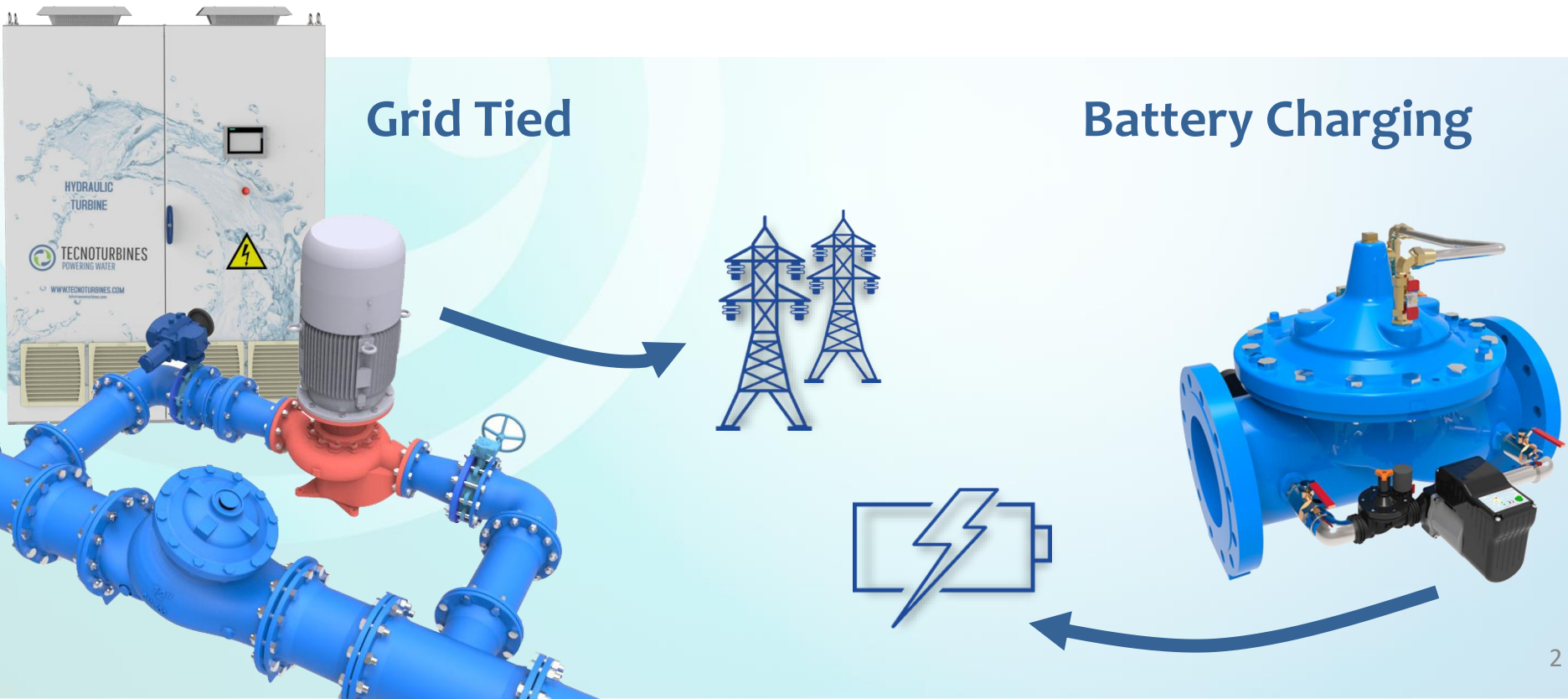


TECNOTURBINES
POWERING WATER

Corporate Presentation



Hydraulic micro-turbines, specially designed to generate electricity under variable hydraulic conditions, using the excess of pressure present in the water pipes





Who is behind Tecnoturbines?

CEO Jaime Lledó: MBA (ESADE), Control Systems & Electronics Engineer. Broad experience in product development at national and international level for renewable energy-focused companies

CTO Enrique Ruiz: Industrial Engineer. Broad experience in managing a developing hydraulic project at AGBAR group

CCO David Miravet: MBA (ESADE), Industrial Engineer. Broad experience as CCO in renewable energy companies at international level.

R+D Carlos Orts: Control Systems & Electronics Engineer. Broad experience in validation and homologation in Vossloh.

Advisory Board:

InnoEnergy: Matias Torrellas

FLUIDRA: Xavi Servat

Caixa Capital Risc: Pau Sanchez



El equipo de Tecnoturbines. :: ALBERTO ARAGÓN





WHAT DO WE OFFER?

1. Energy cost reduction by buying less electricity

Water distribution companies are facing an increase in energy demand and cost (5% - 30% yearly). Using their already existing hydraulic resources they can reduce their energy bill.



2. Excess of pressure reduction in water pipes

The overpressure at water distribution lines is cause of large expenditures on O&M and water loses of about 10-30%. Our turbines recover energy from the excess of pressure ONLY, so reducing it.



3. Energy supply at remote locations

Remote facilities (reservoirs, water treatment plants, etc) or small loads such as dataloggers for monitoring the water network where the grid does not reach, meaning large investment to be on grid per site, Diesel generator or battery periodic replacements.





Tecnoturbines TECHNOLOGY

Based on the **Regenerative Breaking Technology**, our turbines reverses the way turbines have typically be controlled.

Standard control turbine is based in mechanical manipulation of turbine & external elements (runners & impeller angles, floodgate, valves, etc) in order **to fix the impeller speed**, so the generator keeps synchronized with the grid.

Tecnoturbines technology, electronically modifies the speed of the turbine to the point at which generates the maximum energy possible under the given hydro conditions, then feeds into the grid the generated energy with the required parameter of the electricity utility.



F1 recovers energy,
from the moving **Vehicle's kinetic energy**,
under **braking**.



PATENTED



Tecnoturbines recovers energy,
from the moving **Hydraulic kinetic energy**,
in water

ADVANTAGES

1. Energy generation under hydraulic variable conditions

Allows and absorbs variability of head and flow typically present in water distribution networks, meaning that the turbines keeps generating energy regardless of the hydraulic conditions.

Standard turbines only work under a fix condition of head and flow.

2. Efficiency increased up to 80%

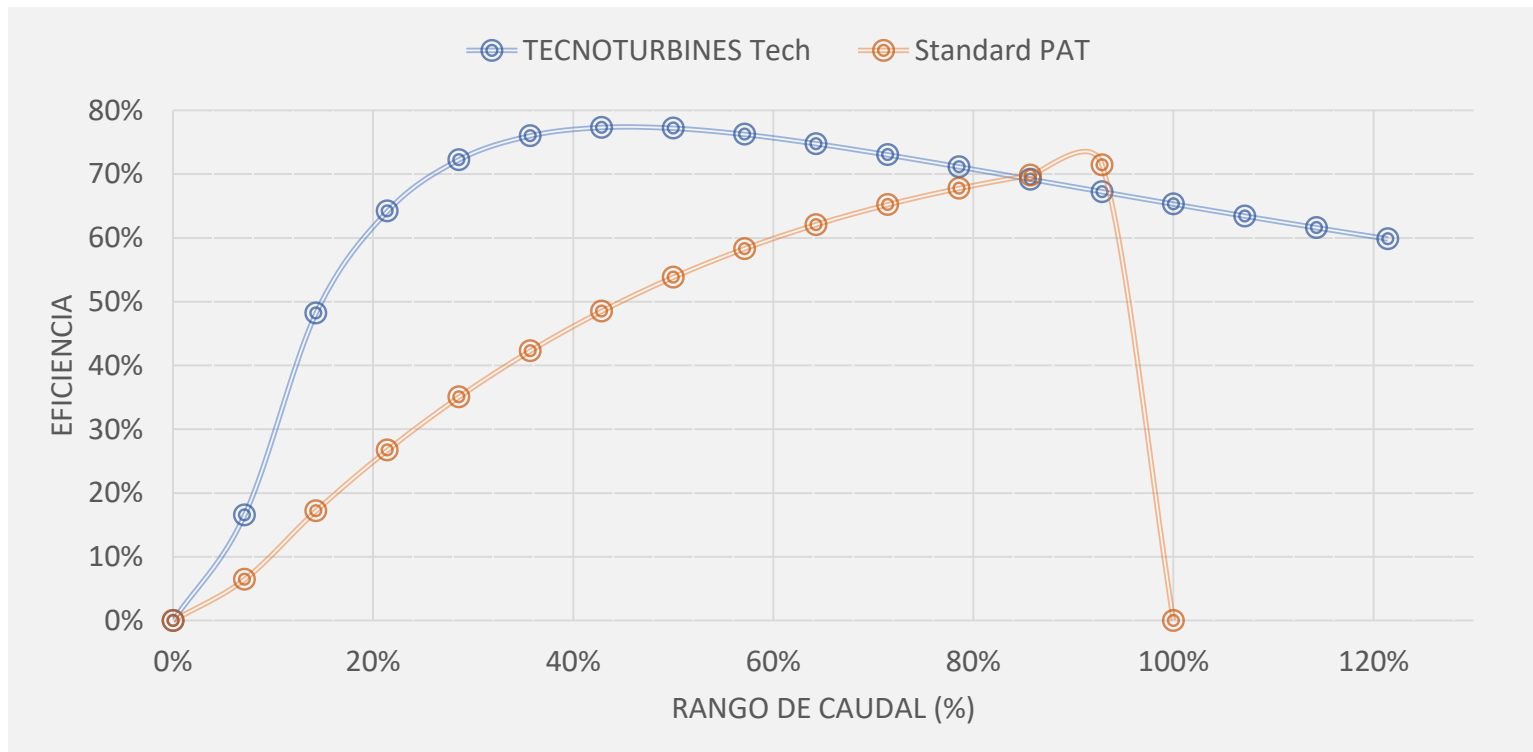
Standard PaT (Pumps as Turbines) only get up to 50% to 60% efficiency. With our systems we can bring the PaT's to their optimum working point, reaching an overall efficiency of the system up to 80%. Meaning more energy production for the same site.

3. Higher energy production

Combining advantages 1 and 2 is translated in higher energy production, since from adv. 1 we can generate for longer periods and recover the full hydraulic availability and from adv.2 we generate more energy than standard PaT's for the same given hydro conditions.

ADVANTAGES

- Higher Efficiency for 115% of the standard flow range than standard PAT.
- Above 70% Efficiency for 50% of the flow range
- Above 60% Efficiency for 80% of the flow range





The
United
States
of
America

The Director of the United States
Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Nichelle K. Lee

Director of the United States Patent and Trademark Office



URKUNDE

Es wird hiermit bescheinigt, dass für die in der Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

Europäisches Patent Nr.

Patentinhaber

CERTIFICATE

It is hereby certified that a European patent has been granted in respect of the invention described in the patent specification for the Contracting States designated in the specification.

European patent No.

2725444

Proprietor of the patent

CERTIFICAT

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet, pour les Etats contractants désignés dans le fascicule de brevet.

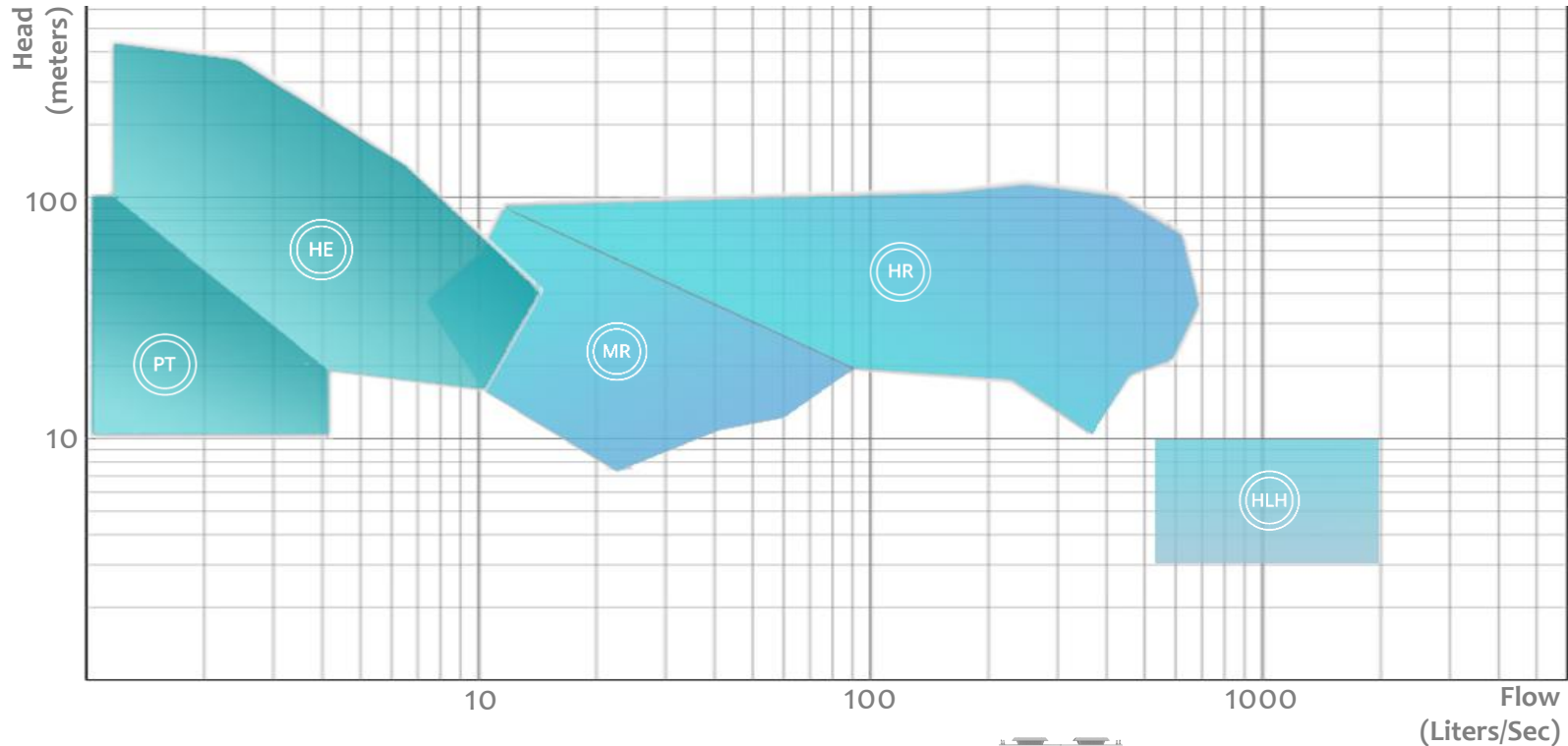
Brevet européen n°

Titulaire du brevet

TECNOTURBINES S.L.
Avenida de los Palacios 61
03179 Formentera del Segura/ES



PRODUCTS AND POTENTIAL APPLICATIONS MAP



PT Picoturbine

HE HE Turbine

MR Micro Regen

HR Hydroregen

HLH Hydro Low Head

BATTERY CHARGING

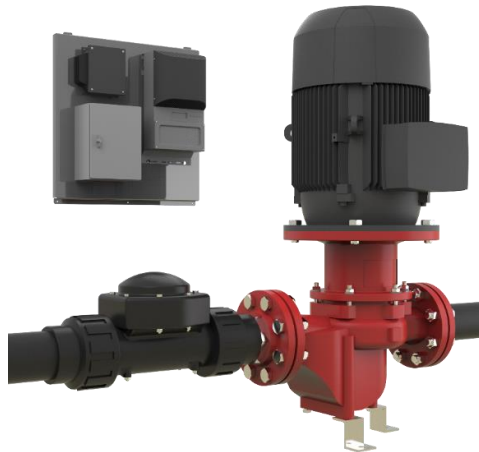
GRID TIED



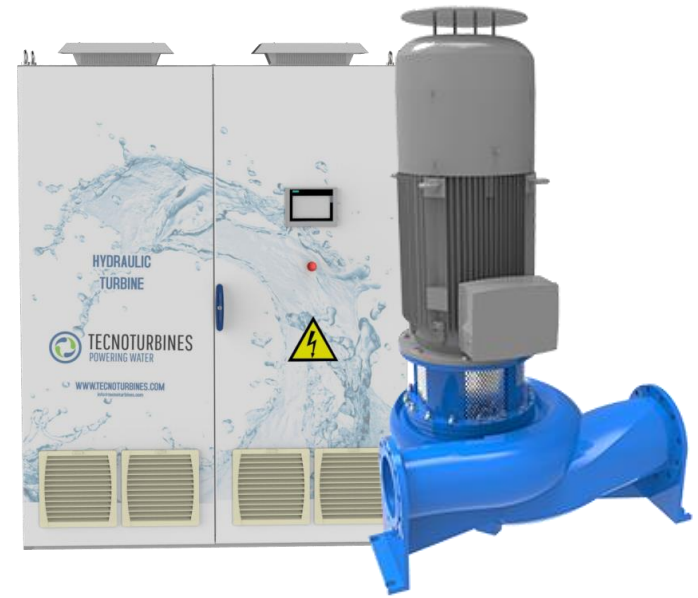
GRID TIED TURBINES

	Micro Regen	Hydro Regen Turbine
Power Range	2kW to 25kW	25kW to 315kW
Flow Range	10 to 90 liter/second	60 to 560 liter/second
Pressure drop Range	1,5 to 11 bars	1,5 to 13 bars
Max. Pressure	PN16 ; PN25	PN16 ; PN25

Micro Regen



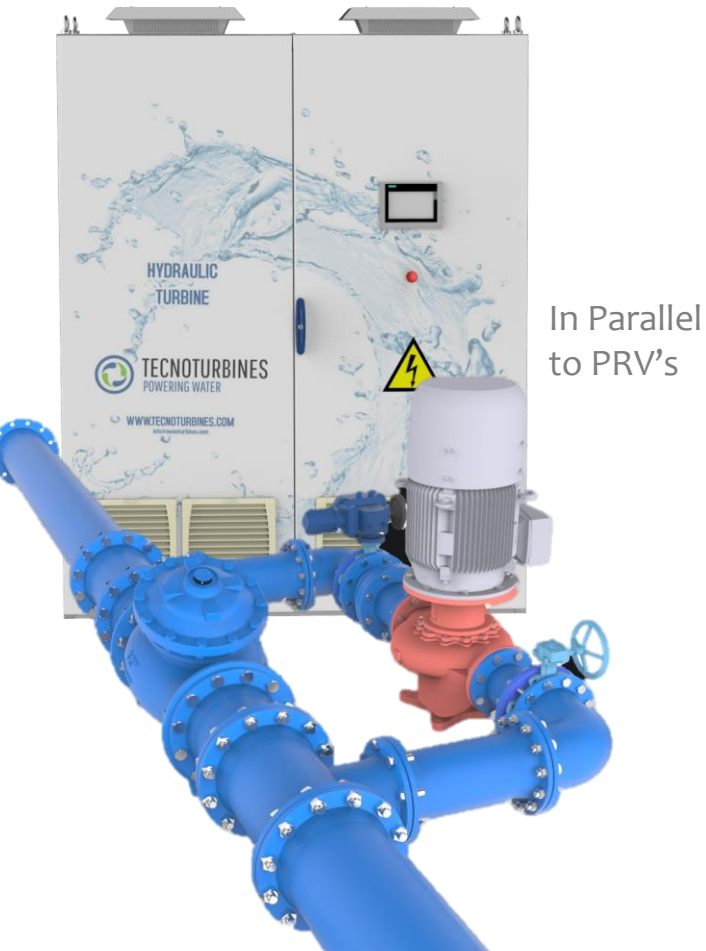
Hydro Regen





GRID TIED TURBINES

APPLICATIONS EXAMPLES



In Parallel
to PRV's

Water
Reservoir inlets



Micro Hydropower
Plants





GRID TIED TURBINES ADVANTAGES

PAYBACK FROM 2 YEARS ON

Feasible projects with a short payback and high ROI. With a permanent flow of incomes at a low risk.



80% REDUCTION IN CIVIL WORKS

Reduces 80% in civil works and 40% the total cost of a standard hydro project. Installed directly in-line over the already existing water pipe.

QUALITY

Top Brands & Components used in the manufacturing of the system.



UP TO 80% GLOBAL EFFICIENCY

Patented technology capable of recovering energy under variable hydraulic conditions at very high global efficiency.



100% RENEWABLE & MINIMUM IMPACT

100% Clean & Renewable Energy. Less impact than solar, Eolic technology (Both, visual & infrastructure) or electric connection (Civil works, installation, infrastructure)



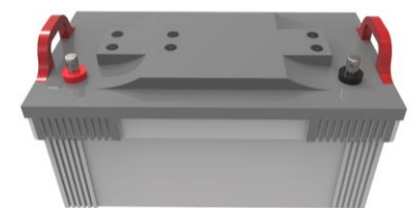
BATTERY CHARGING TURBINES

	Picoturbine	HE Turbine
Power Range	Up to 25W	500W to 6 kW
Flow Range	0,8 – 1 liter/second	1 to 16 liter/second
Pressure drop Range	1,2 to 1,8 bars	1,5 to 39 bars
Max. Pressure	PN10	PN40

Picoturbine



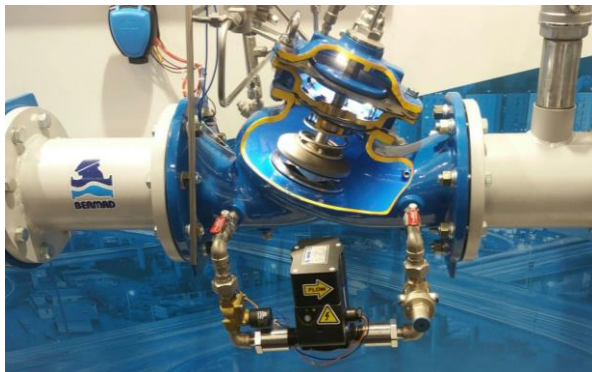
HE Turbine



BATTERY CHARGING TURBINES

APPLICATIONS EXAMPLES

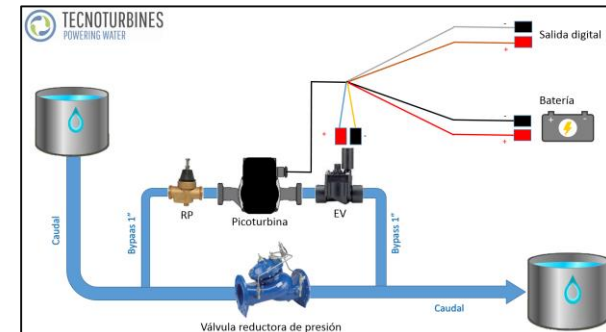
QUICK & EASY INSTALLATION – Directly installed on the PVR.



APPLICATIONS – Telemetry and Pressure Regulators devices. Smart Cities



Installation schematic





BATTERY CHARGING TURBINES

APPLICATIONS EXAMPLES

Electrification Water
Treatment Plants



Remote Control
& Monitoring



Chloride Dosing
Systems





BATTERY CHARGING TURBINES ADVANTAGES

QUICK & EASY INSTALLATION

Plug and Play installation. It can be directly mounted on a PVR and harvest the energy wasted on it.

POWER SUPPLY IN REMOTE SITES

Robust and reliable power supply at locations where the grid is not available or has difficult access.

QUALITY

100% Compatible with tap water, IP67 protection. Manufactured with the best materials. Controls an Electro-Valve for an optimized working control.

REMOTE MONITORING

Allowing both, monitoring of remote stations and turbine behavior parameters.

SECURITY

Prevents vandalism. No visible elements outdoor. It gets hidden into a man hole or closed space. It does not generates noise.

100% RENEWABLE & MINIMUM IMPACT

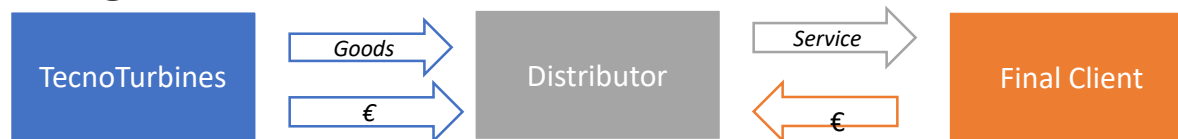
100% Clean & Renewable Energy. Less impact than solar, Eolic technology (Both, visual & infrastructure) or electric connection (Civil works, installation, infrastructure)



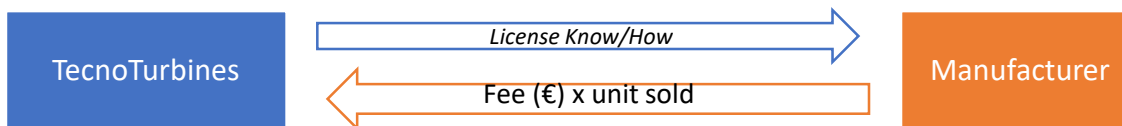
Direct Sell



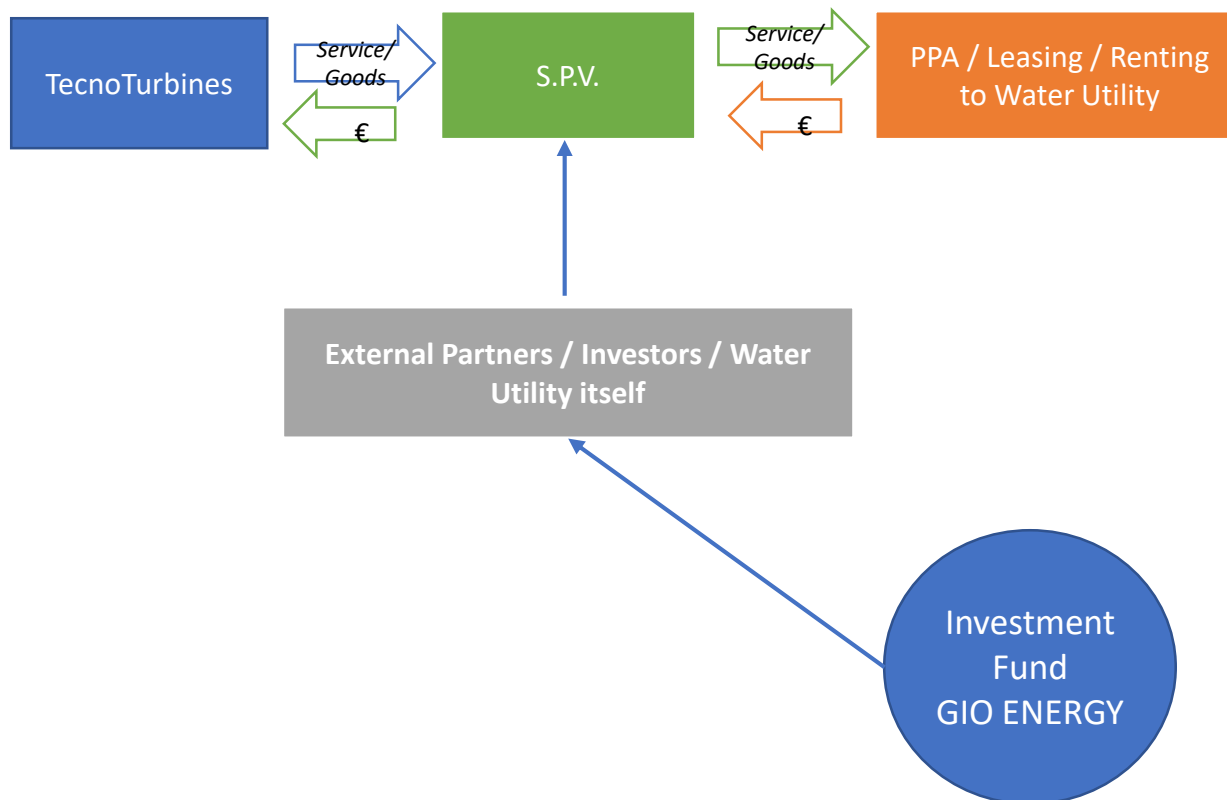
Trough Distributor



Licensing



PPA / LEASING / RENTING Trough S.P.V.



WORKING

EXPERIENCE





GRID-TIED TURBINE FOR ENERGY SELLING

Energy recovery at an irrigation distribution network.
Energy self-consumption and feed in to the grid for direct sell.



CASINOS (SPAIN)



SEPTEMBER, 2015



40 KW OUTPUT POWER



GRID TIED



HYDRO REGEN



EMISSION REDUCTION: 163Tn CO₂eq



GRID-TIED TURBINE FOR ENERGY SELLING

Energy recovery at drinking water reservoir. Energy for self-consumption and feed in to the grid for direct sell.



MANIZALES (COLOMBIA)



FEBRUARY, 2017



45 KW OUTPUT POWER



GRID TIED



HYDRO REGEN



EMISSION REDUCTION: 242Tn CO₂eq



GRID-TIED TURBINE FOR ENERGY SELLING

Energy recovery for Self-Consumption at a water treatment and pumping station plant.



PATERNA, VALENCIA (SPAIN)



MARCH, 2016



10KW OUTPUT POWER



GRID TIED



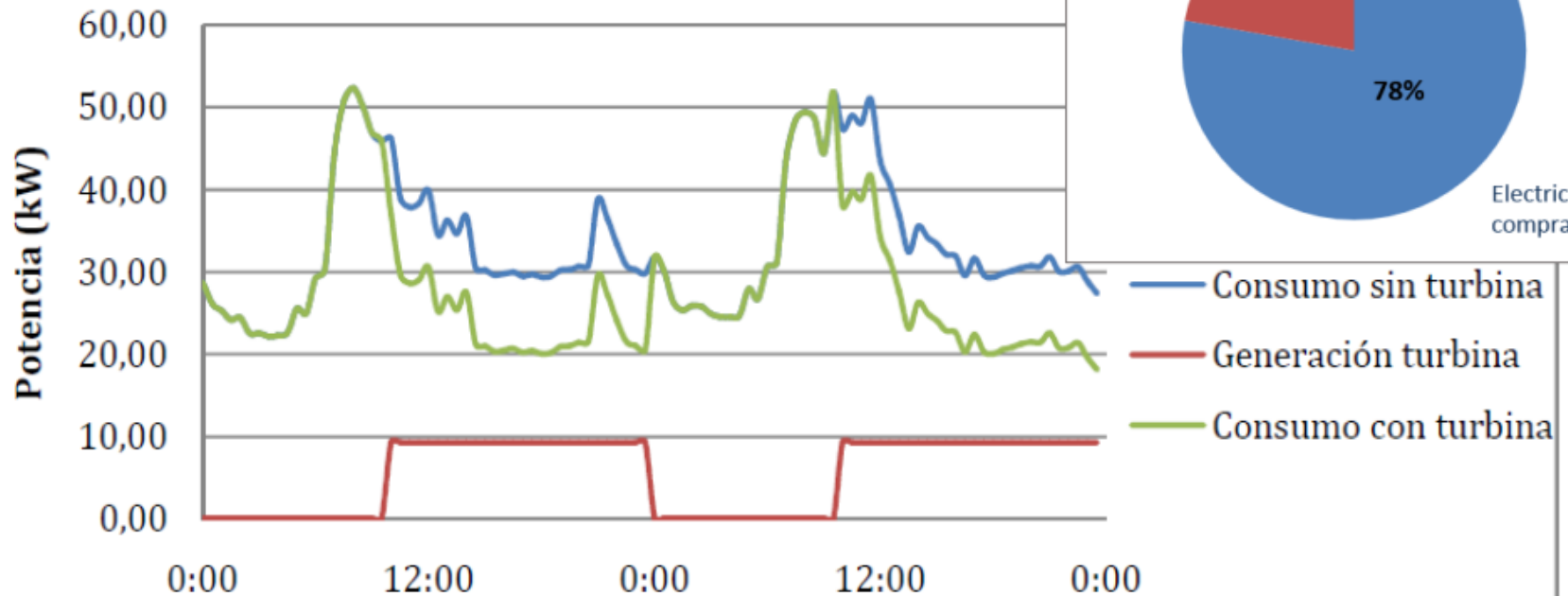
HYDRO REGEN



EMISSION REDUCTION: 44Tn CO2eq



Energía consumida en la EB La Coma





OFF-GRID TURBINE FOR WI-FI & MOBILE DEVICES CHARGING

Energy supply for a free service of mobile devices charging and free WiFi station provided by the city hall.



VILALLER, LLEIDA (SPAIN)



DECEMBER, 2016



1800KW OUTPUT POWER



BATTERY CHARGING



HE TURBINE



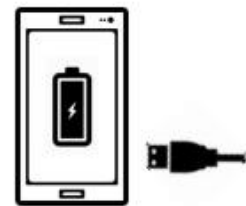
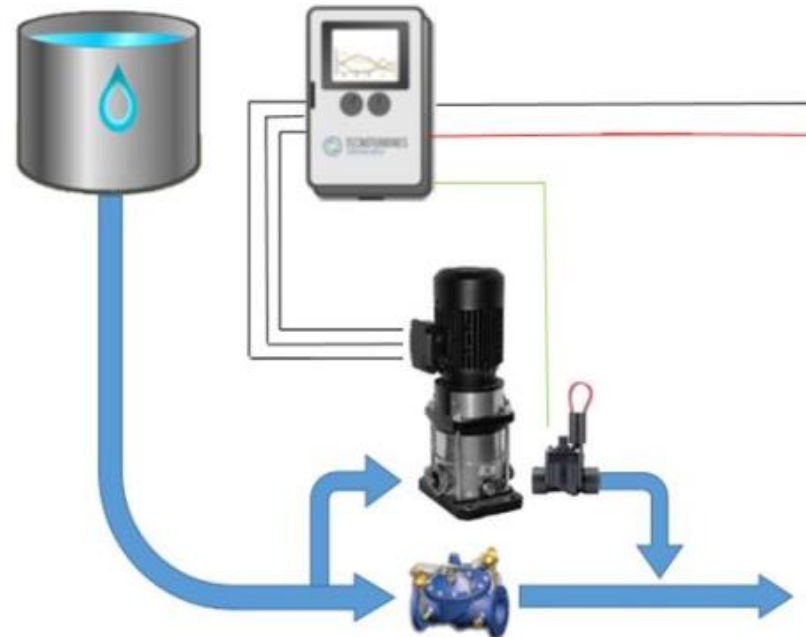
EMISSION REDUCTION: 0,661 Tn CO₂eq



TECNOTURBINES
POWERING WATER



IMPLANTACIÓN MICROTURBINA HIDRÁULICA GREEN WATER PROJECT ALTAFULLA



11.600 kWh/año

↓ 2,9 tCO₂/año

 Aigües de
Catalunya, S.A.

  d'Altafulla





OFF-GRID TURBINE FOR SELF-CONSUMPTION

Drinking Water reservoir energy supply for water treatment and remote monitoring.



LAS BORDAS (SPAIN)



PRESSURE DROP: 50 METRES



FLOW RATE: 5 LITRES / SECOND



GENERATED POWER: 850W



ISOLATED ELECTRIC POWER SUPPLY



HE TURBINE



TECNOTURBINES
POWERING WATER

OFF-GRID TURBINE FOR PUBLIC STREET LIGHTS



Energy supply for a OFF GRID LED street lights



Connecting Waterpeople

- INICIO
- MI IAGUA
- EMPRESAS
- RANKING
- MAGAZINE
- BLOGS
- EMPLEO
- EVENTOS

Aigües de Catalunya genera energía limpia gratuita para combatir el cambio climático





OFF-GRID TURBINE FOR SELF-CONSUMPTION

Drinking Water reservoir energy supply for water treatment and remote monitoring.



ARAGÓN (SPAIN)



THIRD QUARTER OF 2016



25W OUTPUT POWER



BATTERY CHARGING



PICOTURBINE



EMISSION REDUCTION: 83,16 Tn CO₂eq



TECNOTURBINES
POWERING WATER



Picoturbinas para autonomía equipos control,
instrumentación y comunicación.

25 mca ; 1'2 l/s
25 W





GRID-TIED TURBINE FOR ENERGY SELLING

Micro hydro power plant from a river diversion in Japan.



HIEKAWA (JAPAN)



MARCH, 2017



100KW OUTPUT POWER



GRID TIED



HYDRO REGEN



EMISSION REDUCTION: 485Tn CO₂eq

OUR

FACILITIES





TECNOTURBINES
POWERING WATER

R&D and Operations Center (Alicante)





Commercial and Administrative Center (Barcelona)





TECNOTURBINES

POWERING WATER

www.tecnoturbines.com