



Meet your most profitable low-head hydropower plant.

Resilient, cost-effective vortex turbines for rivers or canals with minimal height difference.

Company Overview

"The world is undergoing a revolution in terms of how we find and use energy. Old solutions are being set aside in favour of options that are **sustainable, decentralized, and financially feasible**. Due to the intermittency of wind and solar production, **hydropower is one of the most attractive and intriguing solutions** to harness energy. However, there are considerable environmental and economic issues with large dams, and with so much money needed up front for the installation, many investors and project developers cross hydropower off their list due to financial risk. While small hydropower technologies have been explored, no one has been able to create a solution for low head water channels that is both scalable globally and financially interesting.

Resilient and cost-effective, Turbulent turbines are uniquely designed without the need for a dam, for streams with **minimal height differences (<5 m)**, generating from **15 kW to 70 kW** of power per turbine. As a **scalable solution**, they can generate **up to multiple megawatts in a network of turbines**, close to the end user and with **minimal civil works and maintenance**.

Turbulent's design is **inspired by nature itself**, using vortex technology to deliver **stable and cost-effective** renewable energy without cost to the local ecosystem... and with a competitive price in comparison to other renewables and even diesel. The turbine **allows fish and debris to pass through unharmed**, keeping maintenance low, while control software keeps efficiency high. And it's easy to install, anywhere in the world. Whether in **urban, rural or**

industrial settings, Turbulent believes energy production can work together with nature to satisfy growing **global energy demands**, and has finally created the solution that investors and developers can be confident in.

Turbulent will become a partner in your projects, helping you assess the feasibility of your site with modern tools and tested methods. We will design the project, produce the core units and provide monitoring support after installation."



Dr. Walter J.R. Buydens
Turbulent CEO

Our technology was designed with the collaboration of several Universities and recognized by MIT for its promising innovations.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 873765.

Our Technology

Thanks to the nature-inspired design of the vortex turbine, the rotor is resistant to debris up to 10 cm in diameter and the complete system requires only a small amount of maintenance.

Silent Submersible Generator

Premium efficiency Generator and Gearbox designed for 24/7 operation.

Sluice Gate

Automated or manual sluice gate to control flow.

Trash Rack

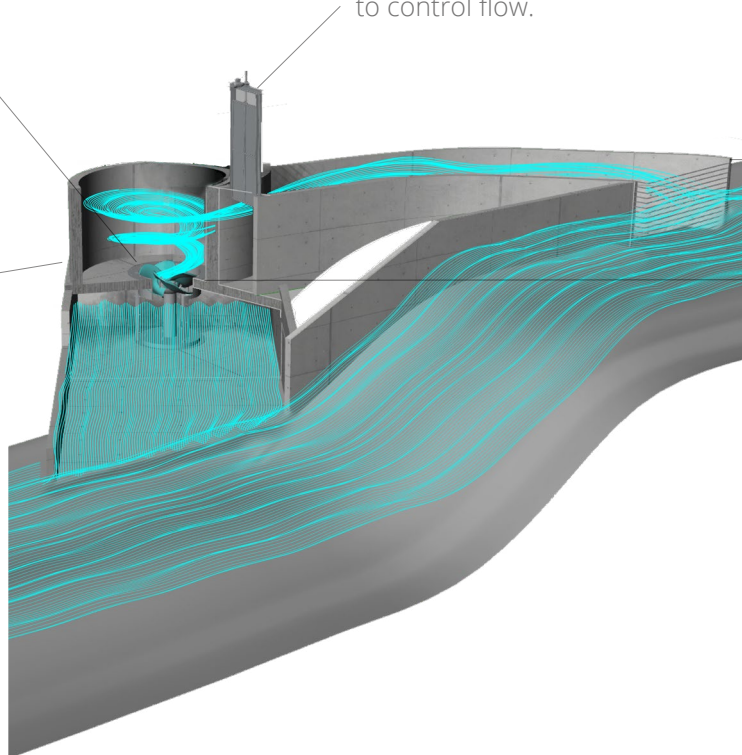
Protective trash rack for large debris. Small debris can safely pass, minimizing the risk of blockage.

Fish-Friendly Basin

The unique basin shape turns the incoming flow into a low-pressure vortex, allowing aquatic life to pass unharmed.

Rotor

Safe for the aquatic life thanks to the low RPM.



Values Per Turbine*



Power
15 - 70 kW



Payback
4 - 8 years**



Flow
1,5 - 5 m³/s



Head
1,5 - 3 m

*Clusters of Turbines can be installed.

**Depending of prices in local market.

Scalable low-head Hydropower plant

Turbulent hydropower plants use the gravitational energy of continuous water from rivers or canals with small drops to power a hydroelectric vortex turbine.

Turbulent low-head hydropower plants can be installed in locations with a minimal flow of 1.5 cubic meters per second and as little as 1.5 to 3 meters of height difference per turbine to deliver 15 to 70 kilowatts of continuous, reliable green energy on-site.

Moreover, for sites with **more height differences** and flow, an **interconnected** system of these turbines can be installed to generate up to **multiple megawatts** of power.

This solution is ideal for off-grid electrification of rural areas, and industrial areas nearby an electricity line where the energy surplus can be sold to the local grid.

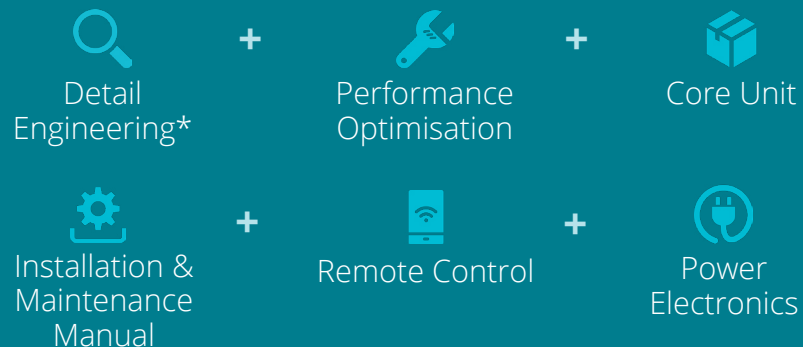


Turbulent turbines are made in Europe using world-renowned manufacturers and components to provide the highest quality in every turbine.



- | | |
|---|---|
| 1 Inlet canal: Trash rack & sluice gate | 4 Outlet canal |
| 2 Bypass canal (with local materials) | 5 Power electronics |
| 3 Turbine | 6 Transmission lines, on-grid community |

Included in On-Grid Package:



Not included:

- Civil works

What We Can Offer Optionally:



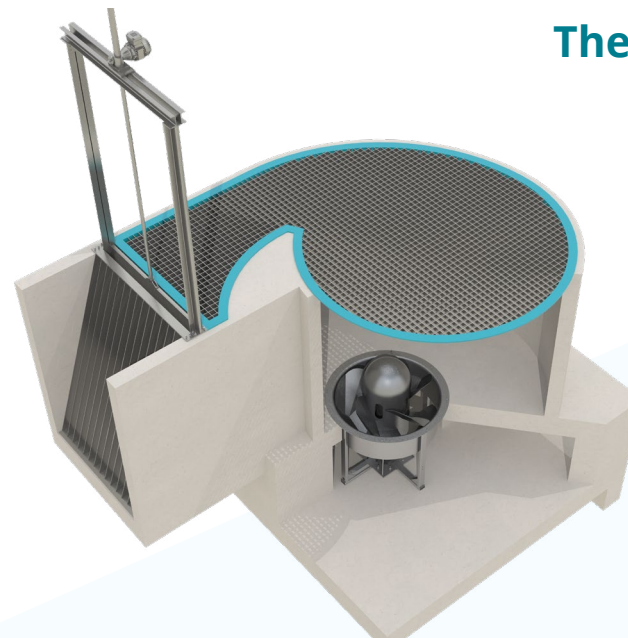
* delivered by feasibility study: inlet, outlet and basin design, blueprint for trash rack and sluice gate

Advantages of our Vortex Turbine

- 15 to 70 kW of continuous power **per unit**
- They can produce **100.000 kWh to several MWh per year**
- A whole unit **fits** inside **20ft container**
- **Fast and easy** installation with a small crane
- Extremely **low maintenance**: 1,2-1,5% of CapEx
- **High ROI** thanks to low Levelized Cost Of Energy (LCOE)
- It can produce green **energy 24h a day, 365 days a year**

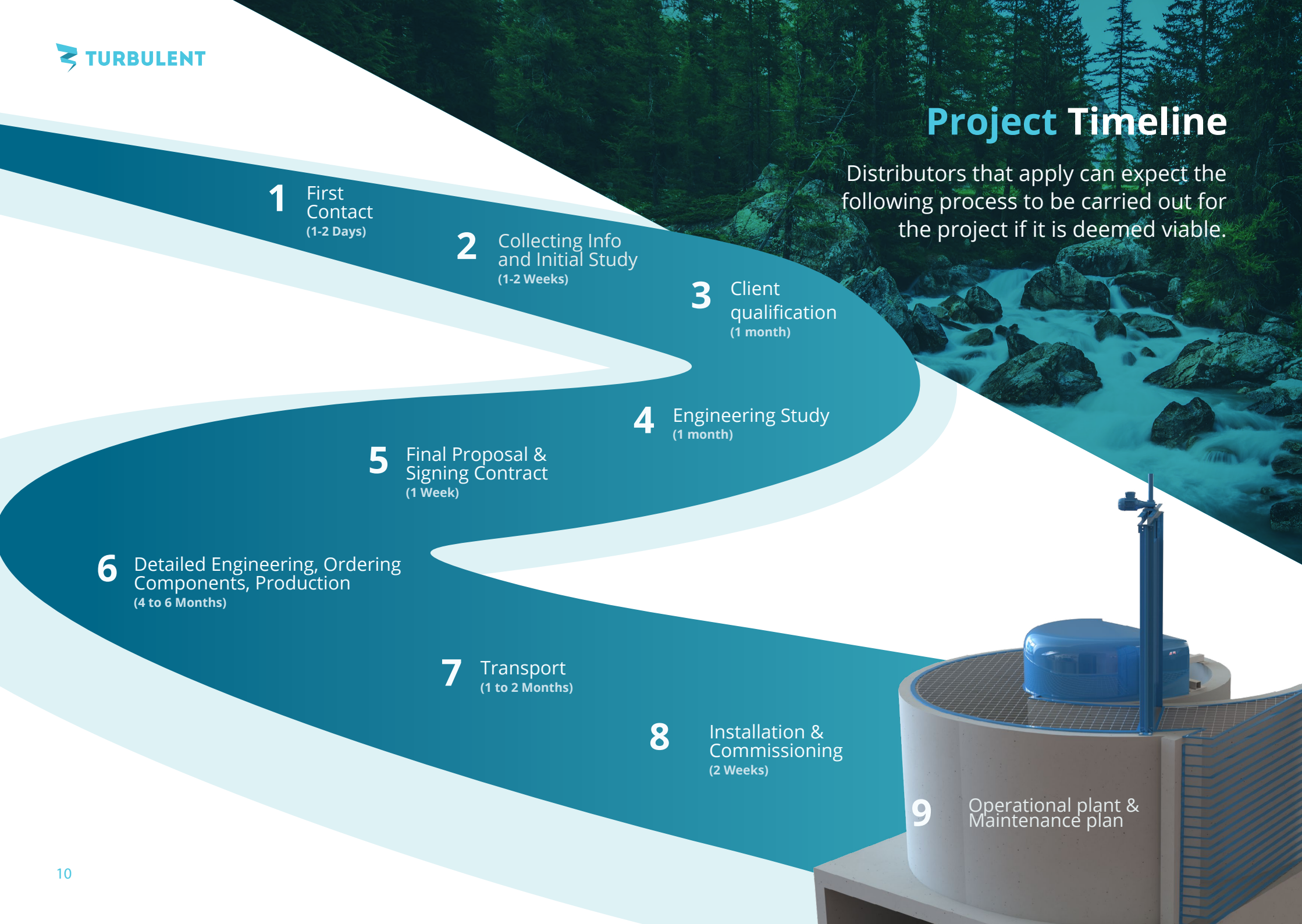
The Core Unit Includes

- Hub and blades made from stainless steel AISI 304
- Premium efficiency generator
- Robust gearbox
- Stainless steel frame for the turbine
- Controls for sluice gate at entrance of turbine
- Control system for the automatization of the power plant



Project Timeline

Distributors that apply can expect the following process to be carried out for the project if it is deemed viable.

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- The diagram illustrates a 9-step project timeline. A large, dark blue, wavy shape resembling a river flows from the top left towards the bottom right. Each step is represented by a white number and text placed within this shape. The steps are: 1. First Contact (1-2 Days), 2. Collecting Info and Initial Study (1-2 Weeks), 3. Client qualification (1 month), 4. Engineering Study (1 month), 5. Final Proposal & Signing Contract (1 Week), 6. Detailed Engineering, Ordering Components, Production (4 to 6 Months), 7. Transport (1 to 2 Months), 8. Installation & Commissioning (2 Weeks), and 9. Operational plant & Maintenance plan. In the bottom right corner, there is a 3D rendering of a circular industrial tank with a blue motor on top and a blue staircase on the side, set against a background of a forest and a stream.
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(1-2 Days)
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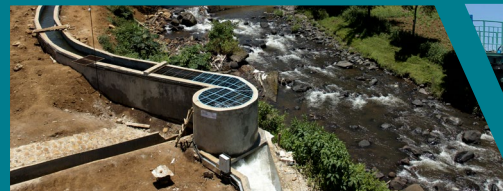
ONGOING AND SUCCESSFUL PROJECTS

Around the world.

Turbulent is currently engaging in distributor and development partnerships in selected strategic regions.

Together, we are working to build projects of a minimum of 250 kW, aiming to contribute to the energy transition goals and to provide universal access to energy.

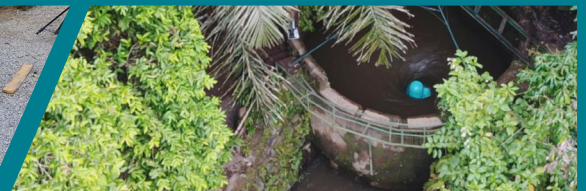
130 kW Murang'a, Kenya



100 kW Taiwan



15 kW Donihue, Chile




13 kW Bali, Indonesia

Technical Details

The vortex turbine blades are optimized to perform best in a well-defined range of flows and heads. Due to the open flow nature of the vortex turbine, it is critical to carefully select the head and flow combination that will guarantee the best performance at design and part flow operations at every site.

Standard turbine impeller dimensions range from 1.3 to 1.9 meters and the standard electrical power outputs range from 15 to 70 kW. To address higher power demand, all standard models can be combined and installed in clusters.

Scan to download the technical specifications of our turbines.



Vortex turbine models 15 to 70 kW		Unit
Flow min. ... max.	1.5 ... 5(*)	m³/s
Head min. ... max.	1.5 ... 3(*)	m
Impeller speed min. ... max.	50 ... 120	rpm

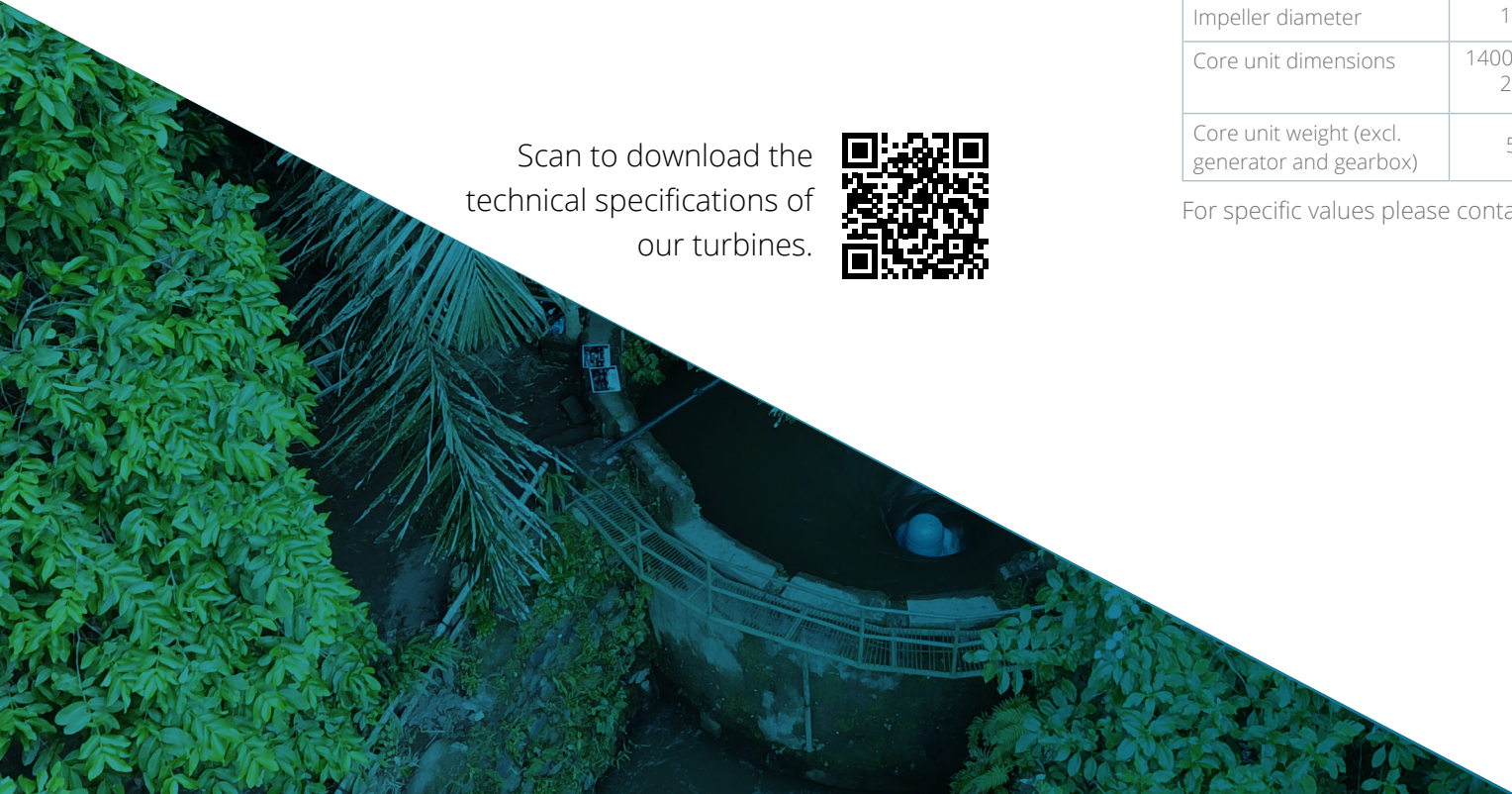
For a standard model, single turbine*

Turbine models by power	15 kW	30 kW	50 kW	70 kW	Unit
Electrical output	15	30	50	70	kW
Typical energy generation per year	100.000	200.000	350.000	500.000	kWh
Nominal flow (*)	1.7	2.7	3.9	4.7	m³/s
Nominal head (*)	1.7	1.9	2.3	2.7	m
Generator and gearbox weight	350	750	950	1300	kg

A wide range of head and flow combinations is available; the table lists typical values.*

Turbine models by size	1.3m	1.5m	1.7m	1.9m	Unit
Impeller diameter	1300	1500	1700	1900	mm
Core unit dimensions	1400x1400x2150	1600x1600x2300	1850x1850x2500	2050x2050x2550	l x w x h (mm)
Core unit weight (excl. generator and gearbox)	500	650	950	1100	kg

For specific values please contact us*





HEAD OFFICE:

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**Do you have a project?
Don't hesitate to contact us!**

Scan our QR Code or contact us via
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