

INNOVATIVE TECHNOLOGY

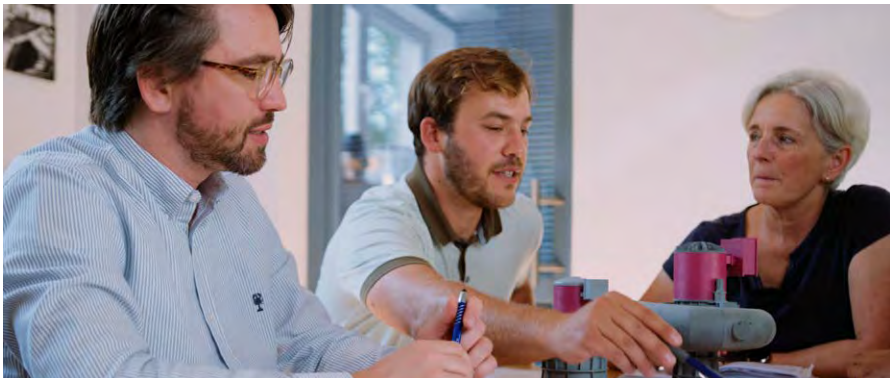


DIVETurbinen
GmbH & Co. KG

TRADITION AND INNOVATION FOR OVER 60 YEARS

DIVE Turbinen GmbH & Co. KG has existed since 2012 as a spin-off of FELLA Maschinenbau GmbH in Amorbach, Germany. We develop innovative technical solutions for hydropower plants around the world. In addition, we offer our clients customised planning and development of compact turbine systems designed to meet the highest standards of reliability, efficiency and ecological sustainability. We support our customers throughout all project phases – from the initial idea and approval process to realisation, plant support and operational management. Both companies are based in Amorbach, Germany, and continue to work in close cooperation, with FELLA Maschinenbau GmbH serving as the main supplier of all high-quality mechanical components. This ensures the consistently high quality of our production and products.

Our strong foundation is further strengthened by long-term cooperation with a local generator manufacturer located just 10 km from our headquarters. Together, we have developed, tested and brought into series production a variable-speed turbine. This patented and unique solution enables particularly fish-friendly operation, a technically simple and therefore robust system design, and a high degree of adaptability to varying hydraulic conditions.



This is where German engineering expertise meets precise manufacturing. Our solutions allow for modernisations and new installations that would often only be feasible with conventional concepts through extensive structural modifications. The close partnership structure ensures that all turbines supplied by DIVE Turbinen GmbH & Co. KG are “Made in Germany” and meet the highest quality standards expected by our customers worldwide.



OUR COMPANY

01

OUR COMPANY | 01

THE DIVE TURBINE | 02

MODERNISATION | 03

LOW HEAD APPLICATIONS | 04

PRESSURE CHAMBER | 05

MEDIUM HEAD APPLICATIONS | 06

IN-PIPE APPLICATION | 07



DIVE TURBINE

02



DIVE IN AN OVERVIEW

The DIVE-Turbine is a modern hydropower solution designed for low to medium head sites, delivering up to 5 MW per unit. It combines high efficiency, environmental sustainability, and low maintenance in a compact, cost-effective system. The DIVE-Turbine is a turbine, directly connected to a fully sealed, water-cooled generator. Its direct-drive design reduces mechanical complexity, eliminates the need for a gearbox, and ensures low maintenance.

The entire unit can be installed underwater, which removes the need for a powerhouse and significantly lowers construction costs. Thanks to its compact and modular design, the system is well-suited for both new installations and retrofitting existing sites. Quiet, low-impact, and efficient, the DIVE-Turbine sets a new standard for sustainable small and medium-scale hydropower.

PATENTED DIVE-SEALING

According to the principle of the diving bell the turbine-generator unit of the DIVE-Turbine encapsulates the volume of air to keep the generator and bearing components completely dry. This volume of gas prevents water from rising to critical heights inside the generator. The patented DIVE-Sealing system provides a low-maintenance, fully submerged operation. Unlimited lifetime!

DOUBLE REGULATED - HIGH YIELD

The DIVE-Turbine with double regulation (variation of the speed and adjustment of the guide vanes) enables energy production with the best efficiency in all operating ranges.

RANGE OF APPLICATION

The DIVE-Turbine has an operating range from 5% to 100% of the nominal discharge. Furthermore, the DIVE-Turbine operates at a variation of -70% to +50% of its nominal head without risk of cavitation. This enables the DIVE turbine to operate with maximum flexibility and reliability under a wide range of operating conditions.

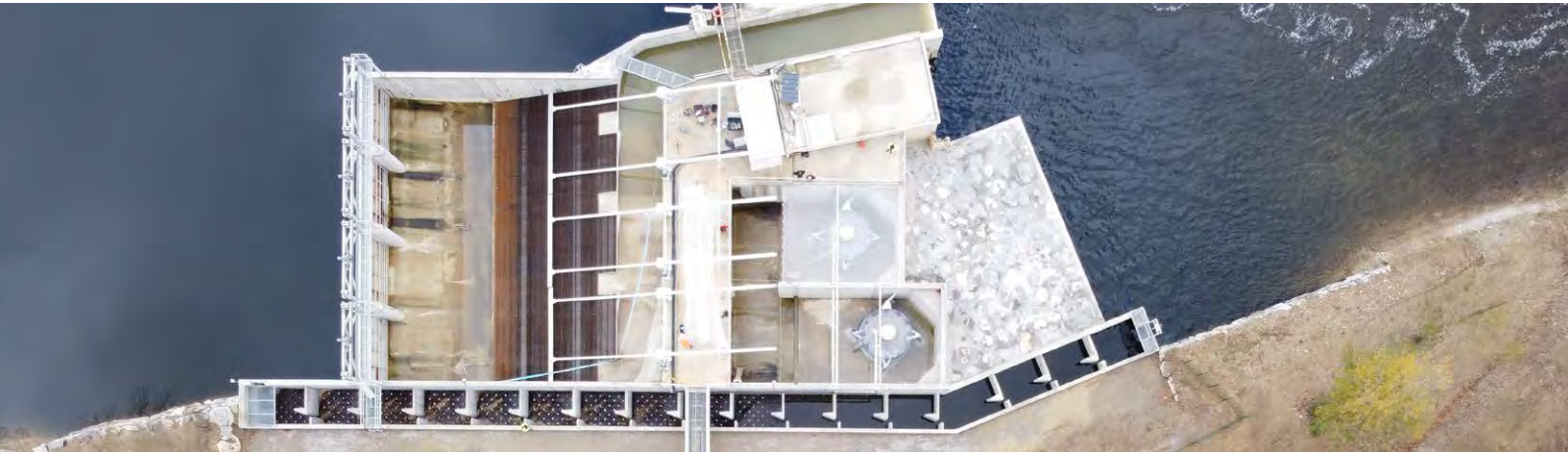
Principle of the diving bell

The first diving bells were built in the 4th century to conquer the seabed. The principle is to submerge a water- and gas-tight bell that encloses a volume of air. The air remains inside the bell, ensuring a dry interior.



FISH PROTECTION TURBINE

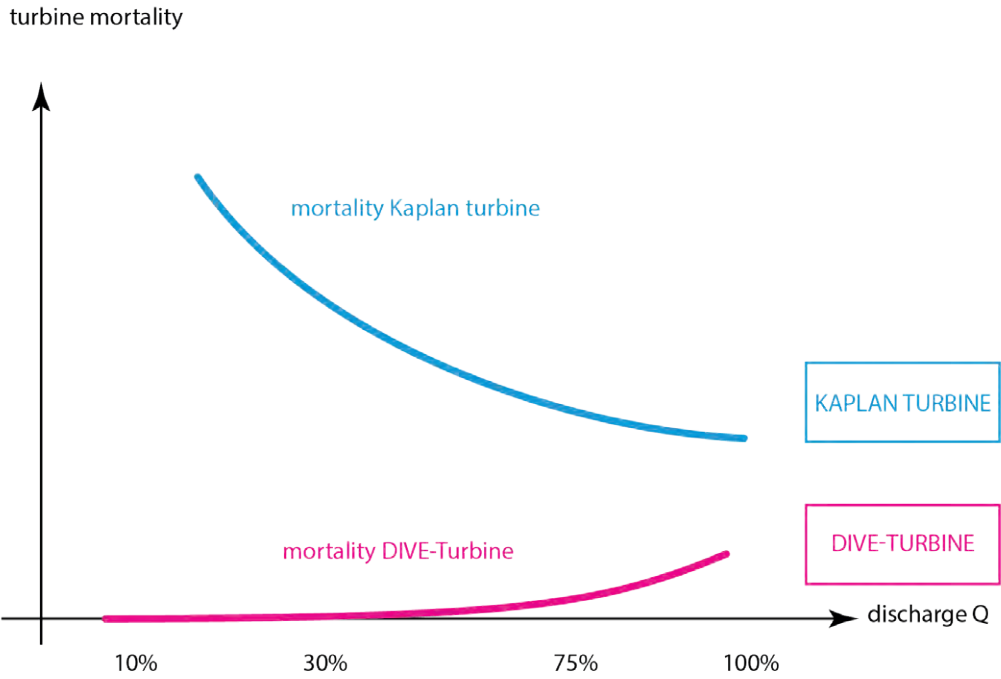
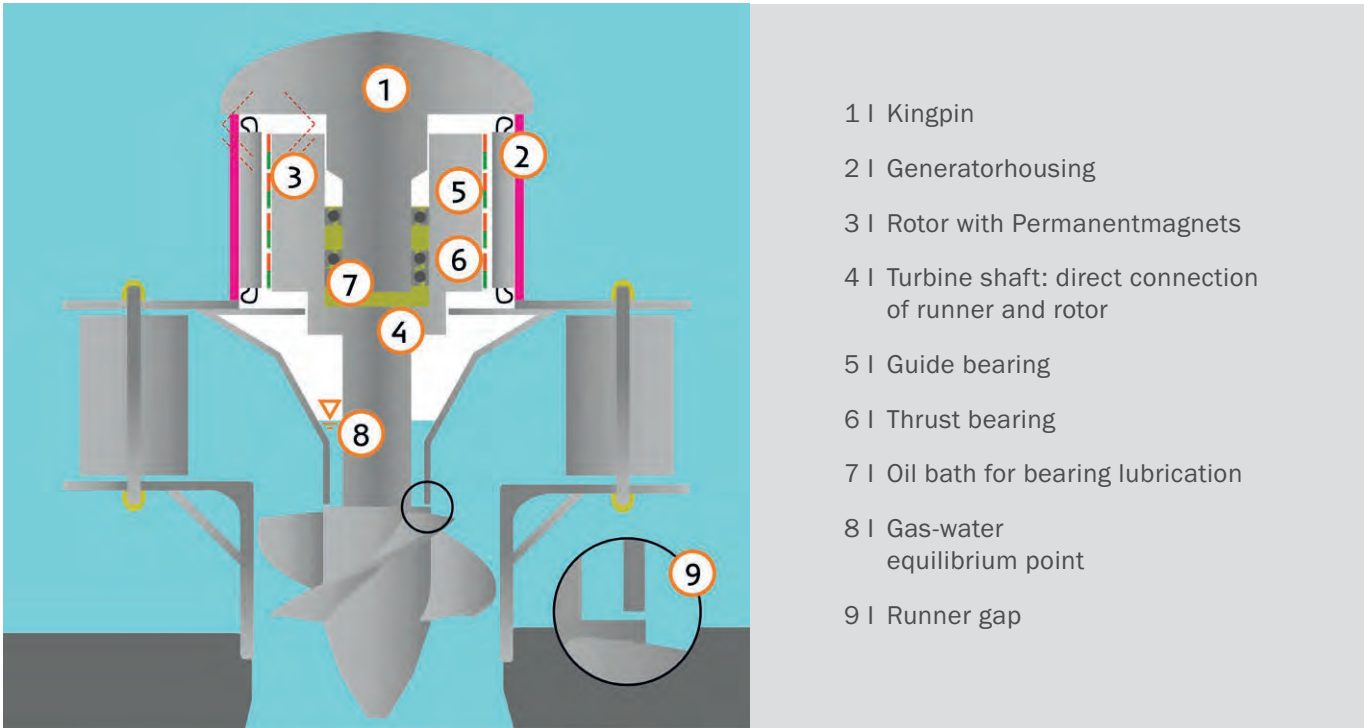
The DIVE turbine features a fish-protective design. DIVE-Turbines generally have fixed runner blades and a runner diameter up to 1.2 times larger than comparable turbines. The speed is correspondingly slower at full load and is significantly reduced at partial load. Due to these characteristics, fish have a minimal risk of collision with rotating parts.



SIGNIFICANCE OF SPEED VARIATION

The speed variation reduces the speed of the turbine as the flow decreases. This achieves a hydraulically similar effect to the mechanical adjustment of the runner blades in Kaplan turbines with comparable efficiencies.

The runner blades of the DIVE-Turbine are fixed to the hub and are always fully open. The mortality curve shown below demonstrates the considerable advantages of the DIVE-Turbine, especially in the partial load range.



TIME FOR MODERNISATION

The DIVE-Turbine is a smart and sustainable solution for upgrading existing hydropower plants. Its compact, design allows for easy integration into existing infrastructure, often without the need for major civil works. By eliminating the need for a powerhouse and using a gearless direct-drive system, the turbine reduces both construction and maintenance costs.

With high efficiency across a wide range of flow conditions and excellent performance even at partial loads, the DIVE-Turbine significantly improves energy output. Its fish-protective, environmentally compliant design also makes it ideal for modernizing older plants to meet current ecological standards.

Already proven in numerous retrofit projects across Europe, the DIVE-Turbine offers a future-proof path to cleaner, more reliable hydropower.

MODERNI- SATION

03



MODERNISATION ULTRA-COMPACT DESIGN

The compact design of the DIVE-Turbine allows easy and space-saving installation in existing structures. Our compact and fully submersible permanent magnet generator is directly connected to the hub of the runner. This eliminates the need for a mechanical gearbox (minimal noise and vibration) and a generator room. The turbine and generator unit has only one interface with the building structure, the draft tube flange.



TURBINE MODERNIZATION CAMELBACK TURBINE

DIVE-Turbines are particularly suitable for the replacement of old Camelback turbines. The new DIVE-Turbine is integrated into the existing turbine chamber of the old Camelback turbine with minimal construction effort.

Our engineers adapt the new solution to the existing turbine chamber and thus achieve maximum efficiencies. Depending on the design, in combination with the old draft tube or with a new draft tube. In recent years, we have successfully realized many projects of this kind.



LOW HEAD APPLICATIONS

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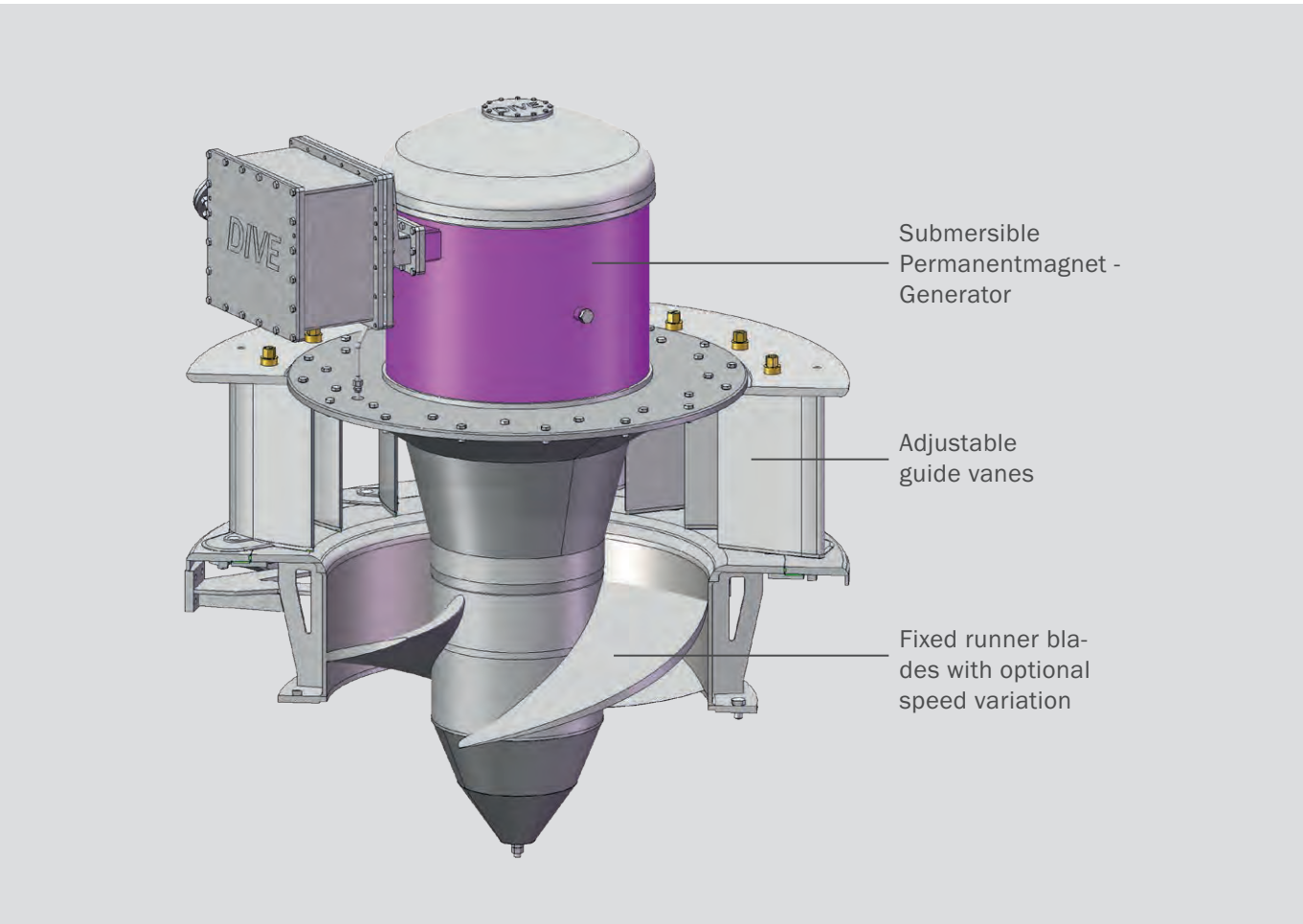
UNIQUE DESIGN MAXIMUM ANNUAL YIELD

The turbine is particularly well suited for low-head applications in the construction of new hydropower plants, as well as for the modernization and reactivation of existing facilities. It enables an efficient increase in the performance of existing power plants and can be integrated into existing weir systems, structures, irrigation channels, thermal plants, or cooling circuits with minimal structural effort. It is also suitable for use in fish-friendly and ecological flow hydropower plants as well as in pressurized and open-channel systems.

DIVE-TURBINE

FOR LOW HEAD APPLICATIONS

The DIVE-Turbine with fixed runner blades was specially developed for low head applications. The turbine design ensures the maximum possible annual yield. Due to the unique design and high quality, all DIVE-Turbines are los-maintenance for 20 years.



RANGE OF USE FROM 5% TO 100% OF NOMINAL FLOW RATE

RANGE OF APPLICATION FROM -70% TO +50% OF THE NOMINAL HEAD

20 YEARS MECHANICAL LOW-MAINTENANCE

FISH-PROTECTIVE DESIGN

MINIMAL SOUND AND NOISE EMISSIONS

COMPLETELY SUBMERGED - NO BUILDING CONSTRUCTION/POWER-HOUSE - FLOOD SAFE

HIGH RESISTANCE TO ABRASION

RUNAWAY PROOF TURBINE-GENERATOR-UNIT - NO DANGER AT RUNAWAY SPEED

A cross-section diagram of the DIVE-Turbine installed in a river. The diagram shows the turbine's components and their connection to a power plant control, inverter, and grid connection. The components are numbered 1 through 5.

- 1 | Runner with fixed runner blades
- 2 | Guide vanes
- 3 | Permanentmagnet - Generator
- 4 | Draft tube
- 5 | Power plant control, inverter and grid connection

FACTS	HEAD	DISCHARGE	CAPACITY
	2 m - 20 m	2 m³/s - 40 m³/s per Turbine	100 kW - 5 MW per Turbine

PRESSURE CHAMBER

05

COMPACT POWER IN A PRESSURE CHAMBER

The DIVE-Turbine with pressure chamber is the ideal solution for hydropower projects with heads between 3 and 30 meters. Specially optimized for horizontal connection to a penstock, this configuration offers maximum efficiency in a minimal footprint.

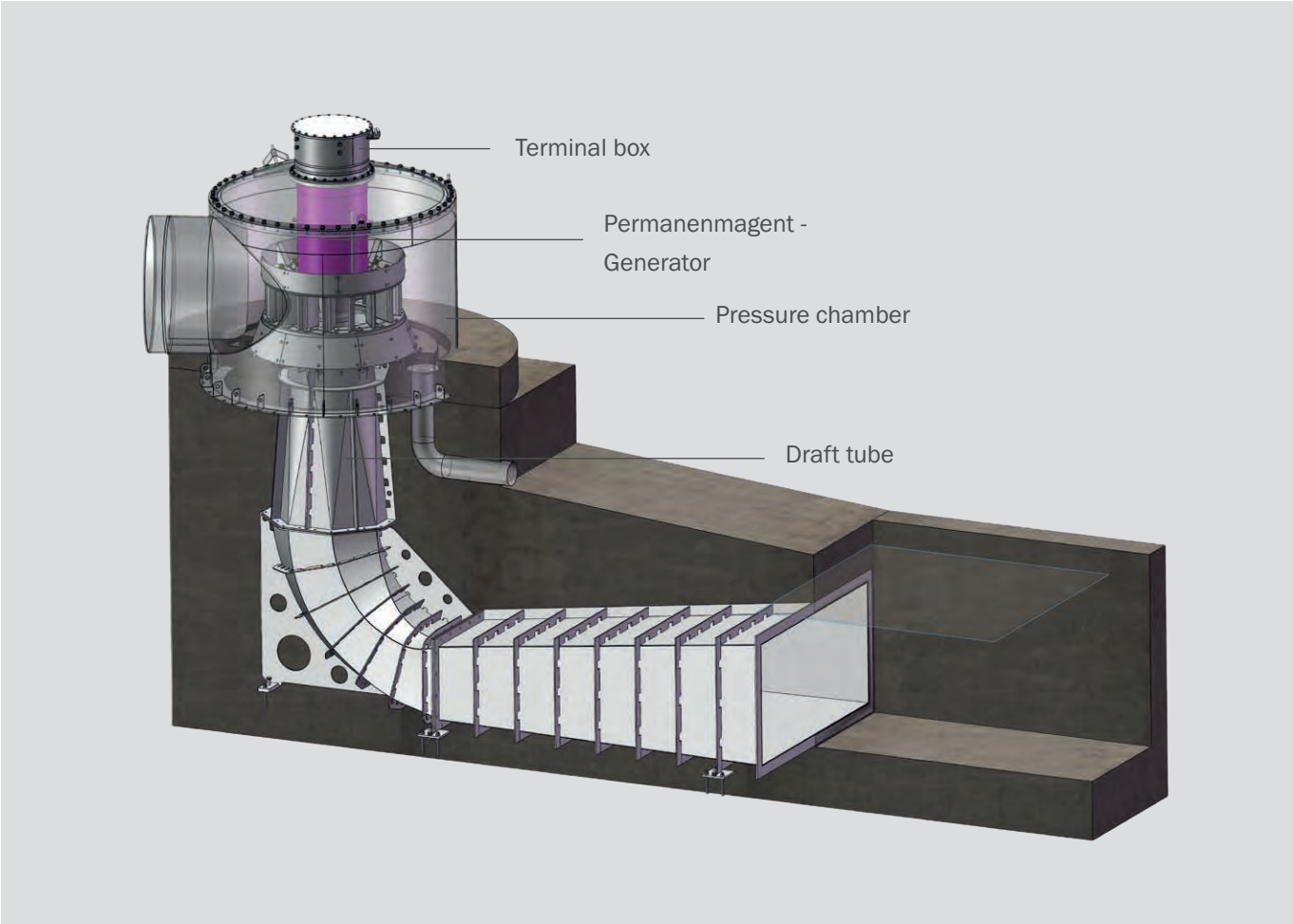
The fully integrated turbine-generator unit is completely submerged, eliminating the need for a traditional powerhouse. Thanks to its gearless direct-drive system, the DIVE-Turbine ensures low maintenance, high reliability, and long-term performance—even in demanding environments. Its watertight, water-cooled generator is surrounded by water, guaranteeing efficient heat dissipation and making the unit completely flood-proof.

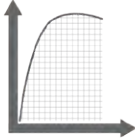


EFFICIENT. RELIABLE.
COST-EFFECTIVE.

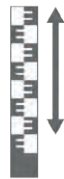
The DIVE-Turbine in pressure chamber design is engineered to reduce total cost of ownership (CAPEX and CTO) without compromising performance. Its compact and robust design allows for cost-efficient installation, especially in underground or confined locations.

By eliminating the need for a powerhouse and external cooling systems, construction and operational expenses are significantly reduced. Proven in numerous projects, the DIVE-Turbine delivers sustainable, low-maintenance hydro-power in a clean, modern format—ideal for the future of energy.





RANGE OF USE FROM
5% TO 100% OF NOMINAL
FLOW RATE



RANGE OF APPLICATION
FROM -70% TO +50% OF
THE NOMINAL HEAD



20 YEARS MECHANICAL
LOW-MAINTENANCE
AND FLOOD SECURE



COMPLETELY SUBMERGED
- NO BUILDING
CONSTRUCTION/POWER-
HOUSE - FLOOD SAFE

FACTS	HEAD	DISCHARGE	CAPACITY
	3 m - 30 m	2 m³/s - 40 m³/s per Turbine	100 kW - 5 MW per Turbine



MEDIUM HEAD APPLICATIONS

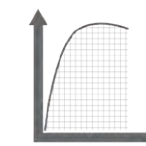
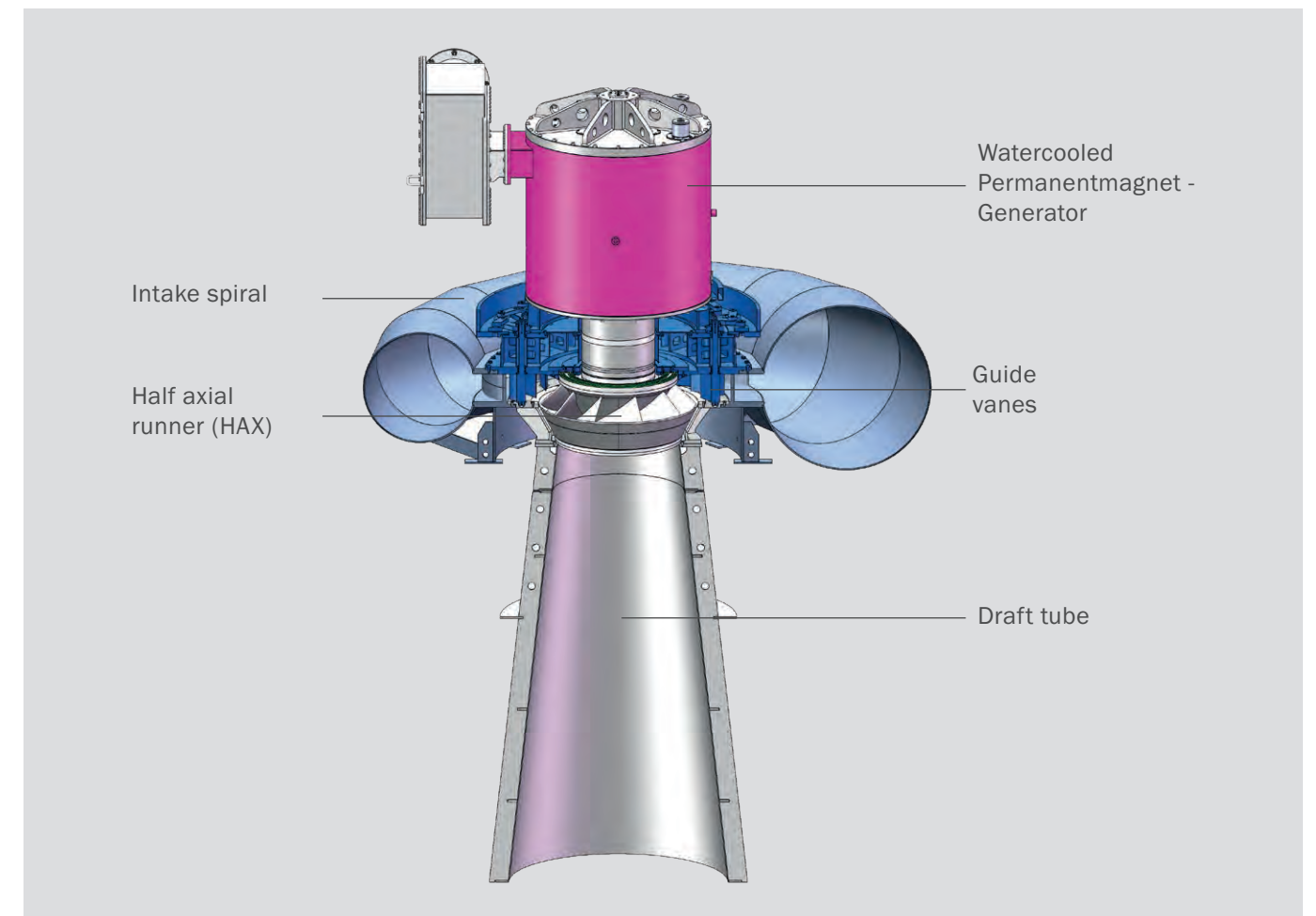
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DIVE-HAX TURBINE: **EFFICIENT POWER FOR MEDIUM HEADS**

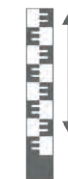
The DIVE-HAX is a compact half-axial turbine designed for heads from 20 to 120 meters. It features double regulation through adjustable guide vanes and variable-speed operation, ensuring maximum efficiency across a wide range of flow and head conditions.

The direct-drive permanent magnet generator reduces mechanical complexity and maintenance, while the compact design allows easy integration into space-constrained or remote locations.

This makes the DIVE-HAX a flexible and future-ready solution for modern medium-head hydropower.



RANGE OF USE FROM
5% TO 100% OF NOMINAL
FLOW RATE



RANGE OF APPLICATION
FROM -70% TO +50% OF
THE NOMINAL HEAD



20 YEARS MECHANICAL
LOW-MAINTENANCE
AND FLOOD SECURE



PERMANENT MAGNET
GENERATOR - NO GEARBOX

SAFETY, SIMPLICITY AND SMART DESIGN

The DIVE-HAX-Turbine stands out by its unique turbine, bearing, and generator design.

The patented DIVE-Sealing allows full floodability of the entire unit, protecting all key components in case of extreme flood events. This feature also enables direct installation at the river course—even without a turbine building. Efficient, safe, and easy to install, the DIVE-HAX is redefining the standards for hydropower in the medium head range.

FACTS

HEAD
10 m - 120 m

DISCHARGE
0,6 m³/s - 20 m³/s
per Turbine

CAPACITY
100 kW - 5 MW
per Turbine

IN-PIPE APPLICATION

07

THE NEW GENERATION OF HYDROPOWER SOLUTIONS

The DIVE-COAX turbine is designed for maximum efficiency and minimal structural effort. It operates without the need for a powerhouse and is installed directly in a vertical penstock.

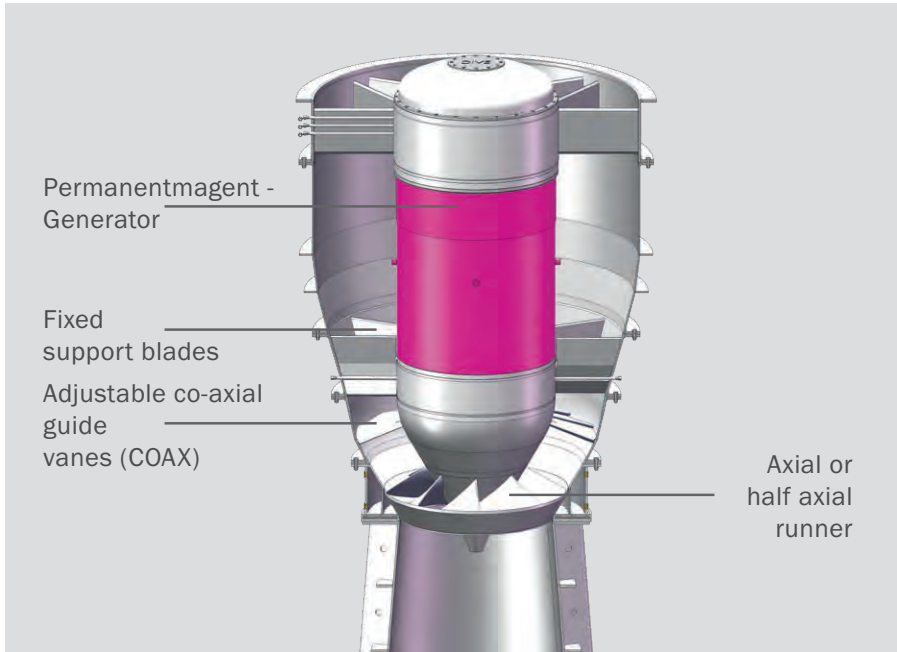
The DIVE-COAX turbine represents a new generation of hydropower solutions – efficient, environmentally friendly, and cost-effective.



DIVE-COAX TURBINE

THE „IN-PIPE“ SOLUTION

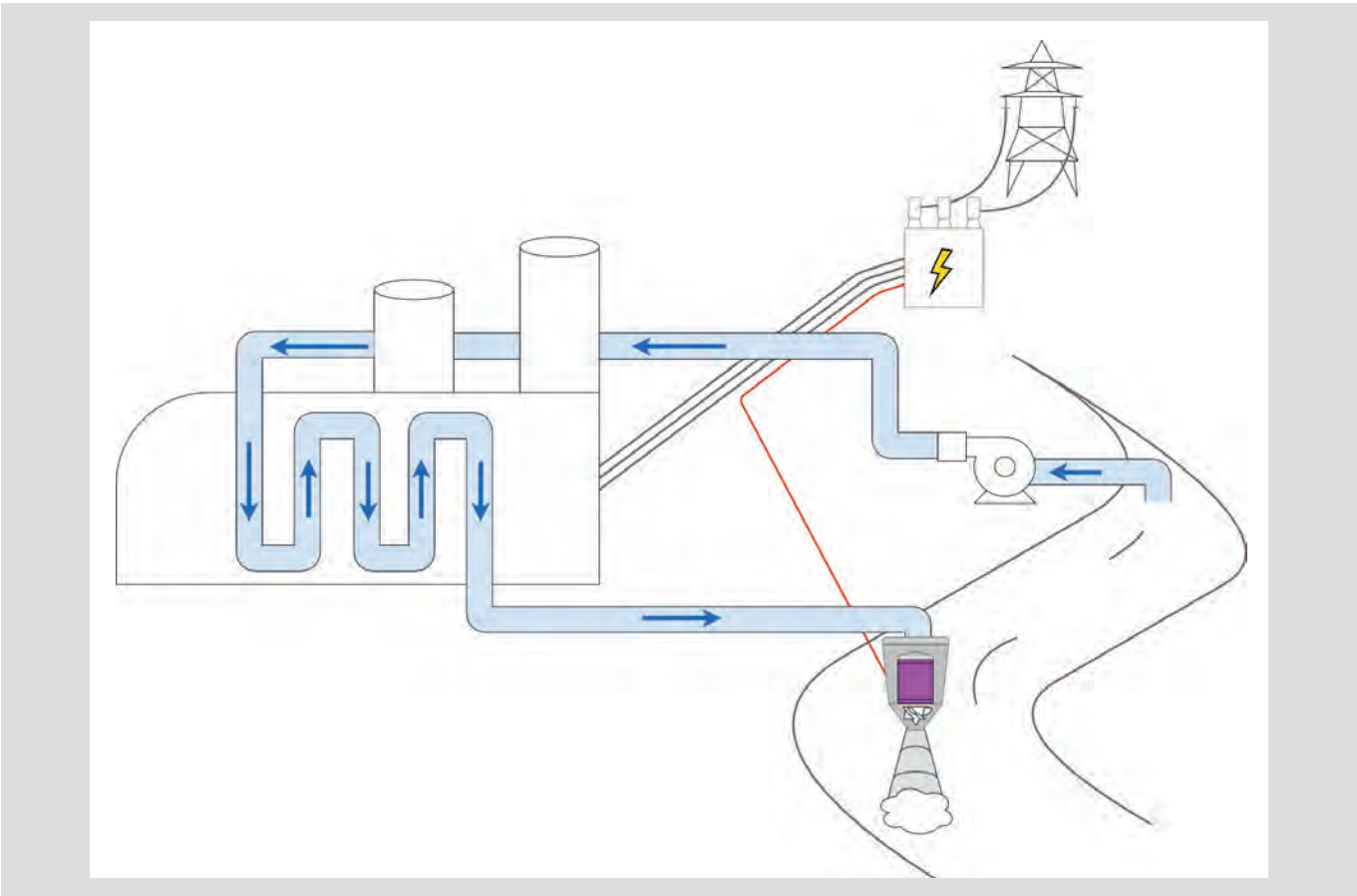
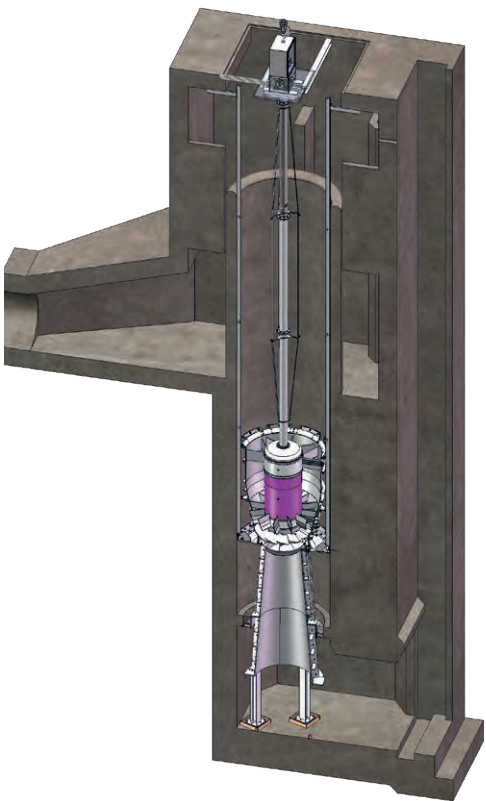
The DIVE-COAX-Turbine is designed for integration into pipe systems. It is the ideal alternative to the classic Z-Type, SAXO and in-pipe turbines as well as a replacement for turbines of similar design (pump turbines). It can be integrated into existing pipe systems, or other outlets (e.g. ecological minimum discharge) with minimal effort. The DIVE-COAX-Turbine is double-regulated via the adjustable guide vanes and the speed control. The special feature are the co-axial guide vanes (COAX), which can be combined with both the classic axial DIVE runner (up to approx. 10 m head) and the half-axial runner (HAX) (from approx. 10 m).



FACTS	HEAD	DISCHARGE	CAPACITY
	5 m - 120 m	0,6 m³/s - 20 m³/s per Turbine	100 kW - 5 MW per Turbine

ENERGY RECOVERY

A requirement for energy recovery in the outlets of existing systems is the avoidance of backwater in the outflow. Due to the runaway proof design of the DIVE-Turbine, the outflow is always possible! When the turbine is switched off, the guide vanes are opened and thus allow a continuous discharge. Due to the DIVE-Sealing, permanent operation in salt water is also possible. This means that DIVE-Turbines can be used in all outlets with at least 2.00 m head and from approx. 0.60 m³/s discharge. No matter if connected to existing hydroelectric power plants, ecological residual water outlets, cooling systems, sewage treatment plants, mines, industrial plants, etc.! The DIVE-COAX-Turbine can be integrated into an existing system with little to no changes, as shown below using the example of a cooling circuit. An example for the installation of a DIVE-COAX-Turbine in the cooling circuit of a gas-fired power plant. The head potential in the outlet of the cooling circuit is between 5 m and 13.50 m, depending on the water level in the outlet of the turbine. With a maximum discharge of 4.50 m³/s, up to 500 kW of electrical energy can be generated.





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