
Strojírny Brno®
WATER TURBINES AND HYDRO-MECHANICAL EQUIPMENT

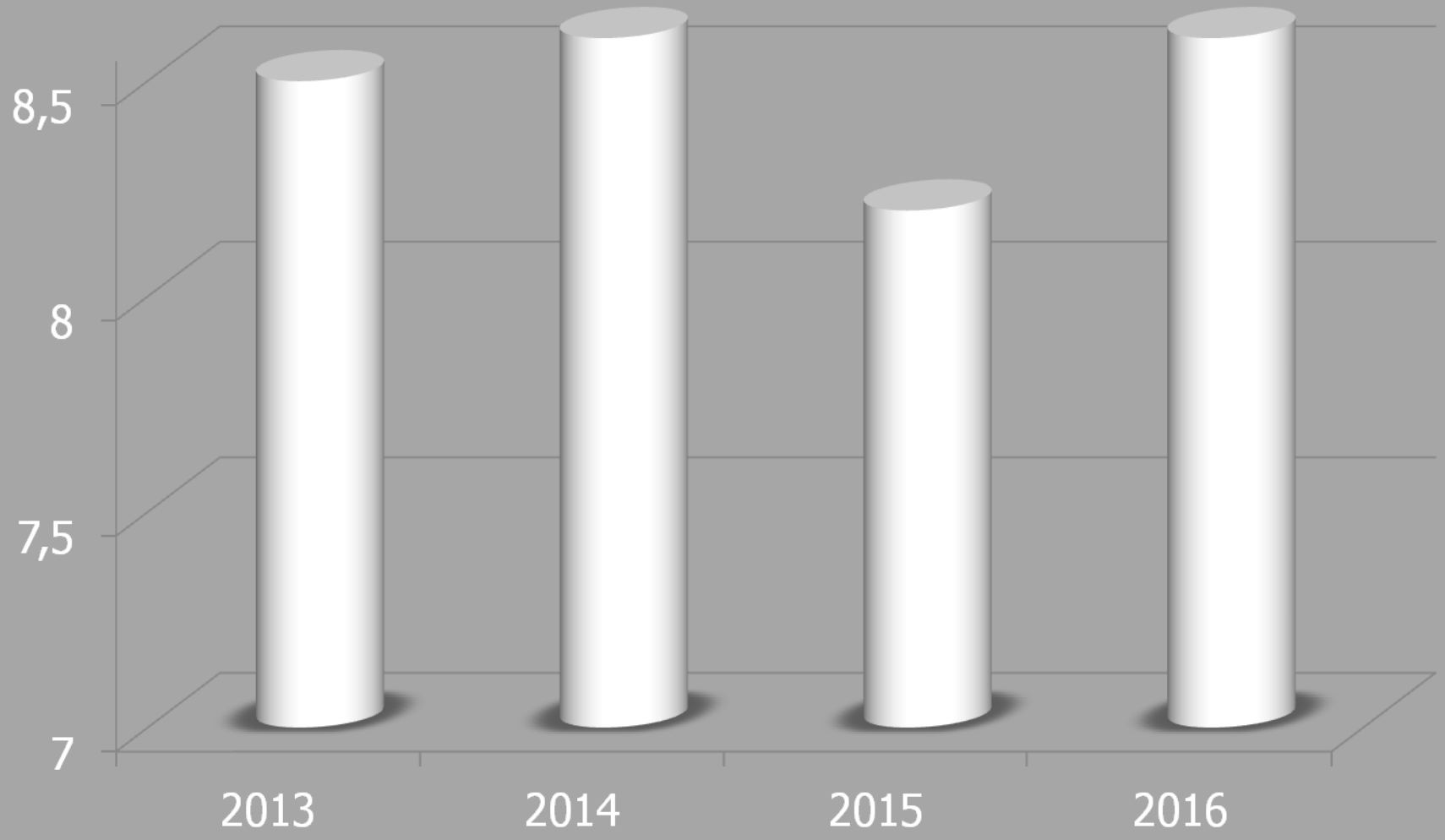
Strojírny Brno company is renowned Czech manufacturer of Water Turbines and Hydro-mechanical Equipment for reliable and safe operation and control of hydro power plants.

Besides Designing, Manufacturing, Supervision, Testing, Commissioning and Servicing of a new Water Turbines and auxiliary equipment. Rehabilitations, Overhauls and Up-grading of existing hydro power technologies are also an important part of our activities.

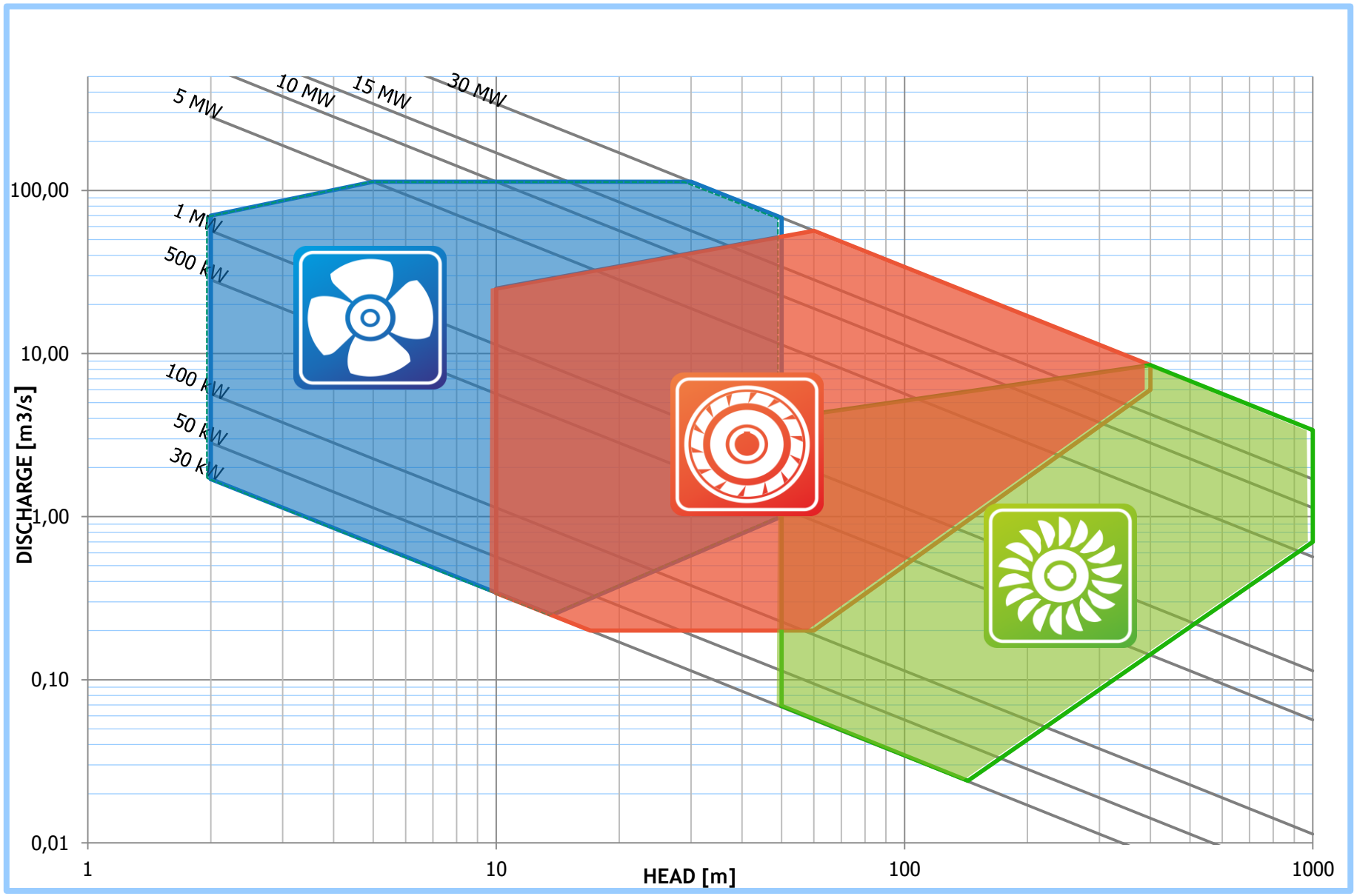
Our supply experience reached more than two thousand hydro power projects supplied worldwide ensuring technical improvements and proving our know-how. Obtained quality certificates and skills of our workers guarantee high quality of installed equipment. All types of Strojirny Brno turbines have been also certified for installations in drinking water treatment plants.

Karel Mikulášek
Managing Director

Financial Turnover in the last four years
(in milions eur)



HYDRO POWER PLANTS RANGE



MECHANICAL EQUIPMENT DESIGN PROCESS

- Elaboration of mechanical part design documentation (Autocad)
- Elaboration of water turbines, hydraulic governors and oil lubricating sets design
- Elaboration of workshop drawings by 3D modelling (ProEngineer, Unigraphics)
- Hydro - mechanical machines strength calculation check (Ansys, WorkBench)
- Calculation and preview of t ransient effects of hydro power plant hydraulic systems
- Mathematical modelling of hydro power plant regulation circuits

VIRTUAL PROTOTYPE

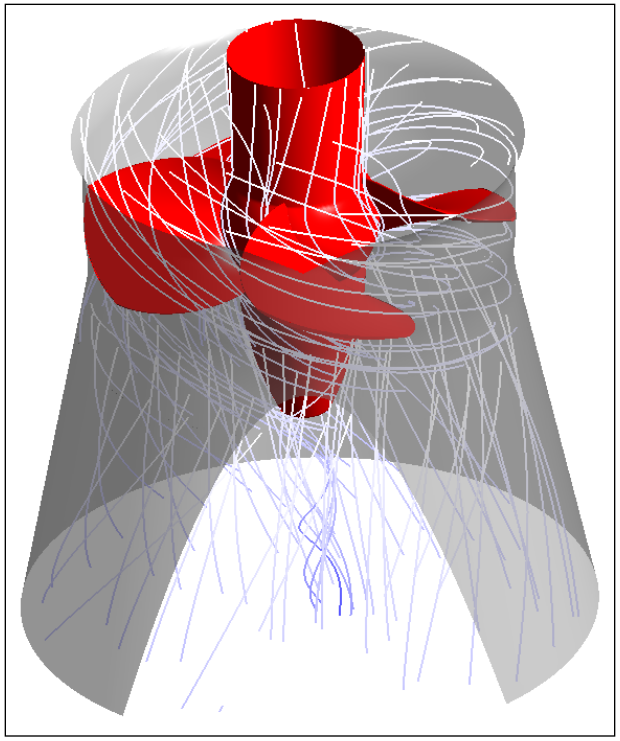
We use the technique of *virtual prototyping* and *reverse engineering*. This is connected with model experimental verification in hydraulic laboratory.

Virtual prototype is given by 3D model from hydraulic design to construction design and manufacturing.
This enables:

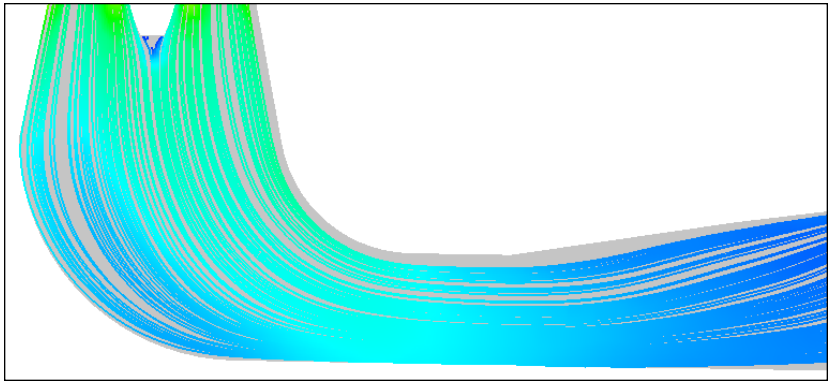
- design of the water machinery parts by means of CFD simulation
- advanced design supported by FEM simulation with feed back to the design
- programming CNC machines.

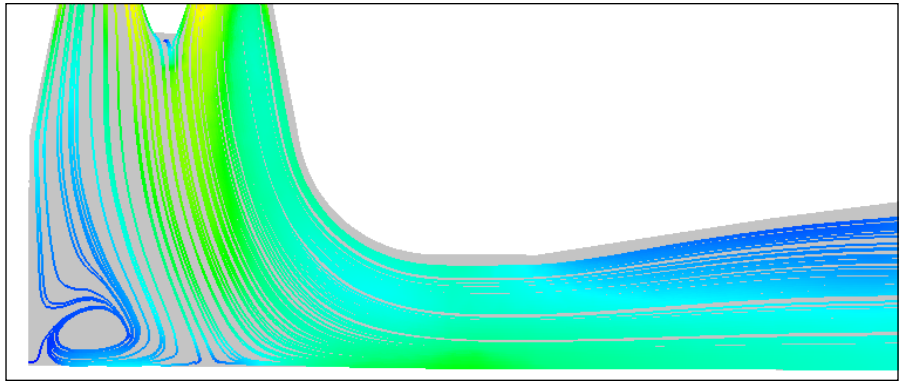
In this way we optimize a machine and fulfil requirements of a new or refurbished machine.

By means of ***virtual prototyping*** and ***reverse engineering*** we are able to evaluate an increase in efficiency and power output of a refurbished turbine already at the phase of an offer.



Kaplan Turbine virtual prototype





Flow in the runner and draft tube

Horizontal Straight-Flow Kaplan Turbine

is applied for Low Heads and High Discharges. We design our Kaplan Turbines with adjustable Guide Vanes and Runner Blades during operation ensuring optimisation of efficiency at varying head and discharge.

Design Parameters:

Range of Heads:	**1 – 35 m**
Range of the Runner diameters:	**500 – 4 000 mm**
Range of power per 1 unit:	**50 – 25 000 kW**

Kaplan Z – type Turbine

is applied for Low Heads and High Discharges. We design our Kaplan Turbines with adjustable Guide Vanes and Runner Blades during operation ensuring optimisation of efficiency at varying head and discharge.

Design Parameters:

Range of Heads:	**1 – 35 m**
Range of the Runner diameters:	**500 – 4 000 mm**
Range of power per 1 unit:	**50 – 25 000 kW**

Vertical Kaplan Turbine

is applied for Low Heads and High Discharges. We design our Kaplan Turbines with adjustable Guide Vanes and Runner Blades during operation ensuring optimisation of efficiency at varying head and discharge.

Design Parameters:

Range of Heads:	**1 – 35 m**
Range of the Runner diameters:	**500 – 4 000 mm**
Range of power per 1 unit:	**50 – 25 000 kW**

HPP Lobkovice, Czech Republic

Two Units Vertical Kaplan Turbines
Installed 2016

Head:	2,5 m
Runner diameter:	3 500 mm
Power max:	2 x 1 200 kW

HPP Miřejovice, Czech Republic

Four Units Vertical Kaplan Turbines

Installed 2010

Head:	3,71 m
Runner diameter:	2 850 mm
Power max:	4 x 1 320 kW

HPP Gumati, Georgia

One Unit Vertical Kaplan Turbine

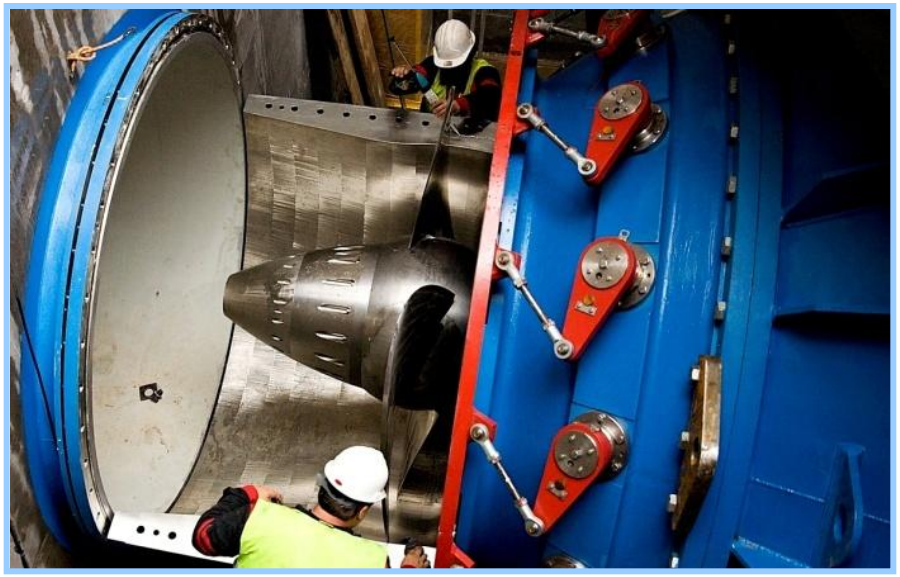
Installed 2010

Head:	26 m
Runner diameter:	3 000 mm
Power max:	13 MW

SHPP Knislinge, Sweden

One Unit Straight Flow Kaplan Turbine
Installed 2012

Head:	4,3 m
Runner diameter:	2 100 mm
Power max:	949 kW

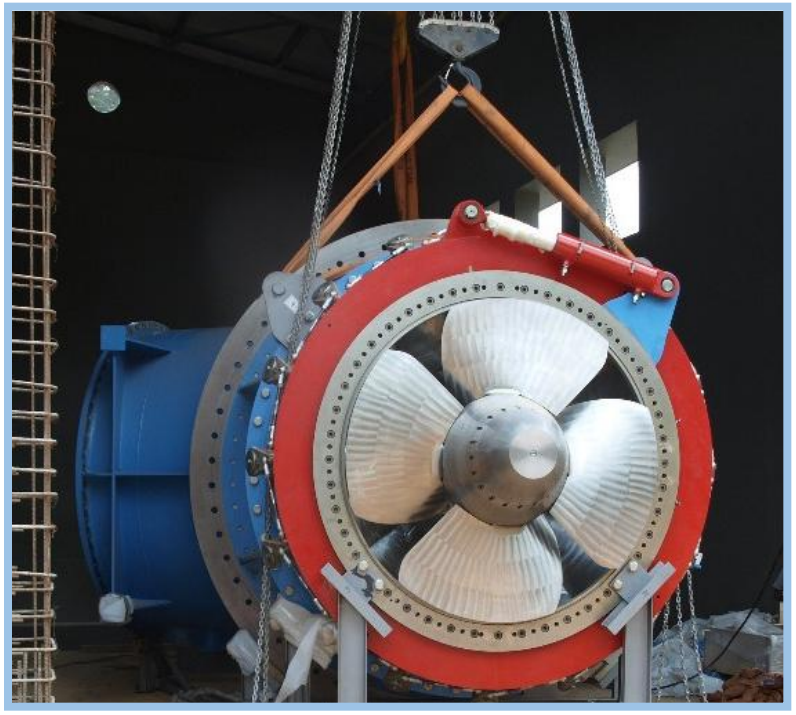


SHPP LAC, Republic of Liberia

Two Units Vertical Kaplan Turbines

Installed 2014

Head:	Unit 1 = 8,95 m, Unit 2 = 9,37 m
Runner diameter:	Unit 1 = 1 750 mm, Unit 2 = 1 100 mm
Power max:	Unit 1 = 1 244 kW, Unit 2 = 571 kW



HPP Sevilla, Philippines

Two Units Vertical Kaplan Turbines
Installed 2004

Head:	10 m
Runner diameter:	1 575 mm
Power max:	2 x 1 329 kW

SHEPP Skäpanäs, Sweden

One Unit Vertical Kaplan Turbine
Installed 2007

Head:	16,5 m
Runner diameter:	3 050 mm
Power max:	8 860 kW

SHPP Tři Chaloupky, Czech Republic

One Unit Vertical Kaplan Turbine

Installed 2013

Head:	2,84 m
Runner diameter:	3 900 mm
Power max:	1 200 kW

Francis Turbine

Is applied for middle/high Heads and moderate/high Discharges. We design our Francis Turbines with adjustable Guide Vanes during operation ensuring optimisation of efficiency at varying discharge.

Horizontal Francis Turbine

Design Parameters:

Range of Heads:	**3 – 250 m**
Range of the Runner diameters:	**300 – 2 500 mm**
Range of power per 1 unit:	**50 – 30 000 kW**

Vertical Francis Turbine

Design Parameters:

Range of Heads:	**3 – 250 m**
Range of the Runner diameters:	**300 – 2 500 mm**
Range of power per 1 unit:	**50 – 30 000 kW**

HPP Atsi, Georgia

One Unit Vertical Francis Turbine

Installed 2014

Head:	45,30 m
Runner diameter:	1 900 mm
Power max:	10 629 kW

PLTM Cilaki 1B, Indonesia

Three Units Horizontal Francis Turbines
Installed 2017

Head:	79,45 m
Runner diameter:	700 mm
Power max:	3 x 3 403 kW

PLTA Pakkat, Indonesia

Three Units Horizontal Francis Turbines Installed 2015

Head:	143 m
Runner diameter:	1 020 mm
Power max:	3 x 7 000 kW

SHPP Římov, Czech Republic

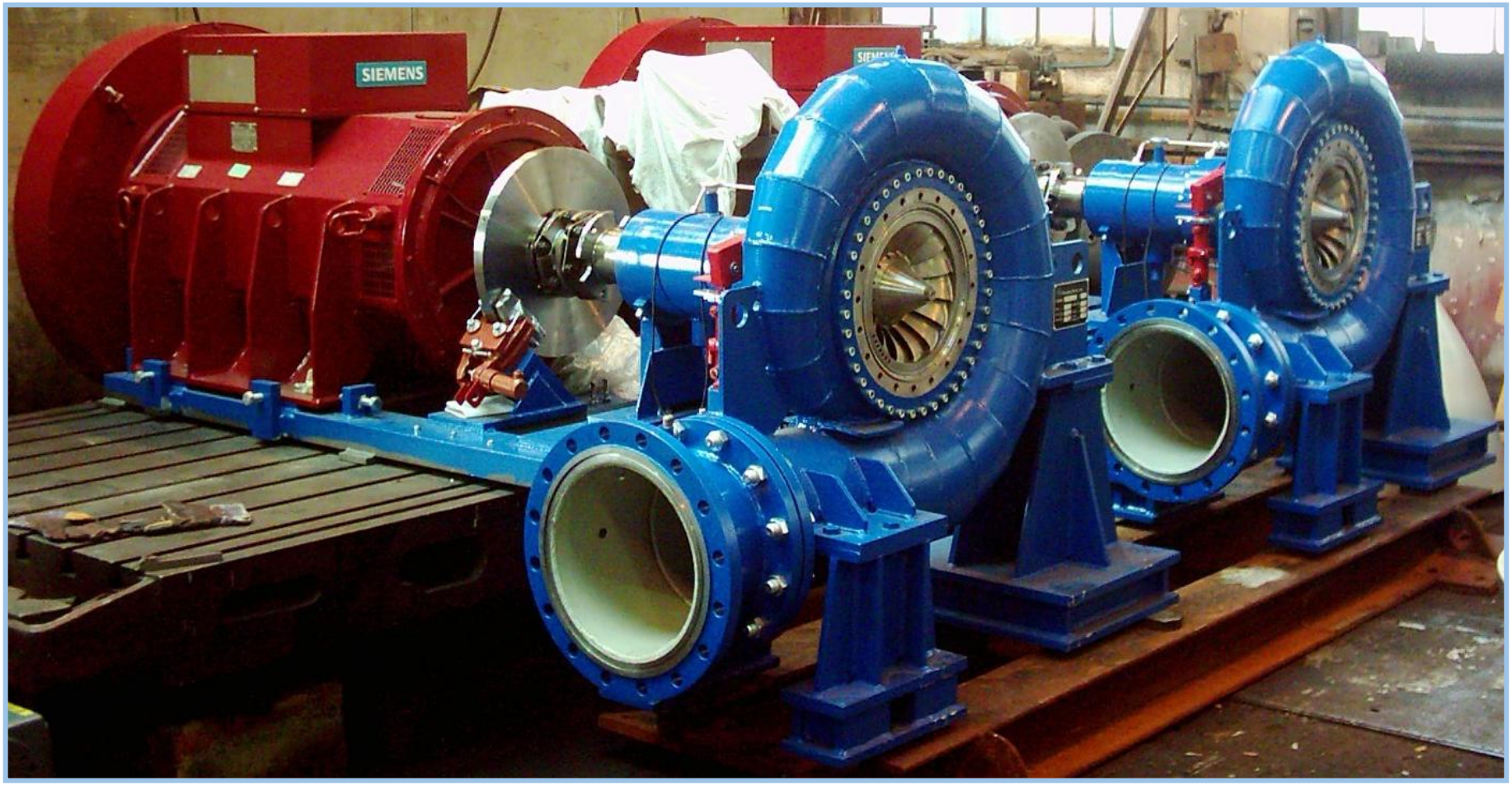
Two Units Horizontal Francis Turbines Installed 2010

Head:	38 m
Runner diameter:	Unit 1 = 600 mm, Unit 2 = 430mm
Power max:	Unit 1 = 780 kW, Unit 2 = 400 kW

SHEPP San Luis, Philippines

Two Units Horizontal Francis Turbines
Installed 2004

Head:	95 m
Runner diameter:	350 mm
Power max:	2 x 400 kW



SHEPP Duslo Sala, Slovakia

One Unit Horizontal Francis Turbine
Installed 2013

Head:	40 m
Runner diameter:	350 mm
Power max:	124 kW

Pelton Turbine

Is non-pressure turbine suitable for very high heads and low discharge. Water is supplied by nozzles equiped with adjustable needles and deflectors to the runner buckets.

Horizontal Pelton Turbine

Design Parameters

Range of Heads:	**3 – 250 m**
Range of the Runner diameters:	**300 – 2 500 mm**
Range of power per 1 unit:	**50 – 30 000 kW**

Vertical Pelton Turbine

Design Parameters

Range of Heads:	**3 – 250 m**
Range of the Runner diameters:	**300 – 2 500 mm**
Range of power per 1 unit:	**50 – 30 000 kW**

HPP Corani, Bolivia

One Unit Horizontal Pelton Turbine
Installed 2017

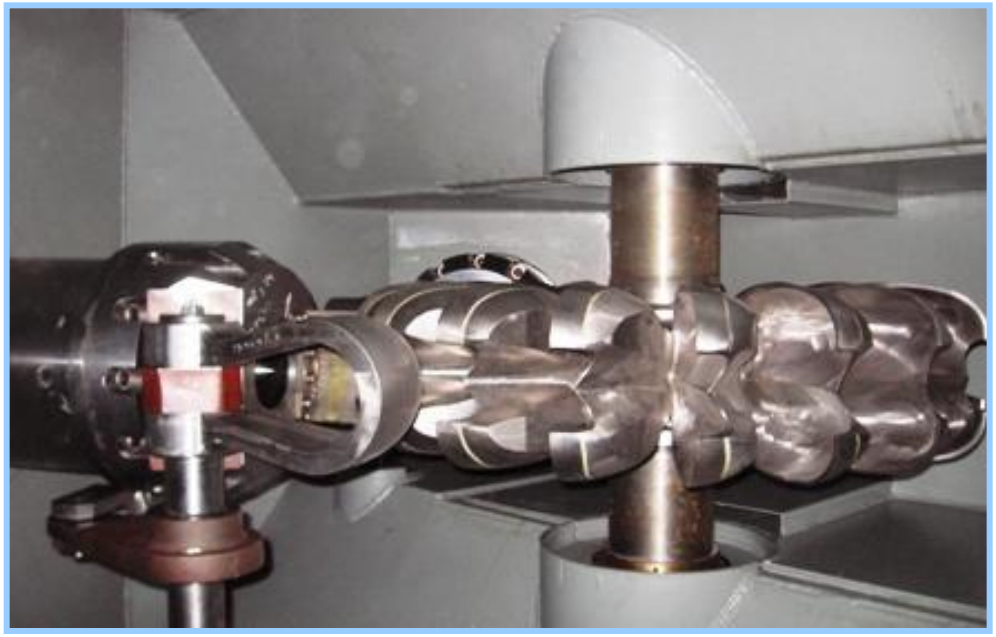
Head:	625 m
Runner diameter:	1 620 mm
Power max:	15 450 kW

SHPP Fossa, Norway

One Unit Horizontal Pelton Turbine

Installed 2009

Head:	296 m
Runner diameter:	700 mm
Power max:	1 769 kW



SHPP Lifjellkraft, Norway

Two Units Vertical Pelton Turbines
Installed 2006

Head:	95 m
Runner diameter:	520 mm
Power max:	457 kW

HPP Shaori, Georgia

Two Units Horizontal Pelton Turbines
Installed 2009

Head:	478 m
Runner diameter:	1 871 mm
Power max:	10 MW

SHPP Bladid, Norway

One Unit Vertical Pelton Turbine
Installed 2006

Head:	90 m
Runner diameter:	580 mm
Power max:	565 kW

HYDRO-MECHANICAL EQUIPMENT

We design and manufacture **HYDRO–MECHANICAl EQUIPMENT** to provide proper and reliable operation of water turbines and hydro power plants: intake trash racks, trash-rake machines with chain or hydraulic drives, gates for intake, flushing sluice or dam level control (radial segment gate), weir flaps, inlet and bottom outlet valves.

Our company is specialized in designing and manufacture of **Hydraulic Governors** to control turbine guide vanes (Kaplan, Francis), runner blades (Kaplan), nozzle needles (Pelton) inlet valves and intake gates.

Last but not least we also design and manufacture our own Oil-lubrication units to ensure reliable lubrication of sleeve bearings with Turbine-Generators units supplied.






REAHABILITATIONS, OVERHAULS AND UP - GRADING

Rehabilitations, Overhauls and Up-Grading of all types of Water Turbines regardless to runner diameters and Turbine power outputs.

NPP Dukovany, Czech Republic

Type of Equipment	Travelling Trash-Raking Machine with Telescopic Beam
Installed:	2003, 2004

HPP Nechranice, Czech Republic

Type of Equipment:	Radial Segment Gates and Stop Logs
Dimensions:	5 600 mm x 13 000 mm
Installed:	2003

Štvanice, Czech Republic

Type of Equipment:	Stationary Two-Arm Hydraulic Trash-Raking Machine
Installed:	2006