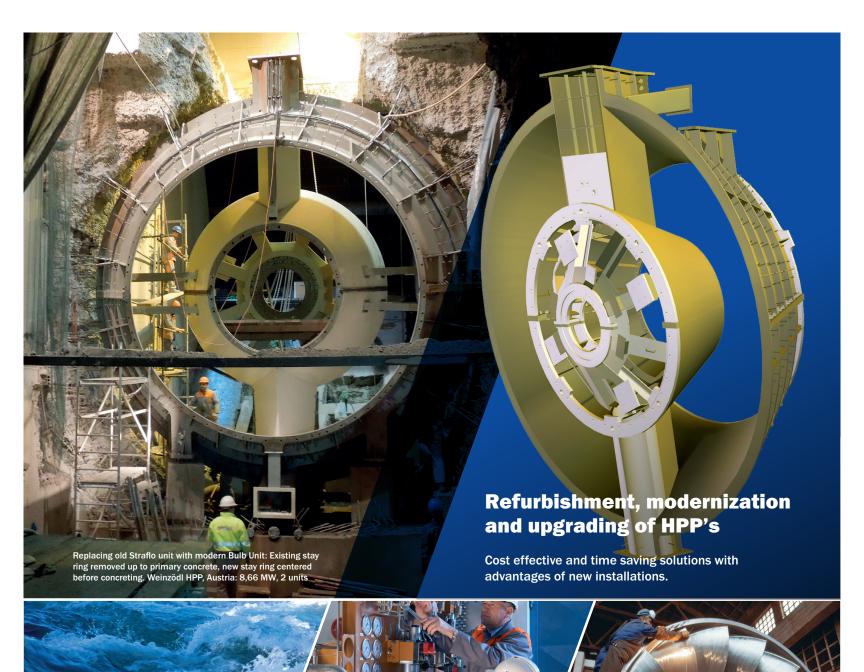
LITOSTR祭JPOWER





The Litostroj Power Group unites tradition, experience, knowledge and the development potential of several reputable European suppliers into a new technological power.

Together we can offer investors complete solutions ranging from development and design to delivery of turnkey hydroelectric power plant equipment. Our advantage is in the know-how and experience of our employees. Our power is in our go-ahead spirit and adaptability.

The Litostroj Power Group has a long history of performing refurbishment, modernization and upgrading (RMU) of hydropower projects of all types and sizes of units.

Scope of Litostroj Power's solution can vary from small-scale repairs, replacement of wearing parts, complete sub-assemblies such as shaft seal, main shaft bearings, etc., to the replacement of complete units. RMU projects may consist of refurbishment of turbine and hydromechanical equipment, generator equipment, EBoP, governor and unit control equipment.

Litostroj Power implements RMU projects worldwide. The Group is organized in a way to offer flexibility of local machining and production for refurbished parts with our established network of competent local partners and delivery of newly machined parts from Litostroj Power production facility.

REFURBISHMENT BY LITOSTROJ POWER

- TURBINES, PUMPS & PUMP TURBINES
- GENERATORS
- EBoP & CONTROLS

Services offered

Site condition assessment

- Analysis of existing componetns and preliminary feasibility study
- · Pre-commissioning before dismantling

Engineering & Consulting

- Consulting to optimize RMU project
- Hydraulic design and model testing
- Mechanical design, reverse engineering and FEM analysis of existing equipment, mechanical redesign
- Mechanical part lifetime expectancy assessment
- Preparation of units for participation in primary regulation of the grid frequency
- · Auxiliary systems redesign

Project execution

- Dismantling of existing unit
- Refurbishment of existing equipment
- Cleaning and sandblasting, NDT examination, DIM measurements, welding repair, machining, corrosion protection
- Manufacturing of new equipment
- · Workshop assembly and function tests

Site Work and unit startup activities

- · Site erection, commissioning
- · Education of staff
- Post-guarantee inspections

Advantages

- Improved efficiency
- · Higher output
- Eco-friendly solutions (self-lubricating bearings, oil-free Kaplan runners, biodegradable oil, water lubricated shaft bearings, etc.)
- Avoiding existing equipment failure and long shut-down periods
- · Increased life time expectancy
- Reduced maintenance work
- Fish friendly
- Modern solutions for auxiliary systems
- HPU & governor replacement for sophisticated turbine controls





Francis unit: Before and after RMU Rama HPP, BIH; 100 MW, 2 units

Selected Reference projects

PROJECT NAME	Completion date	Turbine type	Flow Q [m ³ /s]	Turbine output Pt _{max} [kW]	Runner diameter D [mm]	Units
Peručica VI-VII, Montenegro	2010	Pelton	12.75	59100	2100	2
Peručica I-IV, Montenegro	2010	Pelton	8.5	39400	2400	2
Moste IV, Slovenia	2010	Francis	6	8540	850	1
Moste, Slovenia	2010	Francis	13	6692	1350	2
Dubrava, Croatia	2010	Bulb	250	43500	5500	2
Slapy, Czech Republic	2011	Kaplan	115	53000	3700	1
Zlatoličje, Slovenia	2011	Kaplan	270	79280	1800	2
Grabovica A2, BiH	2011	Kaplan	190	58500	4880	1
Edsforsen, Sweden	2011	Kaplan	95	6340	5900	2
Dlouhé stráně, Czech Republic	2012	Francis-pump turbine	58.4/68.7	328000	4540	2
Mostar A3, BiH	2012	Kaplan	120	25850	5300	1
Moforsen G1, Sweden	2012	Kaplan	180	46400	4750	1
Vasa, Sweden	2013	Kaplan	160	15300	3350	1
Pyhäkoski, Finland	2013	Kaplan	170	52100	3800	2
Lower White River, Canada	2013	Saxo	27.6	5321	2100	2
Chrami GES-2, Georgia	2013	Pelton	12	38000	1950	2
Doblar 1, Slovenia	2013	Francis	25	13756	2127	3
Lipno, Czech Republic	2014	Francis	46	67000	2217	2
Moforsen G3, Sweden	2014	Kaplan	180	57150	5100	1
Đale A, Croatia	2014	Kaplan	110	25850	5200	1
Borgforsen, Sweden	2014	Kaplan	100	12750	5300	1
Kamýk, Czech Republic	2014	Kaplan	105	15000	3800	4
Weinzödl, Austria	2015	Bulb	94.5	8662	3700	2
Hällforsen G1, Sweden	2015	Kaplan	170	14747	3900	1
Rama, BiH	2015	Francis	35.2	103800	1960	1
Grabovica A1, BiH	2015	Kaplan	190	58500	4000	1
Klosterfoss, Norway	2016	Bulb	160	8130	4500	2
Dubrovnik, Croatia	2016	Francis	45	144800	2400	2
Tainionkoski, Finland	2017	Kaplan	240	18856	4100	2
Puntarikoski, Finland	2017	Kaplan	75	7410	5900	1
Granfors, Sweden	2017	Kaplan	130	23670	4000	1





Bulb unit: Dismantling of an old unitand erection of new one. Weinzödl HPP. Austria: 8.66 MW. 2 units

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