Ukrhydroenergo

IMPROVEMENT OF TECHNICAL AND ECONOMIC PERFORMANCE OF THE DNIESTER HPP

Hydropower worldwide

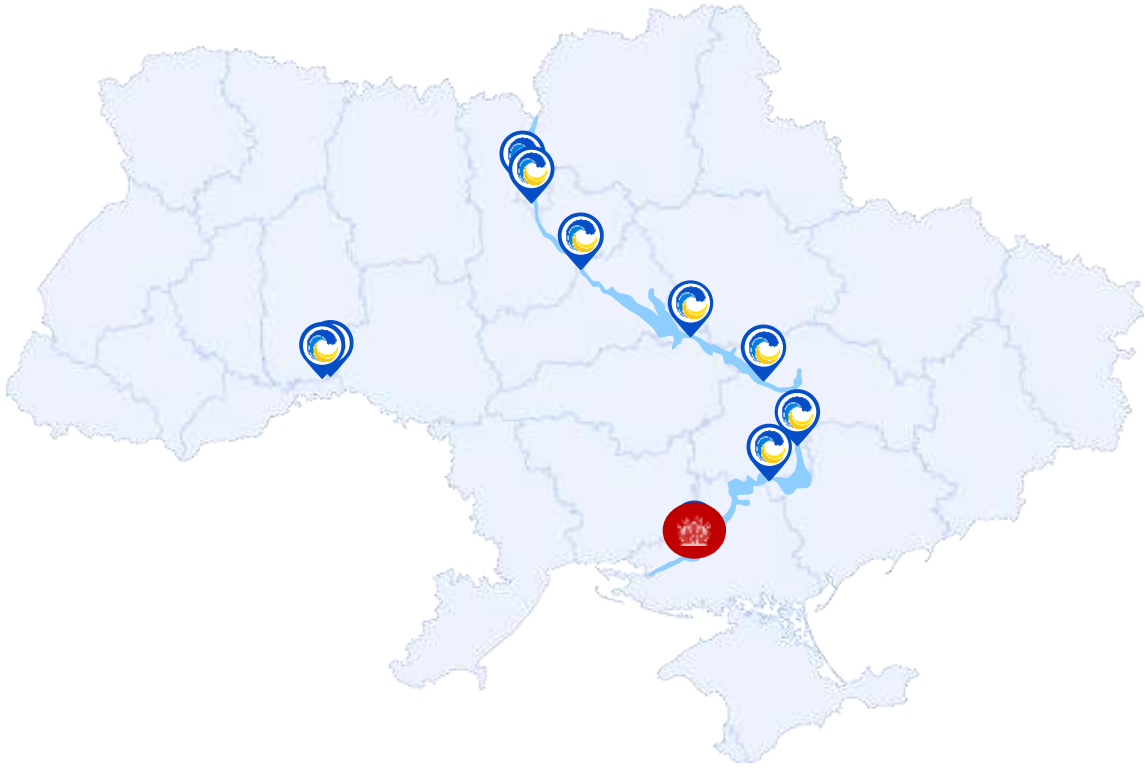
4,201 TWh: Electricity generated from hydropower in 2023, a -4.7% decrease from 2022.
1,416 GW: Hydropower installed capacity reached in 2023, +1.4% increase from 2022.
13.7 GW: Capacity added in 2023, including pumped storage capacity, versus 34 GW added in 2022.
179 GW: Total pumped storage capacity reached in 2023, +2.3% increase from 2022.
6.5 GW: Pumped storage capacity added in 2023, versus 10.5 GW in 2022.

Source: 2023 World Hydropower Outlook

Photo by Patrik Mäki on Unsplash

WHO ARE WE?

Ukrhydroenergo is the leading hydropower company in Ukraine



9
Stations

1000
2400

100 %
State-owned

7-20 %
Of all electricity in the country

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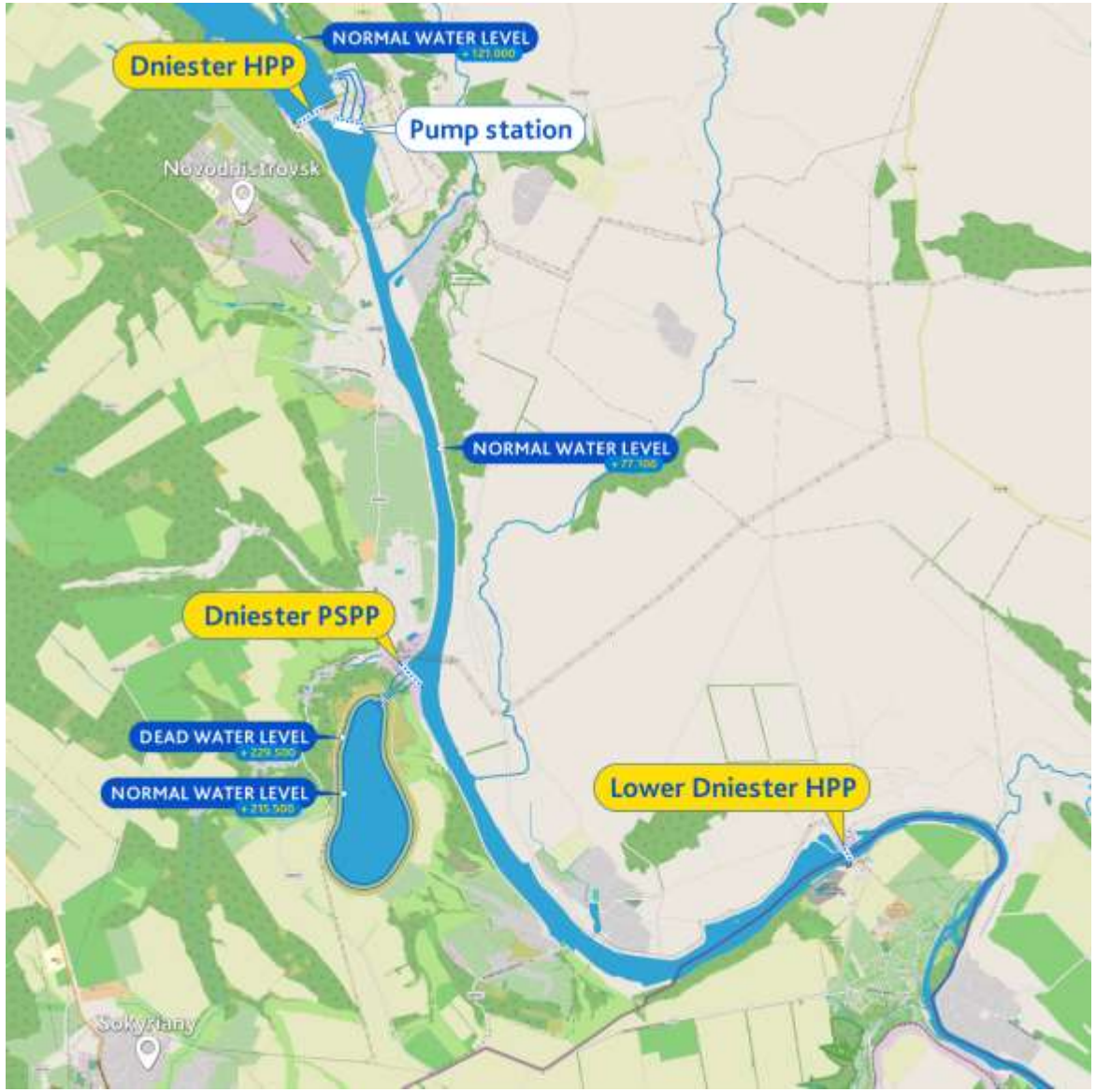

The main facilities of the pumping station are located on the left bank of the Dniester River, at the upper and lower reaches of the Dniester HPP dam. The water intake is located on the bank of the Dniester reservoir. The pumping station building is located in the Lower Dniester Reservoir.

The pressure tunnels are in the rock mass at +58.600 to +59.695 meters.

Installation of pumps to provide additional manoeuvring capacity Dniester PSP

Key results

- Increasing the flexibility of the Dniester power node by sharply increasing the control range when operating in pumping mode, including during periods of consumption of excess electricity generated by wind farms and solar power plants;
- the ability to flexibly change operating modes (generator, engine) without disconnecting hydraulic units from the network
- high flexibility and manoeuvrability of capacities are ensured by the operation of the Dniester HPPs and PSPPs as a single power unit;
- Improving energy performance and efficiency of the energy hub;

Objectives

- Ensuring primary and secondary power regulation.;
- Replacement of natural gas consumption for TPP power units;
- creation of new jobs.

Technical arguments :

- a pumping station with 10 units with an average unit capacity of 22 MW and a total capacity of 220 MW;
- Increase in peak electricity generation by 406 million kWh per year, which is 45% of the Dniester HPP's output;
- Opening hours: at night (5.17 hours) and during the day (2.31 hours).

Total expected investment amount

€400.2 mln.

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LIST OF EQUIPMENT AND POTENTIAL SUPPLIERS FOR THE CONSTRUCTION OF THE PUMPING STATION

№	Name	Possible suppliers
1	**Aggregate equipment**	
1.1.	Mobile oil gear electric pump unit NMSH-5-25-4.0/4, Q=4.0 m3/h, P=0.4 MPa, N=3 kW	
1.2.	Electric pumping unit oil gear, Q=0.6m3/year, H=50m, N=0.75kW, nom=1450 r/min	
1.3.	Switching equipment (filters, air handling unit automation, etc.)	
2	**Pumping equipment**	
2.1.1.	Stationary centrifugal submersible pump, Q=25.03m3/h, H=33.47m, P=6bar, N=10.5kW, nnom=2935 rpm, GRUNDFOS SEV.80.80.92.2.51D, pcs.	
2.1.2.	Centrifugal pump, Q=1200m3/h, H=45m complete with 250kW electric engine, A24A-18x1-13700-V/D-SD-4-U3, pcs.	
2.1.3.	Centrifugal pump, Q=150m3/h, H=45m complete with 26.3kW electric engine, A12A-22x5-13700-V/D-5-4-U3	
2.1.4.	Submersible drainage pump GRUNDFOS DWK.O.13.100.110.5.0D Q=98.01 m3/h, H=23.72 m, N=11 kW, product number 96922661	
2.1.5.	Pump with oil pressure unit (OPU) and operating equipment with a control device, pcs.	
2.1.6.	Submersible pump complete with electric motor and control system, Q=72.02m3/h, H=51.45m, N=22kW, nnom=2850 rpm, GRUNDFOS, DWK.E.10.100.220.5.1D, pcs.	
2.1.7.	Submersible single-stage centrifugal pump FA 10.65E with engine FK 202-4/17, Q=100m3/h, H=25m, N=11.5kW 380V (WILO art.6000036), pcs.	
2.2.1.	Hydraulic loaders, hydraulic drives:	
2.2.1.1.	Hydraulic loader NG-0.8, pcs.	
2.2.1.2.	Hydraulic loader NG-2, pcs.	
2.2.2.	Hydraulic drive of the emergency repair gate (with MNA), ton	

KSB Pumps specializes in pumping equipment and valves. The company is driven by efficiency, reliability and sustainability. The pumps and valves manufactured by KSB are constantly setting new standards - in projects all over the world.

MISA also produces plants for hydroelectric power generation: hydraulic turbines, vertical radial pumps, mixed flow pumps and axial pumps, transformer substations, frequency converters for speed control systems, microprocessor-based automation systems, remote control systems

Companies of Italy.

LIST OF EQUIPMENT AND POTENTIAL SUPPLIERS FOR THE CONSTRUCTION OF THE PUMPING STATION

№	Name	Possible suppliers
3	**Electrical equipment**	
3.1.	Electric motors:	
3.1.1.	Electric motor n=230.7 rpm, N=22MW with smooth starters	
3.1.2.	Electric pump unit NMSH5-25-4,0/4, Q=4 m3/h, P=1.0 MPa, N=4 kW	
3.2.	Transformer substations:	
3.2.1.	Substation KTPSN 0.4/0.23kV - outlet consisting of: with a dry three-phase transformer with a capacity of 250kVA, Unv = 10.5kV, Un = 0.4kV	
3.2.2.	Substation KTPSN-1 0.4/0.23kV consisting of: input cabinet-2pcs, linear cabinet-6pcs, sectional cabinet-1pcs and dry three-phase double-winding transformer with a capacity of 1000kVA type AN, EP-CAST series, Unv=10.5kV, Un=0.4kV, Uk=8%, connection scheme Dyn-11	
3.2.3.	Substation KTPSN-2 0.4/0.23kV consisting of: input cabinet-2pcs, linear cabinet-6pcs, sectional cabinet-1pcs and dry three-phase double-winding transformer with a capacity of 1000kVA type AN, EP-CAST series, Unv=10.5kV, Un=0.4kV, Uk=8%, connection scheme Dyn-11	
3.3.	Transformers:	
3.3.1.	Voltage transformer 110kV	
3.3.2.	ry power transformer KVA 630 R EP-HF, 630 kVA, 10.5/0.4 kV, equipped with a temperature control unit PT-100 in an all-weather casing, pcs.	
3.3.3.	Power transformer, oil-immersed, 3-phase, 125MVA, 110/10.5/10.5kV; Uk=10.5% with on-load tap-changer-110, 110kV, 1000/1A; TVT-35kV, 600-400/1A, pcs.	
3.3.4.	Three-phase dry transformer TSZ-1000/6 U3, pcs.	
3.4.	Switch cabinets, various types	
3.5.	Diesel generator:	
3.5.1.	JCB G330QS in all-weather hood, complete with Cummins QSL9-G5 electric motor and control system, Nm.=240kW, Reserve=264kW, V=400V	
3.5.2.	JCB G500QX in all-weather casing, complete with Scania DC13-72A (02-13) electric motor and control system, Nm.=369kW, Reserve=401kW, V=400V	

SIEMENS – Siemens is a world leader in the market of equipment for power distribution, including electric motors.

CR ELECTRIC Substation – is a company specialising in high-voltage electrical substations. This is a complete turnkey solution.

ABB – specialises in the production of devices in the field of electrical engineering, power engineering and information technology

TRASFOR SA – the company is a manufacturer of transformer substations.

MECA – produces customised oil transformers in accordance with customer requirements and specifications.

Getra – produces high-voltage transformers.

And also: **SIRMET ELETTRICA,** **SEA**

Perkins – is a leading global supplier of diesel engines. Committed to providing quality products and services that exceed customer expectations

Companies of Italy.

LIST OF EQUIPMENT FOR THE CONSTRUCTION OF A PUMPING STATION

№	Name	Possible suppliers
4	**Hydromechanical equipment**	
4.1.	Repair valves:	
4.1.1.	Emergency repair flat wheeled gate valve(5.5-5.5-21.0 m), ton	
4.1.2.	Emergency repair flat wheeled gate valve (6.0-4.75-30.2), ton	
4.1.3.	Repair flat sliding gate valve (5.5-5.5-21.0 m), ton	
4.1.4.	Repair flat sliding gate valve NB (6.0-4.75-30.2), ton	
4.1.5.	Disc valve DN 3200/PN10 with oil pressure unit (OPU) and control equipment, pcs.	
4.2.	Compressors, pcs.	
4.3.	Trash retention grates (6.0-6.5-2.0):	
4.3.1.	Flat-jaw grapple, t	
4.4.	Cranes, t	
4.4.1.	Gantry crane 50/10 t capacity	
4.4.2.	Gantry crane with lifting capacity 2x25+5t	
4.4.3.	Gantry crane with lifting capacity 2x75+5t	
4.4.4.	Overhead crane with lifting capacity 30 t	
4.4.5.	Overhead crane with lifting capacity 80/16+5 t	
4.4.	Passenger lift "OTIS" model Gen2-Premier MRL (without engine room), lift shaft height - 44.55 m, load capacity Q=1000 kg, speed 1.6 m/s, pcs.	
5	**Auxiliary equipment** (rechargeable batteries, uninterruptible power supplies, controllers, flow meters, alarms, adapters, level gauges, level sensors, etc.)	
6	**Other** (pressure gauges, network boards, mobile compressors, surge arresters, light and sound alarms, air handling units, air intakes, alarms, automatic control systems, transformer excitation systems, pumping unit control systems, power lines, etc.).	

ATB – is recognised as one of the most qualified international manufacturing companies in the supply of turnkey equipment.

CAMU LENZI – The company specialises in the production of all types of hydraulic turbines (Kaplan, Francis and Pelton) complete with hydraulic control panel and auxiliary equipment, including hydromechanical equipment.

COMEA - is an Italian engineering company and equipment manufacturer specializing in the production of lifts, cranes and components for all types of industries and applications.

OCMA – the company operates in the production of cranes, winches, manual and motor winches, reloaders, forklifts and rotary platforms.

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