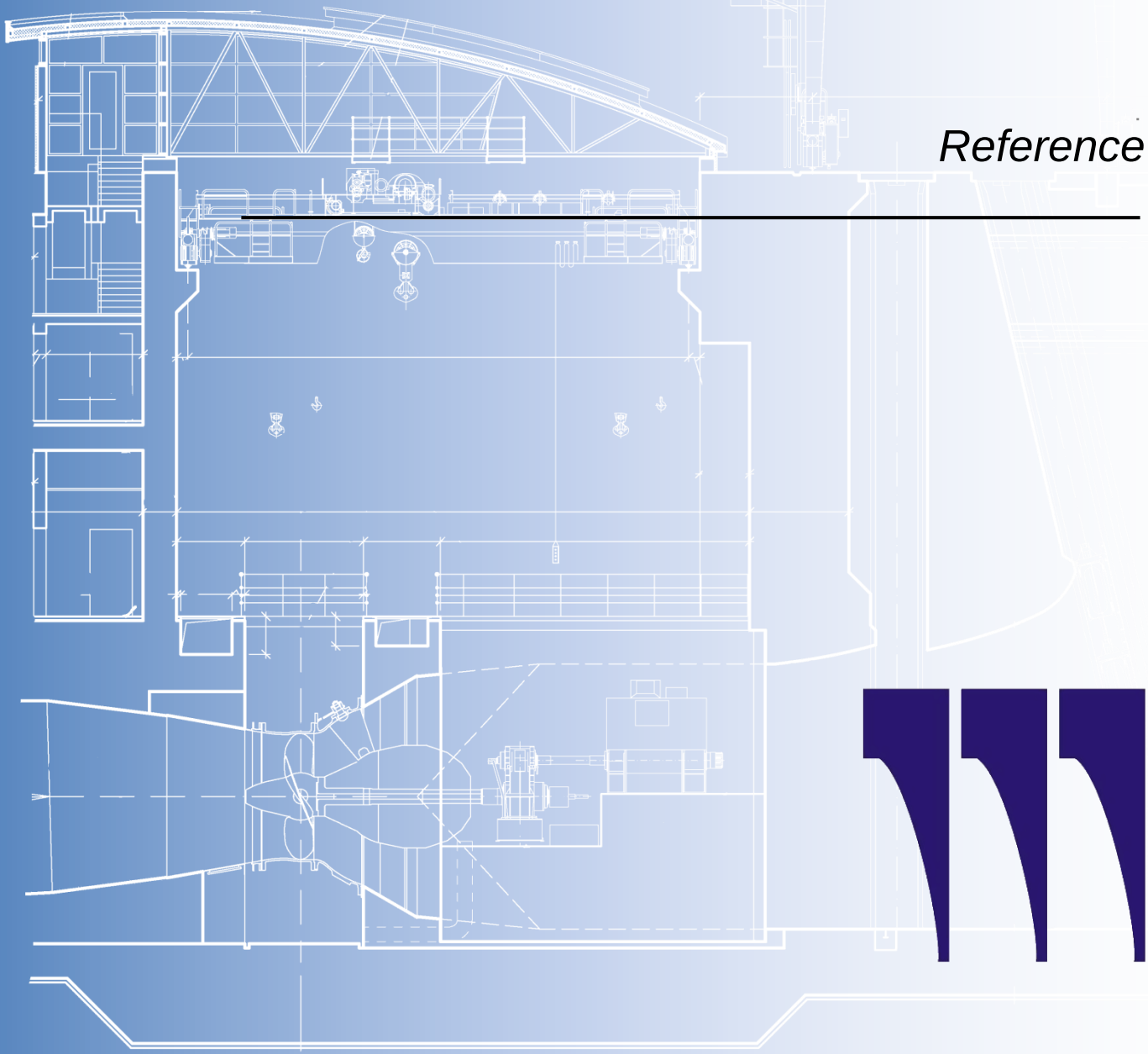
UKRHYDROPROJECT

Private Joint-Stock Company



Reference

UKRAINE – KHARKIV

2025

CONTENT

BRIEF INFORMATION

UKRHYDROPROJECT PRJSC started its activities in 1927 and since then it has become the largest engineering company in Ukraine specializing in the field of hydropower and water resource development.

During the years of its activity, in Ukraine and Moldova, UKRHYDROPROJECT PRJSC has elaborated designs of large and medium-sized hydropower plants (of the capacity up to 900 MW), with protective structures, shipping locks and reservoirs. It has also elaborated designs of hydropower plants (of capacity from 0.4 MW) and hydropower pumped storage plants with the head ranging from 70 m to 500 m, of capacity in turbine mode from 235 MW to 3600 MW. Several large canals have been designed for navigation, irrigation and water supply of different cities and districts of Ukraine, Moldova, and countries of the former Soviet Union (Dnipro–Donbas canal, Siverskyi Donets – Donbas canal, Dnipro – Kryvyi Rih canal etc.). Design works for hydrotechnical structures of ore mining and processing enterprises and metallurgical industry were executed.

As General Designer and Technical Coordinator UKRHYDROPROJECT PRJSC implemented design works for the Thak Mo HPP, Yali HPP, Can Don HPP, Srok Phu Mieng HPP, Bao Loc HPP, Nam Chien HPP, Se San 3A HPP, Hua Na and Huong Dien HPPs in Vietnam; designs of San-Rafael hydro development in Mexico, pumping station Nassiria in Iraq, and also hydro developments of Guaninghe and Chetanhe in China, Xekaman 3, Xekaman 4 in Laos and Uribante-Caparo in Venezuela. In 2008-2010 the works on the development of feasibility studies of shipping lock as a part of Luang Prabang HPP (1410MW) were made in Lao People's Democratic Republic. In 2011 the works on the design of Grand Ethiopian Renaissance Dam Project on the Blue Nile River started.

Since 1994, UKRHYDROPROJECT was reorganized into an open joint-stock company with 100% private equity. At the end of 2009, based on the current legislation of Ukraine, it was renamed into a public joint-stock company.

In 2010, within the framework of structural reorganization of UKRHYDROPROJECT PJSC was created DESIGN ENGINEERING COMPLEX "GRANT" consisting of:

- UKRHYDROPROJECT PJSC,
- HYDROTECHPROJECT LTD,
- UKRATOMENERGOPROJECT LTD,

• INTERDEPARTMENTAL CENTRE OF ENGINEERING RESEARCHES LTD.

In 2017, UKRHYDROPROJECT PJSC was reorganized into a private joint-stock company.

UKRHYDROPROJECT PRJSC has at their disposal a large staff of specialists among them, over 90% are qualified engineers. Among our employees, there are candidates and doctors of technical sciences and an academician of the Academy of Architecture and Construction of Ukraine. In addition, the Company has the required organizational structure, which provides the performance of complex design at the up-to-date level and provides engineering services for the construction of hydraulic, hydro-economic and other energy and civil sites.

UKRHYDROPROJECT PRJSC takes up a significant role in scientific activity and is a corporate member of the International Hydropower Association (IHA), a member of the International Council on Electrical System CIGRE in Ukraine (CIGRE), a member of the Association Hydropower of Ukraine (member of the ICOLD), a member and partner of the public organization Scientific and Technical Union of Energy Workers and Electrical Engineers of Ukraine and a member of the Ukrainian Association of Quality. In 2010, due to the active role of UKRHYDROPROJECT PRJSC, the Ukrainian Committee on Large Dams was established in Ukraine.

Since 2021, the Company has been included in the Register of Product Manufacturers, works and services for defense purposes, procurements of which is a state secret.

Since 2022, the Company has been included in the list of Basic organizations on scientific and technical activity in construction, which is subordinated to the Ministry for Communities, Territories and Infrastructure Development of Ukraine.

In 2023, UKRHYDROPROJECT PRJSC confirmed the recognition of the requirements of the Shipping Register of Ukraine, passing a regular recertification audit.

The quality of the performed works is confirmed by the availability of quality certificates under the ISO 9001:2015 and DSTU ISO 9001:2015 standards.

1. MAIN DIRECTIONS OF ACTIVITY

Private joint-stock company UKRHYDROPROJECT as a member of Design and Engineering Complex “GRANT” carries out a complex of works related to hydropower, water economy, housing, industrial and other kinds of construction, including:

1. Engineering surveys:

- engineering and geological;
- engineering and hydrometeorological;
- ecological and geological;
- engineering and geotechnical;
- engineering and hydrogeological.

2. Design works (new construction, rehabilitation and overhaul):

- power structures (hydropower plants, power stations applying alternative power sources, electric substations and switchyards);
- engineering structures including: retaining walls, supports, manifolds, irrigation channels, tunnels, foundation for equipment, underground structures, hydrotechnical structures such as dams, marine access channels, bank protective and stabilization structures, shipping locks, fish protective and fish passing structures, water bodies and reservoirs, anti-filtration and drainage systems and structures;
- facilities of industrial and civil construction
- inspection and assessment of the technical state of building designs of hydrotechnical structures;
- architectural substantiation;
- architectural and construction design;
- technological design of facilities;
- development of a master plan (micro-district of the block, housing complex, settlement, facility).

3. Design of supporting and frame structures: made of rock, concrete, reinforced concrete, metal.

4. Design of internal and external engineering networks, systems and structures.

- Electric transmission lines and transformer substations;
- Electrical power supply, electrical equipment and lighting;
- Communication, alarm and signaling, radio, television, information systems;
- Heating, ventilation, air conditioning;
- Water supply
- Water supply system and sewerage;
- Automation, controlling and measuring equipment.

5. Engineering works including designer’s services.

6. Elaboration of special parts of projects:

- Environmental impact assessment;

– Labor safety;
– Design of construction organization;
– Civil works realization procedures.

7.Survey and assessment of the technological state of building designs and hydrotechnical structures.

8. Technical assistance, engineering, consulting and information services.

9. Elaboration of the regulation documents "Standard of Organization of Ukraine" (SOU), detailed methodologies and instructions on the exploitation of the atomized control systems of hydrotechnical structures, rules on the exploitation of reservoirs and passports of the exploitation of hydrotechnical structures.

10. Elaboration of antifire measures.

11. Development of bid documentation, enquiry specifications and maintenance of bid process.

12. Authorized and technical supervision of construction.

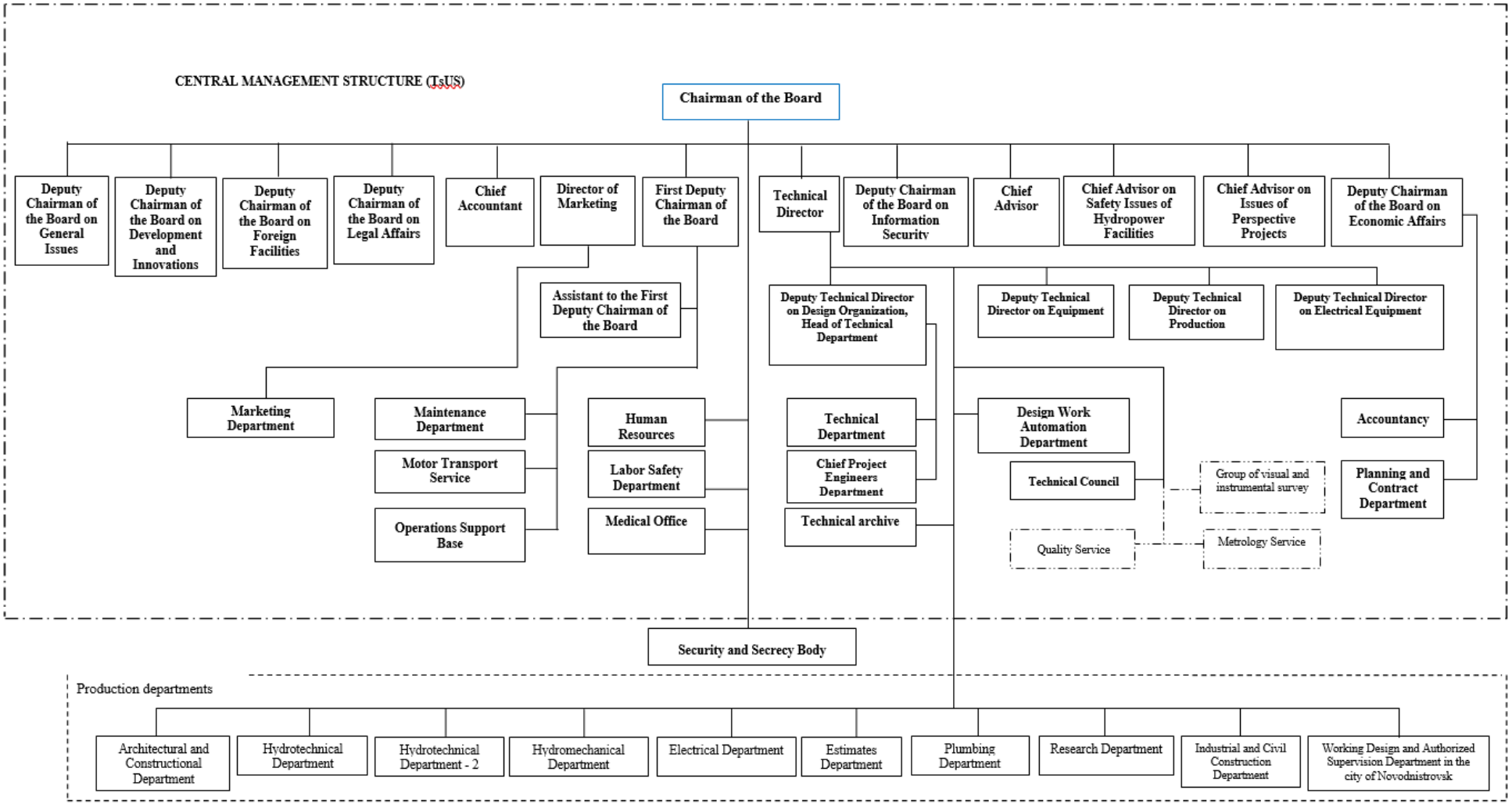
13. Assistance during the passing of expertise of primary feasibility study, feasibility study and project.

14. Elaboration of measures concerning safety providing of hydrotechnical structures.

To perform the above-listed works the specialists pass a qualification certification with further obtaining a qualification certificate of a responsible executor of separate types of works (services) related to the creation of architecture facilities of a class of consequences (responsibility) SS1-SS3.

2. ENGINEERING AND TECHNICAL SUPPORT

2.1. Organizational structure of personnel



2.2. Technical support

Software purchased and developed by UKRHYDROPROJECT PRJSC allows to perform all necessary calculations of hydrotechnical structures, including:

- hydraulic and hydrotechnical calculations (discharge capacity of culverts, water-race conjugations, unstable regimes of HPP flow part, tunnel calculations, etc.);
- filtration calculations of pressurized and free-flow filtration under structures, in the body of structures and in bank abutments;
- calculations of the stress-strain state of structures (including the thermal-stress state), taking into account, if necessary, seismic impacts and construction sequence impact;
- strength and stability calculations of concrete and reinforced concrete elements of hydro structures with a glance to counterpressure influence in sections;
- stability calculations of earth structures with a glance to seismic impacts.

UKRHYDROPROJECT PRJSC has developed design technology based on software products of Autodesk company: AutoCAD and specialized addenda on various design sections.

The model of lay of land is created according to the materials of topographic mapping of the district area of hydro development construction in Civil 3D. Solid design models of the structures are created with AutoCad, Mechanical Desktop, Inventor.

On separate buildings (structures) 3D-model is created, on which all main structures are worked through, precise geometry of all elements of construction is defined, issues of the location of main manufacturing equipment and technological communications are solved.

3D-model is also used for the creation of comfortable and safe surroundings of stay for the employees of the station.

Files of the model are located on the server of the local net of the institute, and each participant in the design process has an opportunity to develop and edit objects of their design section, conforming their decisions with other participants of the project. The current model is the main original material for issuing technical tasks to the constructors to create detailed drawings on separate structures' elements of the construction, for technologists – to check up and control their decisions, for architects – to develop architectural and construction drawings and illustrative material, etc.

2.3. Quality management for design documentation

In 2000, UKRHYDROPROJECT PRJSC was certified by the accredited body from BUREAU VERITAS certification under the international standard ISO 9001.

Annually on external audits, UKRHYDROPROJECT PRJSC confirms the correspondence to the quality management system of the ISO 9001 standard

requirements and capacity to issue documentation, implement and provide services, the quality of which satisfies our customers, taking into account the international requirements and legislation of Ukraine.

In July 2021, our Company successfully passed a regular recertification audit to confirm the correspondence of the qualitative management system to the requirements of the international standard ISO 9001:2015 and DSTU ISO 9001:2015.

Metrological assurance in the company is provided by Metrological Service.

2.4. Archive fund, technical library and patent fund

Archive of UKRHYDROPROJECT PRJSC contains 435,000 storage units of graphic information (drawings, tracing papers), more than 135,000 text documents (explanatory notes, reports, etc.), 30,000 storage units of typical materials and more than 7,000 topographic maps and tapes.

Technical library contains more than 27 thousand units (about 96,000 copies). Among them:

- more than 13,000 titles of technical literature (more than 24,000 copies);
- more than 5,000 titles of regulatory and technical literature (21,000 copies);
- 60 titles of technical journals (30,000 copies).

The electronic regulatory base "NORMA" contains more than 12,000 electronic texts of regulatory documents.

The electronic database “Patent” includes more than 51,000 documents.

3. TECHNICAL ASSISSTANCE AND CONSULTANT SERVICES

Service name	Country	Year(s) of service providing
Technical part of the bid documentation on the equipment for rehabilitation of the hydropower plants of Dnipro Cascade	Ukraine	1995
Expertise of the detailed design of hydrotechnical structures rehabilitation of Zaporizhzhia Aluminium Industrial Complex	Ukraine	1995
Consultant services on the selection of the method of water level reduction on the territory of Kanivske of Dniprovska thermal power plant	Ukraine	1997
Expert's report on the detailed design of the 1st stage of Sudak wind power plant	Ukraine	1998
Elaboration of bid documentation for the construction of Dniester PSP	Ukraine	1999
Technical specifications of bid documentation on the reconstruction of hydro turbine units of OJSC Ukrhydroenergo HPP (2nd stage), Ukraine.	Ukraine	2004 - 2008
Engineering and consultant services during the equipment delivery for Tashlyk PSP	Ukraine	2005
Consideration and approval of design documentation performed by third-party organizations for HPP of Ukrhydroenergo PJSC, and also consideration of the documentation, which is sent by firms-winners of tenders for equipment delivery and other design works and engineering services at the request of the Customer.	Ukraine	2005 to the present
Elaboration of technical tasks for conducting bid procedures for the development of technical requirements concerning equipment delivery	Ukraine	2018
Substantiation of elaboration necessity and development of the task for feasibility study design "Rehabilitation hydrotechnical structures of Dnipro HPP for the providing of further long-lasting exploitation".	Ukraine	2019
Elaboration of the technical task "Services on clarification of zones of possible catastrophic flooding in case of damage or forced water discharge on the hydro structures of the Dnipro and Dniester cascades".	Ukraine	2019
Assessment of technical solutions on the installation of the advertisement structure of JSC "Motor Bank" on the building of the central control board of the Zaporizhzhia single-chamber shipping lock.	Ukraine	2019
Services on the elaboration of the technical task "Revision of the exploitation rules of the Dnipro cascade reservoirs".	Ukraine	2021
Determination of the expected cost of performance of the design and survey works of stage "P" of the project "Construction of the Kakhovka HPP-2" for conducting the bid procedure of procurement.	Ukraine	2022
Technical part of the bid offer on the fulfilment of complex reconstruction of 500 kV outdoor switchyard of "Votkinskaya HPP".	Russian Federation	2010
Technical part of the bid offer on the Polotskaya HPP	Belarus	2009
Technical part of the bid offer on the construction "turnkey" of Nemnovskaya HPP on the river Neman	Belarus	2010

Service name	Country	Year(s) of service providing
Technical part of the bid offer on the construction “turnkey” of Vitebsk HPP on the river Zapadnaya Dvina	Belarus	2010
Technical part of bid technical commercial offer on the modernization of Shardarinskaya HPP	Kazakhstan	2012
Consultant services for small hydropower plant Gulba	Uzbekistan	2007
Technical requirements to the supply of equipment for the HPP at the Tupolang reservoir	Uzbekistan	2012
Actualization of site selection for hydro developments of the Upper Naryn Cascade	Kyrgyzstan	2013
Preparation of the technical and commercial offer concerning the execution of construction part "Package No.2: Replacement of electrical and mechanical part and hydromechanical equipment under the project "Rehabilitation of Uch-Kurganska HPP".	Kyrgyzstan	2019
Technical part of bid technical and commercial offer on the construction of small HPP Cijevna 1 and 2 on the river Bosna	Bosnia and Herzegovina	2010
Designs offers concerning construction of hydropower facilities	Brazil, Vietnam	1997
Consultant services during the elaboration of detailed drawings of the main structures of Yali hydro development	Vietnam	1994
Consultant services on project management of Can Don HPP structures	Vietnam	1998
Engineering and consultant services on electromechanical equipment of Can Don HPP	Vietnam	2001 - 2004
Consultant services of the Chief Project Engineer on the project management of Se San 3A HPP	Vietnam	2002 - 2007
Consultant services on the project management of Srok Phu Mieng HPP	Vietnam	2003
Consultant services on the project management of Bao Lock HPP	Vietnam	2003
Consultant services of the Chief Project Engineer on the project management of Nam Chien HPP	Vietnam	2003 - 2007
Consultant services during the elaboration of engineering design and detailed drawings of the main structures of Se San 3A HPP	Vietnam	2003 - 2005
Consultant services on assistance at tender bids for the purchase of electrical and mechanical equipment for Srok Phu Mieng HPP	Vietnam	2004
Consultant services on assistance at tender bids for the purchase of electrical and mechanical equipment for Bao Lock HPP	Vietnam	2005
Consultant services on assistance at tender bids for An Dien HPP	Vietnam	2006
Technical part of bid offer for Ban Chat, Vietnam	Vietnam	2008
Consultant services on the elaboration of detailed design of Se San 4 HPP	Vietnam	2008
Consideration of technical opportunity to build an arched dam in terms of the dam site of Hang Dong HPP in Shonla province	Vietnam	2018

Service name	Country	Year(s) of service providing
Consultant services of the Chief Project Engineer on the project management of Xekaman 3 HPP structures	Laos	2003 - 2004
Top-class consultant services for Xekaman 1 HPP	Laos	2006 - 2007
Quality expertise of hydrotechnical structures (construction part) of Xekaman 3 HPP	Laos	2013
Examination of materials concerning the state of the damaged part of a tunnel at the Xekaman 3 HPP and options to restore it	Laos	2013
Expertise of the accident consequences at the site of HPP Xekaman 3	Laos	2017
Consultant services on the analysis of the Customer's design documentation for Nassiriya pumping station	Iraq	2005
Consultant services on technical assistance of electric installation, start-up and adjustment works on commissioning of electrical equipment of Nassiriya pumping station	Iraq	2008
Technical part of the bid offer on the rehabilitation of Naghlu HPP, capacity of 4 hydraulic units is 25 MW each	Afghanistan	2006
Technical part of the bid offer on the rehabilitation of 110 kV outdoor switchyard of Naghlu and Machipar HPPs	Afghanistan	2011
Technical part of the bid offer on the rehabilitation and restoration of the HPPs Pul-i-Humri I and II and canal between them	Afghanistan	2013
Consultant services on Teesta Low Dam – IV HPP	India	2006
Technical part of the bid offer on the reconstruction of Kulkhal HPP	India	2011
Technical part of bid technical commercial offer on the construction of HPP Lawi	Pakistan	2014
Technical part of the bid offer on the design, procurement of materials, assembly and factory testing, completion and painting, packing for sea and/or land transportation to the construction site, unloading and storing at the construction site, installation, supervision, pre-commissioning and commissioning of equipment for HPP Alpaslan II	Turkey	2012 - 2013
Assessment of hydropower resources in the Plateau State and preliminary identification of sites for priority HPPs	Nigeria	2013
Participation in the meeting on the completion of construction and visual inspection of the HPP Farin-Ruwa	Nigeria	2014
Materials for pre-feasibility study for the construction of an HPP on the Nyong River	Cameroon	2014
Execution of complex technical expertise of the feasibility study of Dvirula HPP	Georgia	2018

4. ENGINEERING SERVICES

Service name	Country	Year(s) of service providing
Engineering and geological and hydrological maintenance of the construction of the Dniester PSP	Ukraine	2001 to the present
Full-scale control observations and special research of the Dniester PSP structures	Ukraine	2001 to the present
Engineering services related to the Tashlyk PSP	Ukraine	2003 - 2005
Calculations on determination of influence caused by the structures designed by Ukrexport Ltd upon flood passing along the river Siverskyi Donets in the area of Sviatohirsk	Ukraine	2005 - 2006
Complex instrumental inspection of hydrotechnical structures of Kremenchuk shipping lock and evaluation of its technical state	Ukraine	2005 - 2006
Complex instrumental survey of hydrotechnical structures of the Serednodniprovskyi shipping lock and an assessment of its technical state	Ukraine	2005 - 2006
Full-scale control studies on the state of reinforced concrete conduits of the Kyiv PSP under rehabilitation	Ukraine	2005 - 2008
Complex instrumental survey of hydrotechnical structures of the Kaniv shipping lock and an assessment of its technical state	Ukraine	2005 - 2008
Certification of the Krasnokhutirska HPP structures	Ukraine	2006
Inspection of reinforced concrete spill structures on the Kremenchuk shipping lock	Ukraine	2006
Certification of spillway dam in the city of Kirovohrad	Ukraine	2006-2008
Complex survey of hydrotechnical structures of the Kyiv shipping lock and an assessment of its technical state	Ukraine	2006 - 2008
Inspection of the hydrotechnical structures of the Pechenihy hydro development	Ukraine	2007
Inspection of the hydrotechnical structures of Ukrhyfroenergo PJSC	Ukraine	2007 - 2019
Complex of works on the inspection of the upstreams of HPP Ukrhydroenergo PJSC, research works on HPP and elaboration of offers for an increase of the technical state level of hydrotechnical structures	Ukraine	2007 - 2009
Inspection of hydrotechnical structures of reservoir in Ivanivka village, Schevchenkove district, Kharkiv region	Ukraine	2008
Elaboration and correction of maximum permissible indicators of hydrotechnical structures of the Dniester HPP-1	Ukraine	2008 - 2009
Engineering and research works on the clarification of the current state of the rock bed of the HPP structures of Dnipro cascade	Ukraine	2008 - 2010
Analysis of geologic and tectonic characteristics of the state of dam base and body of the Dnipro HPP	Ukraine	2009
Inspection of the drainage of the Kaniv HPP	Ukraine	2009

Service name	Country	Year(s) of service providing
Analysis of the calculated versions of flood discharge of 2010 and influence of ice formation on the structures of the Kyiv HPP.	Ukraine	2010
Observation analysis after the horizontal shifting of the structures of the Kremenchuk HPP, made by the methods of satellite geodesy	Ukraine	2010
Detailed full-scale surveys of the area of the bay Taranya, the Azov Sea. Hydrographic works and engineering-geological reconnaissance inspection.	Ukraine	2010
Complex inspection of highway bridge structures and structures of spillway dam of the Dnipro HPP as well as an assessment of their technical state	Ukraine	2010
Full-scale control observations over the state of hydrotechnical structures of the objects of construction completion of the Tashlyk PSP	Ukraine	2011-2019 2020-2021 2022 to the present
Analysis of the state of hydrotechnical structures of the Dniester HPP-1 according to the data of full-scale control within the period of 2009-2010.	Ukraine	2012 - 2013
Inspection of hydrotechnical structures and hydromechanical equipment of the Tereble-Ritska HPP	Ukraine	2012-2017
Inspection of the bridge at elevation +84.000 at the Dniester HPP-2	Ukraine	2012 - 2013
Inspection of hydrotechnical structures at the HPP-PSP cascade of the South-Ukraine NPP	Ukraine	2013
Conclusion on the technical state of hydrotechnical structures at the HPPs of Ukrhydroenergo PJSC following the inspection date obtained by the Divetechbud 2 Ltd.	Ukraine	2013
Water economy passport for fish farming ponds in the village of Bohodarove, Barvinkove district, Kharkiv region	Ukraine	2013
Visual inspection and preliminary technical solutions on the rehabilitation of the intake at the Brom PJSC, Krasnoperekopsk, Crimea	Ukraine	2013
Inspection of hydrotechnical structures and their hydromechanical equipment at the HPPs and PSPs of Ukrhydroenergo PJSC	Ukraine	2014
Additional geotechnical studies. Instrumental examination of an earth dam at the Bakshalinsky hydro development	Ukraine	2016
Execution of additional engineering and geological research. Instrumental inspection of an earth dam of the Bakshalinsky hydro development	Ukraine	2016
Elaboration of the maximum permissible indicators of the hydrotechnical structures of the Tereble-Ritska HPP	Ukraine	2017
Inspection of the hydrotechnical structures of the HPP-PSP cascade of Ukrhydroenergo PJSC	Ukraine	2017-2019
Analysis and an assessment of the current state of the hydrotechnical structures of the Dnipro HPP, separate structures and their elements, conclusion concerning the technical state in general	Ukraine	2018
Assessment of consequences of the exploitation termination of the Dnipro cascade	Ukraine	2018
Pechenihy hydro development. Full-scale control observations over the state of the hydrotechnical structures of the Pechenihy hydro development	Ukraine	2018, 2020

Service name	Country	Year(s) of service providing
Complex analysis of the hydrotechnical structures state under the data of full-scale observations for the period of 2014-2018 at the affiliates of Ukrhydroenergo PJSC	Ukraine	2018
New construction of the cascade of 5 small HPPs on the Shopurka River, village Velykyi Bychkiv, Rakhiv district, Zakarpattia region. Technical support of engineering surveys	Ukraine	2018
Scientific and technical support of the operation of the hydrotechnical structures of the Dnipro and Dniester cascades	Ukraine	2018-2019 2019-2020 2021-2022 2023-2024
Search of sites of small HPPs on the territory of the Kharkiv region with the determination of the main technical and economic indicators	Ukraine	2019
Services on inspection of the main indicators of state and operation of the hydrotechnical structures and mechanical equipment of Ukrhydroenergo PJSC to the given maximum permissible indicators or calculated values.	Ukraine	2019
Rehabilitation of the Ladyzhynska HPP powerhouse. Installation of a concrete plug on the idle spillway. Stage of working design	Ukraine	2019-2020
Rehabilitation of the Tereble-Ritska HPP powerhouse in village Nyzhnii Bystryi, Khust district, Zakarpattia region. Replacement of turbine gates of hydro units No.1-3	Ukraine	2020
Inspection of the rivers of Kharkiv with providing preliminary recommendations concerning the improvement of the ecological and hydrological state of water bodies	Ukraine	2020
Technical and economic analysis of the feasibility of replacement of hydro units No.4-6 of the Tashlyk PSP with new up-to-date reversible units	Ukraine	2020
Analysis of the operation modes of the Tashlyk PSP with various options of hydraulic power equipment of units No.4-6 and levels of the Oleksandrivske reservoir	Ukraine	2020
Services on instrumental inspection of the state of concrete structures of main conduit rooms, above-turbine room, technological and production facilities, oil pressure unit of unit No.1-6 of the affiliate "the Kaniv HPP" of Ukrhydroenergo PJSC	Ukraine	2021
Services on instrumental inspection of the gate of repair upstream No.1 (81ShchU) of the Kyiv PSP of the affiliate "Cascade of the Kyiv HPPs and PSPs" of Ukrhydroenergo PJSC	Ukraine	2021
Services on instrumental inspection of the state of tubular drainage of the left bank earth dam of the affiliate "Kremenchuk HPP" of Ukrhydroenergo PJSC	Ukraine	2022
Services on the execution of visual and instrumental inspection of flow tracts of hydro units No.1 and 7 of the affiliate "Serednodniprovska HPP" of Ukrhydroenergo PJSC	Ukraine	2022
Feasibility study of the economic effect from water power balance of the Kremenchutske reservoir due to short-term level forcing and deep actuation	Ukraine	2022
Improvement of the exploitation indicators of the equipment operation of unit No.1 of the Dniester PSP by the method of improvement of the system of vibration control of GD-1 with an extension of protection function of a hydro unit and achievement of normative values of insulation resistance of current lines	Ukraine	2022
Certification of the Tereble-Ritska HPP facilities located in the village Nyzhnii Bystryi, Khust district, Zakarpattia region	Ukraine	2022

Service name	Country	Year(s) of service providing
Engineering services on technical support and adaptation of high-voltage equipment produced by ZETO CJSC, town Velikie Luki	Russian Federation	2010
Visual reconnaissance inspection of practically fulfilled works on the rehabilitation of pumping plant of water reuse No.2 of Stoylenskiy Ore Mining and Processing Complex	Russian Federation	2011
Elaboration of technical passport of hydropower structures of the Dubossary HPP	Moldova	2004
Engineering services on the conduct of monitoring over the state of hydrotechnical structures of the Dubossary HPP	Moldova	2009 - 2011
Full-scale control observations of the state of hydrotechnical structures at the Dubossary HPP	Молдова	2012 - 2019
Inspection of the location of a possible site of HPP construction and the conditions of its location on the Kura river	Georgia	2008
Preliminary inspection of the area of HPP possible location on the Kok-Su River	Kazakhstan	2009
Equipment inspection at the Zvornik HPP	Serbia	2011
Inspection of technical state of equipment at the Stejaru HPP	Romania	2012
Refinement of the design solutions at the HPP Parande	Afghanistan	2013
Visual inspection of the HPP Dokan at the Iraqi Kurdistan	Iraq	2013

5. EQUIPMENT SUPPLY

5.1. Technical coordination over the development and supply of hydropower equipment

UKRHYDROPROJECT PRJSC takes part regularly in the bid process for the providing engineering services and equipment supplies, and develops partnership relations with the following well-known Ukrainian companies:

- JSC “Ukrainian Energy Machines”,
- JSC “Plant Electrotyazhmash,
- JSC “Zaporozhcran”,
- PE “Projectgidrostal”,
- PrJSC “Novokramatorsky mashinostroitelny zavod”,
- JSC “Hydrostal”,
- PrJSC “Zaporozhtransformator”,
- Corporation “ELCOR”,
- LLC “Dnipro-Spetsgidroenergomontage”,

and also feels confident to cooperate with Power Generation (Germany), ANDRITZ (Austria), Alstom, Schneider Electric (France), Mavel (Czech Republic), Metso Automation (India), Mitsubishi Corp. (Japan) and etc.

Long-term partnership relations closely connect UKRHYDROPROJECT PRJSC and State Foreign Activities Company Ukrinterenergo (Ukraine), General Constructional Trust Song Da, Assembly Trust Lilama (Vietnam), Fortum (Finland).

UKRHYDROPROJECT PRJSC acted as one of the coordinators of equipment supply to hydropower plants in different countries of the world:

1993 - 1994 - Thakmo HPP, Vietnam
1994 - San-Rafael HPP, Mexico
1996 - 1998 - Yali HPP, Vietnam
2001 - 2002 - Nassiria Pumping Plant, Iraq
2002 - 2003 - Can Don HPP, Vietnam

5.2. Supply of batteries

UKRHYDROPROJECT supplies equipment for private and state energy enterprises.

Name	Country	Year (s) of supply
Battery BB BP 100-12	Ukraine	2020
Stationary battery Sprinter XP 12V3400	Ukraine	2021
Battery Ventura GPL 12-100	Ukraine	2022, 2023
Battery MARATHON M12V105FT	Ukraine	2022, 2023
Battery GPL 12-55	Ukraine	2023
Battery GPL 12-80	Ukraine	2023

6. SERVICES ON AUTHORIZED SUPERVISION

Work designation	Country	Year(s) of work implementation
Authorized supervision over the construction of structures, units and systems of start-up complex of the Tashlyk PSP	Ukraine	2001 - 2008, 2011
Authorized supervision over the installation of automation control system at the Kremenchuk HPP	Ukraine	2003 - 2004
Authorized supervision over the extension of Sudak part of Donuzlav wind power plant	Ukraine	2004
Authorized supervision over the construction of sanitation and utility building of the Kakhovka HPP	Ukraine	2004
Authorized supervision over the rehabilitation of reinforced concrete pipeline of the Kyiv PSP	Ukraine	2004
Authorized supervision over the liquidation of bottom outlets of the Kakhovka HPP	Ukraine	2005 - 2008
Authorized supervision and underwater technical control over the works on the rehabilitation of apron of Kakhovka HPP	Ukraine	2006
HPP of Ukrhydroenergo PJSC. Rehabilitation. II stage. Engineering services on authorized supervision	Ukraine	2006 to the present
Authorized supervision over the manufacturing, participation in contract supervision and testing of drilling and pile units of BIS-3 MOP, BIS-3MSA	Ukraine	2008
Authorized supervision over the manufacturing, participation in contract supervision and testing of pile engine KU-II	Ukraine	2008
Authorized supervision over the construction of protective structures in the recreational area of the Azov coast, the city of Prymorsk	Ukraine	2008
Authorized supervision over the work fulfilment on the rehabilitation of regional control centre Eskhar 30/34	Ukraine	2008 - 2009
Authorized supervision over the construction of structures, hydro developments and systems of the Tashlyk PSP	Ukraine	2010 to the present
Authorized supervision over the overhaul of administration building of the Kremenchuk shipping lock	Ukraine	2011
Authorized supervision over the rehabilitation of hydrotechnical structures (embankment of pond No. 2) on the Palanka River	Ukraine	2012
The Kaniv PSP. Authorized supervision	Ukraine	2016 to the present
Rehabilitation of the Tereble-Ritska HPP in the village Nyzhnii Bystryi, Khust district, Zakarpattia region. Replacement of the main systems (control, excitation of protections and regulation) of hydro units No.1-3. Replacement of turbine gates of the bottom outlet of a dam. Execution of the authorized supervision over construction.	Ukraine	2021
Authorized supervision over the construction of rehabilitation structures of the Dubossary HPP	Moldova	2003 - 2004, 2009-2022
Authorized supervision over the construction of the Grodno HPP	Belarus	2008 - 2011

Work designation	Country	Year(s) of work implementation
Authorized supervision over the execution of the designed and technological parts of the Polotsk HPP structures	Belarus	2011
The Ust-Khantaiska HPP. Machine shop, electrical shop. Replacement of hydro unit equipment. Design documentation. Working documentation. Authorized supervision.	Russian Federation	2012-2014
Authorized supervision over the construction of the Mtkvari HPP	Georgia	2010 - 2011, 2014 to the present
Authorized supervision over the construction of an arched dam and open spillway of the Nam Chien HPP	Vietnam	2006
Authorized supervision over electromechanical equipment of the Can Don HPP	Vietnam	2001 - 2004
Authorized supervision over the execution of the designed and technological parts the Huong Dien HPP	Vietnam	2005-2016
Design works and equipment assembly supervision over Buon Kuop HPP	Vietnam	2005 - 2010
Design works and equipment assembly supervision over A Vuong HPP	Vietnam	2005 - 2010
Authorized supervision over the construction of spillway dam San-Rafael	Mexico	1994
Authorized supervision over the main pumping plant Nassiriya	Iraq	2001 - 2008
Authorized concrete work supervision during the construction of underground section of the house of pumping plant of the thermal power plant Yusifia	Iraq	2002
Equipment assembly supervision at the Al-Adaim HPP	Iraq	2002 - 2005
Equipment assembly supervision at the Makhool HPP	Iraq	2003 - 2004

7. PARTICIPATION IN THE DEVELOPMENT OF PROGRAMS, SCHEMES, STRATEGIES, STANDARDS

Work/service designation	Country	Year(s) of work execution/service provision
Scheme of the rational usage of water resources of the Tisa basin	Ukraine	1990 - 1993
Location scheme of wind power stations	Ukraine	1992 - 1995
Determination of the efficiency of capital investments into the construction and rehabilitation of hydropower objects	Ukraine	2004 - 2005
State scientific and technical programs on the provision of environmental safety in the field of fuel-energy complex. Hydropower objects	Ukraine	2004 - 2005
Subordinate acts (to the project) of the Law of Ukraine “On Safety of Hydrotechnical Structures”	Ukraine	2006 - 2007
Operating instruction of hydrotechnical structures of the Pechenihy hydro development	Ukraine	2008
Operating rules and hydroeconomic passports of the Prybuzke and Oleksandrivske reservoirs	Ukraine	2008
Operating rules of the cascade of reservoirs of the South Bug River basin	Ukraine	2008
Participation in the project development of the Law of Ukraine “On Safety of Hydrotechnical Structures”	Ukraine	2011
Analysis of perspective sources of service water supply and technical economic characteristics of hydrotechnical structures of the sites for the construction of power units of new nuclear power plants.	Ukraine	2011
Operating rules of the Pechenihy reservoir on the Siverskiy Donets River	Ukraine	2013
Analysis of the schematic and detailed design for rehabilitation of power evacuation at the Dniester HPP-2	Ukraine	2016
Operating manual for SCADA system along with the conventional control at the Kakhovka HPP	Ukraine	2016-2017
Operating rules of the Oleksandrivske reservoir at NWL 20.7 m and the upper reservoir of the Tashlyk PSP in the headrace channel	Ukraine	2016 - 2017
Standard of an organization in Ukraine: Rules for determining cost of design work for hydropower facilities	Ukraine	2017
Elaboration of operating rules of the Pechenihy reservoir for the improvement of its technical state and spatial management of ME "Kharkivvodokanal"	Ukraine	2017
Elaboration of operating manual for SCADA system along with the conventional control at the Kaniv HPP	Ukraine	2018
Elaboration of methodic documents for the provision of SCADA operation of the hydrotechnical structures of the Kremenchuk HPP	Ukraine	2018
Analysis of location conditions and use of PSPs during the development of UES of Ukraine for the period up to 2035	Ukraine	2019

Services on elaboration of detailed methodologies and instructions for the operation of SCADA of the hydrotechnical structures. First stage. Affiliate “the Dniester HPP” of Ukrhydroenergo PJSC	Ukraine	2019-2020
Services on elaboration of detailed methodologies and instructions for the operation of SCADA of the hydrotechnical structures. First stage. Affiliate “the Dnipro HPP” of Ukrhydroenergo PJSC	Ukraine	2019-2020
Services on elaboration of detailed methodologies and instructions for the operation of SCADA of the hydrotechnical structures. Second stage. Affiliate “the Dnipro HPP” of Ukrhydroenergo PJSC	Ukraine	2020
Standard of an organization in Ukraine: Rules for determining cost of design work for construction of HPPs and PSPs for the affiliates of Ukrhydroenergo PJSC	Ukraine	2020
Standard of an organization of Ukrhydroenergo PJSC. Technical operation of hydrotechnical structures. General rules	Ukraine	2021-2022
Development of a program for testing the sensitivity of all operating droplet and embedded piezometers at the hydrotechnical structures of the Dubossary HPP.	Moldova	2019
Layout of promising pumped storage power plants and elaboration of additional pre-design materials power supply SKOPSKI LEGURI DOOEL in the Republic of North Macedonia	North Macedonia	2022
Main principles of complex usage of hydropower resources and hydropower development of Tajikistan up to 2030	Tajikistan	2005 - 2006

8. DESIGNED PROJECTS

Accepted abbreviations: *ASD – all stages of design, p. – present, D – design, DesD – design documentation, DW – design works, PDW – preliminary design works, WD – working documentation, SD – schematic design, TEA – technical and economic analysis, FS – feasibility study, TES – technical and economic studies, FC – feasibility calculation, TD – technical design, AS – authorized supervision.*

8.1. Major and medium-sized hydropower plants

Facility name	Country	River	Installed capacity, MW	Mean annual output, GWh.	Max head (net), m	HPP Discharge, m3/s	No. of units	Status of work execution
Dnipro HPP-1	Ukraine	Dnipro	585	1534	38.2	2150	9	ASD commissioned in 1932; renovated in 1947
Kakhovka HPP	Ukraine	Dnipro	300	1254	16,5	2900	6	ASD commissioned in1956
Kremenchuk HPP	Ukraine	Dnipro	625	1495	17,75	5700	12	ASD commissioned in 1960
Serednodniprovska HPP	Ukraine	Dnipro	352	1159	15,25	4400	8	ASD commissioned in 1964
Kyiv HPP	Ukraine	Dnipro	361	688	11,15	5800	20	ASD commissioned in 1968
Kaniv HPP	Ukraine	Dnipro	444	916	13,15	7550	24	ASD commissioned in 1975
Dnipro HPP-2	Ukraine	Dnipro	876,8	2209	38,2	2860	8	ASD commissioned in 1981
Kakhovka HPP-2	Ukraine	Dnipro	250	1429	15,4	2280	6	FS (ind. parts) 2014-2015 TES 2017
Dubossary HPP	Moldova	Dnister	48	261	16,5	400	4	ASD commissioned in 1954 SD 2019-2022

Facility name	Country	River	Installed capacity, MW	Mean annual output, GWh.	Max head (net), m	HPP Discharge, m3/s	No. of units	Status of work execution
Dniester HPP-1	Ukraine	Dnipro	702	865	53,5	1920	6	ASD commissioned in 1983
Dniester HPP-2	Ukraine	Dnipro	40.8	50	7,7	450	3	ASD commissioned in 1999-2002
Yegorlyk HPP	Russian Federation	Velykyi Yehorlyk	30	110	31.9	55	2	TD; 1956 commissioned in1962
Kankun HPP	Russian Federation	Timpton	1200	4865	213,8	732,8	4	ASD; dam design 2010
Nizhne-Bureyskaya HPP	Russian Federation	Bureya	320	1650	28,8	13600	4	SD on layout 2011
Main hydro development of Verkhne-Krasnogorskaya HPP (Srednyaya HPP)	Russian Federation	Kuban	88,5	247,1	39,5	256	2	WD 2011
Grodno HPP	Belarus	Neman	17	84,4	7,3	300	5	WD 2007-2011 (commissioned in 2012)
Polotsk HPP	Belarus	W. Dvina	21,75	112,2	7,7	320,0	5	WD. 2011-2015 (under construction)
Mtkvari HPP	Georgia	Kura	46,4	2,21	105,2	57	2	D, WD, AS 2008-2011, WD 2014-2016 (under construction) 2018-present
Thak Mo HPP	Vietnam	Be	150	611	94	186	2	TD, WD, AS 1991 (commissioned in 1995)

Facility name	Country	River	Installed capacity, MW	Mean annual output, GWh.	Max head (net), m	HPP Discharge, m3/s	No. of units	Status of work execution
Yali HPP	Vietnam	Se San	720	3650	190	418	4	DS, TD, WD 1992-1994 (commissioned in 2002)
Can Don HPP	Vietnam	Be	77,6	306	32	270	2	TD, WD, AS 1996 - 2001 (commissioned in 2003)
Srok Phu Mieng HPP	Vietnam	Be	51	229,5	22	301	2	TD 2003 (commissioned in 2006)
Se San 3A HPP	Vietnam	Se San	108	475	21,5	560	2	TD, AS 2003 (commissioned in 2006)
A Vuong HPP (electrotechnical part)	Vietnam	A Vuong	210	900	321	77,5	2	WD 2005-2011 (under construction)
Huong Dien HPP	Vietnam	Bo	81	204,3 (for two hydro units)	56	197,1	3	D, SD 2005-2009 (commissioned in 2013)
Hua Na HPP	Vietnam	Chu	180	727,0	115,7	192	3	Review of FS 2006, expertise of TD 2009
Bao Loc HPP	Vietnam	La Nga	24,5	128,6	71,6	41,2	2	TD 2003 (under construction)
Nam Chien HPP	Vietnam	Nam Chien	200	789,28	666,42	35,61	2	TD, WD 2003-2006 (under construction)
Buon Kuop HPP	Vietnam	Srepok	280	1400	91	330	2	WD on electrotechnical part 2005-2010 (under construction)

Facility name	Country	River	Installed capacity, MW	Mean annual output, GWh.	Max head (net), m	HPP Discharge, m3/s	No. of units	Status of work execution
Uribante-Caparo hydrotechnical complex	Venezuela	Uribante, Dorados, Comburite, Copare Rivers	500	1660	344,1	183	2	FS 2005
Sendje HPP	Equatorial Guinea	Wele	200	1150	69	315	4	PDW 2008
La Yeska HPP	Mexico	Rio Grande De Santiago	750	1498	163,35	246	2	WD completion on auxiliary equipment 2011
Makhool HPP	Iraq	Tiger	260	1940	23,1	310	4	DW 2003
Grand Ethiopian Renaissance Dam Project	Ethiopia	Blue Nile	6000	15976	123	5390	16	Design optimization, DW for powerhouse 2011-present (under construction)

8.2. Pumped storage power plants

Facility name	Country	River	Capacity, MW		Max. head, m (net)		Operation mode (hour/days)		No of units	Status of work execution
			turbine mode	pumping mode	turbine mode	pumping mode	turbine mode	pumping mode		
Kyiv PSP	Ukraine	Dnipro	235,5	139	67	73	2,7	5,4	6	ASD commissioned in1972
Tereble-Ritska PSP	Ukraine	Rika	1272	1508	201,6	225,5	6	6,7	4	FS 1975
Tereblynska PSP	Ukraine	Tereblia	1040	1163	497	528	4	5	4	FS 1977
Dniester PSP	Ukraine	Dniester	2268	2947	162	169	5	5	7	ASD 1975-present (under construction, 1 hydro unit commissioned in 2010, 2 – in 2014, 3 – in 2016 4 — in 2021).
Tashlyk PSP	Ukraine	South Bug	906	1378	88,5	89,5	3,1	5,7	6	ASD 1981-2005 (under construction, 1 hydro unit commissioned in 2006, 2 — in 2007, 3 — in 2022)
Kaniv PSP	Ukraine	Dnipro	3600	3960	-	100	9	7	18	ASD 1987
Kaniv PSP (design update)	Ukraine	Dnipro	1000	1120	107,2	114	4,2	5,0	4	FS of construction renewal 1999-2004, D 2008
Dudchany 250 MW	Ukraine	Dnipro	250,0	288,0	74,0	80,0	-	-	4	TEA 2021
Chykalivka	Ukraine	Dnipro	232,0	262,0	90,0	114,0	6	8	4	TEA 2021
Leningrad PSP	Russian Federation	Shapsha	1560	1760	93,3 (net)	97,8 (net)	5,6	7	8	Design of penstocks, powerhouse pit, powerhouse strength calculations, 2009
Zelenchuk HPP-PSP	Russian Federation	Bolshoy Zelenchuk	140	160	219	232	-	-	2/2	WD 2011

		Marukha, Aksaut								

8.3. Small hydropower plants

Facility name	Country	River	Capacity, MW	Output, GWh	Head, m	Discharge, m3/s	No of units	Status of work execution
Tereble-Ritska	Ukraine	Tereblia	27	139	215,00	18,00	3	ASD commissioned in 1956
Dobrianska	Ukraine	Syniukha	1,56	5,23	11,60	20,40	4	FC 1988
Stryiska	Ukraine	Stryi	14,32	50,00	35,00	11,90	4	FC 1989
Dobrotvirska	Ukraine	Western Bug	1,05	6,30	8,20	14,60	3	FC 1990
Makazhoiska	Chechnya	Ansalta	0,40	1,67	57,15	0,98	2	FC 1990
Pavlopilska	Ukraine	Kalmius	1,53	7,70	20,30	9,00	2	FC 1992
Oleksandrivska	Ukraine	South Bug	10,9	55	10,5	90	2	ASD 1980-1987 (commissioned 1999)
Pokotylivska	Ukraine	Yatran	0,17	0,94	4,7	2,2	2	FS 2000
Dobrotvirska	Ukraine	Western Bug	1	5,51	8	15	4	FS 2003
Bilotserkivska	Ukraine	Ros	1,54	7,54	12,6	15,00	2	TES 2011
The cascade of power plants on the lower part of the Teresva River, Ukraine								
HPP-1			4,84	20,18	9,70	58,00	2	FS 2008
HPP-2			4,84	20,40	9,70	58,00	2	FS 2008
HPP-3			4,84	20,76	9,70	58,00	2	FS 2008
HPP-4			6,0	22,30	9,70	74,00	2	Approved part of SD 2009
The cascade of small hydropower plants on the Shopurka River in the settlement Velykyi Bychkiv, Rakhiv district, Zakarpattia region								
HPP-1			1000	0.000004	8,0	15,00	1	2018
HPP-2			1000	0.000004	8,0	15,00	1	2018
HPP-3			1000	0.000004	8,0	15,00	1	2018

HPP-4			1000	0.000004	8,0	15,00	1	2018
HPP-5			1000	0.000004	8,0	15,00	1	2018

Visual inspections of small hydropower plants

Work designation	Ukraine	Year(s) of work execution
Complex inspection of the Snyatinska HPP on the Prut River	Ukraine	1992
Inspection of the Ladyzhyn small HPP	Ukraine	2007, 2010, 2012
Visual inspection of the Bilche-Zolotetska small HPP on the Seret River	Ukraine	2009
Visual inspection of the Novolabunivska and Iziaslavska small HPPs	Ukraine	2009
Visual inspection of the part of the Bilochi River for the construction of small HPP	Ukraine	2009
Visual inspection of the Dniester River (part Turenchuk) for the construction of small HPP	Ukraine	2009
Visual inspection of the Novoshytska small HPP on the Bystrytsia River	Ukraine	2009 - 2010
Visual inspection of the Haivoronska small HPP	Ukraine	2010
Visual inspection of the parts of territory and rivers in the places of supposed restoration of mini HPPs in Khmelnytskyi region	Ukraine	2010
Visual inspection of the Krasnokhutirska, Ternivska and Novoarkhanhelska small HPPs	Ukraine	2010
Visual inspection of mini HPP sites on the rivers in Khmelnytskyi region	Ukraine	2010
Visual inspection of the perspective sites for small HPPs on the Zbruch and Strypa Rivers	Ukraine	2010
Visual inspection and technical and economic indicators of the rehabilitation of the Krasnostavska and Kochubeivska small HPPs on the Zhvanchyk River	Ukraine	2011
Assessment of the feasibility to build the Rybnytska small HPP	Ukraine	2013
Rehabilitation of a tunnel at the Tereble-Ritska HPP. Development of auxiliary materials and visual inspection of the tunnel	Ukraine	2017

8.4. Rehabilitation. Modernization. Restoration.

8.4.1. Large and medium-sized HPPs and PSPs

Facility name	Country	River	No of hydro units, pcs		Installed capacity, MW			Average annual electricity output, mln. kWh			Year(s) of work execution
			Total	Rehabilitation	Before rehabilitation	After rehabilitation	increase	Before rehabilitation	After rehabilitation	increase	
Kyiv HPP	Ukraine	Dnipro	20	8	412	440	28	701	709	8	ASD 1996-2002, 2006-present
Kaniv HPP	Ukraine	Dnipro	24	22	451	528	77	918	945	27	ASD 1996-2002, 2006- present
Kremenchuk HPP	Ukraine	Dnipro	12	12	625	682,8	57,8	1495	1516	21	ASD 1996-2002, 2006- present
Serednodniprovska HPP	Ukraine	Dnipro	8	6	360,8	387,2	26,4	1177	1232	55	ASD 1996-2002, 2006-present
Dnipro HPP-1	Ukraine	Dnipro	10	3	627	648	21	1601	1634	33	ASD 1996-2002, 2006-present
Dnipro HPP-2	Ukraine	Dnipro	8	8	876,6	900	23,4	2243	2271	28	ASD 1996-2002, 2006- present
Kakhovka HPP	Ukraine	Dnipro	6	2	323,2	334,8	11,6	1281	1295	14	ASD 1996-2002, 2006-present
Kyiv PSP *	Ukraine	Dnipro	6	3	235,5	235,5	0	226	229,3	3,3	ASD 1996-2002, 2006-present

Facility name	Country	River	No of hydro units, pcs		Installed capacity, MW			Average annual electricity output, mln. kWh			Year(s) of work execution
			Total	Rehabilitation	Before rehabilitation	After rehabilitation	increase	Before rehabilitation	After rehabilitation	increase	
Dniester HPP-1	Ukraine	Dniester	6	6	702	702	0	912	930	18	ASD 2006-present
Dubossary HPP	Moldova	Dniester	4	4	48	up to 64	18	261	being clarified in the design	-	ASD 1979-1993 FS 2005
Iova HPP	Russian Federation	Iova	2	2	96	90,24	-4,76	536,135	-	-	WD 2011-2014
Ust-Khantaiska HPP	Russian Federation	Khantaika	7	7	441	511	7	2000	-	-	WD 2012-2014
Naghlu HPP	Afghanistan	Kabul Pandsher	4	4	100	100	0	-	-	-	WD 2006-2011

* Note – The indicators of the Kyiv PSP are shown for the turbine mode

8.4.2. Small hydropower plants

Facility name	Country	River	Head, m	Discharge, m3/s		Capacity, MW		Output, GWh		No. of units		Year of commissioning/rehabilitation	Year(s) of work execution
				Before rehabilitation	After rehabilitation	Before rehabilitation	After rehabilitation	Before rehabilitation	After rehabilitation	Before rehabilitation	After rehabilitation		
Korsun-Shevchenkivska	Ukraine	Ros	9.55	22.4	28.20	1.74	2.3	5.67	6.74	2	2	1934/1947	FC 1988
Niverkivska	Ukraine	Zbruch	7.00	14.8	16.60	0.8	0.97	3.2	3.77	2	2	1957	FC 1988
Nyzivska	Ukraine	Psel	4.1	13.9	13.9	0.415	0.415	2.7	2.7	3	3	1953	SD 1988
Bodnarivska	Ukraine	Zbruch	7.00	11.1	12.50	0.6	0.73	3.12	3.40	2	2	1955	FC 1988
Sniatynska	Ukraine	Prut	5.50	26.8	44.0	0.8	2.06	2.5	8.80	2	2	1959	SD 1992
Tereble-Ritska	Ukraine	Tereblia	215.00	18.00	36.00	27	57.9	139	182	3	3	1956	PDW 2001
Ladyzhynska	Ukraine	South Bug	16.5	54.2	54.2	7.50	8.00	32.22	36.04	2	2	1964	FS 2011
Mykhailivska	Ukraine	Psel	3.0	10.4	16.6	0.19	0.34	0.8	2.29	2	2	1957	SD 2012-2013

8.4.3. Replacement of auxiliary equipment

Name	Country	River	Generator/ unit switches and breakers	Power unit transformers	Current and voltage measuring transformers	Control systems and electric protections	Excitation transformers and systems	Governing systems	AC and DC auxiliary systems	Systems of technical water supply, air conditioning, fire-fighting and alarm, DC cabinets and batteries, etc.
Kyiv PSP	Ukraine	Dnipro	9/2	2	+	6	6	6	+	+
Kyiv HPP	Ukraine	Dnipro	20/5	5	+	20	20	20	+	+
Kaniv HPP	Ukraine	Dnipro	24/6	6	+	24	24	24	+	+
Kremenchuk HPP	Ukraine	Dnipro	12/4	-	+	12	12	12	+	+
Serednodniprovska HPP	Ukraine	Dnipro	8/4	4	+	8	8	8	+	+
Dnipro HPP-1	Ukraine	Dnipro	-/9	9	+	9	9	9	+	+
Dnipro HPP-2	Ukraine	Dnipro	8/4	4	+	8	8	8	+	+
Kakhovka HPP	Ukraine	Dnipro	-/6	6	+	6	6	6	+	+
Dniester HPP-1	Ukraine	Dniester	-	-	+	6	6	6	+	+
Iova HPP	Russian Federation	Iova	2/-	-	+	2	2	2	+	+
Ust-Khantaiska HPP	Russian Federation	Khantaika	-	-	+	7	7	7	+	+
Naghlu HPP	Афганістан	Kabul Pandsher	-	2	+	4	4	4	+	+

“+” – equipment replacement is in process

8.4.4. Rehabilitation of substations and switchgears

Facility name	Country	Voltage	Year(s) of work execution
Indoor and outdoor switchgears, rehabilitation of the Dnipro cascade (1st stage)	Ukraine	330/154 kV, 33/110 kV, 154 kV	1997 - 2002
The Raionna and Rezervna substations of the Tashlyk PSP	Ukraine	35/6 kV	2004
Outdoor switchgear of the South Ukraine NPP	Ukraine	330 kV	2006 - 2007
Indoor and outdoor switchgears within the rehabilitation of the Dnipro cascade-(2nd stage)	Ukraine	330/154 kV, 33/110 kV, 154 kV	2007 - 2008
Rehabilitation with the replacement of 330 kV air circuit breakers for sulfur hexafluoride circuit breakers at outdoor switchgear of Northern Ukrainian substation (750 kV) of Northern electrical power system NEK “Ukrenergo”	Ukraine	330 kV	2011
Elaboration of design and estimate documentation on the replacement of high-voltage input of phase "A" 330 kV on a block transformer 2 T TDTs-250000/330-U1 type of the Tashlyk PSP	Ukraine	330 kV	2019-2020
The Pravoberezhna substation of the MEM Centre	Russian Federation	330/110/35/10kV	2008
Outdoor switchgear of the Naglu HPP	Afghanistan	110/10 kV	2008

Rehabilitation of the Dnipro cascade

From 1996 till June 2002 UKRHYDROPROJECT PRJSC took part in the development of the first stage of rehabilitation of the Dnipro HPPs' cascade.

The main feature of this project was unprecedented in the global practice execution of rehabilitation work by one company during more than 10 years at all eight hydropower plants of the Dnipro cascade in the conditions of the continuing enterprise.

The main goals and tasks of the rehabilitation were to extend the operational period of the hydropower plants, to increase their capacities, output, reliability and safety, to fulfil the requirements of environmental protection, to improve the quality of electricity produced due to the improvement of the control system, to create modern working conditions that meet current regulations.

As a result of the rehabilitation of nine units at the Kyiv HPP, six units at the Dnipro HPP-1, and one unit at the Kakhovka HPP, total installed capacity at design heads was increased by 88.1 MW, mean annual output – by 95 million kWh.

According to UKRHYDROPROJECT's designs at the Kyiv HPP and PSP, the Kremenchuk HPP, the Serednodniprovska HPP, the Kakhovka HPP, the Dnipro HPP-1 and Dnipro HPP-2 the following equipment was completely or partially replaced: generator and block breakers, disconnectors, current and voltage transformers of 154 and 330kV, excitation systems, speed regulation systems, protection systems and control systems for unit, block and plant levels, electrical protections. At these HPPs AC and DC auxiliary systems and cable systems were partially rehabilitated.

Within the framework of current project UKRHYDROPROJECT PRJSC cooperated with such leading companies as ABB, ALSTOM, ALFA, HAEFELY TRENCH and others.

In 2006 UKRHYDROPROJECT started the implementation of the 2nd stage of the rehabilitation. The Dniester HPP-1 on the Dniester River was included as a part of rehabilitated objects. At this stage, 64 hydro units of the Kyiv HPP and PSP, Kaniv HPP, Serednodniprovska HPP, Kremenchuk HPP, Kakhovka HPP, Dnipro HPP-1 and Dnipro HPP-2 will be upgraded. It is foreseen to increase the total installed capacity of

the cascade by 235 MW, mean annual output of electricity - by 239 million kWh. On the bid basis at these HPPs and the Dniester HPP-1, it is suggested to replace control systems, excitation systems, regulation systems, electrical protection systems of units, blocks and 110 and 330kV lines. Such electrotechnical equipment as breakers, disconnectors, and current and voltage transformers will be also replaced. Auxiliary system, firefighting, air conditioning, technical water supply systems, DC boards and storage batteries will be rehabilitated.

After the complete rehabilitation of the HPPs of the Dnipro cascade, each plant will be equipped with a centralized control and protection system connected to the cascade central control board located in the area of the Kyiv HPP.

8.5. Dams

Facility name	Country	River	Spillway dam				Blind dam			Year(s) of work execution
			type	Length of spillway section, m	Max.height, m	Design discharge, m3/s	type	Length on the crest, m	Max. height, m	
Dnipro	Ukraine	Dnipro	ogee type	338	62.0	22300	Concrete gravity	251	33	ASD commissioned in 1932; restored in 1947
Kakhovka	Ukraine	Dnipro	ogee type	336	37	25400	earth	3200	29	ASD commissioned in 1955
Of Kochetok water intake structure	Ukraine	Siverskyi Donets	ogee type	85	6.3	1750				ASD commissioned in 1956
Kremenchuk	Ukraine	Dnipro	ogee type	160	33.0	19200	earth	10700	30	ASD commissioned in 1963
Serednodniprovska	Ukraine	Dnipro	ogee type	160	35.2	21200	earth	8100	21	ASD commissioned in 1963
Pechenihy	Ukraine	Siverskyi Donets	ogee type	120	15.5	1900	earth	3200	16	ASD commissioned in 1963
Kyiv	Ukraine	Dnipro	With wide sill	240.0	38.39	9300	earth	40900	22.5	ASD commissioned in 1964
Kaniv	Ukraine	Dnipro	With wide sill	288	39.5	16000	earth	16100	26	ASD commissioned in 1972

Facility name	Country	River	Spillway dam				Blind dam			Year(s) of work execution
			type	Length of spillway section, m	Max.height, m	Design discharge, m3/s	type	Length on the crest, m	Max. height, m	
Lutuhino	Ukraine	Sukha Vilkhuvata	Bank fall	25	-	128	earth	320	21	ASD commissioned in 1979
Dniester I	Ukraine	Dniester	ogee type	86.4	80.0	11280	earth	732	60	ASD commissioned in 1981
Tashlyk	Ukraine	South Bug	-	-	-	-		1500	55	ASD commissioned in 1984
Dniester II	Ukraine	Dniester	ogee type	90	26.0	13260	earth	800	26	ASD commissioned in 1999
Pisochynska	Ukraine	Udy	With wide sill	28	-	420	earth	775	6.58	PDW 1957
Maiachkivska	Ukraine	Maiachka	Inclined fall	22	-	47	earth	585	14	ASD 1959-1965
Annovska	Ukraine	Kazennyi Torets	Inclined fall	28	-	199	earth	780	16.5	PDW 1959, 1968
Isakivska	Ukraine	Bila	With wide sill	25	-	132.5	earth	466	31	ASD 1960
Yelyzavetynska	Ukraine	Vilkhivka	fall	22.8	-		earth	208	20	ASD 1960
Kamianska	Ukraine	Kamianka	Automatic inclined fall	21.5	-	200	earth	305	27	ASD 1963,1966
Yanivska	Ukraine	Miusyka	Inclined fall	54	-	420	earth	200	11	PDW 1966
Veselivska	Ukraine	Druha Bilenka	Cascade bank fall	42	-	118	earth	345	7	Design 1966

Facility name	Country	River	Spillway dam				Blind dam			Year(s) of work execution
			type	Length of spillway section, m	Max.height, m	Design discharge, m3/s	type	Length on the crest, m	Max. height, m	
Prudianska	Ukraine	Lopan	fall	28	-	192	earth	1400	11.1	PDW 1967
Merefianska	Ukraine	Mozh	fall	40	-		earth	2000	9	FS 1969
Nemyshlianska	Ukraine	Nemyshlia	Bank fall	20	-	30	earth		15.3	TD 1971-1973
Chernianska	Ukraine	Oskil	With wide sill	96	18.5	2590	earth	1280	16.5	FS 1972
Dniester PSP	Ukraine	Dniester	-	-	-	-	earth	6000	30	ASD 1975-present (under construction)
Sabarovska	Ukraine	South Bug	ogee type	91.45	13.4	1707	rock-fill	38	6	FC 1987
Slovianska	Ukraine	Kazennyi Torets	With wide sill	87	13.6	1160				FC 1987
Varvenska	Ukraine	Udai					earth	2800	17.2	Design
Iziumska	Ukraine	Siverskyi Donets	ogee type	108	14.5	3045	earth	900	13.5	Design
Bolokanska	Ukraine	Velyki Durleshty	Inclined fall	14	-		earth		9.5	Design
Hydrotechnical structure at the Rivne NPP	Ukraine	Styr				2500				PDW (TEA) 2017
Dubossary	Moldova	Dniester	ogee type	104	25.0	8200	earth	855	21	ASD commissioned in 1955

Facility name	Country	River	Spillway dam				Blind dam			Year(s) of work execution
			type	Length of spillway section, m	Max.height, m	Design discharge, m3/s	type	Length on the crest, m	Max. height, m	
Kankun	Russian Federation	Timpton					Rock-fill	971	282,5	Design 2010
Verchne-Krasnogorsk (main hydro development)	Russian Federation	Kuban	Spillway with wide sill of non-aerated profile	40		1850	earth-to-rockfill dam with a core	1840	35,5	WD 2011
Polotsk	Belarus	Zapadnaya Dvina		80	17,5	2250	earth	238,9	17	WD 2012
Dam on the Gekhi River	Armenia	Gekhi	Combined with construction tunnel		-	264	earth	270	90	Design
Guaninhe	China	Taitsyr	-	-	-	-	RC	38,5	82	Calculations 1993
Thakmo	Vietnam	Be	ogee type	44	*26*	4740	earth	-	49	ASD 1991 (commissioned in 1995)
Yali	Vietnam	Se San	ogee type	90	*30*	13800	earth	-	67	ASD 1992-1994 (commissioned in 2002)
Can Don	Vietnam	Be	ogee type	51	*30*	6160	earth	1300	46	ASD 1996-2001 (commissioned in 2003)
Se San 3A	Vietnam	Se San	ogee type	105	*34*	18000	Concrete gravity	130	27	TD 2003 (commissioned in 2006)

Facility name	Country	River	Spillway dam				Blind dam			Year(s) of work execution
			type	Length of spillway section, m	Max.height, m	Design discharge, m3/s	type	Length on the crest, m	Max. height, m	
Srok Phu Mieng	Vietnam	Be	ogee type	66	*26*	7180	-	-	30,5	TD 2003 (commissioned in 2007)
Huong Dien	Vietnam	Bo	RC	52	*82.5*	8000	RC	240	82	ASD 2005-2009 (commissioned in 2010)
Nam Chien	Vietnam	Nam Chien	Arch reinforced concrete	80	135	2387				TD, WD (2003-present)
San-Rafael Hydro Scheme	Mexico	Rio Grande De Santiago	With wide sill	51	18.5	6150	-	-	-	- commissioned in 1994
Uribante-Caparo Hydrotechnical complex	Venezuela	Uribante, Dorados, Comburite, Caparo	Surface one, of automatic action	20	6	215	earth	315	100	FS 2005

8.6. Fishways and fish protection structures

Name	Country	River	Type	Main parameters:						Year(s) of work execution
				Discharge, m3/s	Head, m	Water velocity, m/s	Range of action, m	Frequency working range, Hz	Sound pressure, Pa	
HPPs No.11 and 12 on the borderline section of the Tysa River	Ukraine	Tysa	Fish ladder	4,5	12		-	-	-	Design 1995
HPPs No. 13a, 15a, 69a, 71a, 73 on the Tysa River	Ukraine	Tysa	Fishway canal with trapezoidal cross-section	4,5	13	Not more than 1,2	-	-	-	PDW 2001
HPP on the Tysa River	Ukraine	Tysa	Acoustic fish protection device "Mayak"	-	-	-	50	5-200	max=5000 min=200	PDW, FS 2001
Oleksandrivska Hydro development, design	Ukraine	South Bug	Fish protection structure of active type "Spectr"	-	-	-	50		-	Design 1980
Extension of the Dubossary HPP	Moldova	Dniester	Complex fishway. It consists of fishway canal and fish lift			from 0,8 to 4,0				FS 1994
Mtkvari HPP	Georgia	Kura	Fish ladder with a fishway canal	3,78	20,45	0,9-1,4	27000	-	-	Design 2011

8.7. Navigation structures (shipping locks)

Name	Country	River	Head, m	Depth at the sill, m	Chamber dimension, m	Status of work execution
Kakhovka Lock	Ukraine	Dnipro	17.0	4.0	270x18	ASD commissioned in 1956
Kremenchuk Lock	Ukraine	Dnipro	17.0	3.65	270x18	ASD commissioned in 1960
Serednodniprovskyi Lock	Ukraine	Dnipro	12.5	3.65	270x18	ASD commissioned in 1964
The Black Sea – Baltic water way	Ukraine, Belarus, Poland	Dnipro – Prypiat - Bug - Vistula	от 6 до 15	1.8 4.0	150x18 270x18	FC 1964
Kyiv Lock	Ukraine	Dnipro	11.5	4.0	150x18	ASD commissioned in 1968
Kaniv Lock	Ukraine	Dnipro	12.5	4.0	270x18	ASD commissioned in 1975
Dnipro HPP-2	Ukraine	Dnipro	38.7	5.5	290x18	ASD commissioned in 1978
Danube – sea Channel	Ukraine	Danube	1.3	7.85	300x34	FS 1989, 2002
Dubossary Lock	Moldova	Dnister	17.2	3.65	144x15	Design 1980
Krasnogorsk Lock	Russian Federation	Irtysh	4,9	4,0	150x20	Design, WD 2011
Grodno HPP	Belarus	Neman	18,0	2,3	100x15	FS 2010
Luang Prabang	Laos	Mekong	35,75	3,0	120x12	FS 2008-2011

Rehabilitation of locks

Work designation	Country	Year(s) of work execution
Design works on complex survey and assessment of the state of the Kakhovka shipping lock hydrotechnical structures	Ukraine	2005
Design works on complex survey and assessment of the state of the Zaporizhzhia district hydrotechnical structures	Ukraine	2005
Inspection of the technical state of the hydrotechnical structures of the SE "Ukrvodschliakh" locks	Ukraine	2005
Complex instrumental survey of the hydrotechnical structures of the Kremenchuk shipping lock and assessment of its technical state with the conclusion of certificate of lock technical state	Ukraine	2005
Complex instrumental survey of the hydrotechnical structures of the Dniprodzerzhynsk shipping lock and assessment of its technical state with the conclusion of certificate of lock technical state	Ukraine	2005
Complex survey of the hydrotechnical structures of the Kyiv shipping lock and assessment of its technical state with the conclusion of certificate of lock technical state	Ukraine	2007
Complex survey of the hydrotechnical structures of the Kaniv shipping lock and assessment of its technical state with the conclusion of certificate of lock technical state	Ukraine	2007
Overhaul of the operating lifting and lowering gates of the upper head of the Kaniv lock. Gate replacement (checking of the bearing capacity of the hydrotechnical structures during the overhaul of the operating lifting and lowering gates of the upper head)	Ukraine	2017
Elaboration of a design and overhaul execution of the drainage system of the Kyiv lock shipping chamber	Ukraine	2017
Overhaul of the drainage system of the shipping chamber and water supply galleries of the Kakhovka shipping lock (design elaboration)	Ukraine	2018
Overhaul the hydrotechnical structures of the water supply galleries and the bottom of the shipping chamber of the Kakhovka shipping lock. "Schematic design" stage.	Ukraine	2019
Correction of the estimate documentation and expertise execution of the schematic design of the overhaul drainage system of the shipping chamber of the Kakhovka shipping lock.	Ukraine	2019
Authorized supervision over the work execution on the overhaul drainage system of the shipping chamber of the Kyiv shipping lock.	Ukraine	2019
Overhaul the floating rims and guide ways of the Dniprodzerzhynsk shipping lock. "Schematic design" stage.	Ukraine	2020
Overhaul the drainage system of the Zaporizhzhia shipping lock chamber	Ukraine	2020
Overhaul the central control board building of the Dniprodzerzhynsk shipping lock	Ukraine	2020
Authorized supervision over the work execution on the facility: "Overhaul the hydrotechnical structures of water supply galleries and bottom of the shipping chamber of the Kakhovka shipping lock".	Ukraine	2020
Works on the authorized supervision over the construction work execution on the facility: "Overhaul the drainage system of the Zaporizhzhia shipping lock VP (ZRGS)"	Ukraine	2021
Authorized supervision over the work execution on the facility: "Overhaul the hydrotechnical structures of water supply galleries and bottom of the shipping chamber of the Kakhovka shipping lock".	Ukraine	2022–

8.8. Reservoirs

Name	Country	River	Purpose and live storage	Status of work execution
Dnipro reservoir	Ukraine	Dnipro	Water supply, irrigation, hydropower, river transport, recreation, 850 mln m^3	ASD commissioned in 1932 rehabilitated in 1947
Kakhovka reservoir	Ukraine	Dnipro	Water supply, irrigation, hydropower, river transport, recreation, 6780 mln. m^3	ASD commissioned in 1955
Kremenchuk water storage	Ukraine	Dnipro	Water supply, irrigation, hydropower, river transport, recreation, 8970 mln. m^3	ASD commissioned in 1959
Serednodniprovske reservoir	Ukraine	Dnipro	Water supply, irrigation, hydropower, river transport, recreation, 530 mln. m^3	ASD commissioned in 1963
Pechenihy reservoir	Ukraine	Siverskyi Donets	Water supply of Kharkiv, agricultural water supply, irrigation, recreation, 383 mln. m^3	ASD commissioned in 1964
Kyiv reservoir	Ukraine	Dnipro	Complex: water supply, irrigation, hydropower, river transport, recreation, 1170 mln. m^3	ASD commissioned in 1967
Kaniv reservoir	Ukraine	Dnipro	Water supply, irrigation, hydropower, river transport, recreation, 300 mln. m^3	ASD commissioned in 1973
Dniester reservoir	Ukraine	Dniester	Hydropower, water supply, irrigation, flood control, 2000 mln. m^3	ASD commissioned in 1981
Tashlyk reservoir	Ukraine	South Bug	Cooling reservoir of NPP, 34,6 mln. m^3	ASD commissioned in 1982
Kostiantynivka reservoir	Ukraine	South Bug	Hydropower, irrigation, water supply, recreation, 72,6 mln. m^3	design 1983
Krasnopavlivka reservoir	Ukraine	Popelna	Water supply, irrigation, recreation, 380 mln. m^3	ASD commissioned in 1986
Oleksandrivka reservoir	Ukraine	South Bug	Hydropower, water supply, recreation, 318 mln. m^3	ASD commissioned in 2006
Dubossary reservoir	Moldova	Dniester	Water supply, irrigation, fishery, hydropower, river transport, recreation, 166 mln. m^3	ASD commissioned in 1954

8.9. Canals for water supply, irrigation and navigation

Facility name	Country	Design discharge, m3/s	Length, km	Status of work execution
Mykytivka-Khrustalnyi	Ukraine	20,5	123	PDW 1962
The Black Sea – Baltic waterway	Ukraine, Belarus, Poland	-	928	FC 1963
Dnipro-Donbas, stage 1	Ukraine	120	263	ASD 1969 commissioned in 1984
Danube-Nisporeny	Ukraine, Moldova		175	FS 1981
Danube - Dnipro	Ukraine	1530	440	FS 1981
Dnipro-Donbas, stage 2	Ukraine	25,6	120	ASD 1989-1990 (under construction)
Danube – The Sea	Ukraine			FS 1989
Danube – The Black Sea	Ukraine			FS 2002
Siverskyi Donets - Donbas, rehabilitation	Ukraine	43	132	SD 2007-2008 commissioned in 1974
Don – Oskol	Russian Federation	50	120	Design 1973-1974

8.10. Water supply and sewerage

Facility name	Country	Capacity, dimensions	Status of work execution
Sewerage collector, Vyshgorod town	Ukraine	D = 400 mm	1961
Filter plant in Makiivka town	Ukraine	260000 m3/day	1969
Water penstock in Makiivka town	Ukraine	D = 1000 mm	1969
Gravity-flowing slurry pipeline of Ingury HPP	Georgia	D = 600 mm	1969
Bratushansk canning factory:	Moldova		
– Filter plant		40000 m^3/day	1971
– Structures of potable quality water treatment		32-40 thousand m^3/day	1972
Sewerage structures of waste water biologic treatment:			
- in Krasnopavlivka town	Ukraine	7000 m^3/day	1972
- in Barvinkove town	Ukraine	200 m^3/day	1978
- of Dniester PSP	Ukraine	400 m^3/day	1986
Pumping plant in Novodnistrovsk town	Ukraine	250 m^3/hour	1977
Water penstock from Hrodivka town to Ocheretyne settlement	Ukraine	D = 300 mm	1980
Water supply and sewerage networks:			
- in Barvinkove town	Ukraine	200 m^3/day	1978
- in Ocheretyne settlement	Ukraine		1983; 1988
- in Stepove village	Ukraine		1991
Sewerage pumping plants:			
- of Dubossary HPP	Moldova	7,5 m^3/hour	1988
- of Dniester PSP	Ukraine	50,5 m^3/hour	1986
- in Stepove village	Ukraine	25 m^3/hour	1990

Facility name	Country	Capacity, dimensions	Status of work execution
- Pokotylivka settlement	Ukraine	30 m^3/hour	1991
- Novodnistrovsk town	Ukraine	54 m^3/hour	1991
River water-intake structure with pumping plant in Kamianske town	Ukraine	1,5 m^3/s	1989
Sewerage rainfall collector in Kaniv town	Ukraine	D=500 mm	1990
Sewerage structures of waste water biological treatment in Novodnistrovsk town	Ukraine	12 m^3/day	1991
Pumping plant at water wells with antibacterial installations in Novodnistrovsk	Ukraine	250 m^3/hour	1993
Firefighting pumping plants at the structures of the Dnipro – Donbas canal	Ukraine	100 m^3/hour	1993
Internal water supply and sewerage networks of maintenance and repair workshop in Cherkaske village	Ukraine	5,2 km	1993
Complex modernization and rehabilitation of the Siverskyi Donets-Donbas canal. Rehabilitation of pumping plant of the 1st lifting	Ukraine	32,5 m^3/s (before rehabilitation – 31,0 m^3/s)	SD 2007 - 2008
Nassiria Pumping Plant	Iraq	134 m^3/s	DW, AS 2001-2008 (commissioned in 2008)

8.11. Protective structures

Facility name	Country	Area of protected land, h	Total length of main structure, km	No. and capacity of pumping plants, m3/s	Status of work execution
Kakhovka reservoir	Ukraine				ASD Commissioned in:
- Protective complex of Nikopol		60	3,1	10	1951-1952
- Protective complex of manganese mine		19000	12,1	2/50	1952-1954
- Kamiansko-Znamenskyi protective complex		6700	17,4		1952-1954
- Complex of engineering structures on protection of Zaporizhzhia area		1250	11,8	2/1,5	1952-1953
Kremenchuk reservoir:	Ukraine				ASD Commissioned in:
- Tyasmyn protective complex		15500	3,6	85	1954-1956
- Zolotonosha protective complex		8814	21,2	18	1955-1957
- Budyshe-Svodivskyi protective complex		6827	10,9	3/22,6	1956-1958
- Obolon protective complex		16600	16,0	3/31	1956-1958
- Protection of river side in Cherkasy		-	16,0	-	1956-1957
- Olshana protective complex		9330	10,9	40	1974-1977
- Rehabilitation of upper slope pavements of the leftbank earth dam of Kremenchuk HPP		9780	-	-	Design 2004-2005
- Rehabilitation of pavements of Taburyshenskyi cape		1720	-	-	Design 2004-2005
Serednodniprovske reservoir:	Ukraine				ASD Commissioned in:
- Protective complex of Kremenchuk		-	16,1	3/9,65	1956-1959
- Protective complex of Verkhnodniprovsk		2500	10,0	4	1958-1960
- Orilsk protective complex		44000	29,0	-	1959-1962
Kyiv reservoir:	Ukraine				ASD Commissioned in:
- Irpin protective complex		2500	3,6	61	1960-1962

Facility name	Country	Area of protected land, h	Total length of main structure, km	No. and capacity of pumping plants, m3/s	Status of work execution
- Dnipro-Desna protective complex		48000	72,8	-	1960-1964
- Dnipro-Prypiat protective complex		7500	43,2	6	1962-1964
Kaniv water storage:	Ukraine				ASD Commissioned in:
- Protective complex of Koncha Zaspa		1400	6,2	6	1964-1966
- Protective complex of Protsev-Kiiliv		5240	17,5	15	1966-1968
- Protective complex of Bortnychi-Vyshenky		9500	15,8	50	1967-1969
- Protective complex of Pereiaslav-Khmelnytskyi		15000	9,6	40	1967-1971
Dniester buffer (lower) storage:	Ukraine				ASD
- Protection of Kozliv village		188	3,8	1/4,9	Commissioned in 1998
- Protection of Vasylivtsi village		111	2,2	1/2,86	Under construction
- Protection of Bernashivka village		138,2	9,65	1/2,55	Under construction
- Protection of Voloshkove village		98	1,7	-	Under construction
- Protection of Ozhevo village		75	1,1	1/0,03	Under construction
- Paving of storage banks		425	18,64	-	Under construction
- Shore protection of the Azov Sea in the area of beach section of "Dorozhnyk" recreation camp	Ukraine	1,3	0,65	-	1999
- Shore protection of the Azov Sea near Prymorsk town	Ukraine	70,0	7,0	-	Design 2003
Paving of water storages banks of South Ukrainian power complex from revision:	Ukraine				ASD
- Oleksandrivka reservoir		32,0	13,24	-	Under construction
- Prybuzke reservoir		17,0	2,25	-	Under construction

8.12. Wind power plants

Facility name	Country	Installed capacity, MW	Electric output, MW/year	Status of work execution
Ai-Petri	Ukraine	0,81	900	SD 1991 (Commissioned in 1992)
Adzhygolsk	Ukraine	1,2	1340	SD 1992 (Commissioned in 1992)
Novoushytsk	Ukraine	0,22	250	WD 1994
Zborivsk	Ukraine	0,22	250	WD 1994
“Soniachna dolyna” (modernization)	Ukraine	0,2	233	FC 1995
Adzhygolsk (updating)	Ukraine	1,245	1415,3	SD 1999
Aulska	Ukraine	0,2	233	SD 1999
Donuzlava Wind Power Plant, Sudak section, stage 5	Ukraine	5,0	8852	SD 2001 (Commissioned in 2002)
Donuzlava Wind Power Plant, Sudak section, stage 6	Ukraine	6,3	13654	SD 2002 (Commissioned in 2003)
Extension of Sudak section of Donuzlava WPP	Ukraine	50,0	90345	FS 2002
Vyshhorod	Ukraine	5,0	8296	FS 2003
Vyshhorod	Ukraine	0,625	1037	SD 2006

8.13. Mining and metallurgical industry

UKRHYDROPROJECT performs design and survey works at various enterprises in the mining and metallurgical industry.

8.13.1. Tail storages, Ore and mining complexes

Facility name	Country	Capacity, mln. m3	Dam dimensions		Status of work execution
			Max. height, m	Length, km	
Slime settling reservoir, Ordzhonikidze Mine	Ukraine	13,5	9	4,5	ASD commissioned in 1974
Slime settling reservoir, Voroshylov Mine	Ukraine	10	6,6-7,3	3,45	ASD commissioned in 1975
Slime settling reservoir, Dnieproenergobudprom enterprise	Ukraine	25	4-11	2,2	ASD commissioned in 1976
Kostiantynivka Sludge Collector	Ukraine	0,4	22	1,2	ASD 1962 commissioned in 1965
Tail storage of South Ore and Mining Complex	Ukraine	510	100	4	ASD 1992-1994
Rehabilitation of “Obiednane” tail storage, South Ore and Mining Complex	Ukraine	98,5	28	6,1	Design 2005-2006
Pile-up of ash disposal area of Prydniprovska TPP	Ukraine	-	35	0,6	WD 2010
“Berezoviy Log” Sludge Collector	Russian Federation	220	75	5,5	ASD commissioned in 1975
Tail storage of Lebedinskiy Ore and Mining Complex. Protection of “Yamskaya step” conservation area	Russian Federation	1027,5	51	3,04	SD 1986
Rehabilitation of Tail Storage, Lebedinskiy Ore and Mining Complex	Russian Federation	590,3	90	23,3	ASD 1988-1992, 1999, 2002
Elaboration of technical regulations for extension of pumping plant for the 2nd stage of Stoilenskiy Ore and Mining Complex	Russian Federation	-	-	-	SD 2006 (1st stage commissioned in 2008)
Elaboration of technical regulations for water circulation structure of Stoilenskiy Ore and Mining Complex	Russian Federation	-	-	0,8	SD 2006 commissioned in 2008
Technical regulation of pulp thickening unit of water recycling and transportation of tails of tail storage at Stoilenskiy Ore and Mining Complex	Russian Federation	-	-	-	WD 2006
Visual reconnaissance inspections of actually fulfilled works on the rehabilitation of pumping plant of water recycling No.2 of Stoilenskiy Ore and Mining Complex	Russian Federation	-	-	-	2011

Work designation	Country	Year(s) of work execution
Thickening of enrichment waste of South Ore and Mining Complex PrJSC. Assessment of opportunity for growth of tail storage from the level of 161,0 up to the level of 189,0 m. Calculations of the resilience of slopes of the protective dams. Pre-design work.	Ukraine	2019
Execution of the pre-design works on the electricity provision of the Poltava Ore and Mining Complex with inclusion in power development of PSP (HPP), SPP, and WPP.	Ukraine	2021-present

8.13.2. Metallurgy

Designation of work/services	Country	Year(s) of work execution/service provision
Execution of engineering and hydrological and geological surveys, SD on water decrease and FC at the construction of a skip pit under the design "Rehabilitation of blast furnace No.6" PrJSC "MK Aovstal"	Ukraine	2020-2021
Rehabilitation of blast furnace No.6 PrJSC "MK Aovstal". Elaboration of the sections "Metal structures, Reinforced concrete structures and Architectural section" on a bunker rack.	Ukraine	2020-2021
Expertise inspection and certification of structures of Central water supply of PJSC Zaporozhstal	Ukraine	2021-2022

8.14. High-voltage power transmission lines

Name	Country	Length, km	Year(s) of commissioning
Dnipro – Donbas canal, 8 pumping plants – 10, 35, 110kV HV transmission lines	Ukraine	450,0	1980-1995
Dniester HPP and Dniester PSP, Buffer HPP – 35, 110, 330kV HV transmission lines	Ukraine	120,0	1993-1998
Sniatynska HPP – 10kV HV transmission line	Ukraine	4 x 6	1995
Kremenchuk HPP – overhaul of 330kV HV transmission line "HPP – Pervomaisk”	Ukraine	12	1998
South Ukrainian power complex:	Ukraine		
- Oleksandrivska HPP – 10kV HV transmission line		20	1999
- Oleksandrivska HPP – 35kV HV transmission line		5	2001
- Tashlyk PSP, 6kV cable lines		15	2001
- Tashlyk PSP, reconstruction of 330kV HV transmission lines No. 1 and No. 2		14	2003
330kV HV overpass “Novoodeska – Artsyz” over the Dniester estuary	Ukraine	5,9	FS 2007

8.15. Electric substations

Name	Country	Voltage	Year of commissioning
Outdoor switchyard, Tashlyk PSP	Ukraine	330 kV	1983
Outdoor switchyard. Oleksandrivskyi hydro development	Ukraine	35/10 kV	1984
South Ukrainian power complex. Substation of irrigation pumping plant.	Ukraine	6 kV	1986
Substation of pumping plant in Kozliv village	Ukraine	35/6 kV	1990
Outdoor switchyard of the Dniester HPP-1	Ukraine	330/110 kV	1991
Outdoor switchyard of the Dniester HPP-2	Ukraine	110/35 kV	1991
District substation in Snyatyn	Ukraine	35/10/6 kV	1995
Outdoor switchyard “Kharverst" in Kharkiv	Ukraine	110/6 kV	2005
Metal-clad SF6 switchgear of 330 kV. The Dniester PSP	Ukraine	330 kV	2008
Technical and economic calculations on switchgear choice (outdoor switchyard and metal-clad SF6 switchgear) The Leningrad PSP	Russian Federation	330 kV	2010
Outdoor switchyard. The Thakmo HPP	Vietnam	110/35/10 kV	1990

8.16. Communication

Name	Country	Features	Year(s) of commissioning
Dnipro – Donbas canal	Ukraine		
- Radio relay communication line “Krasnopavlivka – Donetsk”		Length 196km	1982
- Cable communication line and information transfer channels of Krasnopavlivka - Donetsk filter plant		Length 170km	1986
South Ukrainian power complex:	Ukraine		
- High frequency communication channels through transmission lines		35kV network, 10 substations	1954-1991
- radio communication of power structures			1991
- Connection between automatic telephone systems (5 pcs)		150 – 350 subscribers	2003-2005
- Fibre-optic communication lines with multiplexer equipment STM-1		2 lines, length 7 and 15 km	2003-2006
- Fire alarm system (address type) of the Tashlyk PSP		up to 2400 alarm boxes	2003-2006
- Computer networks of the Tashlyk PSP		up to 120 workplaces	2005
- Industrial television of the Tashlyk PSP		up to 40 digital cameras, length of optic-fibre lines 0,5 – 3km	2006-2007
- Radio communication of seismic stations		6 intervals, route length from 3 till 17km, total length is 60km	2006-2008
- Fibre-optic communication lines over 330kV transmission lines with multiplexer equipment of level STM-1		Fibre-optic cable in static protection cable, 2 lines, line length is up to 8km, organization of communication channels, data transmission, emergency automation and relay protection	2006-2008
- Security alarm system of the Tashlyk PSP		up to 500 alarm boxes	2007
- Security alarm system along the perimeter of the Tashlyk PSP		6 sections, length of perimeter up to 4 km	2007
- Dispatch communication of the Tashlyk PSP		up to 150 subscribers	2007-2008
- Protection alarm along the perimeter of the Oleksandrivska HPP		4 sections, perimeter length up to 3 km	2007-2008
- Industrial television of the Oleksandrivska HPP		up to 20 digital cameras, fibre-optic line length from 0,5 to 3km	2007-2008
- Dispatch communication of the Oleksandrivska HPP		up to 100 subscribers	2008
Cascade of the Dnipro and Dniester HPPs and PSPs	Ukraine		

Name	Country	Features	Year(s) of commissioning
- Dispatch communication of the Kaniv HPP		50-100 subscribers	1954-1992
- Radio searching communication of the Kaniv HPP		Radio relay centre, 600W	1954-1992
- Security alarm system along HPP's perimeter and outdoor switch yard		Perimeter length - 1.1km	1980
- Radio relay communication line			1997-2000
- Fire alarm and security system of buildings and structures		-	1997-2005
- Cable communication line		Length 5-10km	2000-2003
- Industrial television		up to 40 TV cameras	2006
Rehabilitation of shipping locks of the Dnieper Cascade HPPs:	Ukraine		
- Dispatch communication (3 plants)		48 subscribers	2007-2008
- Radio searching communication (3 radio centres)		Radio relay centre, 600W	2007-2008
- Radio communication		5 bases, coverage area up to 3 km	2007-2008
- Fire alarm and security systems (3 structures)		2 stations, up to 200 alarm boxes	2007-2008
- Radio communication (river register)		6 radio stations, hot reserve, coverage area up to 30 km	2007-2008
Tashlyk PSP:	Ukraine		
- Engineering and technical means of protection (security system along the perimeter and industrial television) for the installation of the new equipment of the 1st commissioning complex			Design 2008
Stoilenskiy Ore and Mining Complex:	Russian Federation		
- Fire alarm and security systems of buildings and structures		3 stations, 128 areas in each	2007-2008
- dispatch communication		Digital, 48 subscribers	2007-2008
- PABX		Extension up to 512 subscribers	2007-2008
- Radio communication		5 bases, coverage area up to 3 km	2007-2008
- Industrial television		5 cameras, length of fibre-optic cable route is up to 3km	2007-2008

Name	Country	Features	Year(s) of commissioning
- Cable communication line		Length is up to 7 km	2007-2008
Grodno HPP	Belarus		under construction
- Fire alarm system of buildings and structures		1 station, 177 smoke alarm boxes, 24 manual alarm boxes	
- Installation of telephones		Digital, 16 subscribers, analogue, 32 subscribers 38 connecting lines	
Thakmo HPP:	Vietnam		
- High frequency dispatch channels, telemechanics		110kV network, 4 substations	1993
Nassiria Main Pumping Plant:	Iraq		
- Communication, fire alarm and radio searching systems		-	under construction
Naghlu HPP:	Afghanistan		
- dispatch communication		48 subscribers	Design 2007
- PABX (7 pcs)		up to 200 subscribers	Design 2007
- Fibre-optic communication lines over 330kV transmission lines with multiplexer equipment of level STM-1		Fibre-optic cable in static protection cable, 1 line, length of lines is up to 54 km, organization of communication channels, data transmission, emergency automation and relay protection	Design 2008

8.17. Residential complexes with infrastructure

Name	Country	No. of residents (thousands)	Year(s) of commissioning
Villages for construction and operating personnel			
- of Dubossary HPP	Moldova	5	1953
- of Kakhovka HPP	Ukraine	20	1955
- of Kremenchuk HPP	Ukraine	20	1959
- of Serednodniprovska HPP	Ukraine	15	1960
- of Kyiv HPP and PSP	Ukraine	15	1966
- of Kaniv HPP	Ukraine	10	1966
Residential settlements for construction and operating personnel of Dnipro-Donbas canal, 1st and 2nd construction stages:	Ukraine		
- in Pereshchepyne town		10	1972
- in Ocheretyne town		5	1975
- in Dobropillia town		5	1976
- in Krasnopavlivka settlement		3	1977
- in Stepove village		0,16	1994
- in Blahodatne village		0,10	1994
- in Tonenke village		0,10	1994
Residential neighborhoods	Ukraine		
- in Pokotylivka settlement		8	1969 - 1976
- in Yuzhnoukrainske town		50	1984
Residential houses of manor type	Ukraine		
- Petrivka village		50	1984
- Sadove village		55	1984

Name	Country	No. of residents (thousands)	Year(s) of commissioning
- Komyshuvate village		52	1984
- Volodymyrivka village		50	1984
- Tyshenivka village		50	1985
- Kyrylivka village		54	1985
- Yabluneve village		20	1985
- Berestovenky village		51	1984
- Yabluneve village		60	1985
- Pishchane village		62	1987
- Vasylivka settlement		0,16	1984
Residential building in Kobzivka village	Ukraine	0,06	1987
Mansion in Pervukhine village	Ukraine	16 apartments	1989
A town of construction and operating personnel of the Dniester HPP and PSP, Novodnistrovsk town	Ukraine	12	1992
Mansions for the staff of Adzhyholsk WPP	Ukraine	0,02	1994
Residential neighborhood in Kharkov	Ukraine	6	1994
Residential neighborhood No. 3 in Pokotylivka settlement	Ukraine	4	1994

8.18. Individual structures in cities and villages

Name	Country	Number of citizens, places, dimensions	Year(s) commissioning
Civil construction in Pokotylivka settlement:	Ukraine		
- Shopping centre		20 workplaces	1970
- Kindergarten / nursery		180 places	1974
- Cafe		for 50 visitors	1975
- Hostel for workers		140 places	1978
- Hospital		120 beds	1990
Pioneer camp, recreation camp “Lisovyi vohnyk”	Ukraine	240/216 places	1980
Kindergarten / nursery in Berezivka village	Ukraine	for 50 places	1987
Pioneer camp, recreation camp in Novodnistrovsk town	Ukraine	720/576 places	1989
Buildings of township council:			
- Pishchanka village	Ukraine	10 workplaces	1987
- Berestovenka village	Ukraine	12 workplaces	1987
- Leninka village	Ukraine	10 workplaces	1987
Automobile operating company in Kyiv	Ukraine	10 trucks	1987
Centre of culture in Leninka village	Ukraine	300 places	1988
Centre of culture in Berestovenki village	Ukraine	300 places	1989
Township council with PABX in Pokotylivka settlement	Ukraine	20 workplaces	1989
Canteen for Dnipro HPP in Zaporizhzhia city	Ukraine	50 visitors	1989
Construction for the personnel of Dubossary HPP and Moldavenergo enterprise in Dubossary town:	Moldova		
- Canteen		50 visitors	1990
- Hostel		for 50 beds	1990

Name	Country	Number of citizens, places, dimensions	Year(s) commissioning
Laboratory and administrative building with the block of static testing for VNIIG named after B.E. Vedeneev in Kamianske city	Ukraine	100 workplaces	1989
Administrative building of the Dnipro cascade of the Serednodniprovska HPPs and PSPs in Vyshhorod town	Ukraine	120 workplaces	1991
Public micro-centre in Stepove village	Ukraine	150 residents	1990
Improvement of the embankment of the Seret River in Chortkiv	Ukraine	8,0 ha	1992
Territory improvement around the Velyke Lake in Svitlovodsk town	Ukraine	8,0 ha	1994
Area maintenance building of the Kakhovka HPP	Ukraine	100 workplaces	2005
Engineering and utility building of the Dniester PSP	Ukraine	170 workplaces	under construction
Process utilities building of the Tashlyk PSP	Ukraine	130 workplaces	2007
Rehabilitation of the regional control centre Eskhar 30/34	Ukraine	50 workplaces	2008
Rehabilitation of the administration building of shipping locks:	Ukraine		
- in Kremenchuk			2007
- in Kaniv			2007
- in Zaporizhzhia			2007
Overhaul of the central control board building of the Kremenchuk shipping lock with the construction of an additional building	Ukraine		2010

Work designation	Country	Year(s) of work execution
Territory improvement alongside the construction of the sports complex "Kryti tenisni korty", Vyshhorod. Scematic design	Ukraine	2019-2020
Construction of Administrative building. Affiliate "The Kaniv HPP" of PrJSC Ukrhydroenergo. Design works. Stage of schematic design and expertise of the approved part of the design	Ukraine	2019-2020
Overhaul the tobacco shop building roof of PJSC A/T B.A.T.- PRILUCKY TOBACCO COMPANY, SDD	Ukraine	2020
Architect-Engineering (A-E) Services to Support Infrastructure Related Programming in USAID/Ukraine and USAID/Moldova	Ukraine	2021-present
New construction of a multi-functional complex on Novhorodska Street, 72-A in Kharkiv	Ukraine	2021-present
Reconstruction of the square on the corner of Bukovynska and Podilska streets in the city of Novodnistrovsk, Dnistrovsk district, Chernivtsi region	Ukraine	2022

8.19. Bridges and passages

Name	Country	Dimensions	Year(s) of commissioning
Pendant bridge crossing over the Kazennyi Torets River in Sloviansk town	Ukraine	Opening - 90,0 m	1968
Pendant bridge over the Kryvyi Torets River in Kostiantynivka town	Ukraine	Opening – 90,0 m	1980
Bridge crossing (with access roads) through the reservoir of the Kyiv HPP	Ukraine		FS 2007-2008
Hydrological and hydraulic calculations of automobile bridge crossing (with access roads) over the Tysmenytsia River and the Loshan River in Boryslav town in Lviv region.	Ukraine		Design 2008
Bridge crossing over hydro structures of the Kyiv HPP and Kyiv shipping lock. Rehabilitation.	Ukraine		WD 2008 - 2009
Construction of a highway between the villages of Lebedivka and Khotianivka, Vyshhorod, Kyiv region	Ukraine		Basic design 2021

8.20. Engineering preparation of the sites, organization of construction

Name	Country	Year(s) of work execution
Organization of the Oleksandrivske reservoir of the Tashlyk PSP (NWL16,9 m)	Ukraine	2007 - 2008
Sports-training-fitness-and-entertaining complex in Vyshhorod town. Estimation of modern engineering and geological conditions of the construction area	Ukraine	2007 - 2008
Engineering preparation of the territory of industrial site for the construction of 2 steam-gas units of Dnipro metallurgical complex and drainage. Hydrotechnical part and hydrological studies. Feasibility study.	Ukraine	2008
Sediment control of the stream canal of the Utka river. Hydrographic and hydrological works	Ukraine	2008
Development of the work production plans for the assembly of built-up reinforced concrete structures of engineering and utility building, technological building and buildings of thyristor launching units for the Dniester PSP	Ukraine	2008
Constructional part of buildings, structures of water treatment units, structures of reversible cycle of cleaning of industrial and rainwater sewers of gas-turbine stations of compound cycle in Alchevsk town	Ukraine	2008
Sports-training-fitness-and-entertaining complex in Vyshhorod town, 1st stage. Engineering preparation of the territory of complex location	Ukraine	2010
Engineering and hydrological maintenance of facility construction of the Tashlyk PSP	Ukraine	2016-2017
Primary works for the start complex No.3 of the Tashlyk PSP	Ukraine	2017
The Dniester PSP. First and second stages of the construction. Design works on the organization and technology of construction	Ukraine	2018-present
Project development of the construction organization of the objects of process water supply of power unit No. 9 (330 MW) of Novocherkasskaya SDPP (state district power plant)	Russian Federation	2008
Schematic design of inspectorial highways along the dam crest of the upper basin and dam crest of the lower basin of Leningrad PSP	Russian Federation	2010
Project of the organization of construction and systems of drawdown of the foundation pit of penstocks and powerhouse of Leningrad PSP within the construction period	Russian Federation	2010
System of drawdown of the construction pit under the concrete structures of Grodno HPP	Belarus	under construction

8.21.Thermal and nuclear power facilities

Name	Country	Year(s) of work execution
Feasibility study on technical upgrade of the CHP at the Makarov South Machinery Plant	Ukraine	2012
Rehabilitation of Unit No. 6 at the Sloviansk TPP. Verification calculations of strength of turbine and bunker-deaerator structural frames	Ukraine	2015
Technical re-equipment. Modernization of service water pumps of responsible consumers at Unit No. 3 of the Rivne NPP. Schematic and detailed design	Ukraine	2016
Feasibility study on technical upgrade of the CHP at the Makarov South Machinery Plant	Ukraine	2012-2017
Kola NPP. Modernization of the detection and fire extinguishing system at backup diesel generator building No. 1	Russian Federation	2015 - 2016
Feasibility study and preliminary design works on the rehabilitation of the Karaganda TPP providing for the increase in power output within the existing plant. Hydro structures. Master plan and transportation. Communications and alarm system. Electrical equipment	Kazakhstan	2013
Feasibility study and preliminary design works on the rehabilitation of the Balkhash TPP providing for the increase in power output within the existing plant. Hydro structures. Master plan and transportation. Communications and alarm system. Electrical equipment	Kazakhstan	2013
Technical solutions on the set of water intake structures of the service water system at the NPP Nin Thuan 1	Vietnam	2013-2017

9. SAFETY OF HYDRO STRUCTURES

9.1. Development of safety systems for hydro structures

UKRHYDROPROJECT PRJSC has developed and now introduces a safety system for hydro structures, taking into the experience of the creation of such systems at international hydro structures to provide a common approach to all hydrodynamically dangerous structures irrespective of their operational subordination and type of property.

The purpose of the modern concept of hydro structures safety being realized at the Cascade of Dnipro hydropower plants is to provide their proper functioning, to minimize the risks of accidents on hydro structures through the adoption of state-of-the-art technologies at all stages (design, construction, operation) and to be aware of emergency and to be ready to minimize its consequences.

Main tasks, being solved to achieve this aim are the following:

- usage of systematic approach to all safety measures on hydro structures, combining them into consequential self-regulating process;
- determination of functions of system elements and its control structure at various levels;
- determination and clarification of qualitative and quantitative criteria of safety and reliability;
- regulation of evaluation procedures of the technical state of the structures;
- usage of modern devices for collection, processing, storage, documenting and analysis of stored and obtained information as for the state of structures;
- elaboration of offers for the improvement of work of state supervision system over the hydro structures safety;
- organization and realization of scientific, research, design, repair and rehabilitation works.

During 1995 – 1997 UKRHYDROPROJECT PRJSC developed safety system for Kyiv HPP as a pilot project for the whole Cascade of hydropower plants.

The work of UKRHYDROPROJECT PRJSC, concerning the safety system of main structures of the Dnieper Cascade, includes development and installation of complex software at the plants of the Dnipro Cascade. This software allows to perform automatic processing of all the field observations data of hydrotechnical structures which correspond to the existing Ukrainian standard requirements, data classification, analysis, storage and output of necessary information, which simplifies significantly the preparation of reports. Furthermore, software allows to make temporal prognosis of certain indicators on the basis of certain factors, to prevent addition by mistake of any unnecessary information, to compile and store all the reports of operation and corrections done in the process of work with indicators of safety, etc.

Clearness of the information given, provided by measurements directly upon the diameters, allows to analyze the structure state without any additional graphic materials.

The software can operate both in a non-automatic (manual) mode of data gathering and information input, and in an automatic mode of indication collection and input into the electronic computer. In order to perform automatic measurement of the necessary indicators, main objects of hydrotechnical structures should be equipped with proper remote measuring devices and means of real time data transmission to the server of the safety system of hydrotechnical structures (such an automatic system was installed in 2002 at the Kyiv HPP, in 2004 it was installed at the Kremenchuk and Kakhovka HPPs).

Formation of the common communication system along the whole Dnipro cascade will ensure in a real-time operation mode the transmission of the operational information about the state of the cascade hydrotechnical structures, and thus in case of necessity will allow to take immediate measures on fault removal. Besides, necessary information concerning the safety of hydrotechnical structures of the Dnipro cascade can be transferred to the relevant governmental organizations.

Name	Country	Year of work execution
Analysis of the state of hydrotechnical structures of buffer hydro development of the Dniester HPP	Ukraine	2010
Inspection and assessment of the technical state of concrete and reinforced concrete structures of the Dnieper HPP spillway	Ukraine	2010
Specification of the project of the 1st stage of the PSP as a part of 3 units, including measures on raising the reliability and safety of hydrotechnical structures, of main hydropower equipment and hydromechanical equipment of the Dniester PSP	Ukraine	2010
Determination of the technical state and reserve of strength of the protective dams	Ukraine	2016
Analysis of the schematic detailed design on the creation of a system of early determination of occurrence threat of emergencies at the Kyiv PSP and notification in case of their occurrence.	Ukraine	2016
Services on the clarification of possible zones of catastrophic flooding in case of damage or forced water discharge at the hydro structures of the Dnipro and Dniester cascades of PJSC Ukrhydroenergo	Ukraine	2020-2021
Determination of the technical state and assessment of the hydrotechnical structures' safety of the HPP-PSP cascade SS "South Ukrainian NPP"	Ukraine	2022

9.2. Performance of calculations

Name	Country	Year(s) of work execution
Hydrological and hydraulic calculations of the bridge crossing over the Dnipro River in the area of the Kyiv HPP.	Ukraine	FS 2007 – 2008
Researches and estimation of general filtration regime, determination of reasons of body sediments of earth dam- insertion piece between shipping locks and powerhouse of the Kyiv HPP (pre-design works)	Ukraine	2007 – 2009
Analysis of the changes of filtration regime of rock mass at the Tashlyk PSP	Ukraine	2008
Calculations on the influence of the wave breakage of the dams of reservoir of the Tashlyk PSP and water reservoir-cooler of South Ukrainian NPP. Work plan on liquidation of consequences.	Ukraine	2008
Mathematical model and flow calculations in the reservoir in the conditions of the Kaniv PSP operation.	Ukraine	2008
Hydrological and hydraulic calculations of an automobile bridge crossing (with access roads) over the Tysmenytsa and Loshan Rivers.	Ukraine	2008
Hydrological and hydraulic calculations on the rehabilitation of bridge crossing over the hydrotechnical structures of the Kyiv HPP and Kyiv lock.	Ukraine	2008 – 2009
Hydrological calculations and consultant services on the passing of high flood of 2010 through the cascade of Dnipro HPPs	Ukraine	2010
Kakhovka HPP. Stability calculations for the spillway dam during the construction of a powerhouse for the Kakhovka HPP-2	Ukraine	2013
Kyiv PSP. Calculations of the foundation strength for the pillars of hydro units No.2,4,6 on the loads from the hydro units.	Ukraine	2018-2019
Hydropower calculations for the clarification of the installed capacity of the affiliate "Kremenchuk HPP" of PJSC Ukrhydroenergo	Ukraine	2019
Clarification of the designed forced level of the Kakhovka reservoir in terms of the Dnipro cascade operation	Ukraine	2019
Kremenchuk HPP. Rehabilitation of the rotary vane aggregates of units No.4 and 5. Calculation of the foundation strength of generators	Ukraine	2020
Checking calculations and clarification of buildings' structures of Zelenchuk HPP-PSP	Russian Federation	2011

10. ENVIRONMENTAL IMPACT ASSESSMENT FOR PROJECT CONSTRUCTION AND OPERATION

In accordance with the current norms, a section “Environmental Impact Assessment" (EIA)” was developed as a part of abovementioned works of UKRHYDROPROJECT PRJSC.

EIA covers the following issues:

1. Characteristics of the current state of the environment in the area of the site of the object designed.

2. Assessment of an impact of the construction and project exploitation on environment.

2.1 Determination of the degree of the impact on geological environment.

2.2 Determination of the impact of the construction and project exploitation on fish fauna.

2.3 Assessment of the impact of the construction and project exploitation on animal world.

2.4 Assessment of the impact of the construction and project exploitation on soil cover and vegetation.

2.5 Impact of the object creation on the microclimate of the adjoining territory.

2.6 Object Impact on the change of water quality and protection of water ecosystems.

2.7 Medico-biologic studies.

2.8 Historical and archaeological studies.

2.9 Impact of the object construction on the air environment.

3. Assessment of the possible emergency situations and their effects on the environment.

4. Assessment of the object impact on the social environment.

5. Assessment of the object impact on the anthropogenic environment.

6. Based on the general characteristics of the natural conditions and predictions of the object impact on the environment, recommendations on the scope of nature-conservative measures are given in order to prevent or minimize possible negative impacts on the environment.

7. Statement of environmental consequences.

Name	Country	Year(s) of work execution
Environmental protection in the area of the Dnipro-Donbas canal.	Ukraine	1990
Environmental protection of water conduit of local reservoir (design of protective sanitary zone) in the area of Western water treatment plant (WWTP)	Ukraine	1990

Name	Country	Year(s) of work execution
Environmental impact assessment in the area of the Dniester complex hydro development	Ukraine	1996
Dniester PSP. EIA (environmental impact assessment). Rock quarry. Reclamation of section.	Ukraine	1996
Scheme of nature-conservative measures for reclamation of section of the Bernashivske sandstone deposit (Vinnytsia region)	Ukraine	1998
Calculations of maximum permissible indicators of materials of inventory. (project of standards of maximum permissible indicators)	Ukraine	2000
Statement of ecological consequences of the Adzhygolska WPP.	Ukraine	2000
Biological paving of banks against reprocessing of the Karlivske reservoir on the Siverskyi Donets- Donbas canal	Ukraine	2004
EIA of 110/6 kV MRS substation (Main reducing substation) of OJSC “Kharkiv bearing plant”	Ukraine	2004
EIA of the Vyshhorodska WPP.	Ukraine	2005
EIA during the reclamation of section of affected lands of Tashlyk ravine slopes near the outlet canal of the Tashlyk PSP	Ukraine	2005
EIA during the rehabilitation of the Serednodniprovska HPP	Ukraine	2005
EIA during the rehabilitation of the Kyiv HPP	Ukraine	2005
EIA during the rehabilitation of the Kakhovka HPP	Ukraine	2005
EIA during the rehabilitation of the Kremenchuk	Ukraine	2005
EIA during the rehabilitation of the Dnipro HPP-1 and Dnipro HPP-2	Ukraine	2005
EIA and statement of ecological consequences during the extension of Sudak section of MS (main substation)	Ukraine	2005
Creation of protective forest areas along the banks of lower reservoir of Dniester PSP commissioning complex.	Ukraine	2005
Monitoring of the surrounding natural environment in the area of influence of the Tashlyk PSP.	Ukraine	2005 - 2006
EIA during the rehabilitation of the pumping plant of the Siverskyi Donets-Donbas canal.	Ukraine	2006
EIA during reorganization (rehabilitation) of highway bypassing of the Tashlyk reservoir.	Ukraine	2006
Assessment of emergency on the upper reservoir (calculations of the parameters of the wave breakage and harm for the national economy) of the Dniester PSP	Ukraine	2006
EIA of tail storage rehabilitation of the South Ore Mining and Processing Enterprise (SOMPE) (creation of protective forest areas within the sanitary-hygienic and protection zones of the enterprise)	Ukraine	2006
EIA during the rehabilitation of the Kaniv HPP	Ukraine	2006

Name	Country	Year(s) of work execution
EIA in the crossing of high-voltage transmission line of 330 kV “Novoodeska- Artsyz” over the Dniester estuary.	Ukraine	2007
EIA and statement of ecological consequences in the area of the cascade of HPPs on the lower part of the Teresva River.	Ukraine	2008
EIA during the rehabilitation of bridge crossing along the structures of the Kyiv HPP and Kyiv lock.	Ukraine	2008
Protection of Kozlov village during biological reclamation of the section of sand and gravel mix reserve in the area of the Dniester PSP	Ukraine	2008
Protection of Vasylivka village during reclamation of the filled dead river channels upon the damming of the joint river bed of Sokyrianka and Kobalcha Rivers in the area of the Dniester PSP	Ukraine	2009
EIA of the Kaniv HPP	Ukraine	2009
Clarification of EIA of HPP No.4 on the lower part of the Teresva River	Ukraine	2009
Monitoring of the surrounding natural environment in the area of influence of Bakshalinske reservoir of the South-Ukrainian power complex	Ukraine	2007 - 2009
EIA during rehabilitation of spawning ponds of the reservoir in Ivanivka village, Petrivska village council, Shevchenkove district, Kharkiv region.	Ukraine	2009
EIA during reclamation of the dead river channel of the joint riverbeds of Sokyrianka and Kobalcha Rivers in the area of the Dniester PSP.	Ukraine	2009
Monitoring of the surrounding natural environment in the area of influence of the Prybuzke reservoir. South-Ukrainian power complex	Ukraine	2009-2010
EIA during sediment control of the Utka River within the area of town Slavuta in the section between bridge crossings.	Ukraine	2010
Scientific and ecological, technical and economic offers on the allocation of small HPPs and PSPs in Zakarpattia region	Ukraine	2010
Development of a report on the EIA of the project "Completion of the construction of the Tashlyk PSP as part of hydro units No. 3-6 with a gradual increase of the normal water level (NWL) of the Oleksandrivske reservoir on the hill. South Bug River to the mark + 20.7m"	Ukraine	2018-2019
New construction of a cascade of 5 mini hydroelectric power stations on the Shopurka River in the village of Velykyi Bychkiv, Rakhiv district, Zakarpattia region. EIA	Ukraine	2018-2019
Development of the environmental impact assessment report of the project "Completion of the construction of Tashlyk PSP as part of hydro units No. 3-6 with a gradual increase of the normal water level (NWL).	Ukraine	2018-2019
Development of the Report on environmental impact assessment of the planned activity "Completion of construction of the Tashlyk PSP. Introduction of hydro units No. 3-6 (with an increase in the NWL of the Oleksandrivskyi reservoir on the South Bug River to a mark of +16.9 m)	Ukraine	2021-2022
EIA of the Dubossary HPP	Moldova	2010-2022
Environmental impact assessment during the rehabilitation of tail facilities of Lebedinskiy Ore Mining and Processing Enterprise (OMPE) aiming at maintenance of its capacity and an increase of the reservoir capacity (air protection).	Russian Federation	2001
Environmental impact assessment (EIA) during the reconstruction of transfer units (cables of 220 kV) with the replacement of oil-filled for dry ones for the need of “RusHydro” - “Volzhskaya HPP” OJSC (calculation of the diffusion of pollutants emission in the atmosphere).	Russian Federation	2010

11. CONTACT INFORMATION

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