



elektroprojekt

Established 1949

Consulting Engineers

elektroprojekt

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Established 70 years ago, in 1949, **Elektroprojekt** has since developed from a company specialized in design of hydroelectric and thermal power plants into a company unique in the region for its scope of activities in the fields of power generation, water and environmental management, and nature conservation. Such a development has been contributed by Elektroprojekt's experts and their broad experience in those fields. Fifty out of 100 employees are certified engineers, and a number of specialists on the **Elektroprojekt** staff are authorized for validation of foreign design documentation in all building sector segments. Many professionals have established traditionally strong partnerships with scientific, research and educational institutions, and external specialists covering the fields not in the narrow scope of the company's expertise (natural sciences, biotechnology, sociology). Elektroprojekt's experience and capacities for managing multidisciplinary projects should be particularly highlighted, as well as for elaborating and evaluating complex multipurpose infrastructure systems. All the projects are undertaken and implemented with full awareness of socio-economic requirements, considering their nature conservation and environmental protection aspects.

Elektroprojekt has been working for decades with strong sense of responsibility for the national interests. In international projects implemented in 28 countries on four continents - from the USA over the Mediterranean Africa to New Guinea - the company has always endeavoured to meet its clients' requirements while promoting responsibility towards local communities. Such an attitude enabled **Elektroprojekt** to achieve technically reliable, economically efficient and environmentally sustainable solutions. This attitude is reflected in the company's mission statement:

**creating reliable, efficient and sustainable
harmony of construction and technology with mankind and nature
for present and future generations.**

The mission has been an inspiration to previous generations and young people joining **Elektroprojekt** alike. The young are prepared from the early days to assume the role of their predecessors, whose aims and achievements are deeply embedded in the company's professional philosophy and daily practice. The company's products, the documentation developed during the past years, create a unique archive comprising tens of thousands of designs, studies, analyses, manuals, books, and hundreds of thousands of drawings.

As the turnover of employees is rather low, the currently employed have on average 16 years of service in **Elektroprojekt**. Masters and doctors of science and other Elektroprojekt specialists are lecturing at the University of Zagreb Faculty of Civil Engineering, Faculty of Science, and Zagreb Polytechnic, which grants Elektroprojekt the status of a scientific institution.

Elektroprojekt has had a long tradition in implementation of its in-house quality assurance and control policy, environmental protection and nature conservation, health and safety, as confirmed by recertification according to the quality control ISO standards - ISO 9001, the environmental protection ISO 14001, and the occupational health and safety OHSAS 18001 standard. Responsibility towards sustainability of the design solutions is confirmed by setting up a permanent team of experts in charge of the environmental and nature impacts assessment of the company's activities. Rendering consultancy services on projects funded by the World Bank, United Nations, various European banks and funds in the field of power generation, water management, environmental protection and nature conservation has given the company an opportunity to gain invaluable knowledge of procedures, guidelines and requirements faced with by consultants involved in implementation of projects funded by these institutions.

Elektroprojekt owns two companies: Nukel (Slovenia) and Harna (Croatia), and has had a registered office in Teheran (Iran) since 1964. Elektroprojekt is a private joint-stock company with about 280 shareholders according to data for 2015. Total property value amounts to 19,000,000, total assets and reserves to 17,000,000, and revenues to 7,000,000.

**Design, consulting and engineering
of development, building and management
in energy sector, water management,
nature conservation, municipal services,
public facilities and telecommunications**



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ARGUN river

Construction and technology
in harmony with mankind and nature
for present and future generations

**Elektroprojekt
in Chechnya**

TEN HYDROELECTRIC POWER PLANT PROJECTS IN CHECHNYA

HYDROLOGICAL STUDY

- review and analysis of available meteorological and hydrological data
- determining low, mean and high waters of different recurrence periods
- determining suspended and bed load quantities in dam profiles

HYDROPOWER ANALYSIS OF SYSTEM ALTERNATIVES AND SELECTION OF AN OPTIMUM ALTERNATIVE

- calculation of gross power generation potential of the Argun and Sharo-Argun Rivers
- determining power harnessing sections
- three alternative solutions and selection of an optimum alternative
- possible multipurpose water usage (water supply, irrigation)
- protection against water-related damage (flood control, load transportation reduction)

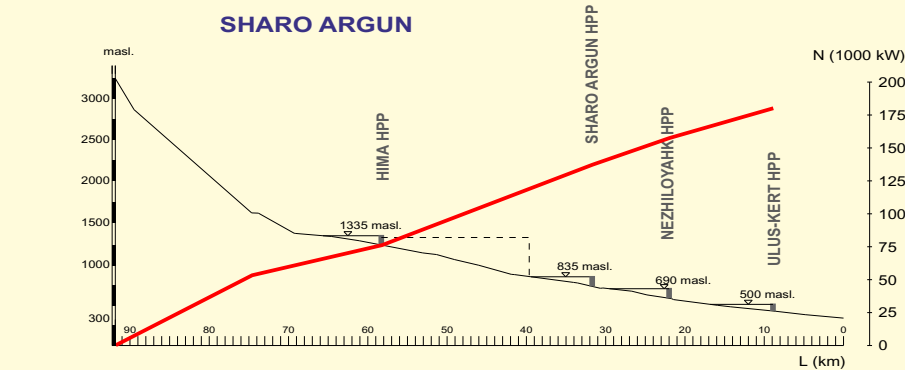
ENERGY ANALYSIS AND ECONOMIC FEASIBILITY, ANALYSIS OF EACH HYDROELECTRIC POWER PLANT INCLUDING PROPOSAL OF CONSTRUCTION PHASES

- analysis and evaluation of economic efficiency of the Argun River basin water harnessing project with regard to creation of new economic value
- making separate analysis for each hydroelectric power plant, for their island operation and operation in a cascade hydropower system
- project evaluation and ranking of hydroelectric power plants
- preparation of construction time schedule for each hydroelectric power plant



INVESTIGATION PROGRAMS (for 10 hydroelectric power plants)

- programs for land surveying, geological, hydrogeological, seismological, seismotectonic, geophysical, geotechnical investigations prepared and laboratory tests carried out
- scope of surface and ground water hydrological investigations and meteorological observations proposed
- monitoring proposed – continuous monitoring and observations
- investigations related to the power plant tie-in with the power grid planned
- investigations needed for the Environmental Impact Study development planned



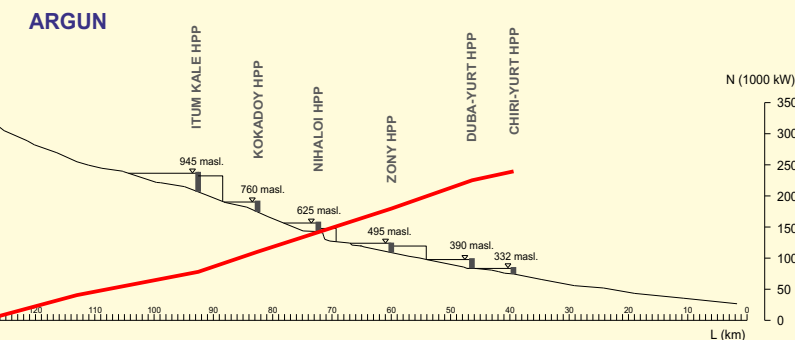
PRELIMINARY STUDIES AND CONCEPTUAL DESIGNS (for 10 hydroelectric power plants)

- overview of available land surveying, geology and hydrogeology supporting documents
- technical description of power plant facilities and related structures prepared
- description of electromechanical equipment
- necessary hydraulic calculations completed
- facilities construction cost estimate made

BASIC INDICATORS FOR THE HYDROELECTRIC POWER PLANTS ON THE ARGUN AND SHARO-ARGUN RIVERS

BASIC PARAMETERS

Argun River	Capacity (MW)	Possible annual output (MWh)	Estimated construction cost (EUR)
CHIRI – YURT HPP	32	131,000	195,000,000
DUBA - YURT HPP	49	184,000	144,000,000
ZONY HPP	80	201,000	270,000,000
NIHALOI HPP	83	215,000	240,000,000
KOKADOY HPP	32	87,000	189,000,000
ITUM - KALE HPP	117	244,000	405,000,000
Argun, total	393	1,062,000	1,443,000,000
Sharo Argun River			
ULUS-KERT HPP	40	81,200	165,000,000
NEZHILLOYAHK HPP	63	130,300	270,000,000
SHARO ARGUN HPP	47	87,900	187,500,000
HIMA HPP	178	185,700	450,000,000
Sharo Argun, total	328	485,100	1,072,500,000
TOTAL	721	1,547,100	2,515,500,000



SYSTEM HYDROPOWER HARNESSING MODEL

- determining physical parameters of the river basin and facilities
- creating hydroelectric power plants 20-year operation model
- selecting an optimum operating mode for each hydroelectric power plant
- possible annual outputs

INFRASTRUCTURE CONCEPT

- determining possible routes of 110/35 and 330/110 kV overhead transmission lines
- determining possible routes for relocation of the existing and construction of new traffic infrastructure (about 45.5 km of roads, 7 bridges and two tunnels)

PRELIMINARY ENVIRONMENTAL IMPACT STUDY

- analysis of data from spatial planning documentation
- description of the environment on the site and in the project impact area (geography, geomorphology, climate, hydrology, seismicity, forestry, hunting ...)
- possible impact assessment (during construction, in operation, in emergencies, after closing down)

