

HPPBOSHKOVMOST



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HPP Boshkov Most is a complex hydroelectric system designed to fully utilize the hydro potential of the *Mala Reka* River and its tributaries: *Tresonche*, *Rosoki*, *Lazaropolska Reka*, *Valovnica*, *Garska*, *Zvonchica*, and *Belesnica*, whose basin is located in the western part of the Republic of North Macedonia.

The Hydroelectric Power Plant *Boshkov Most*, including its intake and outflow structures and the powerhouse, is situated in the western region of North Macedonia, near HPP *Shpilje* and close to the town of Debar. The national highway Skopje–Debar–Ohrid passes in the immediate vicinity of the facility.



It is a typical diversion-type plant that captures the waters of *Mala Reka*, which flows into *Radika* 10 km upstream from its confluence with *Crn Drim*.

The project foresees the construction of a dam and formation of a reservoir, including intakes on all streams in the *Mala Reka* basin, diversion channels, a tunnel, a penstock, and a powerhouse.

The dam will be located at the confluence of the *Jadovska Reka* River and the *Tresonchka Reka* River, below the village of *Tresonche*.

The dam will be 31.8 meters high and will create a reservoir with a usable capacity of 546×10^3 m³, enough to store water for several days.

From the reservoir, water will be conveyed through an 8,750-meter-long tunnel with a diameter of 3.3 meters. The tunnel runs along the right bank of *Mala Reka* through the *Vranje Krasta* massif. The intake and supply from the *Rosoki* River are located on the right side. All other intakes, the *Garska*, *Valovnica*, *Lazaropolska*, *Zvonchica*, and *Beleshnica* rivers, along with intake channels totalling 10,698 meters, are located on the left bank of *Mala Reka* and connect to the main tunnel through the *Gari* and *Tresonche* intake tunnel.

The main tunnel ends in a circular surge tank. Water from the surge tank is carried through a steel penstock to the turbines in the powerhouse. The powerhouse will house two Francis turbine units, each with a capacity of 35.75 MW.

The project will be carried out in four parts:

- Civil works – including the dam, access roads, intakes, main tunnel, surge tank, powerhouse, and related infrastructure.
- Electromechanical equipment – procurement and installation of the main equipment, including turbines, generators, and transformers.
- Works and equipment for a 110 kV substation to connect the plant to the high-voltage grid.
- Construction of a 110 kV transmission line from the Boshkov Most transformer station to the Kichevo region.

For HPP *Boshkov Most*, there is a relatively long series of measured and processed flow data. From 1946 to 1960, measured flow data for the *Radika* River were collected at a location just downstream of the hydroelectric plant, while from 1960 to the present, flows have been continuously measured on the *Mala Reka* River at the site of the future

HPP. Through a series of simultaneous measurements, correlations for each individual intake were determined, which allowed calculation of the total water volume from all intakes and the reservoir at 5.21 m³/s. For the purposes of this project, an additional verification of the hydrological data was carried out by the consulting company *Poyry* from Switzerland in 2015.

Benefits of the project

The *Boshkov Most* Hydroelectric Power Plant is designed to operate during daily peak load hours. It is expected to run at least 5 hours per day during the summer period, while in other parts of the year, the number of operating hours will vary depending on hydrological conditions. According to analyses carried out as part of the preliminary project, *Boshkov Most* HPP will produce approximately 117 GWh of electricity annually.

The expected effects of this project are as follows:

1. **The installed capacity of JSC ESM will increase** by 71.50 MW, with an additional annual production of 117 GWh.
2. **Production of peak electricity of about 117 GWh** to cover daily peak demand, reducing imports and enabling the creation of market products under an open electricity market.
3. Completion of the HPP system within the ***Crn Drim* basin**.
4. **An increase in the share of renewable energy** in JSC ESM's electricity production. The Republic of North Macedonia has commitments to the European Union to achieve a 20% share of renewable energy in the energy balance, a target established and supported by all relevant institutions in North Macedonia.

Figure 1: Location of Boshkov Most HPP on Google Maps



