

## Slovak Electric, plc. Hydro power plants Dobšiná, Inc.



The main task of Slovak Electric, plc is to satisfy customers needs by offering electric power and heat of the highest quality, reliable, with suitable price and the lowest impact on the environment. This task is fulfilled also by Hydro Power Plants in Dobšiná, SE incorporated company. By permanent care and development of the plant we contribute to Slovak energy concept fulfilling. The use of hydro energy reflects environment protection, too.

There are 8 hydro power plants run in Dobšiná. In Ružín and Dobšiná there are pumped storage power plants managed by Slovak Dispatch Center directly from Žilina through LS 3200 system. These two plants take part in secondary regulation of power system in Slovakia, they compensate balance in relation with foreign power systems and are independent from Hydro Power Plants Dobšiná. They are irreplaceable for ability to start running in a very short time and flexibility to change the output. Power plant in Ružín is also able to „black start“, which means that after some black out it is able to start running without any outside support. Hydro Power Plants in Dobšiná II and Ružín II are connected with operation of pumped storage power plants. They are not managed by the Dispatch Center directly, though, but have the direct hydraulic connection with pumped storage power plants and are able to equalise their flows. Other power plants are once through they are regulated and managed by Slovak Electric, plc. HPP Dobšiná Inc. in accordance with agreements given. There is not direct hydraulic connection among them (they are sited on different rivers) and they work separately.

Hydro Power Plant in Dobšiná uses the river Hnilec water and transposes it to the river Slana. It is the first pumped storage hydro power plant built in Slovakia. There are two high-pressure Francis type turbines installed with the capacity of 10.88 MW each. Horizontal pumps have the capacity of 2.5 m<sup>3</sup>s<sup>-1</sup> with maximum delivery height of 285 m. Three types of operation – turbine, pump and compensatory are available in Dobšiná power plants. There worked low-pressure part with Kaplan vertical turbine with 11.5-23.5 m head scope, 6 m<sup>3</sup>s<sup>-1</sup> capacity and 1.065 MW installed capacity until 1994.

During Pumped Storage Power Plant Dobšiná construction

they came to the idea of using water flow under the plant and the level difference between Vlčia valley and Dobšiná stream to construct small hydro power plant. The idea was realized in September 1994. Pressurized water inlet is provided by pressure pipeline 1350 m long with diameter of 1600 mm. There is horizontal Francis turbine installed connected directly with the generator. The operation runs staff of Dobsina by computer SAIA system from Pumped Storage Power Plant in Dobšiná. The installed capacity is 2 MW.

Other power plant using the river Hnilec water is small power plant in Rakovec. It is the oldest power plant within the company. In 1961 when we took over its operation it was considerably damaged and the company repaired it and started again to run. The equipment is original, there are two Francis turbines with the installed capacity of 2 x 0.25 MW delivered in the year 1913.

On the river Hnilec there is also small hydro power plant in Švedlár found in 1939. It was reconstructed, too. There are two Francis spiral turbines controlled by flap, each for 6 m head, 0.68 m<sup>3</sup>s<sup>-1</sup> capacity with the installed capacity of 2 x 45 kW.

The river Hornád offers its hydropotential, too. There is pumped storage power plant in Ružín found in 1972. It is the first pumped storage power plant within the former Czechoslovakia with home made reversible turbines with the installed capacity of 2 x 30 MW, turbine capacity of 67 m<sup>3</sup>s<sup>-1</sup> and pump capacity of 43.6 – 70.7 m<sup>3</sup>s<sup>-1</sup>. Francis reversible ER-25 turbines are used there. Small hydro power plant Ružín II with the installed capacity of 1 x 1.8 MW and with Kaplan turbine was build there in 1974.

The river Hornád flow is used by small hydro power plant in Kropachy with Kaplan turbine and installed capacity of 1 x 0.275 MW found in 1931.

By partition of the river Ondava valley there has been build an accumulative storage with the volume of 172.5 mil.m<sup>2</sup> of 1510 ha overflowed area. The water of this river is used by hydro power plant in Domaša built in 1966 with two Kaplan turbines with the installed capacity of 6.2 MW each.

Hydro Power Plants Dobšiná incorporated to Slovak Electric plc. keeps in all the devices the very high standard by conscientious maintenance and regular repairs. In 1997 and 1998 after 45 years there was realized the general repair of TG 1 and TG 2 Pumped Storage Dobšiná aggregates. They changed turbine wheel, transfer circle and repaired the regulator. All this contributed to better operation. In 1954 there was build the distribution switch yard of 110 kV. After 45 years it was obsolete considerably. Therefore there started gradual reconstruction of it. It has been divided into three stages. The first stage was realized in 2000. The second is being realized now and the third one is planned to be finished by 2002. After the reconstruction the switch yard will be equipped by modern and progressive machines, which will enhance the reliability of the device. Very important for ecology is a fact, that all the transformers will be filled with isolation gas instead of electro-isolation oil. It is planned to modernize other parts of the plant. By these activities the reliable running of the power plant will be ensured for the future.