

Industrial region around Chemnitz

05.11. 2011

Industry and handcraft need energy. The industrialisation of Chemnitz and the region in the surrounding was close connected with the existing of naturel energy resources, as wooden and waterpower.



Zschopau b. Niederwiesa Jan 2011

Zschopau b. Waldkirchen Okt.2011

Chemnitz was and is tangent to water reach rivers, so in the western region from the Zw. Mulde and in the east direction from the Zschopau. This river has a high flow rate ( $Q_N = 23,3 \text{ m}^3/\text{s}$ ) with a high water speed and above all the water level is rather constant about the year. These reasons were the basic for the settlement of several handcrafts companies and industry factories along the river.

Factories for textile industry so spinning mills for cotton, woollen and flax, bleachery and dyeworks, sawmills and wood processing, mills for grain and edible oil (this region isn't suitable for windmills) were erected. All this factories need for production as well water as energy, so they used the quickly flowing water for supply of energy for drives of machines and units.

Rem.: the river Zschopau has a potential head of 970 m by a length of 130 km, this is in Average a drop of 0,7 %.

In the 14.th to 18. th. Century for the driving of machines and units were run-of river power stations used as under-, middle- and overshot water wheels, depend on the suitable drop of the river and the geographical objective facts. This was largely in harmony with the nature.

Increasing the efficiency of waterpower station, a new type of water wheel was introduced, the Zumpfung wheel.



Later in the middle of 19.th century the first turbines were installed. At this time the type “Kaplan-turbines” were installed, then for function,



Wheel of a Kaplan turbine. Cotton mill Mittw. Noiv 2011

they didn't need special canals for water input. The advantage of Kaplan turbines they are not susceptible to faults, but the disadvantage is, they are not not-adjustable. In the following periods, which it was possible, the Kaplan turbines were subsisted by Francis turbines. They have a higher efficiency, but demand higher expenditures for vast-ly canals for water input and inflow units s. a. tooth's and solid filter. A new development is a Kaplan-pipe turbine are but only suitable by specifically local and water technological conditions.

(Used in the Rolle-Mill in Waldkirchen, inst. power 170 kW. Advantage, less space requirements and adjustable)



Water power station for Rolle mill with fish stair



Rolle mill in Waldkirche

The modernising, creating the power and the efficiency of water power station have demanded strong intervention in the natural flow of the rivers for a more than 100 years long period. Weir, inflow canals with tooth's and solid filter had to be erected.

At the beginning of the 20<sup>th</sup> cent there were in Saxon 3500 pc. of small waterpower stations. In 1997 236 stations were again in operation, but total on a new technical level and significantly expanded. But these waterpower stations cover only 0.4 % of the energy consumption of Saxon. The reducing of CO<sub>2</sub>-emission is minimal.

Perforce each water power plant needs the swell of bodies of water by weirs.

Along the river Zschopau has a length of approx. 120 km between Crottendorf and the reservoir Kriebstein 83 pcs. of weir plants, which blocked the ecological consistency. It means, that of a distance of 120 km in average per 1,4 km River there are a weir. (To compare : on the river Flöha the average distance is 0,9 km river / one weir).

We want to consider the section from Zschopau town to reservoir Kriebstein:

In this section of a length of about 45 km there are following impoundments, which can be

proved on the basis of several indications:

The situation before 1989/90: There were along the river Zschopau from Zschopau town to reservoir Kriebstein

- 4 pcs. producing mills for grain
- 11 pcs. spinning mills for cotton
- 1 pc. company for producing of cotton thread
- 1 pc. company for producing of imitation leather
- 1 pc. bleachery and dye factory of textile material
- 1 pc. company for producing units from metal
- 2 pc. companies for producing paper and cartons
- 1 pc mechanical weaving mill
- 1 pc waterpower station for supply of inhabitants
- 2 pc. restaurants (both locations were in former time mill for grain and oil fruits or sawmills)

All objects had an own waterpower station and could total or partial with power directly supply and later with electrical energy their selves.

The political turning in 1989 and the following short period of destroying of the former East-Germany industry there are the actual situation :

- 2 pcs. producing mills for grain
- 1 pc. company for producing units from metal
- 4 pcs. company for producing units of several products
- 4 pcs. small industrial and business parks
- 2 pc. restaurants

- 19 pcs. waterpower stations for supply of households and industry prosecuted by energy companies with an installed power of approx... 3700 kW

All the present waterpower stations existed before 1990 and were modernised in all parts, new and more efficient turbines are adjustable, partly new input – and output canals with modern weirs. And modern input station with mechanical and controlled tooth units.

It may not fail to disclose, that a lot of modernising were only possible and realisable as follow of the water high tide in 2002.

PS.:

Resume:

Until 1990 the waterpower were used mainly for industry and handcraft, to drive machines, aggregates and other units. All spinning mills of along the river Zschopau were destroyed. Textile industry especial spinning mills had a long tradition in this region. That changed the situation total. Today, all waterpower-stations are in the hand of large energy producer.

The introducing of water turbine and so the erection of weirs with input- and output canals have damaged the nature especial in our river. A lot of kinds of fish disappeared in our river, because they couldn't swim upward to their places of births. Therefore there is a program, supported by the government to erect an all weirs called fish stairs.

In the newspaper I read recently "salmon came back for spawning" and another message "Seedlings of catfish were exposed with the hope; some of them will come back in 14 to 15 years as adult catfishes for spawning.



Kraftwerk Mittweida