TRANSFORMATION OF THE SPATIAL ENERGY SYSTEM OF SLOVAKIA

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1 Concept of Spatial Energy System

In order to raise and deliver energy from the primary energy sources, all societies must create more or less elaborate energy supply systems. Because of the strategic importance of energy, each state creates and builds its own energy system and has its energy policy and strategy of supply of energy needs.

An energy system is composed from the structural point of view of great number of activities, which extend from exploration and exploitation of the primary energy sources, through their mining, processing and transformation to other kinds of energy, transfer of energy, transport and its consumption. A complicated spatial system arises, which can be more or less concentrated dependending on the physical and chemical characteristics of the particular energy sources and on the differentiated technological, economic and ecological aspects of their exploitation (SZÖLLÖS 1989).

Particular structural elements of the energy system are closely connected and tied one to another. CHAPMAN (1989) characterized this reality by using the concept of an energy supply chain. Each primary source of energy creates its own chain, links of which are facilities for mining, preparation, storage, transport, transformation of the energy source and facilities for delivery and end use of the produced energy. We use partly this concept of chain for the characteristics of the spatial energy system of Slovakia.

2 Spatial Energy System of Slovakia

The source base of the Slovak energy system is created, as in many other countries, by classical non-renewable energy sources, particularly by fossil and nuclear fuels. The energy supply chains of soft coal, crude oil, natural gas, nuclear fuels and hydroenergy have developed. The fact that the territory of Slovakia is poor in

Bemerkung der Herausgeber:
J. Szöllös befaßt sich in seinem Beitrag mit er Transformation des räumlichen energetischen Systems der Slowakei. In diesem Zusammenhang weist er auf die wichtigsten Aufgaben der Transformation des energetischen Systems der Slowakei hin. Einige von ihnen, wie die Modernisierung der Technologie, die räumlich Dekonzentration der Herstellung elektrischer Energie, wurden bereits realisiert und der Prozeß der Privatisierung begann. Wenig Erfolg wurde auf dem Gebiet der Diversifikation der Quellen energetischer Rohstoffe erzielt, deren Notwendigkeit der Autor in seiner Studie äußert.

primary energy sources has the result that there is almost no complete energy supply chain based on non-renewable sources, with the exception of the soft coal energy chain.

Although the soft coal chain is the most complete one, it can cover only 5.5% of the total energy demand. The source links of this chain are located particularly in three exploited soft coal and lignite basins: Handlová - Nováky, Modrý Kameň and Záhorie. Some small deposits in eastern Slovakia (e.g. Hnojné, Cejkov) and central Slovakia (e. g. Badín, Obyce, Beladice) are at present unexploited. The total amount of identified sources is 1,178 mil. t, from which 828 mil. t are usable (Geofond 1993). A great part of this amount (31.4 % identified and 41.6 % usable) is concentrated in the Handlová - Nováky basin in the region of Horná Nitra.

The mining links represent five underground coalmines - Handlová, Nováky, Cígeľ, Dolina and Záhorie. Their production is gradually declining and reached 3,523 kt in 1992. The first three coalpits located in the Horná Nitra region produce 80% of the annual coal production in Slovakia. The production cannot cover a year's consumption, so 5.5 mil t of soft coal is imported from the Czech Republic. It means, that mining facilities covering about 2/3 of soft coal consumption are abroad (Min. hospodárstva SR, 1993).

The facilities of the transformation link are closely tied with the sources and mines in the Horná Nitra region. The steam power station in Nováky consumes about 85% of local coal production and in 1993 it produced 1,690 GWh of electricity. The rest of the transformation facilities are represented by smaller heat and power stations throughout Slovakia. They produced a total of 27% of electricity (SEP 1994).

Today the chains of crude oil and natural gas are the most extensive. In 1990 they covered more than 50% of total energy needs. Their domestic resource base is almost neglegible and can cover only 2% of total energy needs. These small facilities of the mining link are located around Gbely and Kúty. The spatial structure of these chains is the worst, because the whole demand is supplied from the resource base and mining facilities located in Russia and other countries of CIS. For this reason the transportation links are represented by crude oil and gas pipelines, the dominant link in this chain. These pipelines are of international importance, because they transport natural gas from Russia to western European countries. The largest transformation facility is the Slovnaft refinery in Bratislava.

The nuclear fuel chain has a particularly important role in electricity production. Its resource, mining and processing chain is recently like with crude oil and natural gas in the territory of Russia. Characteristic for this chain is its spatial concentration. The only transformation facility, the nuclear power plant at Jaslovské Bohunice with an installed capacity of 1,760 MW, at present produces more than 50% of the Slovak electricity production.

The rest of electricity production (16.5%) is covered by the transformation facilities of hydroenergy chain. The majority of the hydropower plants are located on the river Váh, but the largest one is the controversial hydropower plant at Gabcíkovo on the river Danube (SEP 1994).

3 Transformation of Slovakia's Spatial Energy System

The main characteristic of the Slovak energy system is its heavy dependence on imported energy sources. This dependence was forced after the division of Czech and Slovak Federation, because the former domestic sources of soft coal, anthracite and also electricity became foreign. At present Slovakia can cover only 13% of its energy needs, 87% are covered by imported sources.

The natural conditions, lack of sources, do not allow a change in this ratio. There are many countries in the world with equally high dependence on imported energy sources. They try to secure their supply of energy sources by spatial diversification of their imports. Slovakia has a well developed network of pipelines and electricity transmission lines just to one source base, the politically and economically unstable territory of the former USSR.

This situation is the result of the 40 year existence of the Eastern Block. Other post-communist countries of Central and Eastern Europe face a similar problem. Energy systems were built on the international level within the blocks and strategically important energy sources were a relevant instrument for securing the dependence of satellite countries.

The Eastern Block no longer exists politically, but the "eastern energy block" still exists. Dependence on the import of energy sources from the countries of the former USSR, particularly from Russia, didn't change radically. The main task of transformation of the energy system of Slovakia is diversification of its source base in co-operation with other post-communist countries. The first step has been already done in electroenergy. The CENTREL - group was established for co-ordination of the electrification systems of the Czech Republic, Hungary, Poland and Slovakia with the aim of harmonising activities according to the purpose of the UCPTE - the united transmission system of the "Western European" countries. Construction of pipelines from Ingolstadt to the Czech Republic and from Schwechat to Bratislava is important for crude oil supply.

The second task is technological modernisation, structural transformation and spatial deconcentration of electricity production. Some old steam power plants should be closed or reconstructed. The Nováky power station is currently under reconstruction. Furnaces with fluid burning will be introduced. A nuclear power plant is being constructed at Mochovce. Slovak energetics does not need more power stations. With improvement of the efficiency of energy production on one side and

energy consumption on the other, the energy system can cover the needs. The largest energy source for Slovakia is energy saving.

The energy system as a part of the whole economy is also facing transformation of ownership. The state-owned monopoly Slovak energy enterprise still produces in its facilities about 90% of electricity. Because of lack of finances for finishing the project, the nuclear power plant in Mochovce would be the first big energy facility owned by foreign subjects - Bayerwerke and Electricité de France. The state monopoly of the resource base - the Slovak coalmines enterprise has already been split into five independent companies.

In conclusion we can say, that the transformation of the energy system is a complex process which will also have remarkable spatial consequences. The major of them are the spatial diversification of the resource base, territorial deconcentration of electricity production and changes in organisational structure of the system. Because of the rigidity of the energy infrastructure and the common lack of finances in the economy, we should consider that the transformation of the energy system would be a long term process and Slovak energetics is only at its beginning.

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