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COMPARISON OF TECHNICAL AND ECONOMICAL PARAMETERS OF GAS PIPELINES WITH OTHER TRANSPORT SYSTEMS

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ABSTRACT: The article deals with gas pipelines, which have become at the end of the twentieth century an unrivalled energy medium due to its economic and ecological advantages. Article compares the main indicators of transport sectors and also describes contemporary situation of gasification and gas pipelines in Slovak republic.

KEYWORDS: gas, pipelines, ecology, effectiveness

❖ INTRODUCTION

The efficient and effective movement of natural gas from producing regions to consumption regions requires an extensive and elaborate transportation system. In many instances, natural gas produced from a particular well will have to travel a great distance to reach its point of use. The transportation system for natural gas consists of a complex network of pipelines, designed to quickly and efficiently transport natural gas from its origin, to areas of high natural gas demand. The gas map of Europe shows dense network of gas-pipelines and underlines the importance of international gas pipelines on Slovak republic area. Transportation of natural gas is closely linked to its storage, as well; should the natural gas being transported not be required at that time, it can be put into storage facilities for when it is needed.

The gas map of Europe (on Figure 1) shows dense network of gas-pipelines and also underlines the importance of international gas pipelines on Slovak republic area. Equally important is the domestic consumption, which in year 1995 amounted to 6, 3 billion. m³ in year 2010 should reach a value of 6, 2 billion. m³. Activities of purchase, transport, distribution, storage, supply and sale of heating gas to customers in Slovakia provides company SPP, a.s. and guarantees a smooth and safe supply of natural gas (hereafter NG) not only in Slovakia, but also by the way of transit transport to other EU countries.



Figure 1: Gas pipelines in Europe [1]

❖ COMPARISON OF FOSSIL FUELS

NG at the end of the twentieth century become an unrivalled energy sources mainly due to the economic and ecological advantages in comparison with (coal, wood, fuel oil etc.), other fuels. The economic benefit, suggesting a specific (real) value of the fuel, expressed in € / kWh comparative base is NG at 100% , than brown coal based on 117% and coal and coke at 151%. The comparison shows that the heat gained by NG is equal on average 34% cheaper and we pay less when we buy NG and also investments in new gas boilers are profitable. NG is widely regarded as the cleanest fossil fuel. The process of combustion is without ash

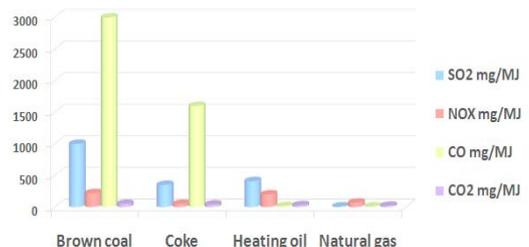


Figure 2: Specific toxic emissions from burning fossil fuels [2]

and sulphur compounds, while by coal combustion is produced more than 40-50% carbon dioxide emissions. The advantages demonstrate NG excellent environmental characteristics, permanent standby, simple control and automation, are the characteristics that predispose NG for heating. The Figure 2 describes toxic emissions produced by combustion process of fossil fuels, natural gas is one of the cleanest fossil fuel and brown coal is the biggest polluter.

❖ COMPARISON OF FUEL TRANSPORT

The determining fossil fuel at the beginning of the 20th century was coal and railway as a transport system. Transport of liquid, gaseous fuels and oils started to exploit pipelines and gas pipelines after the World War I. in USA and later in Europe, for its efficiency. In comparison with coal is NG favourable due to competitiveness against railway and freight transport. European and also Slovak transport infrastructure is developed on high level especially in roads. The biggest progress started after the World War II., when were invested most of resources in road development. Water transport of liquid gas is used where is no other way, this solution is very expensive. The comparison between railways and gas pipelines, railways are much more expensive than pipelines, because of investments to the railways. The construction of railway lines and gas pipelines consumes approximately the same proportion of steel, but the needs for additional materials are incomparably more efficient pipelines

Table 1: Comparison of key indicators of transport sector

	INDICATOR	TRANSPORT SECTOR				
		railway	automobile	water	air	gas pipeline
1.	Investments	very high	very high	variable	variable	high
2.	Total costs	medium	high	low	very high	very low
3.	Productivity	high	low	very high	low	very high
4.	Transport capacity	high	low/medium	very high	low/medium	very high
5.	Commercial rate	medium	high	low	very high	very high
6.	Safety	high	very low	high	medium	very high
7.	Spatial connection	to the railway track	few bound	to the river	to the airport	to the pipeline
8.	Available services	limited	high	very limited	very limited	very high limited
9.	Dependence on weather	almost unlimited	limited	seasonally limited	very limited	completely unlimited

❖ HISTORY AND PRESENT OF GAS INDUSTRY IN SLOVAK REPUBLIC

The first gasworks at the territory of Slovakia for the production of town gas was founded in the year 1856 in Bratislava, at today Kollárovo square which arranged the lighting of the town. Gasworks delivered lighting gas for the 209 gas lamps at the beginning and early in 30th years, when the supply network gradually grew to 80 km, has linked an impressive number of 1572 associated gas lamps. Lightning gas was later used for cooking, heating, ironing and also as a fuel for gas engine. Through urban gasworks use of lightning gas expanded. Gas pipelines began to build, at a higher rate, on the territory of Slovak republic, after year 1971. Expansion of gas pipelines was gradual and in present time it reaches length of 2270 km. The gas pipeline has become part of an international transmission network, supplying natural gas for European countries. Length of natural gas distribution system is up to 30 566 km long, in the area of Slovak republic. Natural gas is nowadays available for nearly 80% of municipalities, to natural gas have access at almost 94% of Slovak citizens. Slovak republic belongs to countries with high density of gas pipelines. (See Figure 3)



Figure 3: Slovak gas pipeline system [2]

❖ CONCLUSION

Natural gas is an almost perfect energy source; it has no smell, it is lighter than air and has been silently acquiring its awesome properties within the depths of the earth for millions of years. This energy source is one of the fossil, non-renewable fuels, but the big problem is, that is exhaustible resource. Natural gas deposits are located in the territory of states, which use the fossil fuel for the application of unfair practices against other states, causing more problems for businesses, residents but also the economies of countries. As can be seen from Table 1, transport of natural gas in terms of all quantitative indicators is most effective through gas pipelines.

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