ANALYSIS OF GAS TRANSPORTATION AS A NATURAL MONOPOLY

Alena BAŠOVÁ

Abstract

The transport of gas through the territory of the Slovak Republic is ensured by he only one transport company, which is a natural monopoly due to the small area where two or more transport companies can not exist, and the second reason is the high costs that would be needed to build a new transport network. Entry of new competitors to the transport market of gas can not be expected, because the Slovak gas market is very limited, and an increase of consumption of natural gas cannot be expected in the future. The entry of a new operator into the gas transportation market can not be expected because the Slovak gas market is very limited, and the increase of the consumption in Europe is affected by economic factors such as gas prices, political factors, tax incentives and subsidy policy that seek to influence Europe's energy mix. In the future, Eustream's performance may be affected by many factors, either negative or positive. One of these factors is Russia's political interest to avoid Ukraine, which could have a negative impact on the amount of gas transported across Slovakia and thus on Eustream's revenues.

Key words

gas transport, natural monopoly, economic profit, cost of transport, regulation

JEL Cassification: F59, Q37, Q48

Introduction

The contribution will deal with the transport of natural gas as a natural monopoly and the financial and economic aspects of natural gas transport in the conditions of the Slovak Republic. The transport of gas through the territory of the Slovak Republic is provided by the only transport company, which acts as a natural monopoly due to the small area where two or more transport companies can not exist, and the second reason is the high investment costs that would be needed to build a new transport network. The entry of a new operator into the gas transportation market can not be expected because the Slovak gas market is very limited, and the increase of the consumption in Europe is affected by economic factors such as gas prices, political factors, tax incentives and subsidy policy that seek to influence Europe's energy mix.

1. Microeconomic analysis of the natural monopoly

Monopol is a type of market structure, while there is the only one seller on the supply side and there is no suitable substitute for the product offered. Barriers to entry into the industry are very high and the monopoly producer can significantly control the price of the offered goods and services, he becomes the creator of the price - price maker (Kopkáš, P. 2010). The principles and nature of the monopoly have been defined in particular in three economic schools. A. Smith, as a representative of classical economics, perceives this market structure as some advantages guaranteed by the state power. It emphasize the existence of artificial entry barriers and low number of industry players. Conversely neoclassical economics focuses on a number of producers in the sector. The monopoly is understand as acting of the only company in a defined territory, because there don't exist the artificial barriers to entry into the industry. Behavioral economists are oriented specially on an undesirable behavior of monopolies.

Monopol is able to achieve maximum profit only in the case of such a product offer or services (Q^*) where the marginal cost [MC (Q^*)] and the marginal revenues [MR (Q^*)] are equal. Profit is defined as the difference between total revenue and total costs:

$$\pi (Q^*) = TR (Q^*) - TC (Q^*)$$
 (1)

A necessary condition for the gain function to reach the maximum at Q^* is that the first derivative at Q^* is zero:

$$\underline{d \pi (Q^*)} = \underline{d (TR(Q^*) - TC (Q^*))} = 0$$
(2)

MR
$$(Q^*) = MC (Q^*)$$
 (3)

The optimal monopoly volume, which maximizes profit in point Q^* in the short term, corresponds to the intersection of curve of marginal cost MC (Q) and marginal revenue MR (Q). The vertical line passing through the QM point and crosses the overall average cost curve, determines the average total cost per unit of production in the QM. The intersection of this vertical line with the demand curve (D) sets the optimal price of the monopoly PM at point QM.





Source: Fendeková, E. 2006. Oligopoly and Regulated Monopolies 1. vyd. Bratislava: Iura Edition, spol. with. r. O., 2006, 80 s. ISBN 80-8078-080-3

The profit of a monopoly that corresponds to such a combination of a price offer is expressed by a rectangle, one side of which corresponds to the offer volume (Q^*) and the second side is the difference between the PM price and the average total cost of the AC (Q^*). Profit is shown in chart 1 marked in gray.

J. S. Mill in his work states that the monopoly is created not due to law, but due to the circumstances, he considers it as usefull.(Mill, J.S. 1909),(Lisý, J. a kol. 2011). He recommend the exclusion of duplication of all activities from production to equipment, because one enterprise would be able to secure the offer of goods and services as well as many suppliers, with only a minimal cost increase. From these reasons, he suggests the existence of only one gas and water company residing in London, he mentioned it would be cheaper, than to have several operators of these services. He ecommended strict state regulation in these sectors.

Mankiw in his work The Principles of Economics explains the difference between the concept of monopoly and the natural monopoly. According to Mankiwa, "a certain sector is a natural monopoly, when the only company, can satisfy the whole demand for a given product or service in the whole market with a lower cost than if there were two or more companies." (Mankiw, N.G. 1999) The term natural monopoly is understood as "an enterprice that provides goods or services at lower cost by exploiting economies of scale and at the same time, there are exist barriers to entry into the sector resulting from high investment costs before starting a business in the sector." (Bašová, A. – Holjenčík, J. 2013).

This kind of incomplete competition occurs especially in sectors where there is an infrastructure requirement, or it is necessary to connect and expand corporate structures such as gas or electricity transportation. Slaný in his work states, that a natural monopoly exists if, the average cost of companies in the sector reach their minimum by the larger volume of production than the demand required.(Slaný, A. a kol. 2013)

2 Gas transport as a natural monopoly and its regulation

In Slovakia, gas transport is provided by the only company, Eustream, a.s. The owner of the company is SPP Infrastructure, 51% of which is owned by stateowned company SPP and 49% owned by the Czech Gas Holding group by the Czech Energy and Industrial Holding Group. The construction of other transport routes is extremely demanding for the investments and the Slovak market is too small for the entry of other competitors.(Synek, M. 2010) This market is influenced by the following factors:

- the increase in natural gas consumption in Europe is affected by economic factors such as gas prices, political factors, tax incentives as well as subsidy policy,
- increasing the market share of Russian gas in Europe, at the present time Russian gas has about 31% share (date from 2015) of the total gas consumption in Europe,
- redirecting / rerouting shipping routes, because Russian giant Gazprom is trying to build two other lines of the Nord Stream gas pipeline to avoid Ukraine and Slovakia, too,
- the creation and use of new routes or new places of consumption, for example the put into operation of a gas pipeline at Vojany - Uzhhorod with an annual capacity of 14.6 billion Cubic meters, supplying gas for the needs of Ukraine and it has been operationed since August 2014,
- entry of new customers on the market, after adoption of 3- rd liberalization package in 2009 in EU, there has been an increasing of the gas suppliers for final consumers, but only the number of customers has increased, but not the amount of gas transported.

The most useful way of regulation is price regulation. In the case of price regulation, there are wide ranges of options that can be divided into three groups:

- (A) regulating the cost of the service,
- (B) incentive Regulation,
- (C) hybrid modes of regulation.(Hvizdoš, L. 2008)

Non - Price regulation is applied by the liberalization packages of the European Union, which has been implemented since 1998. This regulation was carried out in three packages.

3 Analysis of transport company Eustream, a.s.

The start of natural gas transport in Slovakia is related to the construction of the first Bratstvo gas pipeline in the 60s of the 20th Century. Subsequently, Transgas was established, which run the transfer of gas in 1972. After the splitting of CSFR in 1993, part of this pipeline was incorporated under the Slovenský plynárenský priemysel š. p. and a transport division called Slovtranzgaz was established. In 2006, SPP- transport was split off as a joint stock company. In 2008, Eustream received its current name, which passed by the complete unbundling of business activities. Independent network operator Eustream adopt in 2013 the Independend Transport Operator model (ITO model), when the Ministry of Economy SR certified Eustream as an independent operator of the transport network. In 2009, an important event was the adoption of the European Commission's Regulation no. 715/2009 on conditions for access to natural gas transmission networks.

If Eustream customer wants to transport gas from one transport point to another, he must conclude a contract with Eustream. In a framework contract, all the conditions of carriage must be agreed by contract.(Acton, J. P.- Vogelsang, I. 1989) From 2015 Eustream also sells capacity for a period of less than one day, Intraday Capacity, an intraday capacity lasts until the end of the gas day. "Gas day" means a time period beginning at 6.00 am on each calendar day and ending at 6.00 pm on the following calendar day. After receiving, processing and confirming the nomination, Eustream will transport the required amount of gas. At all entry and exit points the price of gas is different, which significantly influences the final price. When the customer purchases a transport capacity, he receives a volume and time discount, depending on the volume and duration of the capacity. It is true that the longer and larger the capacity the customer purchases, the lower the unit price for the gas transported. The price for gas transmission consists of two components.(Cowan, S. 2002) The first component is the tariff for capacity, the second component is the price for the actual transport quantity. We can talk about two types of natural gas transport:

- (A) physical transport;
- (B) commercial transport.

Commercial delivery is ordered from Eustream, who processes and confirms it. Then physical transport follows. Physical transport is the result of commercial transport for several customers. If one customer orders the transport of gas througt the ordered capacity from point A to point B and the other customer orders the transport of gas from point B to point A, only the difference between these two volumes is actually transferred.

Customer also pays in this case for a variable tariff, but also a fixed tariff for the transported quantity. The cost of Eustream consists mainly of the cost of services, material and energy consumption, staff costs and depreciation of the sale of long-term assets and material.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cost	916.15	724.97	646.72	593.05	573.11	453.62	293.20	183.30	186.70

Table 1: Eustream's operating costs

Source: own processing based on annual reports

The following chart shows costs Eustream from 2007 to 2015.





Source: own processing based on annual reports

Eustream's costs since the beginning of its existence have been declining, which may be a consequence of reducing human resource costs, when the number of employees has dropped significantly and these costs have fallen from 2007 to today about 7.83%, as it is documented in the following chart and table.





Source: own processing based on annual reports

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of									
employees	1094	1090	1080	893	1061	986	877	802	748

Source: own processing based on annual reports

Between 2008 and 2009, changes in staff numbers were minimal. A significant decline can be seen only in 2010, when the number of employees dropped from 1080 to 893, a decrease was approximately of about 17%. This decrease was caused primarily due to the economic crisis of 2008, which was reflected mainly in 2009. Another factor that influenced the cost of the analyzed company is gradually introduced unbudling. These activities were continually running from 2009, and this unbundling led to a significant increase in the number of employees to 1080. Since 2011, there has been a more efficient use of human resources, which has gradually resulted in a regular decline in the number of staff and in 31 December 2015 the number of staff was 748. Eustream has reached a profit as a result of its business management in all years of its existence, as can be seen in the following table and graph.

Table n. 4 Profit achieved by Eustream

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Profit	129,4	105,4	97,3	234,2	230,1	333,0	406,8	446,8	559,8

Source: own processing based on annual reports



Figure 3: Profit achieved by Eustream

Source: own processing based on annual reports

Eustream has a special position on the gas market in Slovakia, because it is the only company in this market. The gas pipeline system is sufficient to ensure the transport of gas for Slovakia, but also for the needs of other European countries.





Source: www.eustream.sk

The volume of gas used for consumption on the territory of Slovakia is almost negligible compared to the total transport quantity of gas. It follows that certain indicators such as GDP, unemployment and inflation are to the success of Eustream have almost negligible impact.





Source: own processing based on annual reports

Significant change in domestic consumption in 2014-2015 was due to an excessively hot winter in 2014, which was reflected in a reduction in consumption of gas. More significant than domestic consumption, Eustream's overall volume of gas flows

is affected by decisions by the URSO, as a slovack regulator and consumption of gas in the household and other consumptions of industries in European countries

Conclusion

In the future, Eustream's performance may be affected by many factors, either negative or positive. One of these factors is Russia's political interest to avoid Ukraine, which could have a negative impact on the amount of gas transported across Slovakia and thus on Eustream's revenues. Against this scenario, Eustream is partly protected by having a long-term contract based on the "Ship or Pay" principle with Russian company Gazprom, which means that Gazprom is obliged to pay a fixed price component for the transport capacity booked until 2028, even if it does not carry anything.

The completion of the NordStream II gas pipeline would have a very negative impact on the volume of gas transported. This negative fact could be compensated by the transfer from Bohemian Lanžhot to Austrian Baumgarten. Even here is the threat of competition in the form of a BACI (Bidirectional Austrian-Czech Interconnector) project, that would

Literature

Acton, J. P., Vogelsang, I. (1989). Introduction to the symposium in price In The RAND. *Journal of Economics* 1989, vol. 20, no. 3,

Cowan, S. (2002). Price-cap regulation. *Swedish Economic Policy Review*, 2002.

Mill J. S. (2009). *The Principles of Political Economy with some of their Applications to Social Philosophy.* Vol. 7. London: Longmans, Green and Co. Kap. 9

Mankiw, N. (1999). *Zásady ekonomie*. 1. vyd. Praha: Grada, 763 s. ISBN 8071698911.

Eber, J. (2009). *Management: základy, moderní manažerské přístupy, výkonnost a prosperita.* 2. aktualiz. vyd.. Praha: Management Press, 2009. 734 s. ISBN 9788072612000.

Dluhošová, D. (2008). *Finanční řízení a rozhodování podniku: analýza, investování, oceňování, riziko, flexibilita.* 2. uprav. vyd. Praha: Ekopress, 2008. 192 s. ISBN 9788086929446.

directly connect the Czech transport network to the Austrian one.

Another source of revenue could be the new interconnection between Slovakia and Hungary, despite of this gas pipeline is in commercial operation since July 2015, but has no use at present and does not bring any revenues for Eustream. Relative prospective revenues can be expected from the gas transportation to Ukraine, because till April 2019 is the transport capacity sold out at Budince 's exit point. From geopolitical developments indicate that Ukraine would be interested in importing gas from Europe, the problem can only be Ukraine's ability to fulfill its financial obligations related to gas supply. Another project, from which Eustream expects to bring new volumes of transported gas, and so the new revenue is Eastring gas pipeline. At the end of last year, Eustream received € 1 million to implement a feasibility study. The first Eastring phase could be in operation in 2022, the second in 2026, and the final construction decision could fall in 2018.

Synek, M. (2010). *Podniková ekonomika*. 5., přeprac. a dopl. vyd. Praha: C. H. Beck, 2010. 498 s. ISBN 9788074003363.

Slaný, A. a kol. (2013). *Makroekonomická analýza a hospodárska politika*. Praha: C.H.Beck, 2003, 196 s. ISBN 80-7179-738-3

9.Lisý, J. a kol. (2011). *Ekonómia.* 1. vyd. Bratislava : Iura Edition, spol. s. r. o., 2011, 76 s. ISBN 978-80-8078-406-5

Nord Stream. (2017). *Our Shareholders*. [on-line] [cit. 2017-06-25]. Retrieved from: http://www.nord-stream.com/about-us/our-shareholders/

Contact

Ing. Alena Bašová, PhD Dept. of Finance Faculty of National Economy, University of Economics in Bratislava Dolnozemská cesta 1 852 35 Bratislava e-mail: alenkabaso@gmail.com