THE LIBERALIZATION OF THE ELECTRICITY MARKET AS A PRECONDITION REDUCING ITS CONCENTRATION IN THE SLOVAK REPUBLIC

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Abstract

Aim of the contribution is to point out the positive effects of the liberalization of the electricity market in Slovakia during the years 2011 to 2015. Therefore, in this contribution we analysed the time sequence of creation the single energy market. We focused only on the electricity market, while similar efforts about uniting we can see on the gas market in the EU. To achieve the objective, we used a variety of methods, from the collection of information, particularly from scientific papers, and then we organized this knowledge by sorting into chapters, so we divided this contribution into the several parts. Paired methods of induction and deduction, we have formulated partial conclusions. For better illustration of the obtained results, we have used graphic and mathematical methods that are used mainly for clear presentation of our results in tables and graphs.

Keywords: energy market, liberalization, electro energy sector, HHI index, energy package

JEL Classification: D4, O12, O16

Introduction

The beginnings of the formation of a coherent policy and cooperation in the energy sector in the EU are dated back to May 9, 1950, when French Foreign Minister Robert Schuman presented a plan for deeper cooperation among the six countries of Western Europe. The aim was closer economic and energy cooperation. Nowadays, the changes in priorities and policy in the energy sector brought many challenges. We mean, in particular the global climate changes, constantly diminishing reserves of oil, natural gas and the rapid increase of energy prices. The consequences are quite frequent supply disruptions, block outs of energy supplies and the growing rate of dependency on imports from third countries. The European Union must pay close attention to these issues because energy sources cannot be an instrument of global tension.

1. THE FIRST ENERGY LIBERALIZATION PACKAGE

The biggest problem of energy markets in the Member States, the European Commission (hereinafter EC) considered insufficient unbundling of each activity in the markets and the activity of national energy monopolies in the internal energy market. Even in these regulations there was used the concept of "unbundling" in Slovak translation it means decoupling of. It was only an accounting unbundling, which is an obligation of keeping separate accounts for the supply, distribution and transport of electricity. The main aim of unbundling was to prevent "cross subsidies" and so the energy companies compensated it by the higher selling prices for large enterprises.

This package was adopted by Directive 96/92/Ec of The European Parliament and of the Council of 19 December, 1996 concerning common rules for the internal market in electricity it should be taken into attention the following:

- creating of the internal electricity market is particularly important in order to increase efficiency in the production, transmission and distribution of this product, while reinforcing security of supply and the competitiveness of the European economy and respecting environmental protection;
- the establishment of the internal market in the electricity sector must support the interconnection and interoperability of nets;
- Council Directive 90/547/EEC of 29 October 1990 on the transit of electricity through transmission grids networks has to charge the same prices of electricity to industrial consumers.

First „package“ of energy liberalization demanded:

- the ownership of new generation,
- only accounting and functional unbundling,
- independent authority to solve disputes in the market (regulator),
- liberalization only for big customers.

This first package was adopted in EU in 1996 in electricity sector, and two years later it was adopted in natural gas sector.

The second liberalization package of electro energy market was adopted by Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity. The experiences gained in implementing this Directive shows the benefits that may result from the internal market in electricity, in terms of increasing efficiency, price reductions, higher standards of service and increasing competitiveness. However, significant shortcomings and possibilities for improving the functioning of the market remain, notably concrete measures are needed to secure the same level of conditions in generation and to reduce the risks of market dominance and predatory behaviour, secure non-discriminatory transmission and distribution tariffs, through access to the network on the basis of tariffs published before their entering into force, and ensuring that the rights of small and vulnerable customers were protected and the customers had complete information’s on energy sources for electricity generation, as well as reference to sources, which are providing information on their environmental impact. Execution of legal unbundling should be implemented not later than 7 July 2007.

2. THIRD LIBERALIZATION PACKAGE

By coincidence, the Third Energy Package was created for the Czech presidency of the European Union. In this package was a significant effort to support solidarity between Member States in case of threat to EU energy security. As an example of solidarity and cooperation among Member States could be considered aid that received Slovak Republic from Czech Republic at the time of the gas crisis in 2009. At that time, there were completely interrupted natural gas supplies for several days from Russia.

During the gas crisis there was delivered gas from Czech Republic to Slovakia by reverse flow. The third energy package aims to strengthen the status of consumers in the market. The Directive specifies that a consumer's application for a change of power supplier is to be the change made by the operator concerned within three days of the request. Consumers also have the right to receive complete informations on their consumption. The directive strengthens the

power of the national regulatory authority in the areas of competition and consumer protection with the adoption of an appropriate unbundling model. [5]

The latest round of EU energy market legislation, known as the third package, has been enacted to improve the functioning of the internal energy market and resolve structural problems. [3] It covers five main areas:

- unbundling energy suppliers from network operators,
- strengthening the independence of national regulators,
- establishment of the Agency for the Cooperation of Energy Regulators (hereinafter ACER),
- cross-border cooperation between transmission system operators and the creation of European Networks for Transmission System Operators (hereinafter ENTSO), in electro energy sector ENTSO- E,
- increased transparency on retail markets to benefit consumers. [11]

Unbundling means the disintegration of the vertical monopoly so that the company which supplied electricity did not own any transmission or distribution network. Under the third package, unbundling must take place in one of three ways, depending on the preferences of individual EU countries:

- Model OU (Ownership Unbundling), where all integrated energy companies had to sell their gas and electricity networks. In the case of such unbundling company must not produce or sell electricity energy and such company must not have property shares in the delivery company,
- Model ISO (Independent System Operator). The basic assumption of this model is the creation of an independent entity ISO, which will function as the company operating the transport of energy. This independent subject (ISO) should be nominated by Member State after the suggestion of company owning the transmission net. Then the appointment is approved by the European Commission. The role of ISO is to provide a third party access to transmission networks, charging for the access to the transport nets, maintenance and development of transport, as well as development planning. [4]
- Model ITO (Independent Transmission Operator) where energy supply companies may still own and operate gas or electricity networks, but must do so through a subsidiary. All an important decisions must be taken independent of the parent company.

The level of legal market opening and unbundling is sufficient, but opening of real market is lagging behind because regulated tariffs are set at a low level.

3. THE IMPACT OF LIBERALIZATION ON REDUCING THE CONCENTRATION OF ELECTROENERGY SECTOR

In the next part of the paper we point out on the direct impact on liberalization of the energy sector in the Slovak economy through The Herfindahl index. This index is used in developed countries to measure the degree of concentration of national industries. In the energy sector, there were operating vertically integrated monopolistic companies that abused their dominant market position.[7] By implementing liberalization packages adopted by the European Community into national law gradually reduced the degree of concentration also in Slovak Republic. HHI is known as the Herfindahl-Hirschman Index, and is named after economists Oorris C. Herfindahl and Albert O. Hirschman.

HHI is a measure of the size of companies in relation to the degree of concentration industries of national economy and is an indicator of the degree of concentration among them. It is defined as the sum of the squares of the market shares of the firms within the industry where the market shares are expressed as %. The result is the average market share, weighted by their market share. In calculation is sometimes the number of companies limited to the 50 largest firms in the analysed sector. [1]

The indexes involve the market share of the individual market competitors, squaring it, and add them together.

The formula is:

$$H = \sum s_i^2 \qquad (1)$$

Where

s_i = the market share i company in the market, and i is member of natural numbers.

Thus, in a market with two companies that each have 50 % market share, the Herfindahl index equals: $H = 0.50^2 + 0.50^2 = ½ = 0.5$.

HHI index is a measure of the size of the firms in relation to the industry and is an indicator of the amount of competition among them. [2]

The Herfindahl Index (HHI) ranges from 1/N to one, where N is the number of the companies in the market. Equivalently, if we use as whole numbers, as in 75 instead of 0.75, the index can range up to 1002, or 10,000.

An H below 0.01 (or 100) indicates a highly competitive industry.

An H below 0.15 (or 1,500) indicates an unconcentrated industry.

An H between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration.

An H above 0.25 (above 2,500) indicates high concentration.

The closer the market is to the monopoly of the market, the higher the concentration and the lower the market competitiveness is. For example, if the market was only one company with a share of 100%, the HHI index would equal 10,000 (100ˆ2), which would indicate that the is entirely monopolistic. On the contrary if it were 1,000 companies on the market that would have market shares close to zero, the market would be close to perfect competition and would have the value of 0,01(0,1ˆ2).

4. PRACTICAL APPLICATION OF THE CALCULATION HHI IN SLOVAKIA IN THE PERIOD 2011-2015

In the next part of this contribution we will analyse the HHI index in individual years in the sector of the supply of electricity for households, which is still regulated. The regulator is the Net Office of Regulatory Industries (hereinafter RONI).

Table 1 – Market share of companies in 2011 in SR

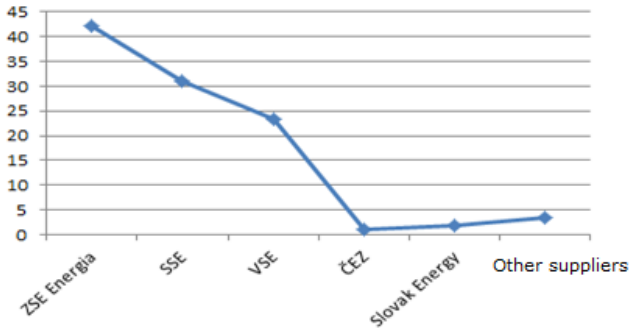
Supplier	Unit	Year 2011	Market share in %
ZSE Energia	GWh	1 986,37	40,12
SSE	GWh	1 602,10	31,11
VSE	GWh	1 175,25	23,24
ČEZ	GWh	126,62	1,1
Slovakia Energy	GWh	3,35	1,88
Other Supliers	GWh	194,11	3,35
Together	GWh	5 087,80	100

Source: own processing according of annual reports by regulated entities [10]

As shown in Table 1 consequently we get the HHI index as the sum of the individual market shares squared and we counted obtain a final value for 2011.

HHI 2011 = ZSE Energia(40,12%) + SSE(31,11%) + VSE(23,24%) + ČEZ(1,1%) + Slovak Energy(3,35%) + other suppliers(3,35ˇ) = 40,12ˆ2 + 31,11ˆ2 + 23,24ˆ2 + 1,1ˆ2 + 1,88ˆ2 + 3,35ˆ2 = 3 133,511

Chart 1 – HHI index in SR in 2011



Source: own processing according table 1

Table 2 – Market share of companies in 2012 in SR

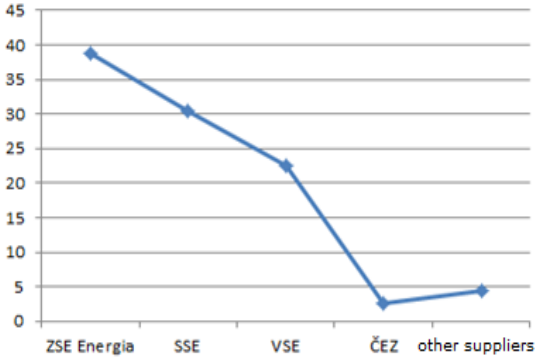
Supplier	Unit	Year 2012	Market share in %
ZSE Energia	GWh	1 973,00	39,85
SSE	GWh	1 503,00	30,36
VSE	GWh	1 074,00	22,45
ČEZ	GWh	132,10	2,55
Slovakia Energy	GWh	0,00	0
Other Suppliers	GWh	200,12	4,44
Together	GWh	4 882,22	100

Source: own processing according of annual reports by regulated entities [10]

As shown in Table 2 consequently we get the HHI index as the sum of the individual market shares squared and counted up we get a final value for 2012.

HHI 2012 = ZSE Energia(39,85%) + SSE(30,36%) + VSE(22,45%) + ČEZ(2,55%) + other suppliers(4,44%) = 39,85ˆ2 + 30,36ˆ2 + 22,45ˆ2 + 2,55ˆ2 + 4,44ˆ2 = 3 039,97

Chart 2 – HHI index in SR in 2012



Source: own processing according table 2

Table 3 – Market share of companies in 2013 in SR

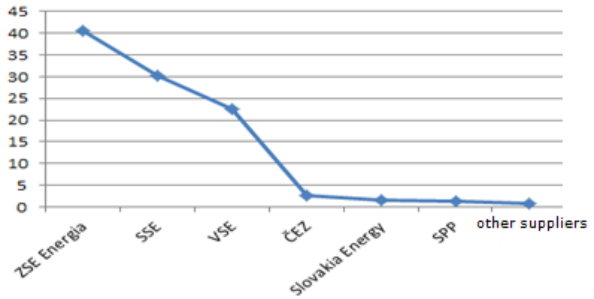
Supplier	Unit	Year 2013	Market share in %
ZSE Energia	GWh	1977,00	40,70
SSE	GWh	1466,00	30,18
VSE	GWh	1096,00	22,56
ČEZ	GWh	131,30	2,70
Slovakia Energy	GWh	83,50	1,72
SPP	GWh	63,40	1,31
Other Supliers	GWh	40,70	0,83
Together	GWh	4857,90	100,00

Source: own processing according of annual reports by regulated entities [10]

As shown in Table 3 consequently we get the HHI index as the sum of the individual market shares squared and counted up we get a final value for 2013.

HHI 2013 = ZSE Energia(40,70%) + SSE(30,18%) + VSE(22,56%) + ČEZ(2,70%) + Slovakia Energy(1,72%) + SPP(1,31%) + other suppliers(0,84%) = 40,70^2 + 30,18^2 +2,70^2 + 1,72^2 + 0,83^2 = 3 088,9461 = 3 088,95

Chart 3 – HHI index in SR in 2013



Source: own processing according table 3

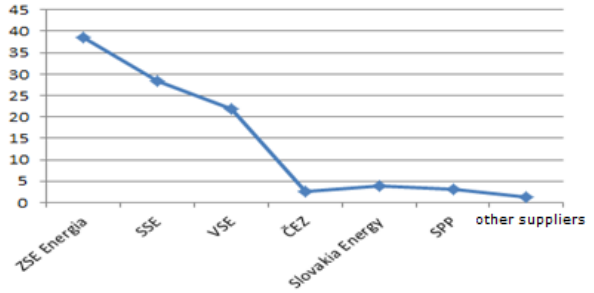
Table 4 – Market share of companies in 2014 in SR

Supplier	Unit	Year 2014	Market share in %
ZSE Energia	GWh	1912,00	38,62
SSE	GWh	1404,00	28,36
VSE	GWh	1086,00	21,94
ČEZ	GWh	132,10	2,67
Slovakia Energy	GWh	190,30	3,84
SPP	GWh	159,80	3,23
Other Suppliers	GWh	66,50	1,34
Together	GWh	4950,70	100,00

Source: own processing according of annual reports by regulated entities [10]

HHI 2014 = ZSE Energia (38,62%) + SSE(28,36%) + VSE(21,94%) + ČEZ(2,67%) + Slovakia Energy(3,84%) + SPP(3,23%) + others suppliers(1,34%) = 38,62ˆ2 + 28,36ˆ2 + 21,94ˆ2 + 2,67ˆ2 + 3,84ˆ2 + 3,23ˆ2 + 1,34^2 = 2 811,2606 = 2 811,26

Chart 4 – HHI index in 2014

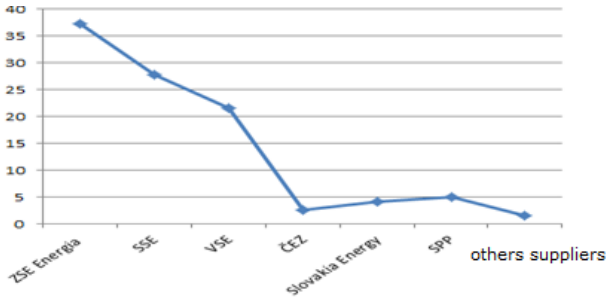


Source: own processing according table 4

The calculation of HHI index for 2015 is different because in the annual reports of regulated entities there are not available data in the same breakdowns as in previous years. Missing data for the quantity of delivered energy in MWh, so I calculate the following form:

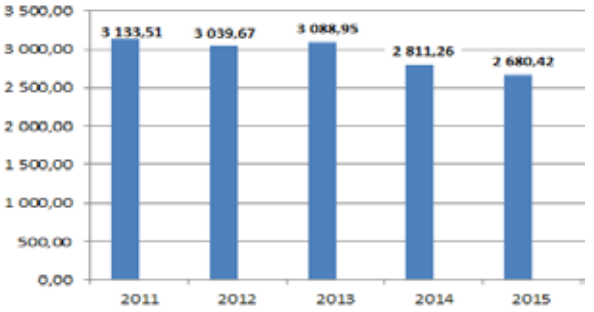
HHI 2015 = ZSE Energia(37, 32%) + SSE(27,77%) + VSE(21,56%) + ČEZ (2,65%) + Slovakia Energy(4,20%) + SPP(4,96%) + other supplies(1,54%) = 37,32^2 + 27,77^2 + 21,56^2 + 4,20^2 + 4,96^2 + 1,54^2 = 2 680,4246 = 2 680,42

Chart 5 – HHI index in SR in 2015



Source: own processing according of annual reports by regulated entities

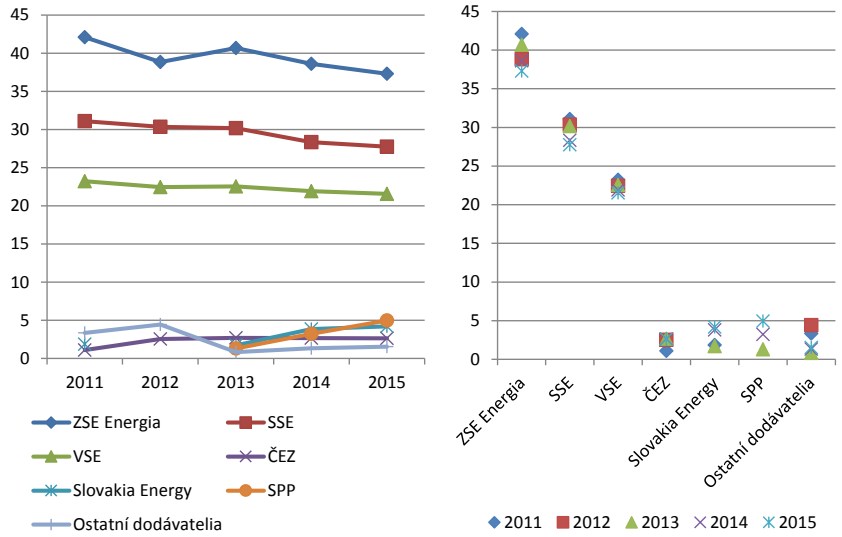
Chart 6 – HHI index in SR in analysed period 2011 – 2015



Source: own processing according calculations above

So the development of HHI index during years 2011 – 2015, we can depict by the following chart.

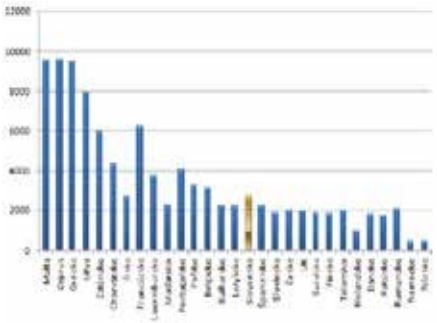
Chart 7 – Development of HHI in SR in 2011- 2015



Source: own processing according charts above

HHI index compared with other EU countries is obvious that Slovakia belongs to the countries with a higher degree of concentration in the electricity market. In some countries there is still a distinct very high level of concentration and the fact belongs to one of the main arguments for further regulatory action in the electro energy sector and increasing competitiveness in these markets. For comparison, the chart of HHI index in the EU in 2015.

Chart 8 – HHI index in electricity supply in the EU for 2015



Source: <http://www.finance.gov.sk/Default.aspx?CatID=1036> [11]

5. EVALUATION OF THE IMPACT OF LIBERALIZATION ON THE SLOVAK ENERGY MARKET

Increased competition in the electricity market is manifested not only in pricing, as well as new differentiated products and enhanced marketing. Until recently, in the market was offering only a homogeneous product, but there is the beginning of emerging innovation and product differentiation. [8] In EU, over the past two years there were appearing products of variable length of contract, fixation of prices for a certain period, a combination of electricity and gas in one package. [6] Additionally, the consumers who prefer renewables have the offer to supply electricity from clean renewable sources, or other additional services and facilities. ACER report states, those customers in Slovakia were able to choose their supplier of electricity from 19 companies. which is below the European average? Final consumers in the capitals of Netherlands, Germany, Finland, Sweden and Denmark can choose from a much wider choice, from an average of 330 offers from 65 suppliers. [9]

Conclusion

Reducing the concentration of the electricity market has a positive impact in several areas. Liberalization was manifested by differentiation of the products offered mainly for large customers who are able to support environmental objectives through their contracts. Today's offer involves the granting of discounts on long-term contract with a fixed term. ZSE, major supplier in the defined territory, for example, offers a program with the guarantee of electricity, which comprises covering emergency costs for electrical appliances of up to € 150. ZSE for communication with final consumers has started to use the services of external agencies since 2014.

The ZSE was the partner of Slovak Food Festival. All of these activities of the biggest player in the electricity market there are positive features of competition fight in the market. Level of competition in the market depends on the attitude of customers and their level of information. The survey of EU indicates that Slovak consumers are satisfied with the offers of suppliers, as well as the possibility of switching suppliers. Development of competition does not help the fact that market has developed a large number of suspicious swindlers and sellers, states RONI. For the development of competition would be appropriate to take real measures to help suppliers to increase the possibility of influencing the final price for consumers. Greater freedom in influencing the final prices would necessarily bring a higher level of competition and the entry of new companies into the market supply.

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DETERMINATION OF CONDITIONS OF GROWTH BY DEFORMATION OF KONDRATIEV CYCLES

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Abstract

Economic growth is not fluent and its trend is not always stable either. During the economic growth long-term fluctuations of economical activity, caused by innovations of the highest order (so-called basic innovations) occur. The facts listed above are being examined by the economical theory in the context of individual theories of business cycles, especially by theories of long-term economic cycles. Basic innovations determine so called long-term cycles (also long waves), on which the process of medium-term business cycles then depends. The second phase of each long wave is characterized by stagnation phenomena in economics, which is a huge issue of the current situation, because at the moment we are in the final phase of one of these long waves. That is also the reason for the low success rate of the implemented pro-growth precautions. A really fundamental change can be expected in connection with the arrival of a new long wave, the fifth one in the order. Innovations, on which this wave depends, are already beginning to appear.

Keywords: K-wawe, innovation, business Cycles

JEL Classification: B15, E14, E44

Introduction

Developed countries in the world are facing a number of problems, the first one being low rates of growth or almost stagnation trends, which lead to many other maladies from high unemployment to huge indebtedness. This situation can be rationally explained by the theory of long-term economic cycles, or the so-called long waves. This theory describes not only why the current epoch differs in its course from economically successful period several decades ago so much, but it also creates a prognosis of renewed economic expansion in decades to come – under the assumption that some basic prerequisites enabling this expansion are met. Simply said the growth potential of outdated traditional technologies had been exhausted before the society managed to implement modern progressive ones.

The facts listed above are being examined by the economical theory in the context of individual theories of business cycles, especially by theories of long-term economic cycles. The basic idea of long waves (also called K-waves) theory is based on highlighting the role of technical and technological factors in economic development, or historical development in general, which the neoclassical economics does not take into account too much. Nevertheless, qualitatively new techniques and technology, together with many other factors lead – thanks to the wave of innovations of the highest orders - to gradual transformation of the society. By virtue of long-wave theory a hypotheses on an approximately 50-year period of these essential influences, which can also be reflected in occurrence and character of war conflicts, revolutionary events, etc. were created.

The main theorists of long-wave concept are Nikolaj Dmitrijevič Kondratiev and Josef Alois Schumpeter, the economists who are very difficult to be placed in any of traditional schools of economics.