ELECTRICITY MARKET DEVELOPMENT IN LATVIA

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Abstract. *Electricity is crucial to the development, progress, security and overall lifestyle in the global economy. A common European electricity market requires market integration and transmission grid expansion, including cross-border interconnectors. The electricity market opening in Latvia was divided into four stages; it began with legal persons in 2007 and ended with household users on 1 January 2015.*
The aim of the research is to assess the development of the Latvian electricity market since the beginning of the electricity market liberalisation.
Research methods used: monographic, descriptive, analysis, synthesis, induction, deduction and regression analysis. The Diamond Model was employed to acquire information for market analysis.
The electricity market's development was affected by its liberalisation. With the interconnections still being developed, the Latvian electricity market is slowly fitting into the Scandinavian market and decreasing its supply dependence on third countries. Now the electricity market is developing naturally; yet, it requires stricter monitoring of its development and stimulation.

Keywords: *electricity market, liberalisation, development*.
JEL code: *M2, E3, O1*

Introduction

Latvia began the opening of its electricity market on 1 July 2007 when, in accordance with Directive 2003/54/EC of the European Parliament and of Council of 26 June 2003 concerning common rules for the internal market in electricity, a legal provision on the electricity market came into force, stipulating that all electricity final consumers, which have a connection to the power grid, have the right to change their electricity supplier without any limits (Report on Control Results …, 2013).

An open electricity market creates prerequisites for competition among electricity suppliers, which results in higher service quality and greater opportunities for electricity consumers. The electricity market opening in Latvia strengthens the single EU electricity market, thereby contributing to Latvia's power supply security and energy independence in the future (Electricity Market Opening…, 2014).

The full opening of the electricity market was initially planned for 1 September 2013, then for 1 April 2014. However, only on 1 January 2015

the opening of the electricity market was completed in Latvia, namely, all household consumers – approximately 850 000 in number – accounting for about 25% of the total electricity consumption were engaged in the electricity market (Electricity Market Opening…, 2014).

So, on 1 January 2015 the electricity market in Latvia was fully liberalised – all electricity consumers in the country purchased their electricity in a free market. According to the available information, no research investigations into whether the electricity market liberalisation is going to develop Latvia's electricity market on the whole have been yet conducted in Latvia.

Research hypothesis: the liberalisation of the electricity market serves as the basis for the development of the electricity market in Latvia.

Research aim: to assess the development of the Latvian electricity market since the beginning of the electricity market liberalisation.

To achieve the aim, the following specific **research tasks** are set:

1) to examine the electricity markets in Latvia and the EU;
2) to assess the offers of electricity suppliers for household electricity consumers in Latvia.

Research methods used: monographic, descriptive, analysis, synthesis, induction, deduction and regression analysis. The Diamond Model was employed to acquire information for market analysis.

Materials used: research papers of national and foreign scientists, research studies, Eurostat data and other information sources.

Research results

Essential issues in the field of energy are associated with the establishment of a single European electricity market and the development and introduction of relevant EU legal acts (Network Codices) as well as the attraction of EU funds and the evaluation of investment projects whose implementation allows effectively interconnecting a number of the electricity markets of EU Member States (Regulator Highlights…, 2015). To understand and analyse the current situation in the electricity market in Latvia, the authors propose criteria for market development evaluation: infrastructure development, electricity trade in the exchange, competition and electricity price.

Infrastructure development. Power interconnections of sufficient capacity are one of the most important prerequisites for optimum electricity market operation. On the whole, the Baltic States have always provided themselves with electricity, additionally diversifying economically most efficient primary resources. However, after the Ignalina nuclear power plant (NPP) was closed, the total electricity

balance of the Baltic States became negative. It has to be taken into account that the efficiency of power grid exploitation in Latvia is not high, and there are objective reasons for it (Karnītis, 2010). Based on the information on the newly constructed power interconnections and the projects being implemented, the authors have created a map for interconnections among the Baltic States, which is presented in Figure 1.

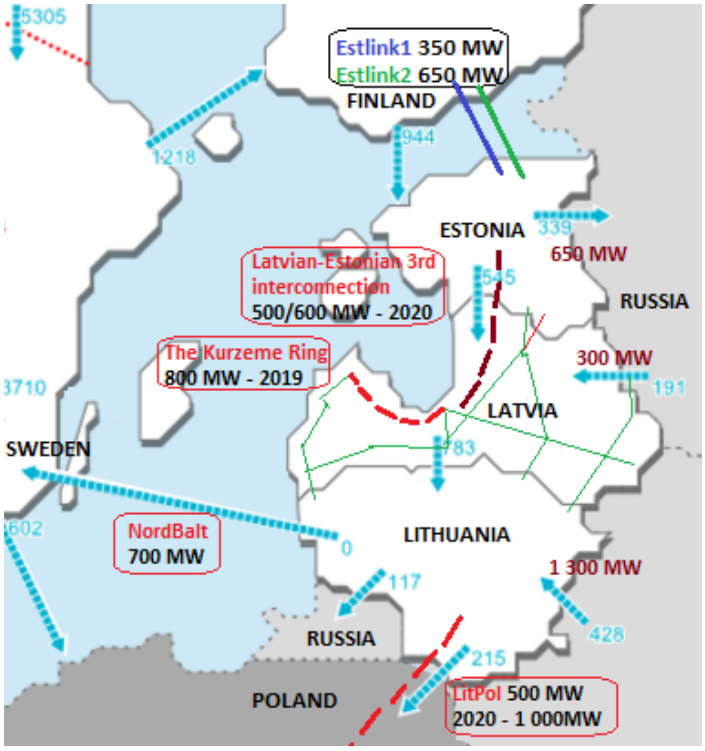

Figure 1. Map for power interconnections for the Baltic States (as of 24 April 2016, 10 p.m.) *(Source: authors' construction)*

The authors find that with the power interconnections between Estonia and Lithuania and other countries emerging, Latvia's access to the largest electricity markets also improves, as the Baltic States, in this way, get integrated into the Scandinavian electricity market where they can purchase electricity at lower prices. Of course, it is also essential to finish the projects started in Latvia in order to provide better electricity supply in the country's territory, increase energy supply security both in Kurzeme region and in the whole country, which gives an opportunity to completely use the NordBalt power interconnection. All the new power interconnections are necessary to reduce dependence on Russia's power supplies.

Electricity exchange (an electricity trading platform in Latvia, where within the framework of the bidding area or between separate bidding areas participants of the electricity exchange buy and sell electricity

through offers and demands. Trade of electricity also includes the physical transmission of electricity (Electricity Market Law, 2005). NordPoolSpot AS (NPS) is an electricity exchange established in 1990 and currently provides electricity exchange services in the Nordic Countries, the Baltic States and other countries. The Nordic/Baltic day-ahead market (ELSPOT) was opened on 3 June 2013, while the continuous cross-border intraday market (ELBAS) started operating on 10 December 2013 (On Appointing a Nominated Electricity…., 2015). Lithuania joined the NPS electricity exchange in June 2012, while Estonia did it in 2010 (Guidelines for Energy Sector Development …, 2016). An analysis of electricity prices for Latvia compared the prices among the Baltic States, and the monthly price changes are presented in Figure 2.

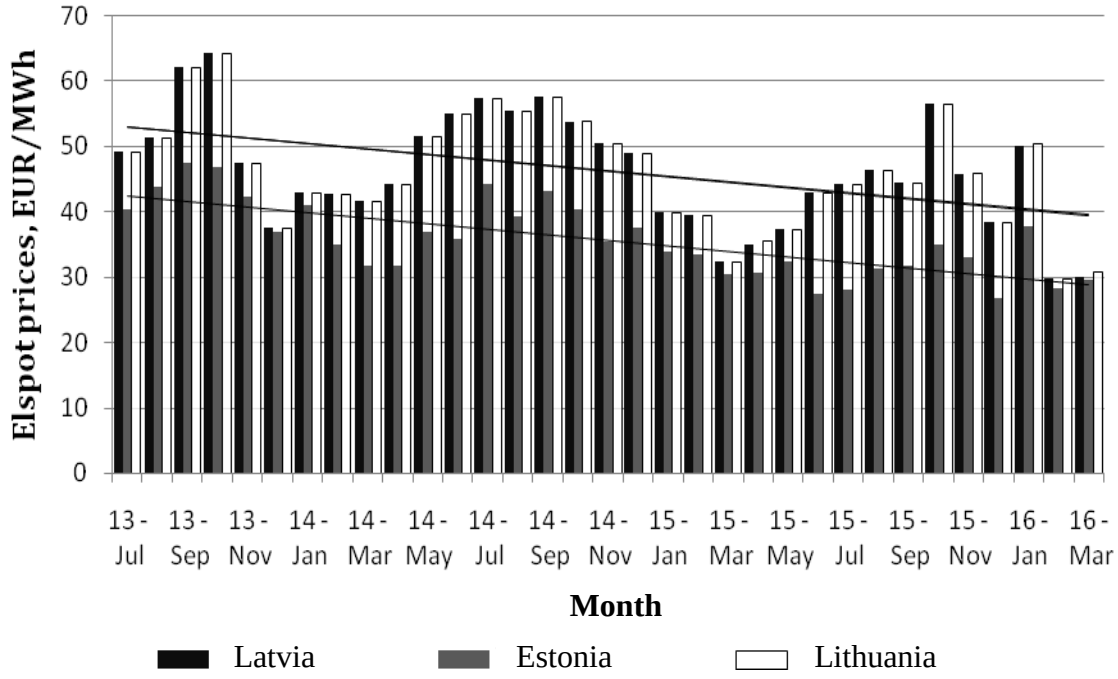

Figure 2. Nord Pool SpotEl prices in July 2013 – March 2016, EUR/MWh
(Source: authors' construction based on Nord Pool SpotEl spot prices)

No significant differences are observed between electricity prices in the bidding areas of Latvia and Lithuania; yet, there is a difference in price between the mentioned countries and Estonia. February 2016 was remarkable due to the fact that for the first time in the open market period the trading of electricity was stable thanks to the recently opened NordBalt power cable, which was officially at the test stage. In February, owing to the cable, Lithuania imported cheap electricity generated at Swedish nuclear and hydro power plants, which contributed to a decrease in electricity market prices to historically the lowest level in the markets of both countries (29.65 EUR/MWh), which was 40.71% lower than in January.

Competition in the electricity market. In any electricity market, there is competition between two or among a number of market participants that compete to sell their electrical energy. The sellers struggle to have buyers and a dominant position in the market or in a segment of the market (Mahņitko, Varfolomejeva, 2010). Competition guarantees a lower price on services. The electricity market needs liberalisation, as a competitive environment leads to the lowest price on a good or a service and it operates as an efficiency driver (Electricity Market Opening…, 2014).

As of 1 January 2013, 44 electricity producers were registered with the register of electricity traders. In the period 2010-2012, actually the following six traders operated in the market: the JSC Latvenergo, Enefit Ltd, "Enerģijas avots" Ltd, BCG Riga Ltd, Inter RAO Latvia Ltd and Baltic Energy Pool Ltd (Report on Control Results…, 2013). Eighty percent legal entities at the end of 2014 and 75% at the end of 2015 bought electricity from the JSC Latvenergo (Sustainability and Annual Report, 2015). Its biggest competitor is Enefit Ltd, which had 15% legal entities as clients at the end of 2015 (Skreja, 2016a). As of 1 January 2015, four traders supplied electricity to household clients, and 11 to legal entities. At present, 36 traders are registered, of which six represent active suppliers of electricity to household clients, while 16 supply electricity to legal entities (according to JSC "Sadales tīkls" data). Currently, approximately 13 thousand households in total have chosen another electricity trader (Skreja, 2016). This means that competition exists in the market, and the monopoly has to make efforts not to lose its market share. The authors conclude that household clients are passive, and such a situation was influenced by the postponement of liberalisation of the market, thus contributing to their distrust. Besides, it was easier to attract new household clients at the moment of opening the market. At present, after changes have taken place in the market, it is much more difficult for new market enterers to attract clients, as they do not make marketing campaigns and focus on a hope that the clients will find them on the Internet by employing price calculators, thus reducing their costs. Some traders that already operate in the market's household segment focus not on increasing the number of clients but only serve the range of existing clients.

The **price of electricity**, which is the most important criterion for the final consumer. According to Eurostat, the electricity price (all taxes and fees included) for households (annually consuming 1000-2500 kWh) in Latvia was the 14th lowest in the EU at 0.1635 EUR/kWh; in Estonia and Lithuania the prices were 0.1302 and 0.1256 EUR/kWh, respectively (Figure 3).

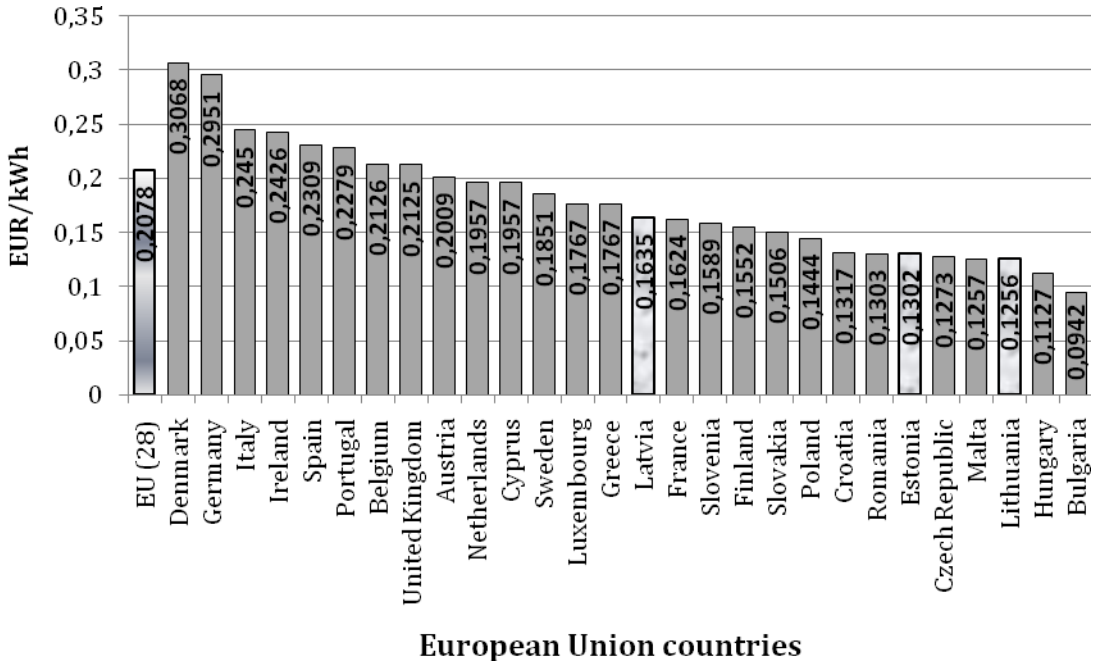

Figure 3. Electricity prices (all taxes and fees included) for households (annually consuming 1000-2500 kWh) in 2015, EUR/kWh
(Source: authors' construction based on Eurostat data)

Figure 3 shows that among the Baltic States, the price on electricity for the segment of household clients in Latvia was the highest; yet, the price was 21.32% lower than the average in the EU. After analysing the electricity prices for households in the Baltic States, the authors find that a sharp increase by 19.78% in the price occurred in Latvia particularly in 2015. So, the comparison of electricity prices for households in the Baltic States leads to a conclusion that the price in Latvia was 25.57% higher than in Estonia and 30.18% higher than in Lithuania.

Figure 4 shows the average electricity prices for households in the period 2008-2015.

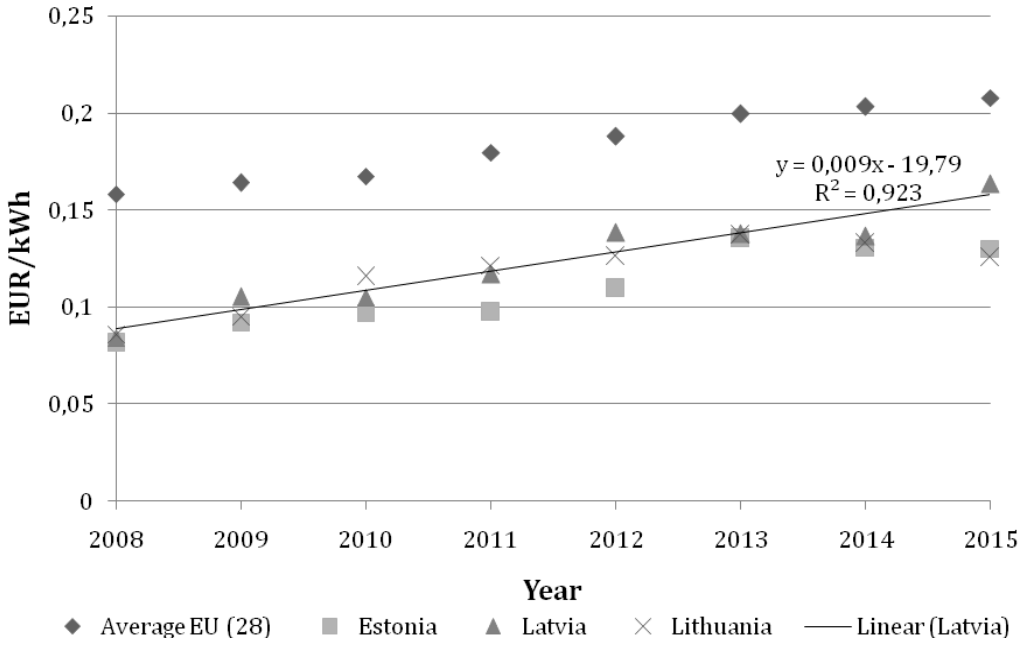

Figure 4. Average electricity prices (all taxes and fees included) for households (annually consuming 1000-2500 kWh) in the period 2008-2015, EUR/kWh
(Source: authors' construction based on Eurostat data)

A regression analysis of the average electricity prices for households in the EU in the period 2008-2015 revels that the determination coefficient is 0.923, which means that the average electricity prices in Latvia strongly correlated with the average electricity prices in the EU, yet, were lower than in the EU.

Changes in households' average electricity consumption are presented in Figure 5.

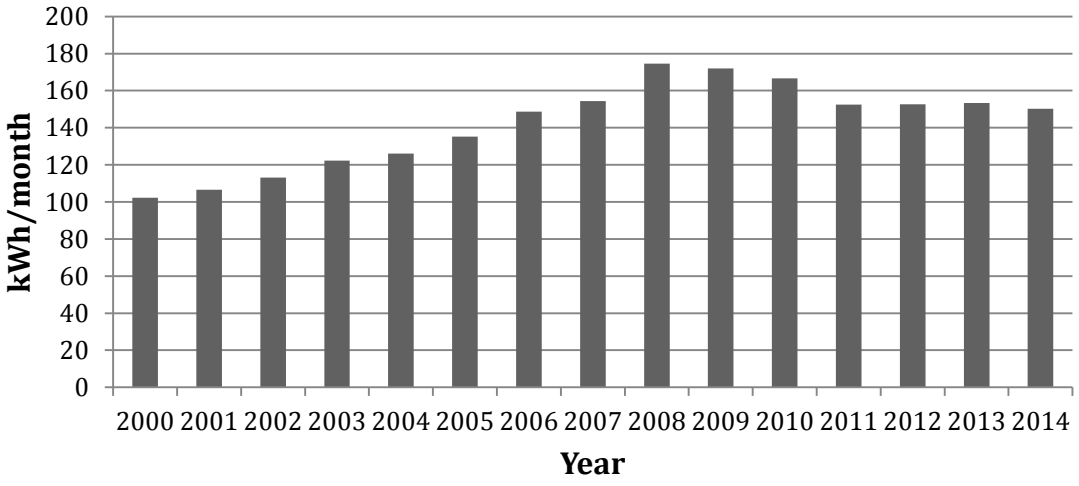

Figure 5. Average electricity consumption per household in the period 2000-2014, kWh/month
(Source: authors' construction based on Eurostat data)

The average electricity consumption per household in Latvia in recent years was equal to 150 kWh a month. Since earlier electricity tariffs were regulated in Latvia, the authors analysed an association between the average electricity consumption cost (150 kWh/month) and the minimum wage and salary in Latvia for the period 2008-2015 (Figure 6).

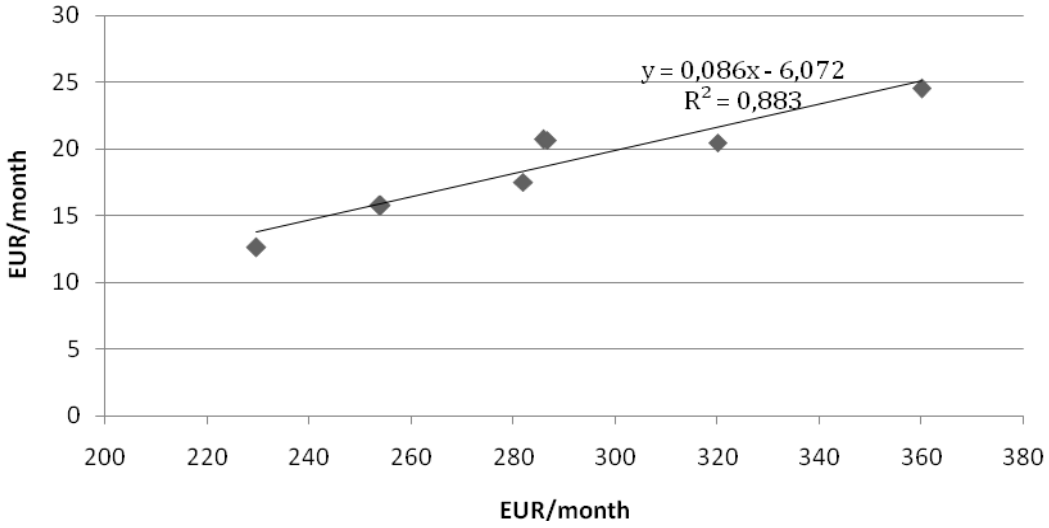

Figure 6. Association between the average electricity consumption cost and the minimum wage and salary in Latvia, EUR/month
(Source: authors' construction based on Eurostat data and Arhipova, 2006)

A regression analysis of the average electricity consumption cost and the minimum wage and salary in Latvia for the period 2008-2015 showed that the correlation coefficient r= 0.94 and the determination coefficient R^2=0.88, which meant that the association was strong and linear. One can assert with a probability of 95% that an increase in the minimum wage and salary by EUR 1 results in an increase in the average electricity consumption cost by 0.086 EUR/month.

It has to be stressed that after the household market was opened (on 1 January 2015) the electricity traders agreed with their clients only on a third of the cost of a kilowatt-hour, as the remaining part was still regulated by the government. The tariff composition and the tariff's components are shown in Figure 7.

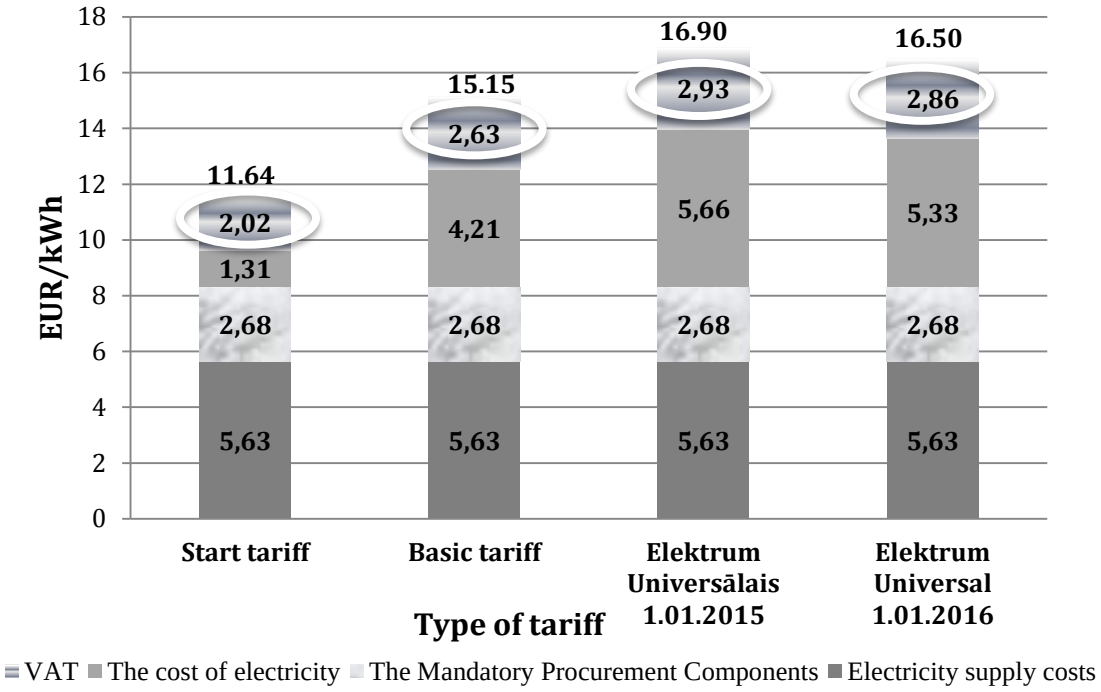

Figure 7. Electricity tariff composition for households in the period 1 April 2011 – 31 March 2016, EUR
(Source: Guidelines for Energy Sector Development..., 2016, and electricity trader offers as of 1 January 2015 and 1 April 2016)

All the other components, except for the price, remain constant regardless of which electricity trader is chosen by a client. It has to be also mentioned that the JSC "Sadales tīkls" has submitted a new draft decision on tariffs, which may both decrease and increase the total electricity cost depending on the place of a power connection and the consumption amount. (Expert: the Plan for Balancing..., 2016). The price on electricity is not subsidised anymore (protected electricity users are an exception), the changes in the price have been relatively large since the market was opened; however, as of 1 January 2016 the price has decreased by 2.36%.

The authors analysed electricity trader offers for households when the market was opened (i.e. on 1 January 2015) and at present, grouping the households by their approximate electricity consumption (within a range from 100 to 1000 kWh/month) and comparing their annual electricity consumption costs. The comparison employed previous tariffs for captive electricity consumers (Start and Basic) and assumed that bill mailing costs did not have to be paid and subscription fees, if stipulated in the contract, were included. The household costs by consumption group for the period since 1 January 2015 are presented in Figure 8.

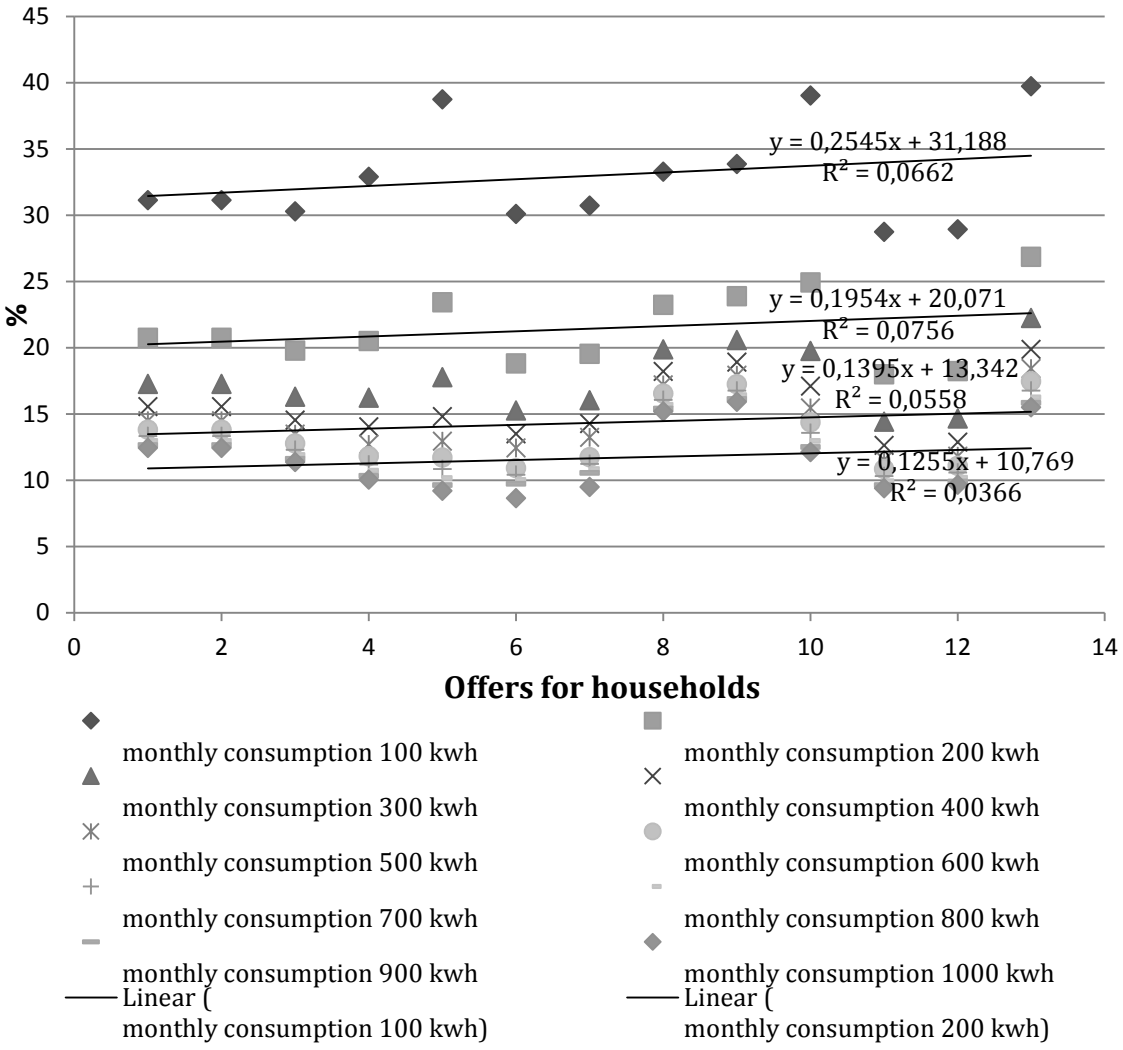

Figure 8. Annual increases in electricity consumption cost for households consuming 100 - 1000 kWh a month since 1 January 2015 (based on tariffs for captive consumers), %
(Source: authors' construction based on electricity trader offers on 1 January 2015)

In the first trader offers, the greatest cost increase was reported for households with an average consumption of 100 kWh a month; yet, as their consumption increases, the cost difference decreases. This may be explained by the fact that before the consumer groups paid the regulated basic tariff, which better fitted the market situation.

The authors also analysed electricity trader offers for households made at present, grouping and comparing the same techniques used during the market opening. The household costs by consumption group for the period from 1 April 2016 are presented in Figure 9.

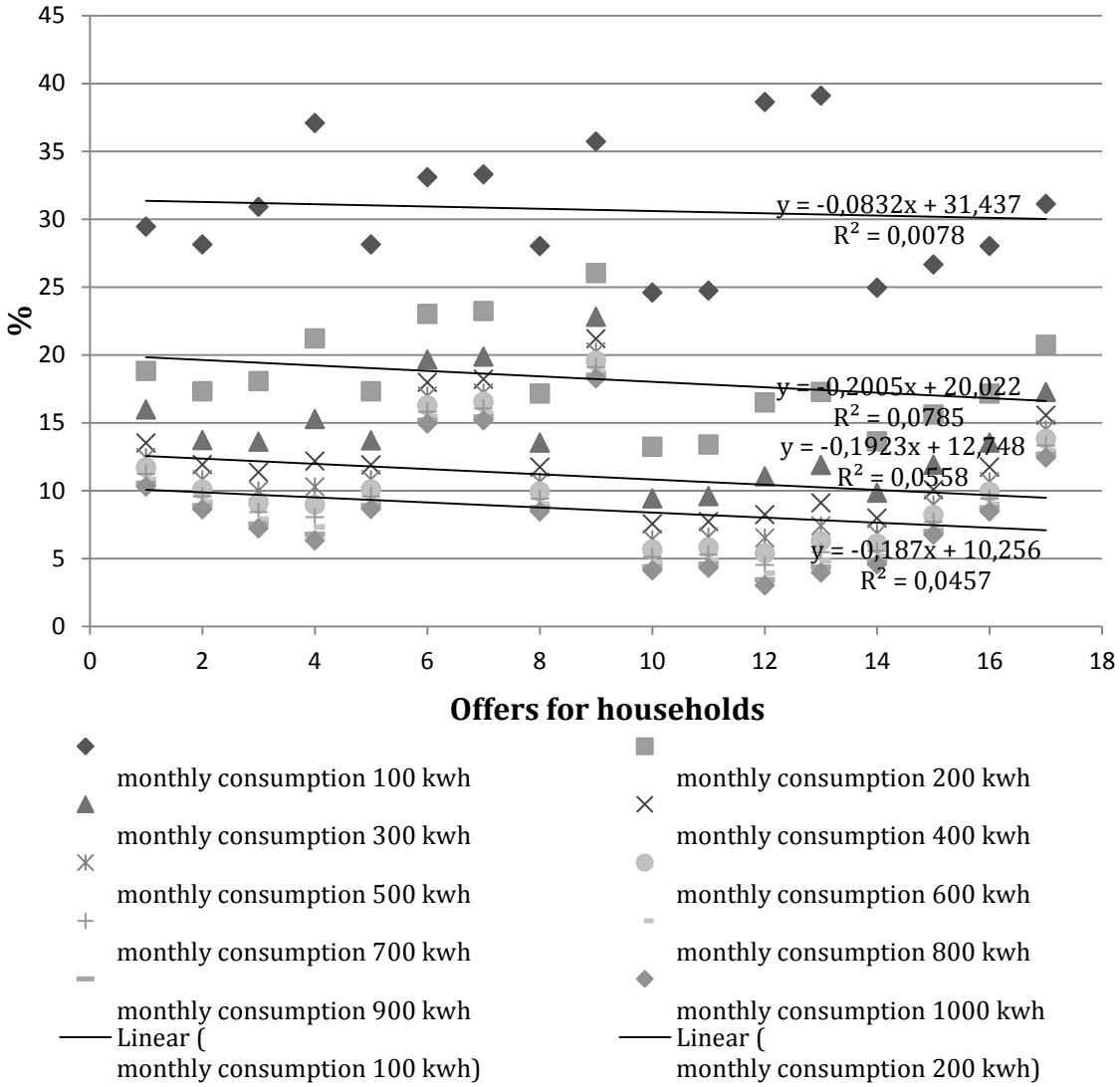

Figure 9. Annual increases in electricity consumption cost for households consuming 100 - 1000 kWh a month from 1 April 2016 (based on tariffs for captive consumers), %
(Source: authors' construction based on electricity trader offers on 1 April 2016)

As of 1 April 2016, the price changed but the changes were small and made no significant effects on the total household expense on electricity. However, the determination coefficients calculated showed that the expense changes were insignificant.

An electricity market model is a procedure how market participants produce, sell, supply and consume electrical energy and exploit the electric power infrastructure. Based on the information analysed in the present research, the authors developed a model for the electricity trade industry according to M. Porter's diamond model (Figure 10).

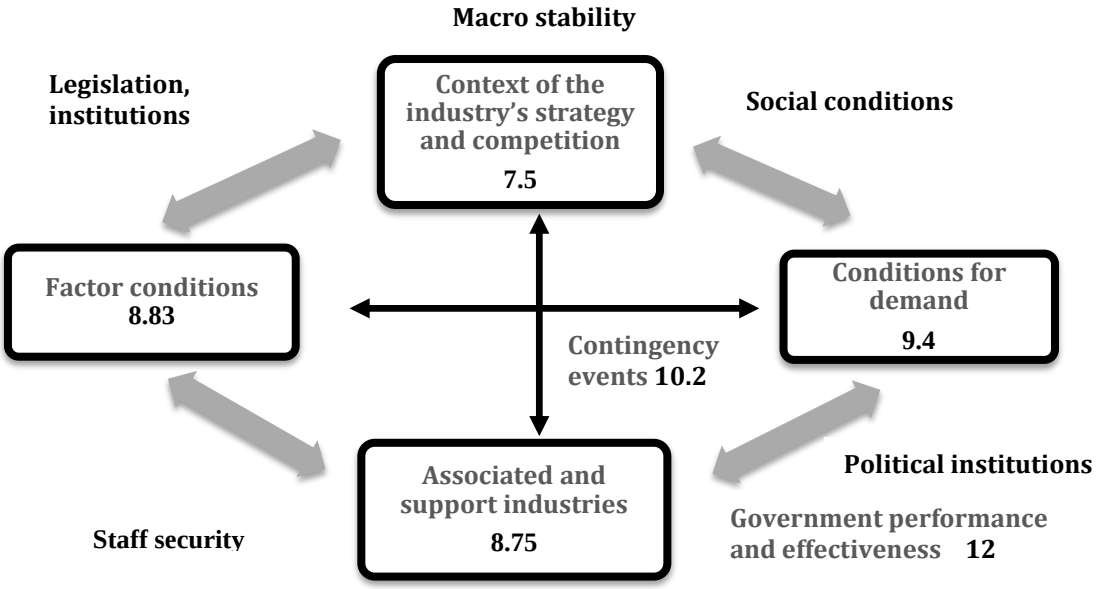

Figure 10. Electricity trade industry according to M.Porter's diamond model *(Source: authors' construction based on the information disclosed in their research)*

For each criteria, the authors set 4-5 indicators that were assessed both in terms of their significance for the industry and in terms of the current situation in the industry. The averages of total scores of both assessments were multiplied, thus acquiring the overall effect indicator.

According to M.Porter's diamond model, the greatest effect on the industry's further development is made by the government, which is logical, as both the historical monopoly JSC Latvenergo and the power transmission and distribution operators, which have become natural monopolies, belong to the Ministry of Economics. For the industry's further development, the conditions for demand for electricity is the next most important prerequisite, which may be justified by the fact that electrical energy is a necessity without which the modern life is unimaginable.

The context of associated and support industries is almost as important as "factor conditions", as electricity traders alone would be incapacitated without transmission and distribution operators and without participating in the exchange.

It has to be noted that the significance level of "contingency events" equals 10.2, which means that there are events in the industry that cannot be controlled by the enterprises but their effects are very significant.

Conclusions and suggestions

1. Since the electricity market was opened in Latvia, positive trends have been observed in this market: power interconnections are developed, electricity may be bought in the exchange and competition increased; yet, the electricity price for the segment of households is declining very gradually, as such clients are passive.
2. The liberalisation in particular positively influenced the electricity market, as power interconnections are being developed, the electricity markets of the Baltic States gradually integrate into the electricity markets of the Scandinavian countries and the supply dependence on third countries decreases. Also, it is important that during the power industry's restructuring the power transmission and distribution networks were separated from power generation and trade activities to contribute to the optimum functioning of the electricity market, thereby enhancing competition in this market.
3. At present, the electricity market is developing naturally; yet, greater control and stimuli are necessary.
4. The Public Utilities Commission has to implement greater control over not only the transmission and distribution operators but also over the field of electricity trade in order to contribute to electricity trader activity and the awareness of household clients because currently the public lacks knowledge of the principles of operation of an electricity market and the price formation mechanism (including the principles of operation of an electricity exchange) and free market advantages.
5. The government has to actively engage in fostering the electricity market's development: the justification for regulated tariffs has to be reviewed and the attraction of EU funds for the infrastructure has to be continued, as the market's liberalisation by itself does not ensure its further development; therefore, a stimulative environment has to be provided in all the dimensions.
6. The government has to continue synchronising the Baltic electricity transmission systems with the European ones, as higher competition, which works as the market driver, could be expected only if making the market more transparent.

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ELEKTROENERĢIJAS TIRGUS ATTĪSTĪBA LATVIJĀ

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Kopsavilkums

Elektroenerģija ir svarīga attīstībā, aizsardzībā un kopumā dzīves ciklā globālajā ekonomikā. Kopējais Eiropas elektroenerģijas tirgus pieprasa gan tirgus integrāciju, gan pārvades tīklu paplašināšanu, tostarp arī pārrobežu starpsavienojumu attīstību. Elektroenerģijas tirgus atvēršana Latvijā tika sadalīta četros posmos; tā sākās ar juridiskām personām 2007. gadā un noslēdzas ar mājsaimniecības lietotājiem 01.01.2015.

Pētījuma mērķis ir izvērtēt Latvijas elektroenerģijas tirgus attīstību kopš elektroenerģijas tirgus liberalizēšanas uzsākšanas.

Pielietotās pētījuma metodes: monogrāfiski aprakstošā metode, analīze, sintēzes, zinātniskās indukcijas, dedukcijas metodes un regresijas analīze un pielietots Dimanta modelis tirgus analīzei.

Elektroenerģijas tirgus attīstību ietekmējusi tieši tā liberalizācija. Joprojām attīstās starpsavienojumi, Latvijas elektroenerģijas tirgus lēnām iekļaujas Skandināvijas tirgū un samazinās piegāžu atkarība no trešajām valstīm. Pašlaik elektroenerģijas tirgus attīstās dabiski, bet tam nepieciešama stingrāka uzraudzība un stimulēšana, lai tas attīstītos.

Atslēgas vārdi: elektroenerģijas tirgus, liberalizācija, attīstība.