

TAXATION OF ELECTRICITY FOR GERMAN HOUSEHOLDS, AS SOURCE OF RES FINANCING – CONCLUSIONS FOR POLAND

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SUMMARY

Business, legal and intellectual resources have been concentrated around the transformation of the electricity sector in Germany. The financial burden and risk have been redirected in large extent towards society. Despite one of the highest electricity fees for households in Europe, Germans accept the reform. Poland is facing serious challenges in the process of modernisation of power engineering. While observing the power sector of Germany, it is worth to draw lessons from their experience. In both countries, the differences in the power sector are significant, and the discrepancy in the purchasing power of money in these countries is relevant. Realized analysis made it possible to draw conclusions for Poland for the development of power generation and distribution of electricity.

INTRODUCTION

The world's largest power sector transforming project is being realized in Germany. It has many supporters, but also a group of sceptics and even significant amount of critics. This transformation is a political project, which assumes departure from fossil fuels and nuclear power for renewable energy sources (RES). With the continuous development of this type of technology, emission pollution levels into the atmosphere, soils and water are getting lower (Kesner R. et al., 2015). Energy sources such as gas, coal, uranium and oil systematically shrinks, while natural energy resources at all times remain at the same level (Piasecka I. i inni, 2013). The reasons for this expensive and risky reconstruction of the energy sector, can be found out in continuous desire, growing demand for energy, become independent from the import of fuels (Germany expenses reach 90 - 100 billion euros annually and is still growing), increasing resistance against nuclear power, lower costs of RES technology, climate protection, citizen involvement in

the creation of civic energy. The effect of a such reconstruction process in the energy sector is a fact, that about 50% of all renewable energy installations belong to German citizens, and support for government activities in this field reaches 80% (Maćkowiak-Pandera J., 2015). This interest induces observation and analysis of the social acceptability in terms of incurring the costs of this operation.

TAXATION

Almost from the beginning of the energy sector, it is in various forms under surveillance. (Przybył M.A. i Śpiewak R., 2017). The legal basis for the development of RES energy in Germany was initiated by Act of 07.12.1990 on bringing to the public electrical energy grid, electrical power coming from the RES. In its content it obliges the electrical grid operators to receive electricity from RES, and allows them to charge the final recipients with RES costs. Ten years later, act on priority and favouring for RES was implemented. It replaced the above mentioned act and has taken over essential support instruments from it. The EEG Act through subsequent amendments it implemented facilities for RES investors. One of them was to create a possibility for direct sale of electricity to final recipients or through an energy exchange. The aim of this was to achieve higher prices than those set out in the act, and the supplement of prices was supposed to be a market bonus from the electrical grid operator. Another element was the flexibility bonus, whose task was to encourage to supply electrical energy in a dependent system from the current daily and seasonal demand. On the German market there is a system of price support in the form of subsidies from the state budget, which is the legal denomination of purchase price from renewable energy producers, by operators and it has a public support character. The

electrical grid operator under the influence of the compensatory mechanism, has right to add additional costs to the energy sales price of power company, which can do it for consumers in form a charge of RES in the price of 1 kWh. This additional fee is modified annually. The EEG Act also allows to introduce a reduction in purchase prices of energy from its manufacturers, to control the quantitative increase of the installation. With the development of RES, the legislation associated with it is evolving. German legislation supports the development directions set by the government. In Poland entrepreneurs still have the feeling, that many legal actions, it does not stem from the real needs of economic, but for obscure reasons, non-legal reasons or the particular interests of certain groups. The governmental has adopted a draft law on RES, in which it changes, the existing support system for RES. The system is supposed to be more marketable. It waives the fares guaranteed for the auction system, preferred by the European Commission. Support in the development of RES, in Germany, consumes 24 billion euros annually (PAP, 2016). Apart from support elements for RES, there are also taxes. All these elements impinge on the final price, which must pay electrical energy consumer.

COMPARISON

To create a comparative profile, it is necessary to analyze the components affecting the price of energy. Currently electrical energy is no longer a good of social importance, but a commodity, which is produced, transported (transmitted) and sold to the end consumer. Each of these processes generate costs. In Fig. 1, are presented comparative prices in Poland against the European background, which must be paid by the final consumer for electrical energy. Differences are important, but do they really reflect the current market situation? To determine this, it should relating expense of generation, distribution, sales and taxes to average earnings, so in fact assess the cost of energy, measured by purchasing power parity. The energy price in the market is not precisely reflecting the final cost of

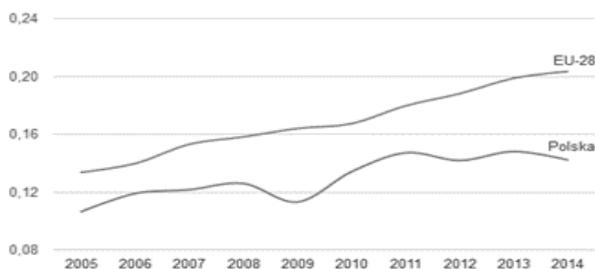


Fig.1 Comparison of average prices including taxes and VAT for households in the first quarter of each year for 1 kWh electricity in Europe (€) generation. Market price of electrical energy can be determined using equations (1) and (2) which are the "uplift" sum of the price and the final cost of generating in the electrical system. One of the fundamental aspects of deviations from the final cost of generation is the power available in the moment, as illustrated in the following illustration (fig. 2).

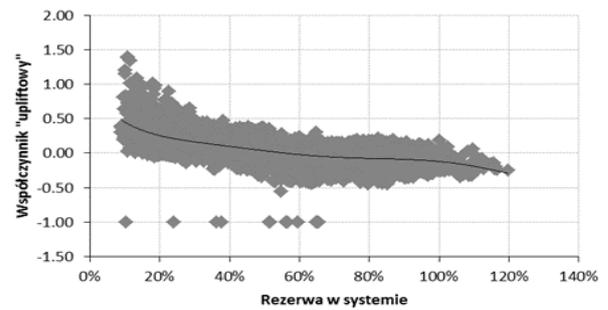


Fig.2 Shaping of "uplift" factor based on power reserve in the system

$$Upl_p = Y \cdot SRMC_{sys} \quad (1)$$

$$P = Upl_p + SRMC_{sys} \quad (2)$$

Figure 3 shows wholesale electrical energy prices. In Poland they are about 14% higher than the prices in Germany, but the consumers of that country pay one of the highest rates in Europe, although they have one of the lowest prices of energy in the wholesale market. As the reason for this, should be seen in intensive development of RES, which caused a significant fall in energy prices on the wholesale market (Woźniak H. 2014) Increase in energy generation from RES, results in reduced generation from conventional power plants.

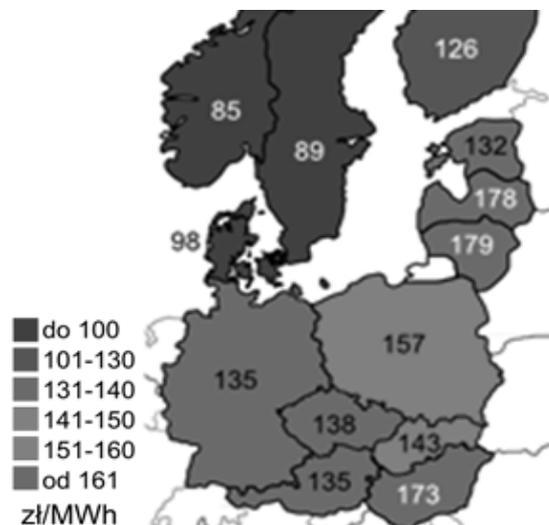


Fig.3 Wholesale electricity prices in Europe

Power plants which produce the most expensive electrical energy, are being shut down as first. From the remaining power plants with low variable costs, price is created by the level of generation costs from brown coal. Low prices of coal and gas, result into carbon dioxide emissions costs. The electricity price for households in Poland is varied (fig. 4) and dependent on the distribution system operator. For many years it also has an upward tendency (fig. 5).

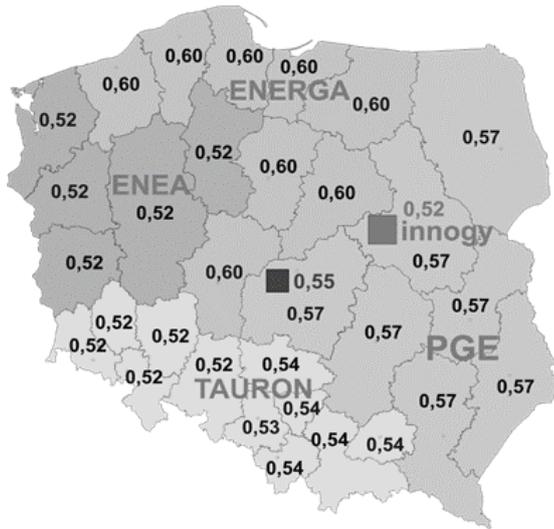


Fig.4 Price 1 kWh in tariff G11 per day. 08/30/2017

The electricity price for households in Germany is about 85% higher than in Poland. The scale of this difference is shown in figure 5. The differences represent high taxes and subsidies for renewable energy, which are mostly borne by households, alleviating the impact on German industry in this way (Derski B., 2016). Striving to maintain the competitiveness of German companies, they are legally supported with numerous reliefs and tax exemptions. The level of fees per 1 kWh of the German industry is comparable to that of Polish companies, which are also exempt from some of the costs of supporting renewable energy.

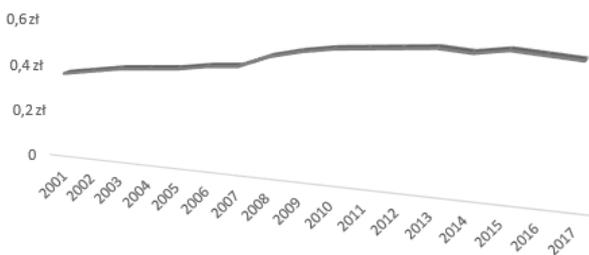


Fig.5 The average price of 1 kWh in the G11 tariff for households in the years 2001-2017

Taxes are a major cost burden for users in both countries, and tax policy priorities differ so it is also used to support some of the means of generation, for

example, renewable energy. Distribution fees are also significant in the total price. Germans are not discouraged by high electrical energy bills and continue to support energy transformation (57% acceptance with 11% negative ratings).

Table 1. Components of electrical energy prices for households in Poland and Germany in 2015 (gr / kWh)

	Wholesale price of energy (base)	Services and sales margin	Support for RES	Cogeneration and others technology support
Poland	16	5	4	0
Germany	14	14	25	2

	Distribution of energy networks	Other taxes and fees	VAT tax	SUM
Poland	24	1	12	62
Germany	27	15	18	115

Component relationships in the end price in both countries are represented in the table below.

Table 2. Relationships of the components in the end price in Germany and Poland for 2015 (in %)

	Poland	Germany
Wholesale prices	25,5	12,0
Taxes (VAT)	19,0	16,0
Distribution	39,0	24,0
Value of support	7,0	23,0
Services and margin	8,0	12,0
Other taxes and fees	1,5	13,0

The reason of that is fact, that significant share in RES investments have individuals. Only about 12 - 13% of the power from RES is owned by power companies and 14% is owned by industry. Transformation stimulates the German economy and is considered profitable. The development of RES in the country is not systematized. Its share in the growth of new generation capacities is varied (Śpiwak R. i Wesołowska P., 2016). More reliable measure to determine the scale of the impact of electricity prices on the household budget of the Germans and Poles, is comparison of retail prices according to the purchasing power parity of money. The parity takes into account the real purchasing power of the inhabitants of the country, ie the amount of electricity that can be purchased for the value of an average salary. According to statistics for 2016, Germans could buy for its average salary (3612 euros)

13377 kilowatt-hour and the Poles (957 euros, at a rate of 4.234 zł / euro) 7044 kilowatt-hour of electrical energy. The difference oscillates within 90% to the disadvantage of the Polish end-consumer.

CONCLUSIONS

The electrical power price must increase because Poland can not afford to carry on energy transformation a scale like Germany. Investing in RES technologies is inevitable. End consumers will participate not only in the cost for the actual consumption of electrical energy, but also for transmission and distribution services, investments in infrastructure and subsidies for renewable energy. We are going to pay for EU policy, which aims for definite limitation of coal in power sector. Moreover Poland will have to pay for EU policy, which heads for elimination of coal in power sector. Poland still treat coal as the primary source of energy, so likely increase in carbon dioxide emission allowances will raise the cost of generating electrical energy from coal. Electrical power production in conventional power plants seems to be in the near future with a deficit or a small profit, so for political reasons, household tariffs will continue to be administratively and controlled. Low-cost import can minimize the rate of cost increase, as interconnection capacity is currently small and their development cannot be considered massive. A decisive portion of profits will be taken over by the distribution sector, as transmission fees will continue to increase due to the large power block market and the need to provide power for hundreds of kilometres. Distribution costs (in Poland about 10-15% higher than in Germany) can halt the development of sources (RES) close to the recipient. The current market model in Poland based on high network charges and relatively low energy taxes does not encourage saving. To increased efficiency and number of investment in prosumer RES, may prompt users significant environmental taxes in electrical energy charges, but even then, the share of energy costs in the household's balance of payments may be even higher than it is now (13.4%), and this can result in social unrest. An unfavorable scenario in terms of energy security is possible, where electrical energy is obtained from Germany, Lithuania, Belarus and the Kaliningrad Oblast.

LIST OF SYMBOLS

P	price,
$SRMC_{sys}$	marginal cost of production in the system,

Upl_p	uplift price,
Y	uplift factor.

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