

## The role of state in determining the electricity prices in Poland

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**Abstract.** Electricity markets in the European Union, including Poland, have in the last two decades, have seen huge transformations. The most important of these were the liberalization processes, which since 2007 have greatly accelerated. The article examines whether and how the State influenced changes on price formation for end consumers in the electricity market since 2007. The analysis showed that in many EU Member States, prices are still regulated. In addition, the influence of the State on the level of electricity prices did not decrease, but increased. This happened under the influence of energy and climate policies, as a result of which the State has introduced a number of new charges that have been spilled onto final consumers.

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### INTRODUCTION

Since the beginning of the 1990s of the electricity markets in the European Union are subject to liberalization. Enterprises operating in the past, as state monopolies have been subjected to restructuring and privatization processes. In addition, the examined markets, treated so far to direct supervision by the State, were covered by specialized sectoral regulation. But while in the United States the task of the regulation was supervision of businesses, in the European Union, the main purpose of the regulation in the electricity sector was to create competitiveness (Nagaj 2013a, p. 90). It started dominating the doctrine that the best guarantee of low electricity prices is the liberalization of the market. For this reason, starting from 1996, in the EU it started the implementation of the electricity directives (96/92/EC, 2003/54/EC, 2009/72/EC), whose purpose was a gradual reduction the State's role in the electricity markets. An element of these transformations were changes in the price control by the State, which relied on release of electricity prices from regulation and to subject the network charges to ex ante regulation. At the same time, however, the EU energy and climate policies have begun to have a stronger and stronger impact on electricity markets, reflected by the promotion of energy efficiency, low carbon technologies and renewable energy sources. Due to the need for high investment in the electricity sector and the higher cost of electricity generation in power plants using these technologies or energy sources, the State began to introduce various market and legislation

mechanisms that would support this kind of EU policies. The result is an assumption that the cost of energy and climate policies will be absorbed onto final consumers and electricity bills paid by them. It is therefore difficult not to resist the impression that despite the liberalization processes, the role of government in the electricity sector is not reduced. The aim of the paper is to examine what is the role of the State in the development of electricity prices in Poland. Achieving this aim was subordinated to the structure of the paper. In the first part of the article it is a literature review on state intervention, its nature and role of the state in the electricity sector. In the next part of the article an analysis of the role played by the State in the development of electricity prices in the EU countries. Following this there is an analysis of the role of the state in shaping the electricity prices in Poland. The work is completed by the conclusions.

## LITERATURE REVIEW

Since the beginning of the development of the economics the discussion continues about what should be the role of the State in the economy. In the 80's, many economists found that the sectors of infrastructure, such as electricity sector, should not be the subject of direct State control, but the specialized sectoral regulation that, as pointed by Boyer i Saillard (2002, p. 37), is the codification of social relations that define a mode of production, namely institutional forms. However, it should be remembered that the sectoral regulation can also mean a strong state interference into the economy. As noted by D.F. Spulber, „regulations are general rules and specific actions imposed by administrative agencies that interfere directly with the market allocation mechanism or indirectly by altering consumer and firm demand and supply decisions” (Spulberg 1989, p. 37). The instruments used by the economic regulation can affect many areas of the market. As noted by A. Kahn, in infrastructure sectors there are various components of regulation: control of entry, price fixing, prescription of quality and conditions of service, the imposition of an obligation to serve all applicants under reasonable conditions) (Kahn 1998, p. 3). The key and the most glaring manifestation of state influence on the economic life is the price control or shaping its level. In relation to the regulated sectors, such as electricity sector, in the literature are presented two approaches to regulation, the public interest and private interest. According to the first of these, the sector should be regulated due to market failures that occur on it. The electricity sector is an example of just this, because it is vulnerable to monopolization, unfair competition, information asymmetry and the presence of externalities. The regulation is introduced in order to eliminate or reduce these market failures and in this way increase social welfare. However, as was proved by C. Friedland and G. Stigler (1962), regulation does not lead to the realization of the public interest. In examination of the electricity market in the United States, regulation did not lead to the expected lower prices for end-users, and in addition the regulatory costs had to be incurred. On this basis, the critics of sectoral regulation created the theory of economic regulation (G. Stigler, S. Peltzman, R. Posner, G. Becker) emphasizing that regulation most often satisfies only the most individual needs of individuals or interest groups that are seeking the regulation. As noted by Stigler (1971, p. 3), because the fact that enterprises are usually better organized than consumers, so markets are most often regulated in order to bring benefits to the industry. Moreover, as noted by Becker (1983), regulation may be the subject to the rivalry of many interest groups, and its shape is the result of competition between them. However, in general, the basic premise of activities of interest groups is to achieve benefits in the form of rent, which the legislature can provide to the enterprise or enterprises by various restrictions on competition and the possibility of applying higher price. As emphasised by Posner (1975), This is harmful for the economy and causes deadweight loss, because companies seeking the rent by regulation in the form of a stronger market position or for example

price regulation, use the significant resources that could be used in production. The way to eliminate this phenomenon is the liberalization and the reduction of State influence on the economy.

Changes that have occurred in the environment of the infrastructure sectors, including the electricity sector, in the 80's and 90's meant that the way to ensure low prices and security of supply of goods and services in the infrastructure sectors is the creation of competition (Nagaj 2013b, pp. 46-47). For this reason, in the EU Member States in sectors susceptible to monopolization, regulation in the electricity sector was used as an instrument for creating competitiveness. It should be also remembered that in the monopoly sectors, despite the creation of the liberalization process, the State often holds the right to price regulation or otherwise affects the price formation. The State can use for this purpose various methods. These are: authoritative setting of some fundamental rules that should be followed by entrepreneurs during the independent creation of their prices, approval of tariffs by the state or the setting assizes (Nagaj 2013b, p. 44).

In relation to the electricity market, subject literature indicates that the main benefit of its liberalization was to improve the cost-effectiveness of companies (Newberry and Pollitt 1997, Salies and Waddams Price 2004). Of the relevant market, now climate policy begins to play an increasingly important role, which is not indifferent to the electricity prices. As was indicated by the Swedish Antitrust Authority (2010, in: den Hertog 1999) or Pollitt (2012), the effect of such state policy was the increase in prices. This means that despite the liberalization process in the electricity market, the state's role in electricity price formation has not been minimized and it is still significant. Besides, it is pointed out that the liberalization and deregulation of the electricity market does not have to be effective. As pointed out by Steve Thomas, such reasons may be (Thomas 2006, in: Boogen 2010, p. 8-9):

- the need for the regulatory bargaining by companies to deal with the risk occurring in the sector,
- the need for huge investments to build the market,
- specific characteristics of electricity, i.e. lack of storage possibility, the need for continual balance of supply and demand, lack of substitutes, the negative impact of the electricity sector on the environment, the need to care for the security of supply.

For these indicated above reasons, the electricity market is not subjected entirely to market forces and to a lesser or greater extent, the State shapes the situation on the examined market.

## THE STATE AND END-USER ELECTRICITY PRICES IN THE EUROPEAN UNION

In accordance with the directives adopted by the European Commission, electricity markets were subjected to liberalization processes. The first electricity directive, which started this process, was adopted in 1996 (Directive 96/92/EC). Whereas the last one was adopted in 2009 (Directive 2009/72/EC), and applied by the EU Member States since 2011. On the basis of these rules from July 2007 all electricity consumers in the EU Member States would have been able to choose their electricity supplier freely in a competitive marketplace.

Currently, electricity prices in EU Member States are not determined directly by the State, but indirectly. This is done by independent regulatory authorities, which are the central public administration authorities. Consecutively entered electricity directives directives on the one hand progressively liberalized electricity markets, on the other hand introduced the obligation to establish regulatory bodies for energy sector and increased responsibilities and competences of regulators.

In table 1 was showed in which countries and in which segments of the electricity market, the electricity prices were controlled by the regulator.

Table 1

## The European Union countries, where there is electricity price control

Country	Households		Small Enterprises		Medium and Large Enterprises		Industry	
	2007	2013	2007	2013	2007	2013	2007	2013
Austria								
Belgium*	x							
Bulgaria	x	x	x	x	x	x	x	
Czech Republic	x							
Germany								
Denmark	x	x	x		x		x	
Estonia	x		x		x		x	
Greece	x	x	x	x	x	x	x	
Spain	x	x	x	x	x	x	x	
Finland	x							
France	x	x	x	x	x	x	x	x
Hungary	x	x	x	x	x	x	x	
Cyprus	x	x	x	x	x	x	x	x
Malta	x	x	x	x	x	x	x	x
Ireland	x		x		x		x	
Italy	x	x	x	x	x	x	x	
Lithuania	x	x	x		x		x	
Luxembourg	x							
Latvia	x	x	x		x		x	
Netherlands								
Poland	x	x	x		x		x	
Portugal	x	x	x		x		x	
Romania	x	x	x	x	x	x	x	
Sweden								x
Slovenia	x							
Slovakia		x		x		x		
Great Britain								

\*In Belgium regulated prices for households with special needs.

Source: (Acer/CEER 2013, p. 40).

Despite the opening of electricity markets to competition by allowing all final customers to purchase energy from any supplier of electricity, over the period considered the electricity prices were regulated in many the EU Member States (see table 1). It is true that in 2013 the number of such countries was less than in 2007. However, it should be noted that in the households segment, electricity prices are still regulated by the 15 Member States. It is worth adding that apart from electricity price regulation, in all EU Member States network charges, according to the requirements of Directive 2009/72/EC, were subject to ex ante regulation. This means that despite the introduction of market mechanisms in the electricity markets, governments continued to have a significant impact on the examined markets.

An important measure, illustrating what impact the State has on the electricity market and price formation, is the share of taxes and any charges (levies) on the total electricity price.

The Figures 1 and 2 show what share taxes and levies (extracted from network charges or supply price) had in total electricity bills for households and industrial consumers in the European Union.

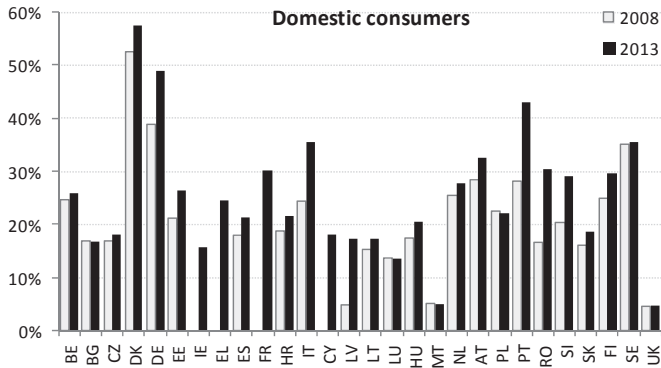


Figure 1. Share of taxes and levies in total electricity price for household customers (Band DC) in the EU Member States  
Source: based on Eurostat data.

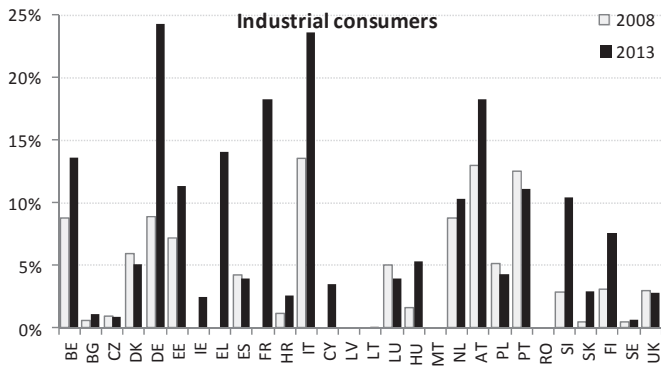
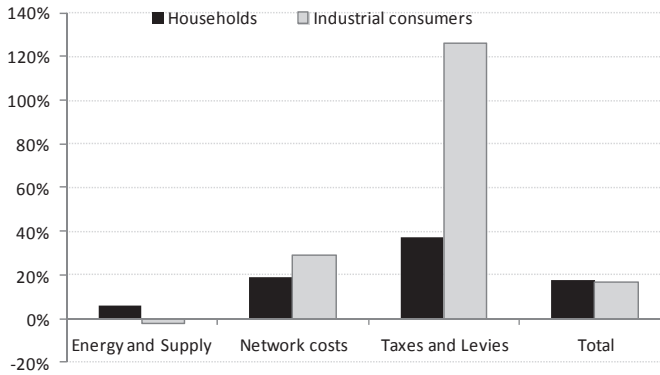


Figure 2. Share of taxes and levies in total electricity price for industrial customers (Band IC) in the EU Member States  
Source: based on Eurostat data.

The analysis showed that since 2008 in most European Union countries, the share of tax surcharges on total electricity bills increased. This concerned both electricity bills for households and for industrial consumers. This situation occurred in 24 countries in the household segment and in 18 countries in the segment of industrial customers. This means that despite the fact that since mid-2007 in EU countries electricity markets were opened to competition, the State’s influence on the total electricity prices increased in most countries. It should be noted that the impact was stronger in the segment of households than of businesses. Depending on the country the share of taxes and levies in the electricity price for households in 2013 ranged from 4.7% to 57.4% (in 2008-2013 the average increase in the share of taxes and levies amounted to 6.8 percentage points), while in the case of prices for industrial consumers from 0% to 24.3% (average increase of 3.4 percentage points).

The confirmation of the fact that, despite the liberalization measures in the electricity markets in the European Union, the role of the State in shaping electricity prices has not decreased, but remained dominant, in the analysis of changes in electricity prices by components. Figure 3 shows what was the share of components of end-user electricity prices in the increase in the overall price in the period 2008-2012.



**Figure 3. Evolution of EU-28 electricity retail price\* (for households - band DC and for industrial consumers - band IC) by components (percentage change)**

\* Prices include all taxes in the case of households. Prices exclude VAT and other recoverable taxes in the case of industry, as well as industry exemptions (data not available).

Source: Eurostat, Energy Statistics [in] European Commission (2014), Commission Staff Working Document: Energy prices and costs report. Accompanying the document: Communication from the Commission to the European Parliament, the Council, and the European Economic and Social Committee and the Committee of the Regions. Energy prices and costs in Europe, COM(2014) 21 final, Brussels, p. 16.

Analysis of changes in electricity prices for end consumers by components indicated that in 2008-2012 prices increased primarily due to taxes and levies. It is worth noting that the increase was generally observed only in those components of electricity prices, which were shaped by the State. The growth was observed in network charges, which are subject to regulation and tax and non-tax surcharges. It must therefore be concluded that the State's influence on electricity prices was very large.

The main reason for the increase in the role of the State in shaping the amount of bills paid by end users was energy and climate policy and its three priorities of the Climate Package 3x20% in 2008. It refers mainly to its two components, namely the willingness to increase the use of renewable energy sources in energy production and energy efficiency and wider use of cogeneration units. Figure 4 shows how big a change was observed in the share of renewable energy sources in electricity production and electricity from cogeneration units in the analyzed period.

It is worth noting that the energy and climate policies conducted by the European Commission made the constantly increasing use of renewable energy sources and cogeneration units for power generation. This meant that there was the need for funding capital expenditure on these generation installations. Adding to this fact that the electricity produced from these energy sources is more expensive than from conventional sources, hence the cost of EU energy and climate policies were shifted onto the consumer. They were reflected through additional energy or carbon-related taxes, as well as through levies and charges on energy bills.

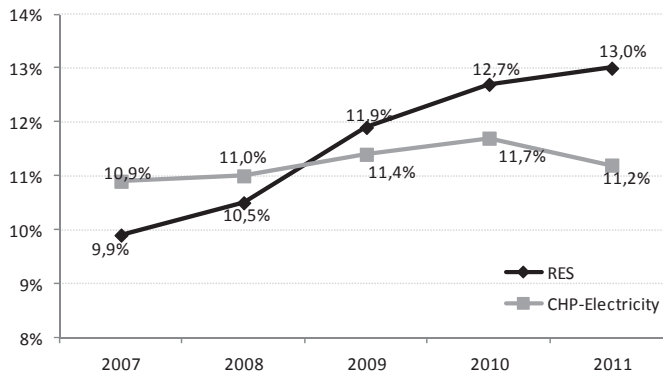


Figure 4. Renewable Energy Sources Share in Gross Final Energy Consumption and Combined Heat and Power (CHP) Share in Total Electricity Generation in 2007-2011 in EU-27.

Source: European Commission, EU energy in figures. Statistical Pocketbook 2012, 2012, Available at: [http://ec.europa.eu/energy/publications/doc/2012\\_energy\\_figures.pdf](http://ec.europa.eu/energy/publications/doc/2012_energy_figures.pdf) (referred on 17/05/2014), pp. 92, 102; European Commission, EU energy in figures. Statistical Pocketbook 2013, Luxembourg 2013, Available at: [http://ec.europa.eu/energy/publications/doc/2014\\_pocketbook.pdf](http://ec.europa.eu/energy/publications/doc/2014_pocketbook.pdf) (referred on 16/05/2014), pp. 95, 110.

In the EU Member States were used various tools (measures) supporting renewable energy and energy efficiency policies (production of electricity from cogeneration - CHP). Among them were legal instruments, consisting of the obligation to production or purchasing by trading companies relevant, specified as a percentage, the amount of electricity generated from these installations, and financial instruments. The most commonly used financial instruments to support renewable energy and energy efficiency policies were:

- public support for investments and reductions, exemptions and tax returns,
- systems of guaranteed prices, direct shaping of their level in the form of feed-in tariff system, premium options, a fixed strike price or long-term contracts,
- system of tradable certificates of origin for energy from renewable sources or produced in the cogeneration units and the obligation to redeem the certificates by electricity companies.

The last two support systems directly affect the electricity bills paid by the final consumers. In the case of guaranteed prices in the EU is mostly used feed-in tariff system. This instrument consists of gradual, long-term subsidies to electricity prices, produced in the supported plants, in order to equalize the price competitiveness of this electricity with conventional energy. As mentioned earlier, the cost of these subsidies are shifted as a whole to the end-user electricity prices. That system was used in Austria, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Lithuania, Luxembourg, Netherlands, Portugal, Slovakia, Slovenia, Spain and United Kingdom. The Eu Member State, which in the broadest degree benefited from this form of support is Germany, which in 2000 by the Acts<sup>1</sup> introduced the so-called. EEG surcharge for RES oraz co-called. KWKG surcharge for electricity produced in cogeneration units. However, while KWKG surcharge was more or less constant throughout whole period since it was

<sup>1</sup> EEG surcharge has been entered by the German Renewable Energy Act of 2000 (German: Erneuerbare-Energien-Gesetz). On 20th December 2012 has entered the latest EEG amendment. Whereas KWKG surcharge has entered into force by the CHP Act of 18th May 2000. In 2002 (on 1st April 2002. the Act has entered into force) has been replaced by the Act on the Retention, Modernisation and Extension of Combined Heat and Power Generation (CHP Act of 19th March 2002, amended on 07th August 2013).

introduced, the EEG surcharge steadily increased. EEG surcharge guaranteed investors above-market fees for renewable electricity for 20 years from the point of installation (in 2003 it was 0.41 eurocent/kWh (excl. VAT), 2.577 eurocents/kWh in 2013 and 6.24 eurocent/kWh for 2014).

The second support system commonly used in the EU were certificates and negotiable certificates of origin. They were used, among others, by Belgium, Italy, Netherlands, Poland, Romania, Sweden and United Kingdom (Surma 2010, in: Paska, Pawlak, Surma 2013). It consists in the fact that the electricity generated from renewable sources or cogeneration units is certified, and electricity companies are obliged to purchase and redempt of certificates of origin for this electricity. Thus, generation companies receive revenue from the sale of these negotiable certificates of origin for electricity.

Due to the fact that there are such support systems, the cost of their implementation were shifted onto final consumers in their electricity bills. For this reason, despite the fact that the State in some countries does not directly fix the electricity prices (does not regulate them), the State indirectly shaped the level of electricity bills paid by final customers.

Table 2 shows the structure of the electricity bills paid by final consumers in Germany (where is applied support system of feed-in tariff) and the UK (support system by negotiable certificates of origin for electricity).

Table 2

Breakdown of average the electricity bill (price) for household customers in Germany and United Kingdom in 2013

Country	Components	Structure
Germany	Energy and Supply	21.3%
	Net Network charge	19.8%
	Billing, metering, and metering operations	2.3%
	Supply (incl. margin)	7.5%
	Concession fee	5.7%
	Taxes (electricity tax and VAT)	23.0%
	Surcharge under EEG	18.0%
	Surcharge under KWKG	0.4%
	Surcharge under section 19 StromNEV	1.1%
Surcharge for offshore liability	0.9%	
United Kingdom	Wholesale energy cost (excl. carbon)	37.3%
	Network costs	23.1%
	Other supplier costs and margin	21.0%
	Costs of energy and climate change policies (ECO 3.8%, RO 5.2%, EU ECTS 1.4%, CPF 0.9%, Warm Home Discount 1.0%, FITs 1.2%, Smart Meters&Better Billing 0.2%)	13.9%
	VAT	4.7%

Source: (Bundesnetzagentur, Bundeskartellamt 2013, p. 53; DECC 2013, p. 78).

Analysis of the data in Table 2 indicates that in Germany and the UK, ie countries where the electricity prices are not regulated and are leaders in the liberalization of the electricity sector, the State largely shaped the level of electricity bills. It happened through taxes and charges imposed by the government due to run energy and climate policies. In 2013, taxes and levies in Germany accounted 43.4% share in total electricity price paid by households, while in the UK 18.6%.



## PRICING ON THE ELECTRICITY MARKET IN POLAND

Similarly, in Poland, total electricity prices were largely shaped by the State. This took place in the three components of the total electricity price for end-users: energy and supply and taxes and non-tax charges added to electricity bills. Network charges, just like in other EU countries, were subject to ex ante regulation by the sectoral regulator, namely the President of the Energy Regulatory Office (President of ERO). While in the first three years of regulation (1999-2001) cost of service method was applied, since 2002 it was applied a method of incentive regulation (currently used tariffs approved under the 4-year regulatory period in force since 2012).

In Poland, the subject of the impact of State was also Energy and supply, which the European Commission recommended to release and not regulate. Despite this, prices were subject of regulation. In Poland, from the obligation to submit tariffs for approval by the regulator were released only electricity prices for enterprises and, in the household segment, the energy acquired under TPA principle. In order to determine the degree to which the electricity price was determined by the policy of the State, it is worth making the decomposition of the cost of electricity consumed in Poland. Decomposition of the cost of electricity consumed (energy and supply) in sales in Poland indicated that its level was influenced by the following elements:

- price of purchased Energy,
- cost of property rights from renewable sources (green certificates),
- cost of property rights from cogeneration units (red certificates),
- cost of property rights from gas cogeneration units (yellow certificates)
- the cost of the property rights from generation of methane (purple certificates),
- balancing and transaction costs and margin
- Excise duty on electricity.

Apart from the fact that electricity prices were regulated in some segments of the electricity market in Poland, most of the components of unit electricity price in Poland has been shaped by the State (regardless of the existence of price regulation). It should be noted that five of the seven components of electricity prices are charges imposed by the State on electricity companies and ultimately shifted to final consumers. The State aiming to achieve the objectives from the climate package 3x20% and a willingness to increase the share of renewables in total energy consumption and the energy produced in cogeneration, it have introduced a number of obligations on energy companies, which increased the electricity price paid by households. These duties (except the need for paying excise duty and VAT) are:

- a duty to obtain and submit for cancellation by the President of the ERO certificates of origin for electricity produced from renewable energy sources (green certificates) or to pay a replacement fee. This obligation was determined as a percentage share of such energy in total executed annual electricity sales;
- a duty to obtain and submit for cancellation by the President of the ERO certificates of origin for electricity produced in cogeneration units (so-called yellow, red and purple certificates) or to pay a replacement fee. In this area were introduced obligations for energy produced in coal-fired cogeneration (CHP1), gas (CHP2) and from mine gas or biogas (CHP3).

It should be added that in the period considered, ie from the moment in which the electricity market was liberalized, burdens from the State, defined as the percentage shares in sales steadily increased. For renewable energy percentage share increased from 4.2% in 2007 to 10.4% in 2012 and 12% in 2013. However, for the energy produced in cogeneration those obligations increased accordingly: for CHP1 from 15.2% in 2007 to 23.2% in 2012, for CHP2 to 3.5% in 2012, and for CHP3 introduced the obligation of 0.6% in 2012 and 0.9% in 2013.

As a result of such the policy, about 23% of electricity prices (excluding VAT) offered by the sellers was determined by the tax or non-tax charges imposed by the State, of which 15.6% resulted from charges relating to the promotion of renewable energy and electricity generated in cogeneration (see Figure 5).

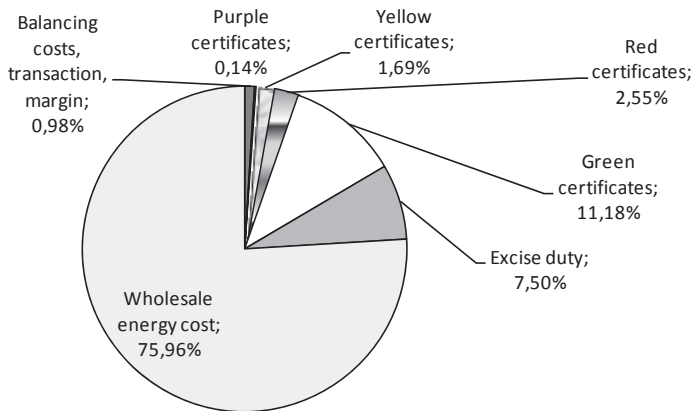


Figure 5. Average unit components of electricity prices in Poland in 2012

Source: *Analiza składników kosztów energii elektrycznej w 2012*. Available at: [http://energocel.pl/out/Analiza\\_kosztow\\_energii\\_2012r.pdf](http://energocel.pl/out/Analiza_kosztow_energii_2012r.pdf) (referred on 19/05/2014).

This means that despite the liberalization of electricity trade sub-sector in Poland (to enable final consumers to switch electricity supplier) and the exemption from regulation part of the electricity market (for companies), the State largely determined the electricity prices. Moreover, in the period 2007-2013 the State's influence on the electricity prices has increased.

## CONCLUSIONS

The analysis showed that in Poland, as in other EU countries, despite the liberalization measures conducted in the electricity market, the state's role in price formation not only did not decrease but even increased. Although since 2007, namely allowing all customers to purchase electricity from any seller, the amount of energy sold by trading companies to end users according to the rules of free competition (namely without the approval of tariffs by the regulator) increased, the role of the State (government) in shaping electricity prices has increased. In addition in the household segment prices were constantly the subject of regulation. The factor that caused an increase in importance of the State in shaping the electricity price over the period considered was conducted energy and climate policies related to the implementation of the package 3x20%. As a result, the production of energy from renewable sources and cogeneration grew steadily, and thereby the level of charges related to support these energy sources. Therefore, it should be noted that the nature of State influence on the electricity price has changed, and also the impact of the State in shaping the end user electricity price during the analyzed period has increased.

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