

**“Liquidity and Transparency of the Wholesale Electricity Market:  
The Duty to Trade on a Power Exchange”**

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**Abstract**

The paper discusses an energy regulation instrument that was introduced in the power sector in order to reduce inefficient in-group electricity trading that was a source of soaring electricity prices. The remedy was especially tailored to correct the market failure that occurred in the Polish power market as a result of both: (i) the termination of Long Term Contracts and (ii) the governmentally steered consolidation of the power sector that also involved vertical integration. Several behavioural and structural instruments are considered and the reasoning supporting selection of the most appropriate one is given. The outcomes of qualitative analysis confirm that the remedy applied, namely the introduction of the duty to trade on a power exchange (PX) into the Polish Energy Law, was a successful market reform. The research carried out in this paper contributes to scientific knowledge on regulatory and policy issues and the solutions adopted can be applied to other power markets facing similar problems as electricity markets are liberalised and the problem of liquidity and transparency of the wholesale power market is at stake. Although such a solution to problems mentioned above may not refer only to the European Union member states, it is worth notice that the duty to trade on the power exchange is currently discussed as a regulatory measure that may be used against dominant gas companies (within the concept of so called Energy Union). We strongly believe that our paper gives arguments that may be useful in a discussion on a wholesale energy markets both in the EU and non-EU countries.

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## Introduction

Building common electricity and gas markets is the long term goal of the EU liberalisation directives (2009/72, 2009/73).<sup>3,4</sup> The measures applied to achieve such goals are legal rules introducing institutions like unbundling, Third Party Access (TPA) and transparency requirements. Execution of those tools is entrusted to a network of public bodies, consisting of the EC Commission, Agency for the Cooperation of Energy Regulators (ACER) and National Regulatory Authorities (NRAs) acting in cooperation with antitrust and financial authorities as well as central governments. It is of particular interest that legal instruments in the sector specific regulation of the electricity market are quite often borrowed from antitrust theory and practice. On the other hand, antitrust authorities sometimes cross the boundaries of competition law enforcement, using remedies that actively create (or even regulate) the markets. Our paper analyses a very specific instrument, joining in its origin crosspieces of antitrust and sector specific regulation. The analysis of an instrument that we call duty to trade on the power exchange is a contribution to the wider discussion on antitrust mechanisms and regulatory remedies such as Virtual Power Plant (VPP) auctions or electricity (gas) release programmes. We argue that although specific, the duty to trade on a PX belongs to the same family of pro-market remedies, bringing more liquidity to the power market.

### 1. The power sector before electricity market re-design in 2009-2010

The consolidation of the Polish power sector<sup>5</sup> that was carried out in 2006–2008 as a consequence of the Government's Programme for the Power Sector (2006) led to the creation of four State owned energy groups. As expected consolidation of the power sector has led to a significant increase in the potential for market power in the power sector, and this is confirmed by a dramatic increase in the Concentration Ratios and the HHI.<sup>6</sup> In terms of ownership, they could be briefly described as both being state owned, and

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<sup>3</sup> Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC; OJ L 211, 14.8.2009.

<sup>4</sup> Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC; OJ L 211, 14.8.2009

<sup>5</sup> As the Polish power sector, which is the subject of the case discussed in this paper, has already been described in the international literature, we deliberately omit this part of the paper and give appropriate references, as follows: J Kamiński 'The impact of liberalisation of the electricity market on the hard coal mining sector in Poland' (2009) 37 (3) Energy Policy; J Kamiński, M Kudełko, 'The prospects for hard coal as a fuel for the Polish power sector' (2010) 38 (12) Energy Policy, 7939-7950; J Kamiński 'Market power in a coal-based power generation sector: the case of Poland' (2011) 36 (11) Energy Policy, 6634-6644

<sup>6</sup> See J Kamiński 'The development of market power in the Polish power generation sector: A 10-year perspective' (2012) 42 Energy Policy, 136-147

receiving an uneven part of generation assets. One of those consolidated companies, PGE S.A., was given a substantial share of the low cost generation sector based on brown coal combustion. On top of that, PGE SA came to own approx. 40% of total capacity as a result of the introduction of the Programme. That clearly could not be interpreted as a step towards increasing competition in the electricity market. The transfer of cheap brown coal-based power generation assets to a company with such a high market share gives this company a competitive advantage.

The consolidation of the Polish power sector coincided with the process of termination of long-term contracts. Their share in the electricity trade was very high at that time, and this market reform was aimed at increasing the share of competitively traded electricity. Without freeing electricity from LTAs, there was no space for competitive trade. The withdrawal of LTAs and the mechanisms for compensation for stranded costs were initially perceived as successful.

Unfortunately, the introduction of those two crosscurrent reforms (consolidation and termination of LTAs) has quickly led to the malfunctioning of the power market. What happened was that power generation companies operating within vertically integrated energy groups started trading most of their electricity with electricity trading companies that were in the same capital groups. Although that should not be a problem *per se*, the real problem was that the prices in those contracts were significantly different from the prices in a competitive market.<sup>7,8</sup> This adverse effect of the termination of the LTAs has prompted the search for a policy tool that would help to correct this clearly identified market failure. It was even more urgent as a sharp increase in costs that would be incurred by industrial customers was expected due to the erroneous assumptions in the electricity price forecasts used in the development of the LTA termination programme. Another problem that occurred during the termination of LTAs was the definition of competitive market from the Law on the termination of the LTAs. The stakeholders of the programme of the termination of the LTAs had to answer the question whether insider trading was a part of a competitive

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<sup>7</sup> National Report of the President of the Energy Regulatory Office in Poland (2009)

<sup>8</sup> National Report of the President of the Energy Regulatory Office in Poland (2010)

market or not<sup>9</sup>. The idea to introduce completely new regulatory measure – a duty to trade on the power exchange born as an answer to that question.

Another piece of the regulatory puzzles was that when the reforms described above were introduced it was decided to remove the obligation to gain approval for the retail electricity tariffs for households from the President of the Energy Regulatory Office (PERO). This decision was however rescinded as the market was not ready (the main reason was lack of liquidity, transparency and non-effective competition) and electricity prices were expected to rise. Accordingly, complex market situation caused dramatic increase in electricity prices but only for non-retail consumers and energy-intensive industries were particularly affected. One of consequences of high electricity prices were e.g. the closure of an aluminium plant and protests by workers of other factories.

## **2. Lack of liquidity of the wholesale electricity market and prices**

The power exchange is a type of commodity exchanges, and is regulated in Poland in a separate legislation regime. Despite the existence of several wholesale energy trading platforms, the only one that was used by market participants was POLPX (Polish Power Exchange, in Polish: *Towarowa Gielda Energii S.A.*) in Warsaw. Initially it was a power exchange founded by market participants. Later, as a result of acquisition, it became an exchange owned by the Warsaw Stock Exchange.

An insignificant share of trading in the power exchange was not accidental, as it was not an attractive marketplace for generators and wholesale traders, neither before the consolidation, nor after. As previously indicated, the consolidated energy companies very quickly came to the conclusion that trade within groups is the easiest way to increase profits. Higher electricity prices in in-group trading led directly to higher prices in the tariffs for final consumers, hence leading to extraordinary profits. It is therefore a classic example of market failure and negative externalities caused by the lack of implementation of the relevant regulatory solutions following the termination of LTAs and the consolidation of the energy sector. The problem was

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<sup>9</sup> The answer to that question was important because the Law on the termination of the LTAs stipulated e.g. that if in a given year, the average price per MWh of electricity in a competitive market, announced by the President of the ERO is higher than the cost of producing one MWh by the LTA power plant, shall not be paid to cover the certain amounts. In such a case, LTA manufacturer, who received an advance shall be obliged to return them, see: art.46(5) of the Act of 29 June 2007 on coverage of generator's costs resulting from the early termination of Long-Term Power and Electricity Contracts (hereinafter Law on the termination of LTAs), Journal of Laws of 2007, No. 130, item 905, as amended.

serious, which could be confirmed by the fact that in 2009 and 2010 the share of in-group trade was around 70-80%, both in the case of hard and brown coal-based power producers. The only exception was PGE, which, due to its large excess production capacity, had to sell energy outside the group.

In 2009, under bilateral agreements, generators sold over 90% of electricity to trading companies. Other markets were the balancing market (run by the TSO – Polish Power Grid Company) and, to a very small extent, the power exchange (Fig. 1).

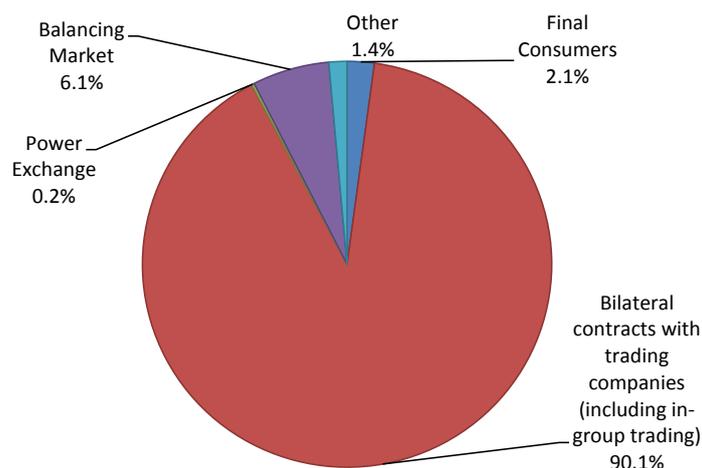


Fig. 1. Destinations of electricity sold by the power generation sector in 2009 [%]

Source: ERO 2013

As previously mentioned, the way electricity was traded directly translated to the level of the wholesale price of electricity. In the case of electricity produced by hard coal generators the average price of electricity increased from approximately 42.4 EUR/MWh in 2007 to 54.9 EUR/MWh in 2009 (i.e. by 30%), and then declined slightly to 52.2 EUR/MWh in 2010. Similarly, the prices of electricity generated in brown coal-based power plants (operated by PGE SA and ZE PAK SA) increased from around 39.2 EUR/MWh in 2007 to 49.7 EUR/MWh in 2009 (i.e. 27%) (Fig. 2). In both cases, the prices in the wholesale market increased by about 30% within two years, which was a phenomenon that had not been observed in the Polish energy sector.

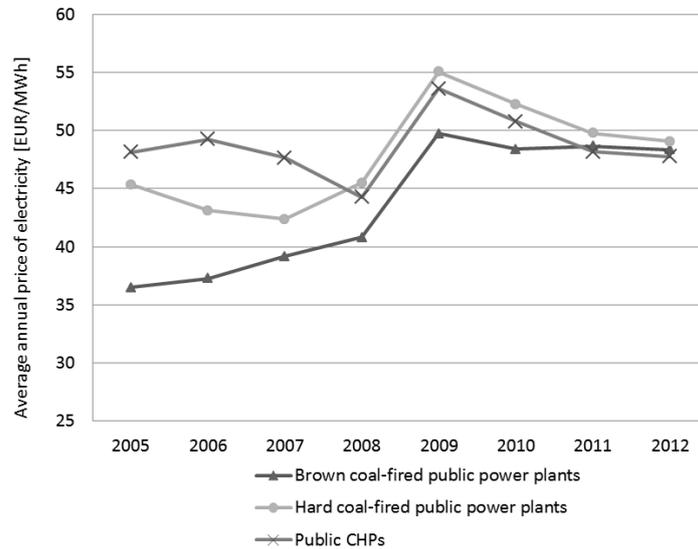


Fig. 2. Annual average price of electricity [€2012/MWh]  
 Source: own calculations based on Energy Statistics

As power producers took advantage of their position and increased the prices of electricity above the levels of normal profits, and since the wholesale electricity market was already deregulated it was almost impossible to take action to quickly improve the situation. Although such a situation required a solution at the national level, the government was not willing to introduce an instrument that would increase the transparency of electricity trade and lead to price reductions, and it was the President of the Energy Regulatory Office who replied to the requests of the energy intensive sector on this issue. The problem he faced was the lack of appropriate legal measures to introduce necessary systemic changes or to moderate the market behaviour of market players, so the only way was to introduce the changes needed into the Energy law.

The remainder of the paper is structured as follows. Section 2 discusses the methods that were applied to correct market failures in the Polish power sector outlined in section 1. Relevant policy tools that could be considered in the process of improving competition in the power sector were compared and analysed, and the most appropriate one is chosen. The regulatory and legislative aspects of PX duty to trade are analysed as well. Section 3 discusses the results – the consequences and outcomes of the introduction of the remedy into Polish Energy Law. The conclusions and key policy findings are summarised in section 4.

### 3. Material and methods

#### 3.1. Virtual power plants

Although the focus in our paper is put on the duty to trade on a PX, we have to note that regulatory systems recognize regulatory measures that are *prima facie* similar to the one that we analyse. A measure that is specifically designed to promote competition in the electricity market and has been relatively often applied to it is the Virtual Power Plant (VPP) auction, described as: *sales of electricity capacity which, rather than “physical” divestitures, are “virtual” divestitures by one or more dominant firms in a market. Instead of selling the physical power plant, the firm retains management and control of the plant, but offers contracts that are intended to replicate the output of the plant. Typically, these contracts are sold as divisible goods of varying durations, offered in periodic open and transparent auctions.*<sup>10</sup> This type of auction was applied for example in the EDF case as a behavioural measure to be used while assessing EDF’s intention of purchase 1/3 of the shares of the German utility EnBW, and to do that EDF agreed to make 6 000 MW of virtual capacity available in France in order to increase competition in the market. EDF was at the time selling to around 90% of the so-called free consumers in the French market (Schultz 2005).<sup>11</sup>

What makes VPP close to our case are the essential characteristics taken into account by the regulators when adopting decisions on VPP, which are:

- facilitating entry into the electricity market by assuring the availability of electricity supplies on the high-power grid to new entrants;
- promoting the development of and adding liquidity to the wholesale electricity market; and
- reducing market power in the spot electricity market.<sup>12</sup>

Similar essential characteristics were considered before the introduction of the duty to trade on a PX that we analyse in this article.

Examples of the solutions mentioned above (namely gas release and the VPP auctions) are mainly applied by the competition authorities as remedies in the course of proceedings against dominant companies

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<sup>10</sup> LM Ausubel, P Cramton, ‘Virtual power plant auctions’ (2010) 18 Utilities Policy, 201-208

<sup>11</sup> C Schultz, *Virtual Capacity and Competition* (2005) CESifo Working Paper No. 1487

<sup>12</sup> LM Ausubel, P Cramton, *ibid.*

and during assessment of mergers and acquisitions. The use of such remedies in the framework of sector specific regulation is authorized by both market directives (2009/72, 2009/73), which, among other powers of NRAs, lay down *the power to carry out investigations into the functioning of the electricity markets, and to decide upon and impose any necessary and proportionate measures to promote effective competition and ensure the proper functioning of the market*. This regulation provides the basis for establishing the powers of NRAs in national law, which might raise some concerns in terms of their relations with competition law. The EU law here refers to *effective competition and proper functioning of the market*, which are naturally associated with a competition law regime. Literature and specialists claim in general that the implementation of those regulations may assume the form of specific national provisions on virtual power plants or gas release programmes that apply to concentrated markets with historically incumbent undertakings that preserve their rights resulting from long term import contracts.<sup>13</sup> In the case of VPP this is indirectly confirmed by the recital 37 of preamble to directive 2009/72, which stipulates that: *The establishment of virtual power plants — electricity release programmes whereby electricity undertakings are obliged to sell or to make available a certain volume of electricity or to grant access to part of their generation capacity to interested suppliers for a certain period of time — is one of the possible measures that can be used to promote effective competition and ensure the proper functioning of the market*. It should be underlined that in this provision EU law equates VPP to electricity release programmes which are based on imposing on the incumbent dominant company an electricity sale obligation in favour of competitors to render it possible for them to enter the market.<sup>14</sup> Implementing the possibilities offered by art. 37(4)(b) of Directive 2009/72/EC and art. 41(4)(b) of Directive 2009/73/EC are not only limited to VPP and gas release programmes but may also be related to specific programmes concerning particular subsectors, like e.g. storage or transmission.<sup>15</sup> In our opinion, those provisions, however, do not restrict national legislators to regulating only such programmes as are mentioned above. One should consider that Member States (taking into account specific national market conditions) may on the grounds of those provisions also regulate for other instruments that

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<sup>13</sup> E Cabau, 'National Regulatory Authorities' in C Jones, *EU Energy Law. The Internal Energy Market – the Third Liberalisation Package* (2010) 244.

<sup>14</sup> C Chaton, F Gasmi, ML Guillerminet, JD Oviedo, 'Gas release and transport capacity investment as instruments to foster competition in gas markets' (2010) IDEI Working Papers 647.

<sup>15</sup> Commission staff working paper interpretative note on Directive 2009/72/EC concerning common rules for the internal market in electricity and Directive 2009/73/EC concerning common rules for the internal market in natural gas, Regulatory Authorities, Brussels, 22 January 2010.

are designed to promote *effective competition and ensure the proper functioning of the market*, while taking into account the proportionality and adequacy rules.

### **3.2.The duty to trade on a PX in the Energy Law**

In section 1 we argued, that in 2008 - 2010 there were grounds for state intervention concerning the malfunctioning of the electricity market. Although the process of adjusting the market should have been commenced either by Parliament or the Government, it was the President of the Energy Regulatory Office who was most interested and active in intensifying competition in the electricity sector. The 2010 amendment to the Energy law, which included provisions concerning the PX duty to trade, was a difficult process, mostly due to the resistance of the power sector and the reluctant position of the Minister of the Economy.

One of basic arguments against the introduction of PX duty to trade was a concern about the monopolizing of the wholesale trade exclusively by one power exchange. Those arguments were raised both by politicians and smaller trading platforms that were afraid of the largest entity, POLPX, dominating the trade. It was not understandable on what grounds this reasoning was based as the functioning of a single PX is a natural state for several power markets due to:

- the specificity of exchange fares, that favour larger markets;
- a higher level of liquidity, which is the value of an exchange to a participant.<sup>16</sup>

In consequence of this, in most European countries there exists only one power exchange. Concerns were also raised with regard to the restriction of investment in the generation sector, which argued that only OTC contracts may be credible collateral for bank credits.

It was even more difficult to get this accepted since it was not stipulated in European law, which states no duties on Member States in that respect regarding implementation.<sup>17</sup> Polish energy law closely follows the EU Energy directives and arguments for means of implementation could make a legislative proposal easier to accept by policymakers. A certain analogy may be detected in the *measures that can be*

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<sup>16</sup> *Regulation of Power Exchanges, A Report Prepared for DTe by Frontier Economics (2005).*

<sup>17</sup> Z Muras, F Elżanowski, 'Komentarz do art. 49a', in: M Swora and Z Muras (eds), *Prawo energetyczne - komentarz* (2010) 128 - 1282

*used to promote effective competition and ensure the proper functioning of the market*, which may be adopted by the Member States, according to recital 37 of the preamble to Directive 2009/72/EC. This provision refers rather (as we argued above) to VPP and the gas release programmes as individual measures, while the duty to trade on a PX concerns the whole energy market, and may be described as an example of a measure supporting liquidity which reinforces the position of the power exchange (Meeus 2010). Thus, the solution adopted was not based on the explicit norms of the EU directives, rather it was a specific instrument in support of the market liberalisation process, introduced by national law as a reaction to market failure on the Polish energy market.<sup>18</sup>

Regarding the introduction of duty to trade on a PX, in 2009 - 2010, one could also consider using the tools provided in competition law. The problem was that the Polish competition authority (President of the Office of Competition and Consumer Protection, hereinafter: POCCP), did not have a proper cause for action (like a merger case or other case with a view to issuing a commitment decision) and what is even more significant - specific knowledge on how the electricity market functions. On the other hand, having such specific knowledge, the PERO was not equipped with powers that could have effectively improved the situation on the market. As a consequence, a remedy such as VPP auctions could not have been applied. In such a case, the only thing to do was to refer the matter to government to try to persuade it of the necessity to initialise the legislative procedure (Fig. 3).

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<sup>18</sup> M Swora, 'Krajowe organy regulacyjne w trzecim pakiecie liberalizacyjnym' in: M Rudnicki and K Sobieraj (eds), *Nowe prawo energetyczne* (2013) lub ew. M Swora, 'Działalność przedsiębiorstw energetycznych (wybrane obowiązki)' in: J Grabowski, L Kieres and A Walaszek-Pyziół, *System prawa gospodarczego. Publiczne prawo gospodarcze* (2013).

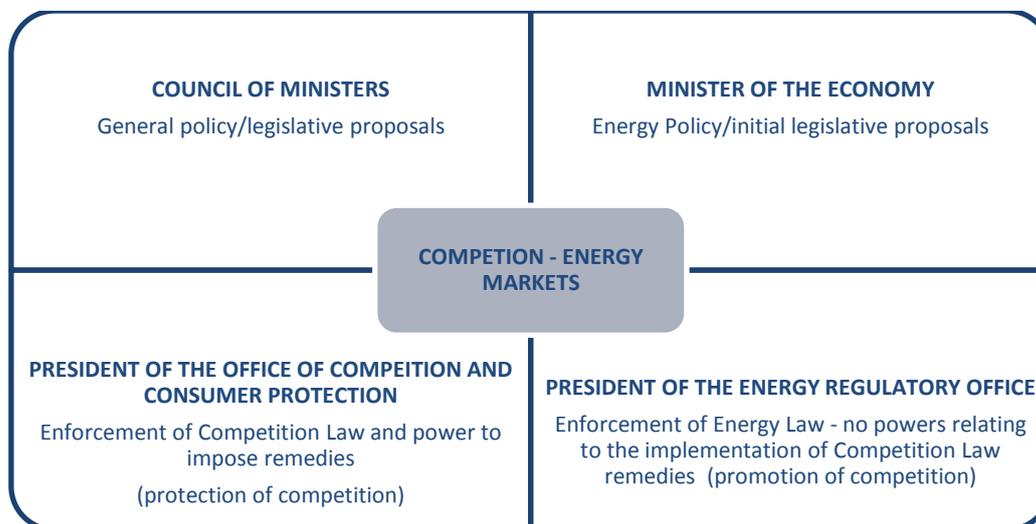


Fig. 3. Division of powers and competition in energy markets

In 2009-2010 there were good grounds for proposing changes that could have improved the malfunctioning electricity market, as prices were high and industrial energy users argued that such a situation may cause bankruptcies (esp. in energy intensive industries). A good occasion to introduce such a change was during the process of amending the Energy Law which commenced in 2009. Eventually, the duty to trade on a PX was regulated in the Act of 8 January 2010 amending the Energy Law of 2007.

The duty to trade on a PX stipulated in art. 49a of the Energy Law is of a general character. It applies to every participant operating in the generation sector, which is obliged to sell at least 15% of the electricity generated in a particular year through the power exchange. However, a specific obligation is imposed on generators covered by the programme for the terminating of long term contracts (hereinafter: ex-LTA generators) who have to offer the whole volume of electricity produced in a given year in power exchanges. This aggravated rigour was the consequence of the necessity of obtaining the correct state aid clearance that was granted in favour of those generators who voluntarily terminated their long term contracts. It may be questioned however whether the obligation was correctly targeted, taking into account the abovementioned specificity of the Polish power generation market which was dominated by one energy holding (PGE SA). The obligation was imposed on all market participants, regardless of their market share. An example of a more targeted measure is the provision of art. 111 of the Hungarian Electricity Act 2007, according to which the obligation to sell in the power exchange market may be imposed on market players having significant market power in the wholesale market. The energy regulator conducts an assessment of significant market

power (equivalent to a dominant position) in the relevant markets. Hungarian electricity law also includes another interesting instrument, which applies to all generators above 20 MW and traders with available free capacity and obliges them to sell their free capacities scheduled for the next year under an open and transparent procedure. This obligation may be carried out by selling capacities through power exchange markets. Comparing Hungarian and Polish provisions on duty to trade on a PX (exchange trade obligation), one may isolate two models of such measure:

- 1) a general obligation – imposed on all entities in the generation sector,
- 2) targeted obligations – imposed on certain parts of the generation sector (e.g. ex-LTA generators) or a dominant firm.

Regarding the implementation of both models, where entities are defined in general terms in statutes, there is no need for an additional decision of the NRA, which is only supervising the execution of the duty and may impose sanctions. In the case of targeted obligations imposed on a dominant company it is first of all crucial to define the relevant market which the regulator feels should be the subject of an individual decision. This means that in a typical situation the procedure is of considerable length, although there is the unquestionable advantage of the more tailored remedy of a targeted obligation measure.

Referring back to the scope of the obligation, it should be assumed that the choice of covering a wide spectrum of market participants and not only the dominant undertaking was due to the economies foreseen in implementing the law and the conservative approach of (at least some) policymakers. The Polish Energy Law does not envisage individual *powers of the regulator to decide upon and impose any necessary and proportionate measures to promote effective competition and ensure the proper functioning of the market*.<sup>19</sup> One of the reasons for this omission is the rather strict approach to the division of powers between the systems of energy regulation and protection of competition. The Polish antitrust authority is traditionally very reluctant to share its competences with the energy market regulator. This approach was very clearly presented during the discussions on the amendment to the Energy Law 2007 and the new energy and gas laws (drafts from 2012) that were supposed to implement the provisions of Directives 2009/72/EC and

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<sup>19</sup> Article 37(4)b of Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC; OJ L 211, 14.8.2009

2009/73/EC. Finally, the amendment did not contain regulations on powers which would enable the NRA to impose individual measures aimed at ensuring the proper functioning of the gas market.<sup>20</sup> In consequence, the Polish energy market regulator – unlike the telecommunications market regulator – has no powers to carry out assessments of significant market power and impose regulatory duties on companies holding such power.<sup>21</sup>

The duty to trade on a PX through the power exchange is not absolute as there are certain exceptions, either directly stated in the Energy Law (*ex lege*) or determined by the NRA through its decisions. Those exceptions are mostly justified on technical and economic grounds and are the consequence of the specific features of generating sources. Moreover, taking into account concerns about investment stability, the Polish legislator also excluded energy sold on the basis of contracts that are collaterals to obligations resulting from contracts concluded with financial institutions. An important condition is that the exception granted by the NRA's decision may only apply if it will not result in a serious disruption of competition on the energy or balancing markets. There were only few individual exceptions

The generators submit reports regarding trade on the PX, based on art. 49a(9) of the Energy Law as PERO supervises the execution of the exchange obligation. A financial penalty may be imposed by PERO on a generator in case of failure to fulfil the obligation.

It may *prima facie* raise constitutional concerns that imposing a specific way of energy trading on energy companies can constitute a violation of their freedom to carry on economic activity. In our opinion, competition in the electricity market is the value that overbalances in our case these concerns in so far as the duties imposed proportionally address market imperfections and bring liquidity and transparency. As the economic analysis proves, the successful introduction of such market reforms results in increasing competition, hence reduces dead weight loss, and improves the social surplus.<sup>22</sup>

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<sup>20</sup> M Swora, 'Działalność przedsiębiorstw energetycznych (wybrane obowiązki)' in: J Grabowski, L Kieres and A Walaszek-Pyziół, *System prawa gospodarczego. Publiczne prawo gospodarcze* (2013) lub ew. M Swora, 'Krajowe organy regulacyjne w trzecim pakiecie liberalizacyjnym' in: M Rudnicki and K Sobieraj (eds), *Nowe prawo energetyczne* (2013)

<sup>21</sup> M Wach 'Polish Telecom Regulator's Decisions Regarding Mobile Termination Rates and the Standpoint of the EC' (2011) 4 (5) *Yearbook of Antitrust and Regulatory Studies*

<sup>22</sup> please see J Kamiński 'Market power in a coal-based power generation sector: the case of Poland' (2011) 36 (11) *Energy Policy*, 6634-6644 as an example

#### 4. Results and discussion

The introduction of the duty to trade on a PX caused a huge drop in in-group electricity trade, to approx. 25% in 2011 and 2012 in the case of hard coal-based power producers and plummeted to almost zero in the case of brown coal-fired power generators (Fig. 2). Consequently the power exchange had already become a key power trading platform in 2011. While in 2009 the sale of electricity through the power exchange was practically negligible regardless of whether it related to hard- or brown coal-based power production, in 2010 it amounted to 4.2% and it reached 58.7% in 2011. Bilateral contracts accounted for less than 40% of all forms of wholesale trade, whereas in the year before this the share amounted to 89.8%. The remaining sales were mostly carried out through the balancing market and power was only sold to foreign buyers to a limited extent.<sup>23</sup> In 2012, the number of commercial transactions carried out through the power exchange increased to 61.8% of the volume of electricity sold by generators.<sup>24</sup> The changes in the crucial years 2010-2011 are depicted in Fig. 4.

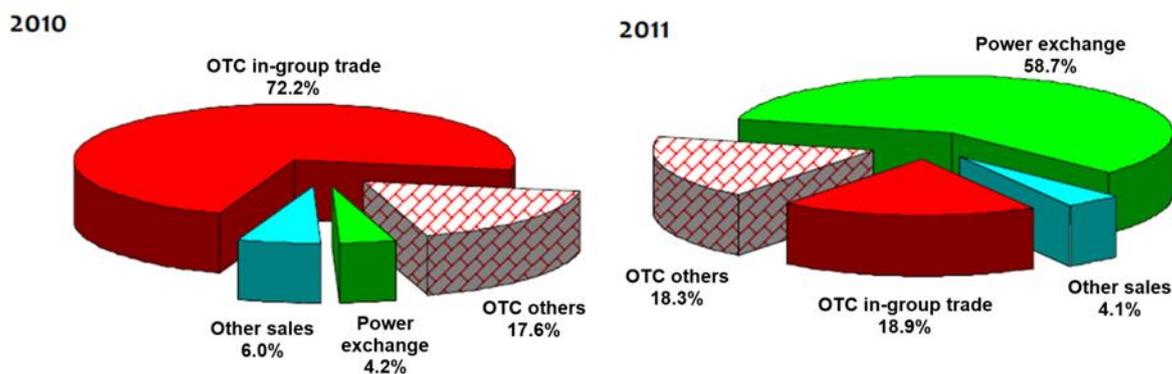


Fig. 4. Shares of electricity markets  
- consequences of the introduction of the PX duty to trade (2010-2011)

Source: ERO

As far as prices are concerned, there is a substantial price convergence observed after the introduction of the obligation. While in 2010 the difference between hard and brown coal-fired generation prices was approx. 3.87 EUR/MWh, in 2011 it was 1.11 EUR/MWh, and in 2012 it was only 0.72 EUR/MWh. That observation is typical of a situation where there is a high share of trade via a power

<sup>23</sup> National Report of the President of the Energy Regulatory Office in Poland (2012)

<sup>24</sup> National Report of the President of the Energy Regulatory Office in Poland (2013)

exchange, as there is only one clearing price regardless of technology or fuel. Therefore, there is no technological differentiation which theoretically could be taken into account in bilateral contracts. That outcome is of crucial importance because now the more expensive hard coal-based power plants are forced to increase their economic efficiency (cut costs) in order to be competitive in the electricity market.

There is another fact supporting this observation, resulting from a comparison of hard coal-fired generation prices and costs. While the LRMC of those power plants increased by 8.4% in 2012 (in comparison with 2011), the price of electricity dropped only by 1.4%. Moreover, the analysis of the Lerner Index based on LRMC shows that in the case of hard coal power plants, after the introduction of duty to trade on a PX, the value of the Lerner Index dropped from 0.1 in 2010, to 0.05 in 2011, and -0.04 in 2012. The negative value of the Lerner Index means those power plants generate losses on electricity production. Another consequence is that brown coal power generation takes advantage of lower costs, hence their LRMC-based Lerner Index maintains a level of 0.3, which is very high. This situation could change if CO<sub>2</sub> permits become more expensive, as brown coal-fired power generation emits more CO<sub>2</sub> per MWh, therefore they would be exposed to a higher cost burden resulting from the ETS.

An analysis of the SRMC-based Lerner Index further confirms the previous findings. The introduction of the duty to trade on a PX intensified the decline in its values in 2012 in the case of hard coal-based power generation (to approx. 0.22), with CHPs producing a similar outcome. It is worth noting that brown coal-fired power generators managed to keep the price-cost margin at the level of 0.54, which is a huge value, in particular when compared to other technologies.

Results presented in these section of our paper all confirm that this way of trading electricity has been accepted by the participants in the wholesale market. This fact is also confirmed by the official position of the Association of Energy Trading (*Towarzystwo Obrotu Energią* – TOE), a voluntary, self-governing and apolitical non-profit organisation established in 2003. This association, although initially reluctant to support the duty to trade on a PX, assessed the introduction in 2012 in the following way: *while TOE is somewhat concerned about the administrative obligation imposed on generators to sell electricity through a prescribed trading platform, the experience so far is positive, with greater liquidity in the market, more*

*credible price indexes and the Electricity Commodity Exchange becoming increasingly user-friendly.*<sup>25</sup> Also the current President of the ERO concluded that: *the obligation to electricity generators to sell generated electricity through the power exchange, which came into effect on 9 August 2010 under Article 49a of the Energy Law, brought about the expected effects* (ERO 2012). The effects that were achieved owing to the introduction of the duty to trade on a PX can be summarised as follows:

- ensuring equal access by market participants to electricity traded in Poland by ensuring equal conditions of participation in power exchange trading,
- ensuring transparency of electricity trading by guaranteeing equal access to information inter alia on electricity prices and conditions for participation in electricity trading,
- ensuring accurate prices of electricity by directing a large part of the wholesale electricity trading into an organized market which is the Commodity Exchange, while maintaining supervision by the Financial Supervision Commission. This supervision is supposed to eliminate the possibility of manipulation of electricity prices - especially in a market such as one in which there are companies with a strong market position.
- simplifying the energy trade process from the perspective of consumers, hence increasing their position and strength in the electricity market,
- ensuring the safety of the settlement of financial transactions by a licensed Warsaw Commodity Clearing House (ERO 2012).

Even if we assume that PERO as the author of the idea of the duty to trade on a PX could not present a view other than positive, the economic facts and general approval of market players, lead us to a positive assessment of this specific regulatory measure.

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<sup>25</sup> TOE Report, *Electricity Market in Poland: Status on 31 March, 2012* (2012)

## Conclusions and policy implications

The duty to trade on a PX belongs to a family of regulatory measures that may be applied to improve liquidity and transparency in the wholesale electricity and/or gas markets. Implementation of duty to trade on a PX was an appropriate response to serious problems that were affecting the Polish electricity market in 2008 – 2009, namely the (i) lack of transparency of the power trade, (ii) negative effects of vertical integration, (iii) horizontal consolidation, (iv) termination of the LTAs, (v) deregulation of prices for industrial customers and (vi) lack of credible price indexes. Those issues, in addition to increasing coal prices, have caused the dynamic increase in energy prices. The mechanism that was sought was supposed to put such a difficult market situation in order. One of the solutions debated was to introduce administrative measures and strengthen price control, but finally it was decided to accept arrangements that were supposed to improve competition: the introduction of duty to trade on a PX. Adoption of this pro-market measure during the financial crises, when proposals to reregulate the market are more likely to be on the top of the politicians' wish list, was not an obvious choice; but it worked. The ultimate effect of the legislative changes was a greater liquidity and transparency in the market and a reliable price index. Duty to trade on a PX, classified as an example of liquidity supporting measures, though initially being questioned and opposed by the market participants, was finally accepted, which may be confirmed by the volumes traded on the PX.

Energy covered by the duty to trade on a PX (at least 15% generated by all producers and 100% generated by producers who used to be bound by an LTA) translates into 74.8 TWh, which is approximately 51% of the gross electricity generated by those companies. According to 2012 data, generators sold 81.5 TWh (out of a total electricity production in Poland of 150 TWh) through the power exchange. Taking into account the exceptions it is quite clear that the energy generators internalised the obligation to sell energy through the power exchange which became not just an unwanted administrative burden but also an accepted market mechanism. As far as the economic results are concerned, improved competition in the electricity market forced hard coal-based power generators to reduce prices, which translated to a significant drop in the value of the Lerner Index. For those power generators the LRMC-based Lerner Index plummeted to -0.04, and the SRMC-based one to 0.22. Such low price-cost margins have never been observed in the Polish

power market. Additionally there has been a substantial convergence of prices, and the differences between hard and brown coal-fired generation prices are only of the order of 0.7 EUR/MWh.

On the other hand, it has to be pointed out that duty to trade on a PX did not change the competitive situation on the supply side of the market, as it did not bring in new entrants. It also did not diminish the market power of the dominant player which results from cost differences between hard and brown coal-fired power generation. Individually applied VPP auctions would surely be more effective in this respect. However, it worked on the demand side, creating a more liquid and transparent wholesale market and new opportunities for traders. Regulation of the possibility to apply for an exemption when there is a need to guarantee a bank loan was protected against objections regarding the anti-investment character of that measure (such objections were presented e.g. by critics of the gas release programme in *Distrigas*). Last but not least, a competitive wholesale market has been created, enabling proper settlement of compensation of terminated LTAs. And although there are other upcoming issues that the Polish electricity market will have to face, the regulatory measure discussed in this paper may serve as an example of a remedy that could be introduced in other regulatory regimes facing similar problems.