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*Marcin Zawada**

THE POWER EXCHANGE IN POLAND AGAINST THE BACKGROUND OF ITS EUROPEAN COUNTERPARTS

1. Introduction

It is a rule for many walks of economic activities that disequilibrium between demand and supply is balanced by means of inventory. In the case of the electricity market, the market can be called a **real time market** as electricity must be provided the moment there is a demand for it. This is because the capacity to store it up is very limited. This stems from the specificity of the electricity market that is determined by features typical of physical phenomena, to which also passage of current belongs[1]:

– in electric power system – being a gigantic electric circuit composed of sources (power plant) and energy receivers (industry, municipal receivers) – production and consumption of electric energy are inseparably connected with each other in time, which means that at every moment supply must meet demand,

– demand for electric energy changes in time (within twenty-four hours, across days of the week, along with seasons of the year) and depends on various predictable and unpredictable factors,

– the specificity of the electric energy industry makes it impossible to point out the power plant, from which a given final receiver gets energy,

– from practical point of view, electric energy cannot be stored up. Shortages in electric power system have to be immediately balanced by increasing the output of power plants.

In the light of the above-mentioned facts one has to agree that the electric energy market must not be defined by means of common scientific definitions. However, one can state that the market is "a set of those buying and selling

* PhD., Chair of Econometrics and Statistics, Technical University of Częstochowa.

[1] *Polski rynek energii elektrycznej*, proceedings elaborated by CIRE, www.cire.pl (07.2002).

electric energy, and possessing proper appliances (either to produce or to receive) connected to a common net, a set of decisions taken by such agents on questions related to electric energy turnover and system or net services on the grounds of contracts" (Kalinowski, Wilczyński 1998, p. 245).

One must not speak about just one electric energy market. There are a lot of such markets diversified with respect to area, volume, economic agents, and technical parameters of means of transport[2]. For a dozen of years or so those markets have been undergoing a process of changes aimed at liberalization and increased competition.

The essence of the competition on the electric energy market is to create an institutional surface, on which sellers could offer their products and conclude transactions. In general, there are two distinctive mechanisms of implementing this idea but they might be extended also to include an exchange market (see Tab. 1; Malko 1999, p. 19).

The basic prerequisite to take effective risk while dealing with the electric energy trade is a decentralized, stochastic distribution of load. The crucial elements of such an approach are complex functions of supply as well as the stochastic nature of the problem itself. These features contribute to the fact that the uncertainty lends itself more naturally to being grasped by means of games among the numerous market participants than to a superior coordinator. This is where the idea and emergence of electric power exchange came from.

Table 1. Three mechanisms of a competitive market

Mechanism	Number of buyers	Does the buyer know the seller?	Do all the buyers pay the same price?
Pool market	one	yes	As a rule
Bilateral contracts	many	yes	no
Electric energy exchange	many	no	yes

Source: J. Malko, 1999, p. 19.

2. Contracts on the wholesale market of electric energy

Trade with electric energy on the wholesale market takes place in three basic segments (Buczkowski 2001):

– Contracts, in which trade with electric energy takes the form of bilateral contracts made directly between interested parties.

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[2] One can speak about e.g. international, system, local, wholesale or retail markets.

– Exchange, in which trade with energy takes the form of contracts made via power exchange.

– Balancing, in which the Operator of Passage System balances the differences between the transactions concluded both in the form of contracts and on the power exchange, and the actual demand for electric energy.

Bilateral contracts constitute the main form of trade on the electric energy market. In the first stage such contracts are made between producers and distributors. At further stages of development of the market one can observe contracts made not only between producers and distributors but also between some other financial institutions such as banks or insurance companies (Mielczarski 2000, p. 116).

Prices and volumes for each traded period are fixed in the contracts. Traditionally, the bilateral contracts used to be signed for long periods with prices and volumes fixed for each contracted month. However, the electric energy market is by its nature a momentary, even hourly market calling for fixing prices and volumes every hour on every day. If for a contract to be handed to the operator of the industrial system, then the so-called charting of the contract must follow i.e. assigning price and volume to each hour.

Trade on the balancing market is always forced by the changing situation in the electric power system. Producers of energy are unable to foresee accurately the output of their plants, whereas distributors cannot predict precisely their retail buyers' demand. The natural deviations appearing between the amount of contracted energy and the actually consumed amount is reckoned by the balancing market. This market can also be a segment, in which all parties consciously lead their own market games.

On the power exchange there might be several types of contracts existent. These are first of all:

– transactions for the Day Ahead,

– standard contracts,

– futures.

Transactions for the Day Ahead are concluded for each hour of a given day, on the day preceding the transaction. Standard contracts of fixed volume and duration are made for a year, quarter, month or a week. They are financial instruments rendering it possible to get insured from risks of the market. Futures enable sellers to vend a certain amount of electric energy in the future at a prefixed price. The price is arranged on the day of contract, whereas the load follows later, at a time defined by the contract. Futures are used by exchanges in certain amounts of energy (of 500 or 736 MWh).

3. The power exchange in Poland and transactions that are concluded there

The establishment of the Power exchange Corporation was initiated by the Minister of Treasure in July 1999 through inviting tenders for a consortium to set up and start a power exchange in Poland. The winner of the tender, arbitrated at the turn of September 1999, proved a consortium supervised by ELEKTRIM co.

The founder' act of the Power exchange Corporation was signed by its stockholders on November 29, 1999. The very first transactions were concluded on June 30, 2000. At the end of March, 2003 there were 38 parties to the Exchange dealing with production (power plants) and trading with electric energy (distributing stations)[3].

The activities of the corporation are: running the exchange of energy and natural gas as well as servicing property laws whose value depends directly or indirectly on the value of electric energy.

There are the following markets present on the Energy Commodity Exchange (TGE) in Poland:

The Day Ahead Market (RDN) was the market established on the exchange in the very beginning. The market functions one day before the physical load of energy occurs. The market consists of 24 independent and separate markets, where agents can freely buy or sell energy in line with their needs. Members of the Power exchange can make bids for single units (of production or load) or for a whole transaction portfolio (regarding whole power plants or groups of receivers). The exchange clearing transaction price is a price that makes demand and supply curves intersect (Fig. 1).

The principles of the acceptance of bids are as follows:

– All selling offers priced below the price fixed for a given hour are fully accepted;

– All buying offers priced above the price fixed for a given hour are fully accepted;

– All offers priced at the price fixed for a given hour can be fully or partly accepted (the reduction ratio is the same for all offers).

[3] www.polpx.pl (04.2003).

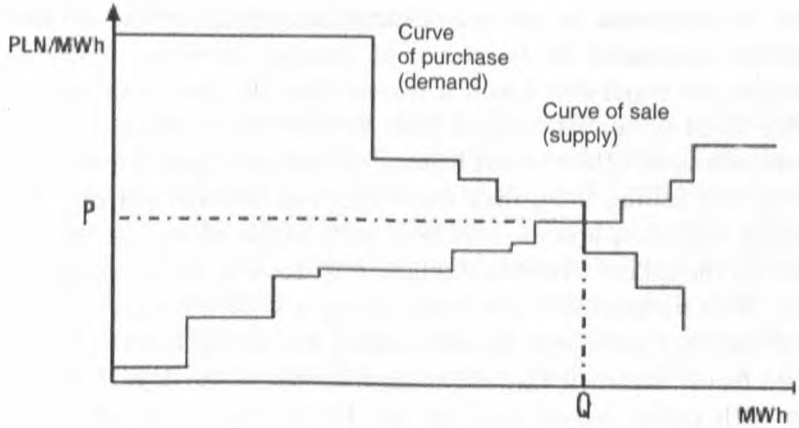

Fig. 1. Fixing equilibrium price and volume per each hour of the Day Ahead floor
Source: www.polpx.pl (05.2003).

Contracts due to one week or one month as well as the so-called "peak" contracts are quoted **on the Term Finance Market**. Quotation takes place from Monday to Friday between 12.00 and 14.00. The basic instrument for weekly and monthly contracts is electric energy whose price is fixed on the Day Ahead Market (RDN), expressed in PLN/MWh. On the other hand, the basic instrument for the "peak" contracts is electric energy between 19.00 and 21.00 on working days, whose price is also fixed on the RDN.

A weekly contract is due within 167–169 hours starting at 0.00 on Monday, following the day of expiration of the weekly contract, up to 24.00 on the first Sunday, following the start of the time limit of claimability. A monthly contract is due within another 671–673 hours starting at 0.00 on Monday, following the day of expiration of the first weekly contract set up through a division of the monthly contract, up to 24.00 on the fourth Sunday, following the start of the time limit of claimability. The time limit of claimability in rush hour are three hours, from 19.00 to 21.00 on working days, from Monday till Friday in one calendar week.

Monthly contracts are subject to division into four weekly contracts. On the day of division, after the exchange session is over, the Clearing Chamber changes the open positions in the divided monthly contract into analogous open positions in the four weekly contracts, each contract having a different time of claimability. The time of claimability of the four weekly contracts is in line with the time of the monthly contract.

The transaction rate of the day is reckoned after every exchange session is over except for the day of the expiration of the contract. The transaction rate of the day is computed as an arithmetic mean of the prices of the last 10 transactions concluded on the exchange session. However, if fewer than 10 transactions are concluded during a session then the transaction rate is equal to the price fixed for the last transaction. If, when an exchange session is over, there are still some offers left with better quotations (higher for the buying bids, lower for the selling bids) than the transaction rate computed in the above-mentioned way, then it is the best limit price of the offers (for the buyer – the highest, for the sellers – the lowest) that is assumed to be the transaction rate of the day. If no transaction is concluded during a session then it is the arithmetic mean of the limit price from the best buying and selling orders after the market is closed that is acknowledged the transaction rate of the day. However, if there are no such orders issued then the last known rate is recognized to be the transaction rate of the day.

The final transaction rate is reckoned upon the day of expiry of the contract. The rate is computed as an averaged weighted by the turnover of all the transactions concluded during a session. If no transaction is concluded upon the expiration of the contract then it is then it is the arithmetic mean of the limit price from the best buying and selling orders after the market is closed that is acknowledged the final transaction rate. However, if there are no such orders issued then the last known rate is recognized to be the final transaction rate. After the validity of a given term contract is over then there follows a period of clearing accounts of the contract. A basis for the final clearing of all the transactions concluded within the contract is the final transaction rate recognized upon the day of expiry of the contract. While clearing the contract the final transaction rate is every day compared with the reference rate fixed on the RDN on a given day of load.

The Power exchange aims to deal with the following issues[4]:

– Improving the effectiveness of the Polish energy sector and the sectors connected with it as well as adjusting the sector to the competition and requirements existent in the European Union;

– Enabling all agents equal rights to enter the exchange market;

– Establishing clear rules on the energy market;

– Forming an information and transaction plane to open the Polish electric power sector to the world competition;

– Approaching market, objective prices of energy;

– Minimizing transaction costs.

[4] www.polpx.pl (05.2003).

3. Selected power exchanges in Europe

Nord Pool – the Scandinavian power exchange. The Scandinavian Power exchange, Nord Pool, has been operating since 1993. It is the first international energy exchange. It is regarded as the world paragon of trading with this commodity. Scandinavian countries (Norway, Sweden, Finland, Denmark) belong to this exchange but the participation in it is not obligatory. The exchange is an independent, capital corporation of big state energy enterprises. The owners of the exchange are a Norwegian company, Statnett SF (50% of shares), and a Swedish company, Kraftnat (50% of shares) (Przybyłowicz 2000).

Nord Pool is believed to be the most open electric energy market. Circa 300 participants meet there, among whom one can distinguish: producers of energy, distributors, industrial enterprises, bigger receivers, brokers, and traders. Nord Pool offers transaction on the spot floor – **Elspot** – and on the term floor – **Eltermin**. The turnover of the exchange constitutes 32% of the energy consumed in the four countries.

Day contracts for the load of energy at a given hour on the Day Ahead are subject to trading on the spot floor.

The term floor serves to manage the risk of term portfolios of the participants of the exchange. The commercial transactions on the term floor are divided into: futures, forwards as well as European and Asian options[5].

3.1. The balancing floor

As already mentioned, it is necessary for the whole power system to be in equilibrium at each moment in time as far as production and consumption are concerned. This guarantees equalization of the difference between the amount produced and the existing needs.

The balancing floor enables its participants to reach equilibrium between demand and supply at the moment of delivering the energy. On this floor are present producers of energy who want to balance their position gained on the spot floor. The participants present their buying and selling offers at the latest two hours before the load starts. Afterwards, the operator of the system reckons and issues the equilibrium price for a given hour.

The balancing market serves as the net operator's tool to lessen all the unpredicted differences between the actual and planned passage of energy in the

[5]www.nordpool.no (16.04.2003).

short run. This segment of the market is not common for Norway and Sweden. In Norway Statnett bears responsibility for an equilibrium between production and consumption of energy on the whole territory of Norway, for the main net and foreign connections, for the short-term balances of the domestic power system (regulation of frequency), as well as for eliminating blockages in the passage of energy. In Sweden the same functions are performed by Svenska Kraftnat.

OMEL – the Spanish electric power Exchange. OMEL is a private, joint stock company founded in 1997[6]. Most of the transactions of OMEL are concluded on the Day Ahead terms, where contracts are signed per each hour of the following day. The offer contains volumes expressed in MWh as well as prices expressed in EURO/kWh. If the offer is to hold for more than one day, then it can be prepared in line with standard parameters, which means that the order is automatically put down into the order book.

When a technical day schedule, standing good chances of success, is issued, the exchange operator starts sessions on the Hour Ahead floor, the participation in which is voluntary. The structure of offers and the process of their harmonization on the Hour Ahead market is similar to what happens on the Day Ahead market. There are circa 150 agents dealing with production or distribution of electric energy present on the exchange.

APX (Amsterdam Power Exchange) – the Dutch exchange of electric energy. The APX has been operating since May 25, 1999. It is the first electronic trade platform on the Continent (Brandt 2001).

The APX was founded to support and liberalize the power market in Holland. It was the first exchange to trade internationally from its very beginning. The APX enables producers, distributors, traders, brokers and industrial receivers to buy and sell electric energy by means of the Day Ahead contracts[7].

The subject of trade on the exchange is electric energy in terms of quantitative units (kWh). It is the Day Ahead spot, where transactions are fixed and concluded in one hour-cycles, at a minimum unit of volume of 100 kWh. In 2001, on average 9% of the consumption of electric energy in Holland was realized on the APX. By January 2002, 36 international agents (producers, distributor, traders, industrial users) had actively acted on the APX.

EEX (European Energy Exchange). In 2002, the German electric energy exchanges in Leipzig (LPX) and in Frankfurt (EEX) were united into one European Energy Exchange (EEX), seated in Leipzig.

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[6] www.omel.es (24.03.2003).

[7] www.apx.nl/main.htm (04.05.2003).

The EEX offers its members an auction market as well as continuous trading[8].

The system of auction market is something like the trading system that used to exist on the LPX. Trading is built on bilateral auctioning for individual hours.

Contracts per individual hours are sold at a minimum price of 0.1 MWh for a day ahead. Bidders have at least to fix volumes – approved by the EEX – for the highest and the lowest price limits. Quotations of the highest and the lowest price limits are separate offers[9].

Apart from the contracts for individual hours the following blocks are offered at auction[10]:

- 1 – EEX Night (0:00–6:00)
- 2 – EEX Morning (6:00–10:00)
- 3 – EEX High–Noon (10:00–14:00)
- 4 – EEX Afternoon (14:00–18:00)
- 5 – EEX Evening (18:00–24:00)
- 6 – EEX Rush Hour (16:00–20:00)
- 7 – EEX Baseload (24:00–24:00)
- 8 – EEX Peakload (8:00–20:00)
- 9 – EEX Off Peak 1 (24:00–8:00)
- 10 – EEX Off Peak 2 (20:00–24:00)

The participants determine their desirable volumes and prices for a block. The maximum volume of an individual block offer was fixed at 100 MWh, whereas one participant can deliver at most six block offers.

3.2. Continuous trading

The EEX exchange provides also for continuous trading for three block contracts. Products subject to continuous trading are as follows:

– baseload contracts have 24 MWh/lot (equivalent of a constant load of 1 MW from midnight to midnight); valuation is in unit points EUR/MWh; minimum oscillation of the price is 0.01 percentage point (equivalent of 1 cent EUR/MWh);

– peakload contracts have 12 MWh/lot (equivalent of a constant load of 1 MW from 8.00 to 16.00); valuation is performed the same way as baseload

[8]www.eex.de (30.04.2003).

[9]www.eex.de (30.04.2003).

[10]www.oscogen.ethz.ch (28.04.2003).

contracts are (unit points in EUR/MWh, minimum oscillation of the price is 0.01 percentage point, equivalent of 1 cent EUR/MWh);

– baseload weekend contracts have 24 MWh/lot (equivalent of a constant load of 1 MWh from midnight to midnight); they are valid only on Saturdays and Sundays; valuation is in unit points EUR/MWh; minimum oscillation of the price is 0.01 percentage point (equivalent of 1 cent EUR/MWh).

4. Turnover and prices of electric energy between July 2000 – December 2002 on some selected electric energy exchanges in Europe – comparative analysis

In this section of the paper a comparative analysis has been undertaken regarding prices of electric energy (EURO/MWh) and turnover (MWh) on four European electric energy exchanges, quoted on the Day Ahead floor. In the case of the Commercial Energy Exchange (TGE) in Poland, prices were cnverted into EURO/MWh per the daily exchange rate announced by the NBP (Central Bank of Poland). The period of investigation covers July 1, 2000 – December 31, 2002. The beginning of this interval marks the day of conclusion of the very first transactions on the TGE in Poland.

The comparative analysis was carried out by means of information of two stages of frequency: monthly and hourly.

Prices of electric energy by monthly frequency

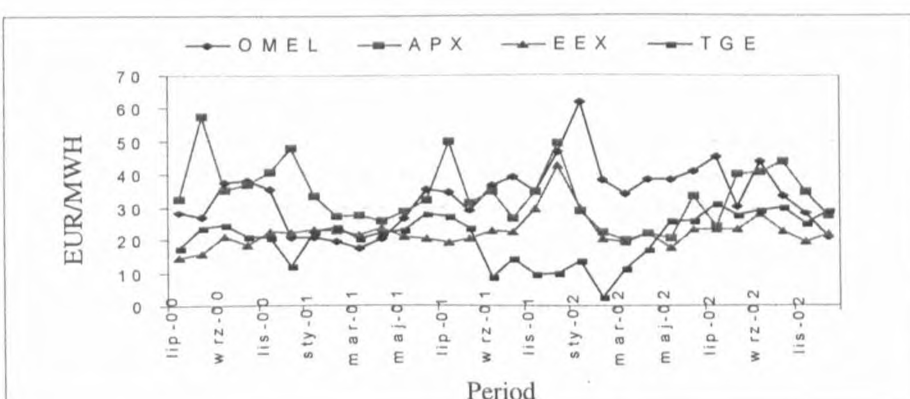

Fig. 2. Average prices of electric energy quoted on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002

S o u r c e: own elaboration based on www.polpx.pl, www.apx.nl, www.eex.de, www.omel.es

Average prices differ considerably across the exchanges under investigation. The most expensive energy is sold on the exchange in Amsterdam (from July 2000 to December 2001) and on the exchange of Spain (January 2001 – December 2002). The cheapest energy is on average in Poland and in Germany. The December of 2001 is worthy of attention as then all the exchange prices – except for the Polish ones – rose.

While analyzing the diversity of prices (see fig. 3) one can state that in absolute terms all the exchanges – except for the Dutch one – are characterized by a similar dispersion ranging from 5 to 20 EURO/MWh. However, on the APX the dispersion is 10–130 EURO/MWh. In relative terms this means 26–400% of the average value, whereas for the OMEL the analogous figure is 18–50% and for the German and Polish Exchanges: 27–176% and 15–100% respectively.

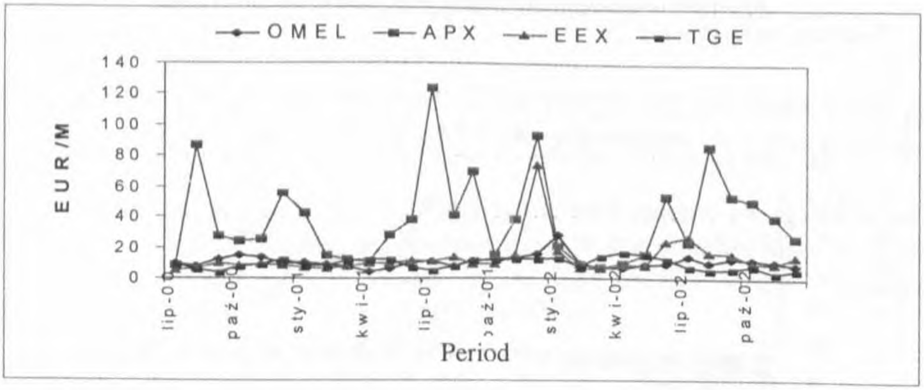

Fig. 3. Dispersion of average prices of electric energy quoted on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002
Source: As same as Fig. 2.

As far as the hourly frequency is concerned, the average prices exhibit much similarity. One can clearly observe the so-called morning and afternoon (evening) peaks and distinct drops is the small hours, being the period of the least demand for electric energy. The highest average prices are on the Dutch exchange. The prices on the Polish exchange are relatively stable, which might attest to the fact that the time of the day does not significantly affect prices offered on the exchange floor.

The dispersion of prices of electric energy by the hourly frequency is similar to that by the monthly frequency. The largest dispersion exhibits the Dutch exchange and the German one comes after. The TGE and OMEL have similar dispersions typified by only slight changes hour after hour.

Prices of electric energy by hourly frequency

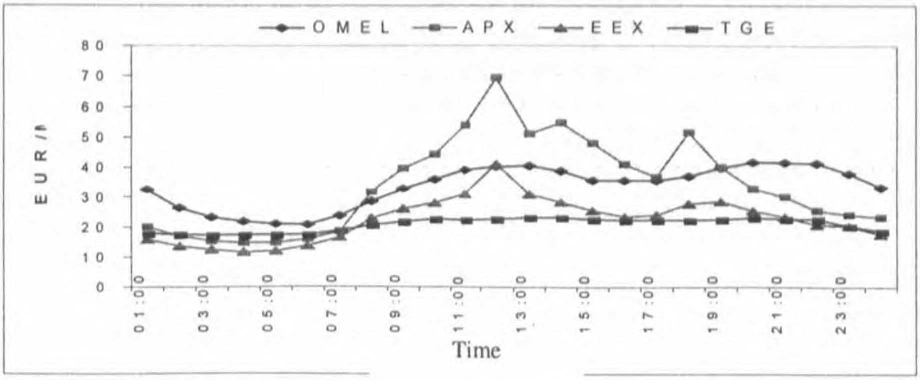

Fig. 4. Average prices of electric energy quoted on selected European electric energy exchanges by hourly frequency in the period: July 2000 – December 2002

Source: As same as Fig. 2.

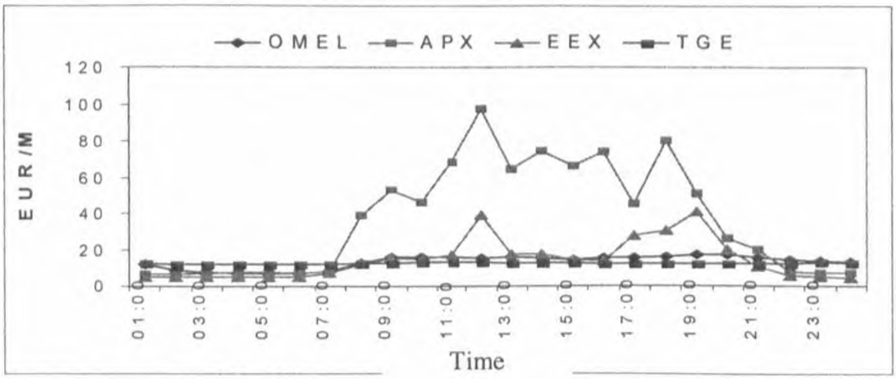

Fig. 5. Dispersion of average prices of electric energy quoted on selected European electric energy exchanges by hourly frequency in the period: July 2000 – December 2002

Source: As same as Fig. 2.

All the exchanges – except for the Polish one – are characterized by an increase in volumes during the period under consideration. The EEX has the highest rates of growth. Its turnover increased by 1740% in December 2002 as compared with July 2000 (an average monthly growth of 10.5%). As for the Dutch exchange, its increase amounted to 367%, which meant 5.5% average monthly rate of growth. The Polish exchange, if compared with the other exchanges, is typified by the smallest turnover, not exceeding 200 GWh a month.

Turnover of electric energy by monthly frequency

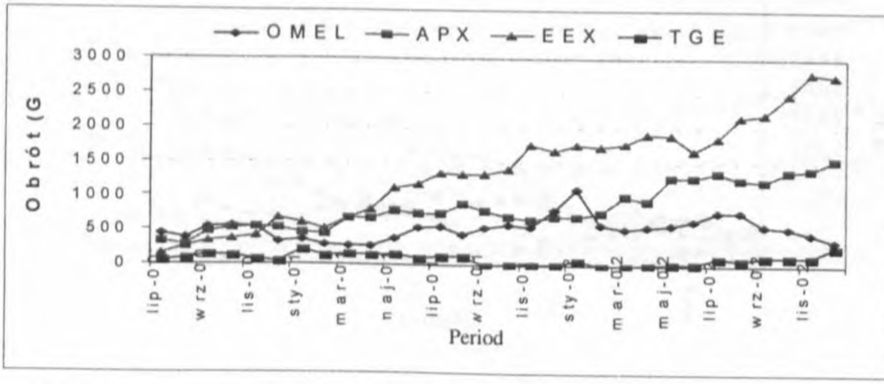

Fig. 6. Total turnover of electric energy realized on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002

Source: As same as Fig. 2.

In the case of such a small turnover, even slight changes make it that the dynamics reaches 576% only to drop to 3–4% next months. This is conspicuous from Fig. 7.

Identical patterns, as those exhibited by the total electric energy turnovers, show also the curves depicting average turnovers by the monthly frequency. The biggest volumes and rates of growth are noticed on the German exchange, whereas the smallest ones – on the Polish exchange.

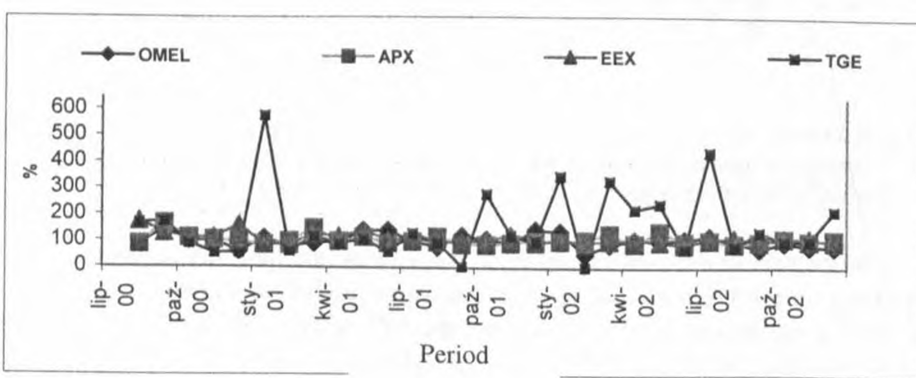

Fig. 7. Dynamics of turnover of electric energy realized on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002

Source: As same as Fig. 2.

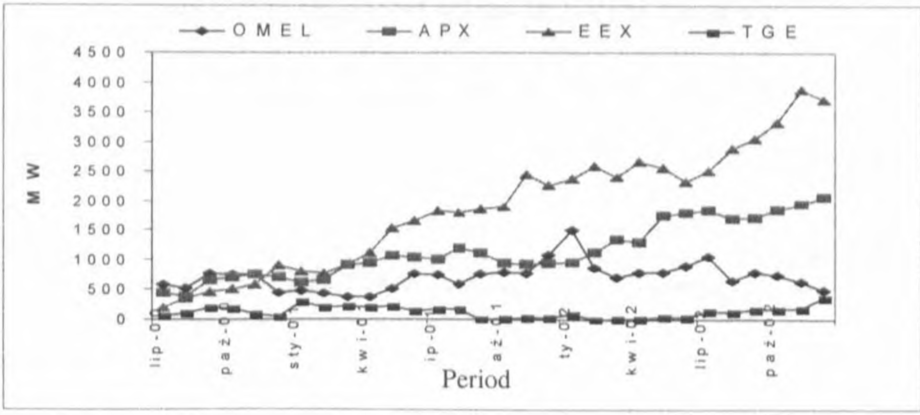

Fig. 8. Average turnover of electric energy realized on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002
Source: As same as Fig. 2.

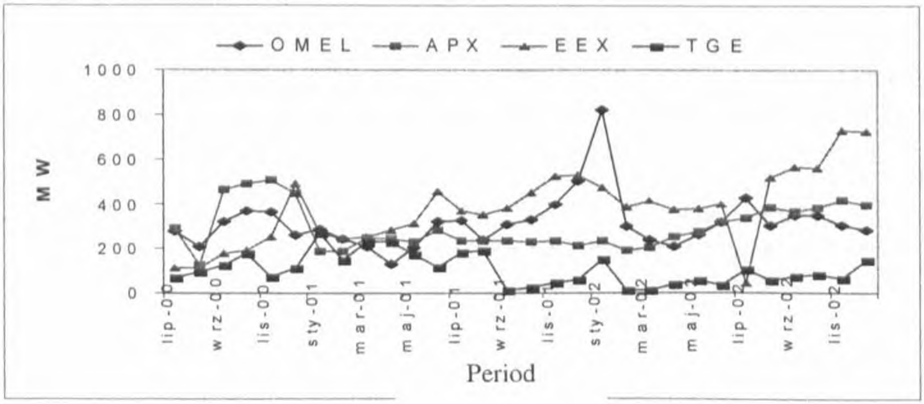

Fig. 9. Dispersion of average volumes of electric energy quoted on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002
Source: As same as Fig. 2.

The biggest dispersion regarding average, absolute monthly turnovers can be observed on the German and Spanish exchanges, whereas the smallest one – on the Polish exchange. In relative terms, the following dispersions, compared to the mean value, were recorded on the exchanges: 40–50% for OMEL, 55–65% for the APX, 55–60% for the German exchange, and 120–140% for the Polish exchange.

For the case of the hourly frequency, distinct differences can be seen across the exchanges respecting their volumes. The EEX predominates here with the APX, OMEL, and TGE respectively to follow. The turnover on the Polish exchange is relatively stable if compared to the other exchanges.

Turnover of electric energy by hourly frequency

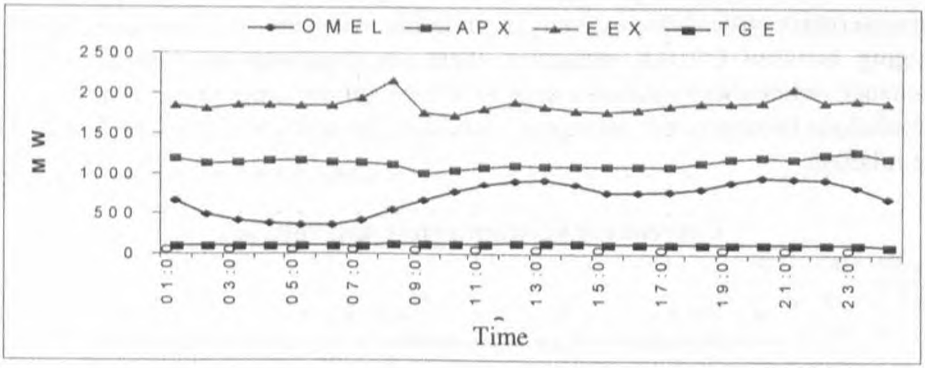

Fig. 10. Average volumes electric energy quoted on selected European electric energy exchanges by hourly frequency in the period: July 2000 – December 2002

S o u r c e: As same as Fig. 2

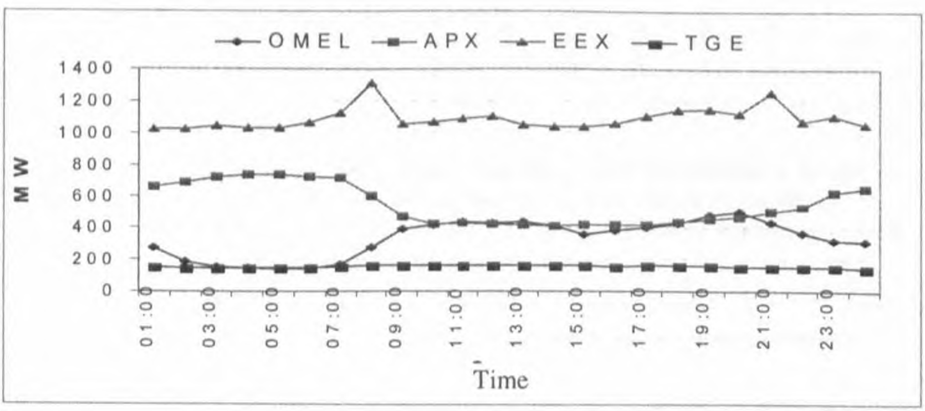

Fig. 11. Dispersion of average volumes of electric energy quoted on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002

S o u r c e: As same as Fig. 2.

A similar pattern, as that exhibited by the average turnover, emerges from the figure depicting the dispersions of volumes (by hourly frequency). The biggest absolute volumes shows the German exchange with the Dutch, Spanish, and Polish exchanges respectively to follow.

The last issue subject to the investigation was to determine the dependence between volumes and prices, both in terms of monthly and hourly frequencies. The dependence was estimated by means of the linear Parson correlation coefficient. The results are presented in figures 12 and 13. In the case of the monthly data the largest positive correlation shows the Spanish exchange, for which the correlation equals nearly 1. On the Polish exchange those two characteristics are also positively correlated, with the correlation estimates ranging between 0.7–0.8. However, there are such moments on the Polish exchange, when these estimates drop to 0.2. As for the other two exchanges, the correlations behave quite "strangely", which might attest to the insignificance of the relation.

Correlation between prices and volumes

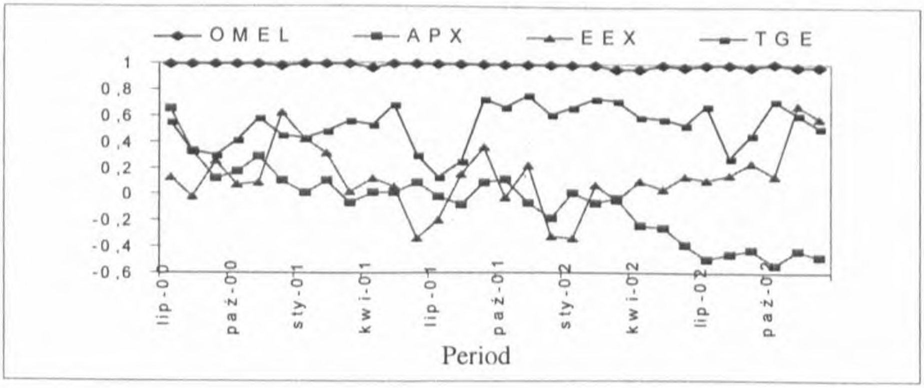

Fig. 12. Correlations between prices and volumes on selected European electric energy exchanges by monthly frequency in the period: July 2000 – December 2002

S o u r c e: As same as Fig. 2.

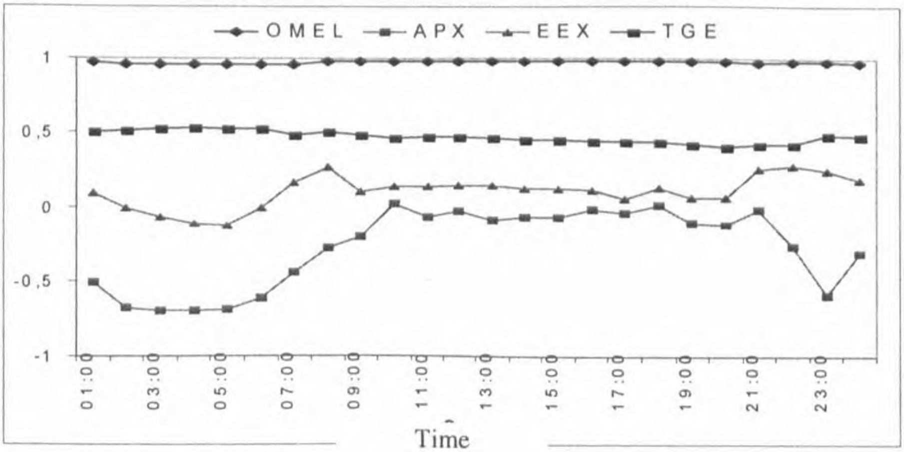

Fig. 13. Correlations between prices and volumes on selected European electric energy exchanges by hourly frequency in the period: July 2000 – December 2002

S o u r c e: As same as Fig. 2.

In the case of the hourly frequency, a strong linear correlation can be observed between volumes and prices on the Spanish exchange. On the TGE this dependence is rather weak. For the other two exchanges one can state that the dependence between volumes and prices is insignificant.

5. Summary and conclusions

A crucial purpose of liberalization of the electric energy market in Poland was to secure rational prices of energy for the final receivers, loads of high quality energy as well as profitability of economic agents operating on the energy market. In a way, to realize some of these aims the idea occurred of establishing an electric energy exchange after some other European power exchanges.

Unfortunately, after three years of its existence the Polish energy exchange is still on the margin of the energy market: its turnover is minute and almost 100% of all the contracts are bilateral ones.

The comparative analysis carried out in the paper of the Polish and some other European power exchanges enables us to draw the following conclusions:

– the duration of the Polish exchange is comparable to other European exchanges;

– similar – if not identical to those present in the West – floors exist on the Polish exchange;

– the Polish exchange stands far behind its western counterparts as far as contract prices and volumes are concerned;

– the share of trade with energy on European exchanges is inconsiderable, ca. 15–30% and on the Polish exchange it is even smaller, not exceeding 7%.

There are some prerequisites for a strong energy exchange to be established in Middle Europe after the Scandinavian exchange. The Polish energy exchange enjoys experience comparable to that of the German or Dutch ones. On the other hand, the Czech Republic or Hungary do not possess their own power exchanges yet. One can hope then that Poland stands good chances of becoming an important party on the European energy market.

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Marcin Zawada

POLSKA GIEŁDA ENERGII ELEKTRYCZNEJ NA TLE JEJ EUROPEJSKICH ODPOWIEDNIKÓW

Restrukturyzacja i rozwój konkurencyjnego rynku energii elektrycznej w Polsce spowodował, że w jego strukturze w roku 2000 pojawiła się Giełda Energii. Giełdy tego typu funkcjonują od wielu lat w niektórych krajach europejskich i pozostałych częściach świata, i stanowią ważny element rynku energii elektrycznej.

Głównym celem opracowania jest porównanie Giełdy Energii Elektrycznej w Polsce z jej europejskimi odpowiednikami – w Holandii, Hiszpanii, Niemczech i Skandynawii – pod względem: zasad funkcjonowania, rodzaju zawieranych transakcji, wielkości obrotów w ujęciu wartościowym i ilościowym, udziału w rynku energii. Dane statystyczne wykorzystane w części empirycznej referatu dotyczą okresu od roku 2000 do 2002. W analizie porównawczej wykorzystano metody statystyczno-ekonometryczne mające zastosowanie w badaniach rynku energii elektrycznej. Obliczenia zostały wykonane z wykorzystaniem pakietu komputerowego STATISTICA.

Przeprowadzona analiza pozwala:

- zdiagnozować stan rozwoju konkurencyjnego rynku energii elektrycznej w Polsce,
- określić rolę Giełdy Energii Elektrycznej w tworzeniu mechanizmów wolnego obrotu energią elektryczną,
- ustalić pozycję polskiej Giełdy Energii Elektrycznej na tle jej europejskich odpowiedników.