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Power industry restructuring in the EU countries, as well as in Poland — the introduction of the competence market

KEY WORDS: power industry, electrical energy market, energy exchange

Introduction

Changes in the power industry, which took place both on the global scale covering the European market of electrical energy, and on the local scale, regarding the internal markets of each of the EU countries, may be dated back to the end of the 80's.

The pioneer of these changes was the United Kingdom, where at that time the governmental decisions were taken with regard to the new organisation of the electrical energy market. These processes were related to the deregulation and privatisation of the entire infrastructure of the British national power system and constituted the impulse for development not only for the power industry system, but also for the entire economy. The centralised, obligatory pool electrical energy offering market was created, which, in spite of the numerous advantages, introduced the restrictions in the market development [1].

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Revised by Prof. Roman NEY

It covered merely the producers of the electrical energy, the balance between the demand and supply not being the price-making factor. Instead, the administration methods were employed, and only the financial contracts were concluded, while the strong market position of the producers led to the market deformations. The market so constructed was unable to make up for the changes occurring in other countries, such as Norway, Germany, Finland, where the electrical energy market became opened to the public. This forced Great Britain to carry out the far-reaching reform of its electrical energy market, the result of which was the introduction of the NETA (New Electricity Trading Arrangements) programme in 2000, which replaced the pool market with the simple exchange market, and the supplementary day and hour balance segment. The rules and premises related to the process of implementation of the new market mechanisms, taken into consideration while preparing the NETA programme, considerably refer to the changes that are currently occurring in the electrical energy market in Poland [1, 2].

The picture of the liberalisation progress and the changes related to the privatisation of the power industry sector, and the directions of such reforms is presented in figure 1, where 100% market liberalisation level was attained by Finland, Sweden and the United Kingdom [3, 9].

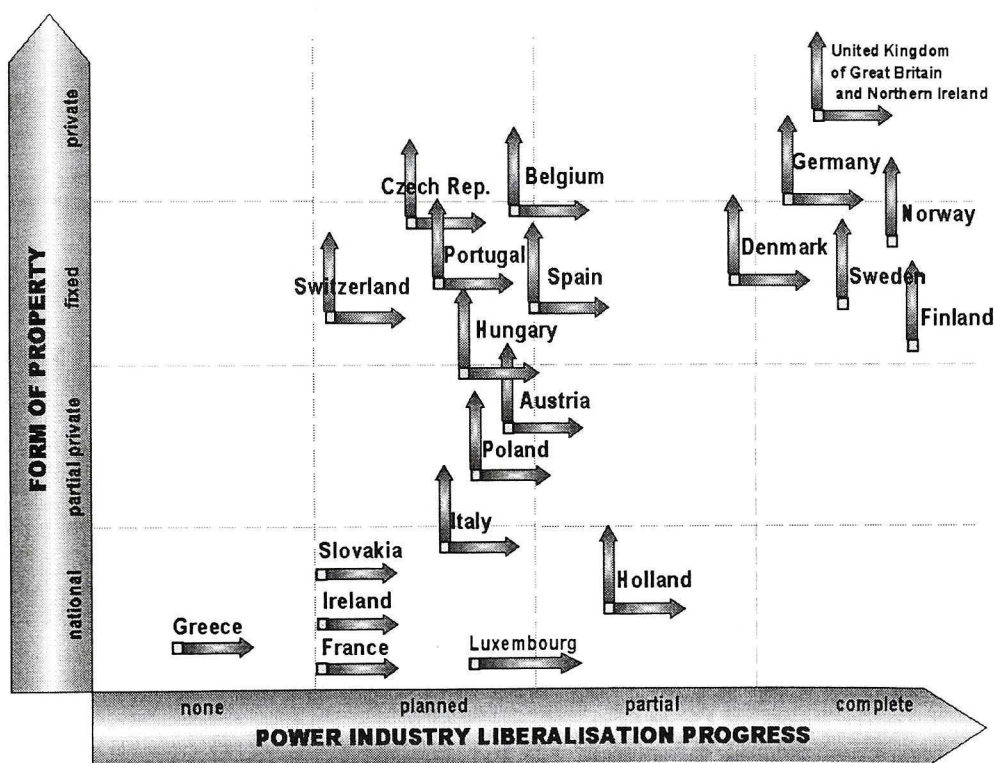


Fig. 1. Liberalisation progress and changes related to the privatisation of the power industry sector in European countries [3]

Rys. 1. Postęp w liberalizacji i prywatyzacji energetyki w krajach Unii Europejskiej

Reforms in Poland

The reforms of the power industry system in Poland commenced with the introduction of two significant changes, notably the entire decentralisation of the energy sector and the process of prices adaptation. The previous structure in the '80s was based on five vertically integrated state-owned power authorities (5 power industry districts), containing from few to more than a dozen electricity generating plants, distributing centres, as well as repairing plants and the grid execution servicing units, with auxiliary character. The financial results of the companies entering into the composition of the particular district were calculated at the highest governmental level, without any possibility of economical assessments with regard to the functioning of the particular companies. The prices of the electrical energy for the communal recipients were of social character, while the prices of electricity for the industrial recipients were of political character.

At the beginning of the '90s, the power industry districts were liquidated, and the vertically integrated entities became the self-sustaining power industry companies, divided into the power generating companies (power generation plants, and power and heat generation plants), the distribution companies, and a single company managing the transmission and the foreign trade of the electrical energy, known as the Polish Power Grid Company (PPGC).

The conversion of the state-owned power industry companies into the joint-stocks, with 100% share of the State Treasury, had started since 1993. The process took the longest time in the power generation sub-sector, where the last power plant was commercialised as late as in 1999 [4].

The Polish Energy Law meets the requirements with regard to the realisation of the third parties access (TPA) principle only for the energy generated domestically (this will change when Poland accesses the European Union). The participants of the market will attain the right for access to the grid according to the strictly determined schedules [5]: August 1998 — for customers buying more than 500 GW·h p.a., 1 January 1999 — 100 GW·h, 1 January 2000 — 40 GW·h, 1 January 2002 — 10 GW·h, 1 January 2004 — 1 GW·h, and 5 December 2005 all customers.

One of the Polish power industry policy adapting acts was the ordinance issued in 2000, introducing the obligation of purchasing the energy from the non-conventional and renewable resources, as well as energy produced in combination with the heat generation. At that time the Energy Market started its operations. At the end of 2000, the energy market run by the Energy Market was recognised by the President of the Energy Regulation Office (URE) to be the competitive market. Owing to the application of rebates and discounts, the prices of electrical energy in this market for the producers and wholesale recipients are lower than tariff-based prices. The producers operating in the competitive market may be freed by the Energy Regulation Office from the obligation to submit their tariffs for approval.

The characteristics of the national power system

The national power system (KSE) is divided into three separate subsystems, notably the generation subsystem, the transmission subsystem and the distribution subsystem.

Generation

The generation subsystem is based on the operation of the 17 system power plants, the total installed power of which exceeds 90% of the KSE total power (see table 1). The share of the smaller power plants and power and heat generation plants does not exceed 10%. The total number of generation units in Poland is equal to 32. The main source for producing the electrical energy in the most of these units is the hard coal and lignite. The table 2 shows the gross

TABLE 1. Installed capacity in polish power plants by types [5, 10]

TABELA 1. Zainstalowana moc elektrowni w Polsce według typu [5, 10]

Specification	Years									
	1990		1997		1998		1999		2000	
	MW	%	MW	%	MW	%	MW	%	MW	%
Total	31 952	100.0	33 717	100.0	33 851	100.0	34 263	100.0	34 596	100.0
Public power plants	28 786	90.1	30 759	91.2	31 030	91.7	31 443	91.8	31 948	92.3
Thermal power plants:	26 891	84.2	28 751	85.3	28 918	85.4	29 327	85.6	29 779	86.1
— coal power plants	17 723	55.5	19 693	58.4	19 824	58.6	20 179	58.9	20 601	59.5
— brown coal power plants	9 058	28.3	9 058	26.9	9 093	26.9	9 148	26.7	9 178	26.5
Hydro power plants	2 005	6.3	2 008	6.0	2 113	6.2	2 116	6.2	2 169	6.3
Other power plants over 0.5 MW	3 166	9.9	2 958	8.8	2 821	8.3	2 820	8.2	2 648	7.7

TABLE 2. Electricity generation by various sources (1999—2000) [5, 10]

TABELA 2. Produkcja energii elektrycznej uwzględniająca źródła wytwarzania (1999—2000) [5, 10]

Specification	1999	2000	Dynamic [%]
	GW·h		
Total	142 128	145 169	102.1
Public heat and power generating plants and power plants	133 299	136 256	102.3
of which:			
— coal power plants	61 049	63 696	104.3
— brown coal power plants	50 741	49 677	97.9
— heat and power generating plants	17 525	19 050	108.7
— hydro power plants	3 984	3 833	96.2
Independents heat and power generating and power plants	1 623	1 722	106.1
Industrial power plants	7 206	7 192	99.8

production of the electrical energy during 1999—2000, where the highest dynamics of the production growth in these years are found for the independent power plants and independent power and heat generation plants.

Transmission

The entity responsible for the subsystem of the electrical energy transmission is the Operator of the Transmission System, i.e. PPGC, which manages the KSE operation, performing the grid activities with regard to the highest voltages (the 220 kV lines with the total length of 8183 kilometres, and the 400 kV lines with the total length of 4591 kilometres). The operator also performs the transmission activities and the distribution of the electrical energy realising the most of the wholesale turnover of the electrical energy; the energy purchased from the system power plants is sold to the distribution companies. The prices of energy in such transactions are based upon the wholesale tariff approved by the regulator (URE). The transmission activities and the distribution is subject to URE regulation.

Distribution

The distribution companies (Power Authorities) function in the distribution subsystem, the area of operations of which covers both the wholesale and retail market of the electrical energy. Currently, 33 Power Authorities are found in Poland, in the form of the joint stocks. Their main obligations include as follows [5, 7]:

- ◆ maintaining the adequate technical status of the 110 kilovolts distribution grids, as well as MV and LV networks they own;
- ◆ providing for the quality and reliability of the deliveries of the electrical energy;
- ◆ making available the distribution grid at the application of the recipient, who, in accordance with the TPA principle, has the right for transmission services and purchases the electrical energy directly from the producer or in the wholesale market;
- ◆ the sale of electrical energy to the tariff recipients, as well as rendering services to the turnover companies, operating on behalf of the recipients having the right for transmission services.

The number of final recipients and the consumption of electrical energy, provided in table 3, shows the structure of the energy distribution.

Turnover

In addition to the distribution companies, the turnover companies who have obtained the license for energy turnover also operate in the market, more than 10 being active throughout the entire country. The total number of licenses issued with regard to this kind of economic activities is equal to 285, as at February 28 2002.

TABLE 3. Number of customers and electricity consumption (2000) [5]

TABELA 3. Liczba użytkowników i konsumpcja energii elektrycznej (2000) [5]

Kind of customers	Number	Consumption [GW·h]	Share in consumption [%]
Industry	64 000	57 628	56.9
Households	11 123 000	21 037	20.8
Agriculture	2 214 000	4 750	4.7
Traction	N/A	3 678	3.6
Street lighting	N/A	1 825	1.8
Total	15 291 000	101 239	100.0

The conclusive model of electrical energy market in Poland

The model of electrical energy market in Poland belongs to the group of decentralised models and operates at two main levels, as the wholesale market and the retail market. The competitive game in the decentralised market is played not only among the market entities, but also among the individual segments of this market, in various time horizons. The drawing 2 illustrates such

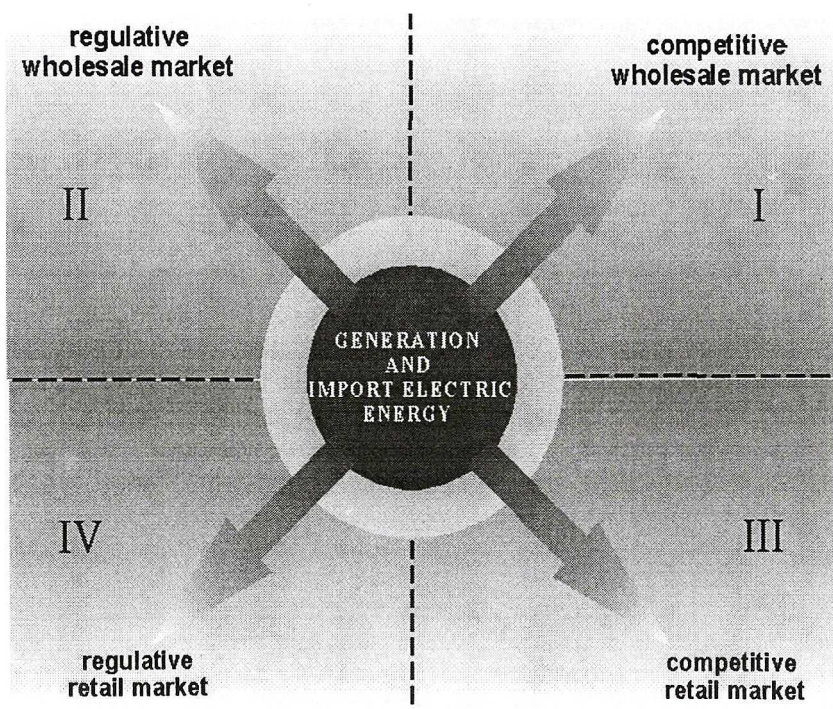


Fig. 2. Structure of four levels of energy market in Poland

Rys. 2. Czterostopniowa struktura rynku energii w Polsce

structure, where the four market areas have been highlighted, including the behaviour of the entities in this market [6]:

I. The competitive game between the authorised entities.

II. The producers deliver the electrical energy and render the regulating system services in accordance with the URE tariff.

III. The turnover companies and the distribution companies perform the sales of electrical energy to the off-tariff recipients.

IV. The distribution companies sell the electrical energy to the tariff recipients, who have not yet obtained the right for the transmission services or to the recipients who have already obtained such right but they do not want to exercise it.

In the above-mentioned areas, the contract market, the exchange market and the balance market may be recognised with regard to the form of trade in the physical energy market.

On the contract market, energy is traded on the basis of contracts concluded between energy generators, network operators, energy traders and energy consumers. At present long term contracts concluded between PSE SA and generators account for about 70% of domestic energy demand. As a result, only the portion of the energy produced may be subject to the principles of the free market. The remedy would be to change those long-term contracts into financial contracts and to implement the system of compensation fees [6, 8].

The energy on the exchange market is traded in the form of contracts. The participation on the exchange market is not obligatory. Once that market is developed it should guarantee its participants the following advantages: open and transparent trading rules, the elimination of trading risk as electricity buyers have to provide collateral, reduced negotiation costs due to the automation of the order selection process, wide flexibility in concluding transactions. In addition to the following day market in the exchange market, also the contract market functions, where the deadline for completion of the contracts concluded equals one month. Also the contracts for the green energy, deriving from the non-conventional and renewable resources, are encountered in the market in question.

Balancing market is the market that closes energy balance in the whole electric energy system. It enables the companies to purchase additional amounts of energy not covered by the previously concluded contracts (on the contract and exchange markets) necessary to balance national power system. On September 2001 an hourly-based balancing market came into life.

The access to the market is the factor determining the dynamics and the methods of the competitive markets development. The power industry is the network sector with the natural monopoly character. The two basic areas may be recognized, where the elements of natural monopoly are not found and where the effective competence may be attained. The first area pertains to the procedures and criteria to be fulfilled by the power industry company if it wants to perform the activities related to the generating, transmission, distribution of the turnover of the electrical energy. The second area refers to the methods and conditions with regard to the access of the network by the third parties. Owing to the licensing procedures, the regulating office performs the control of the entities entering the market, as well as the individual terms and conditions of their economic activities, and performs the regulation of the prices of the electrical energy, and the monitoring and control of the concessionaires in the market. The solutions contained in the Energy Law act are relatively liberal, determining only the short list of requirements to be fulfilled

by the entity to obtain the license, notably the entity must be domiciled in Poland, the entity must have the funds and the technical capabilities allowing performing the economic activities and must employ the personnel with the adequate qualifications and finely the entity must have the land development permit [9].

The Polish power industry still faces the tasks as follows:

- ◆ the facilitating of the use of the right for TPA by the final recipients holding such right;
- ◆ the implementation of the compensation charges system so that the Parties to the contracts do not face the risk of lower income;
- ◆ the preparation of the draft of further development of electrical energy markets, including the inter-system exchange within the framework of the common European market.

Summary

In order to implement the electrical energy market in Poland, the following steps should be taken, notably:

1. The creation of the adequate economic conditions for companies operation, inter alia, through the transfer of the costs of generation and the delivery of electrical energy to the tariffs for the recipients.
2. Maintaining the ownership and operational independence of the market operators and the system operators from the market participants, i.e. from the producers, distributors, turnover companies, and the wholesale and retail recipients of the electrical energy.
3. The development of the market infrastructure, i.e. the metering and settlements systems, offers providing systems, planning systems and operation managing systems.
4. Solving the problem of the stranded costs arising from the long-term contracts regarding the delivery of the electrical energy.
5. Improving the principles, rules and the market procedures regarding the balance market.
6. Harmonising the statutory regulations, both in the sphere of the authorisations interlacing, as well as in the sphere of the licenses granted by the URE President.
7. Within the framework of the anti-monopoly plan, actions should be taken to prevent the excessive horizontal consolidation, which constitutes the basis for the construction of the excessive market strength, particularly on the side of electrical energy generation.

References

- [1] POPCZYK J., 2001 — Elektroenergetyka XXI wieku w Polsce i na świecie. Mat. Konf. kursu TEMPUS nt. Zrównoważonego rozwoju energetycznego, Łopuszna.
- [2] ZERKA M., GAPYS T., — Doświadczenia z wdrażania nowej organizacji rynku energii elektrycznej w Wielkiej Brytanii. Publikacje Centrum Informacji o Rynku Energii (CIRE), www.cire.pl
- [3] GIERMEK K., GODZISZ K., 2002 — Restrukturyzacja elektroenergetyki a rozwój rynku konkurencyjnego. Biuletyn URE 1.
- [4] Energetyka polska w „pigułce”. Publikacje CIRE, www.cire.pl
- [5] Energy market in Poland, Polish Power Transmission and Distribution Association, www.ptpiree.com.pl

- [6] MIELCZARSKI W., 2000 — Rynki energii elektrycznej. Agencja Rynku Energii SA i Energoprojekt-Consulting SA, Warszawa.
- [7] Biuletyn Urzędu Regulacji Energetyki. Strona internetowa www.ure.gov.pl
- [8] WŁODARCZYK W., 2001 — Rynkowa reforma sektora elektroenergetycznego. URE — Biblioteka Regulatora, Warszawa, www.ure.gov.pl
- [9] JUCHNIEWICZ L., 2001 — Regulacja polskiego sektora energetycznego a akcesja do Unii Europejskiej. URE — Biblioteka Regulatora, Warszawa, www.ure.gov.pl.
- [10] Statistical Yearbook of the Republic of Poland 2001.

Abstract

The energy sector reforms performed in countries such as Germany, Great Britain or Norway have been the proof documenting that the most efficient method stimulating the improvement of the efficiency is the creation of the competence mechanisms. The reduction of the electrical energy prices for end-users, as well as the growth of electrical energy turnover and the reduction of the electrical energy generation costs, have been the results of the reforms in question.

Based upon the Energy Laws Act passed in 1997, subject to many amendments since then, as well as the executory acts, the legal conditions of introducing the competence market of electrical energy have been created in Poland. This is due to the fact that the Act in question is in conformity to the guidelines of the EU directive No. 92/96, and contains the main principles of power industry sector economic activities, inter alia, the market deregulation (the introduction of the competence mechanisms), as well as the separation of the electrical energy turnover area from its transmission and distribution.

The paper presents the characteristics of the national power system, the course of the power industry reforms, as well as the conclusive model of the electrical energy market in Poland.

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Restrukturyzacja sektora energetycznego w krajach Unii Europejskiej i w Polsce — wprowadzenie rynku konkurencyjnego

SŁOWA KLUCZOWE: energetyka, rynek energii elektrycznej, handel energią

Streszczenie

Reformy sektora energetycznego prowadzone w takich krajach jak Niemcy, Wielka Brytania czy Norwegia udowadniają, że najefektywniejszą metodą stymulowania wzrostu efektywności jest stworzenie

mechanizmów konkurencyjności. Rezultatem tych reform była redukcja cen energii elektrycznej dla użytkowników, jak również wzrost obrotów energią elektryczną oraz obniżenie kosztów jej wytwarzania. Prawo energetyczne przyjęte w 1997 r. wraz z szeregiem poprawek oraz aktami wykonawczymi stworzyły prawną podstawę do wprowadzenia konkurencyjnego rynku energii elektrycznej w Polsce. Prawo to jest zgodne z wytycznymi dyrektywy nr 92/96 UE określa główne zasady działalności ekonomicznej sektora energetycznego, między innymi deregulację (wprowadzenie mechanizmu konkurencyjności) oraz oddzielenie obszaru obrotów energią elektryczną od jej przesyłu i dystrybucji. Artykuł przedstawia charakterystykę krajowego systemu energetycznego, przebieg reform oraz model rynku energii elektrycznej w Polsce.