

## Electric Energy Sector in Poland

By Zbigniew Mantorski \*

### The Way Toward A Modern Energy Sector

Since the beginning of the transformation in Poland, that is from the beginning of the 1990s, it was obvious, that the energy sector, including electric energy, had to be completely reconstructed. In 1990 this sector was divided into 3 sub-sectors: generation, transmission and distribution and the Polish Grid Company (PSE SA) founded with 100% state treasury ownership. In 1993, 33 distribution companies were separated from the transmission network and became joint stock companies also with 100% state treasury ownership, while still managed by PSE SA. The next important step in the energy sector modernisation was the connection of the Polish energy network to the West European network UCPTE in 1995, but the most important changes started in 1997 when the Polish Parliament passed the Energy Act, which became the force of law. Concurrently with the implementation of the new law, the Energy Regulation Office (URE) was founded. These measures facilitated the commencement of privatisation – the first energy company Heat and Power Plant in Cracov, was privatised the following year. Electricity prices are no longer set by the Finance Ministry, but prepared by distribution companies; while still subject to the approval of the President of URE. The basis for privatisation were determined in “The Strategy of Privatisation Distribution Sub-sector in Poland” (with amendments), a document prepared by the State Treasury Ministry. In 1999 the Polish Power Exchange was founded and in 2001 an hourly-based market opened up. The last power plant was transformed into a state treasury joint stock company the same year. Now it can be said that from a legislation point of view, nearly all the measures enabling the reconstruction and privatisation of the electric energy sector have been implemented.

### Current Situation

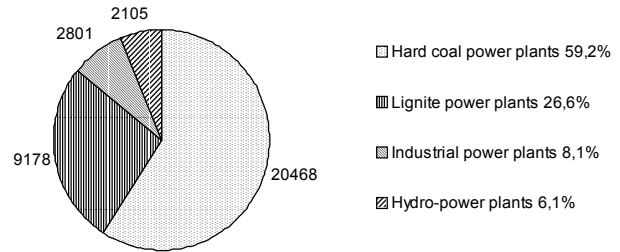
As mentioned above, the Polish energy sector is divided into three sub-sectors: generation, transmission and distribution.

The generation sub-sector has 17 system power plants, all fuelled by hard coal and lignite, several big heat and power plants and industrial power plants mostly fuelled by hard coal. Hydro-power plants work mainly as peak-load plants. There are no nuclear power plants in Poland. In 2000 the total installed capacity was 34,552 MW and total energy production was 144,417 GWh (142 TWh predicted for 2002). The outlook for installed capacity is presented in Figure 1 and for energy production in Figure 2. With total installed power of over 34 GW, the peak loads are between 15 and 23 GW and there is still a substantial power margin.

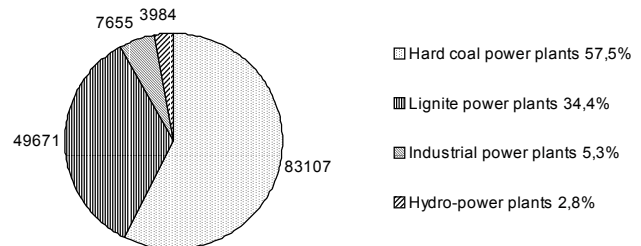
PSE SA, the national grid operator of the highest voltage networks, is responsible for transmission, and purchases electricity from system power plants, selling it to distribution companies. It has 8116 km of 220 kV lines, 4660 km of 400 kV lines and 114 km of 750 kV lines.

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**Figure 1**  
Installed Capacity (2000) by Type of Plant [MW]

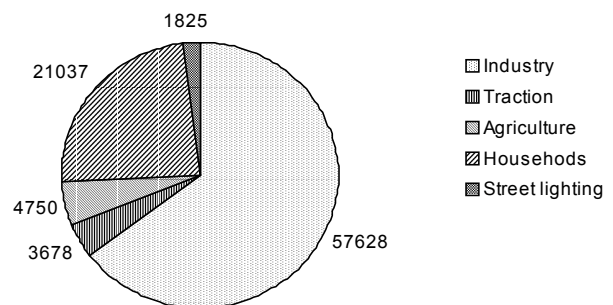


**Figure 2**  
Electric Energy Production (2000) by Type of Plant [GWh]



The 33 distribution companies are operators of a 110 kV, medium and low-voltage network. In 2000 they supplied above 15 million customers and sold them 100,239 GWh. Figure 3 presents the structure of electricity consumption in Poland. In February 2002 the Ministry of Economy issued a document concerning the evaluation and correction of energy policy up to 2020. Two variants (base and high) predict 1.2% and 1.3 % increase, respectively, in annual energy consumption up to 2005.

**Figure 3**  
Structure of Electricity Consumption (2000) [GWh]

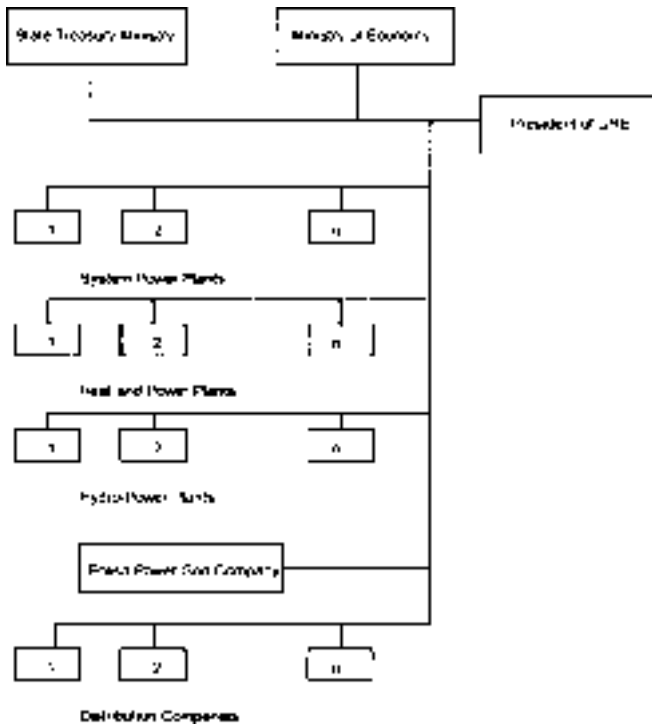


The current structure of the Polish electric energy sector is presented in Figure 4.

### Privatisation

The foundations for the privatisation strategy were laid down in “Privatisation of Energy Sector, Assumption and Implementation”, a document prepared in 1999 by the Ministry of State Treasury. It assumes that power plants shall be privatised individually by strategic investors. Lignite fuelled power plants have to be privatised alongside mines. Heat and power plants will also be privatised individually, by strategic investors, financial investors, public offer or flotation. So far, 5 heat and power plants have been privatised, with Electricite

**Figure 4**  
**Structure of the Electric Energy Sector**



de France as the main shareholder; as well as three large power stations: PAK – 2 GW, Rybnik – 1.7 GW, Polaniec – 1.8 GW.

The distribution companies were divided into the groups in which they are to be privatised with preferences for strategic investors. Only the largest of these companies (GZE in Upper Silesia) was privatised in 2001 with Swedish Vattenfall as the strategic investor.

PSE SA – the national grid operator will be privatised when the privatisation of the other sector companies is completed, but the State Treasury shall remain the owner of the majority of shares.

The privatisation of the energy sector had initially been planned to be completed by 2002, but the process was delayed. The change of government in 1999 and the ensuing changes in the posts of ministers responsible for energy sector privatisation resulted in different concepts of privatisation. The lack of an effective solution to the long-term contracts made it difficult to find strategic investors. Additionally, some cases of poor privatisation practices in other sectors of the Polish economy have created an unfavourable social climate for the privatisation of all strategic enterprises.

#### Barriers to Electric Energy Sector Development

There are several barriers hindering the growth of the electric energy sector: these are legal, political, organisational, technical and social, including:

- Imperfection in the Energy Act,
- Lack of correct methodology in tariffs construction,
- Lack of equal market opportunities for electricity produced with low and high emission of pollutants,
- An obligation to purchase electricity in Minimum Electricity Amounts – long-term contracts cover most of energy

trade, power exchange transactions are not concluded by PSE SA,

- Concentration of wholesale energy trade in one company,
- The mechanism of price construction for end users is not working correctly,
- The regulatory policy of URE,
- A negative influence by the present ownership of the sector (the state treasury is the majority owner),
- A technical infrastructure that is undeveloped (metering, telecommunication, IT),
- A lack of operating experience in competitive markets,
- Development trends in the energy sector are difficult to predict; there are discrepancies between different forecasts,
- A misunderstanding and lack of knowledge about changes in the energy sector,
- Social disapproval of privatisation and the ensuing changes, evoked by mistakes made in the course of privatisation in other sectors as well as negative propaganda made by some populist politicians.

#### Conclusions

In last few years, the Polish electricity sector has taken some very important steps:

- The Polish power system has been connected to the West European system,
- The new Energy Act has been implemented, establishing the framework for new energy policy,
- A new market system has been created,
- The privatisation of the electric energy sector has started and is in progress,
- More rational use of electricity, motivated by the new pricing system,
- Successful pollution reduction measures have been undertaken by energy enterprises.

Despite barriers to the electric energy sector development and some unsolved problems, the Polish energy sector is moving towards liberation. Several solutions implemented in Poland as well as problems that accompany the transition, are worthy of consideration by other countries that are transforming their energy sector.

#### References

- Energy Market in Poland (2002). <http://www.ptpire.com.pl>
- Frydrychowski R. (2002). Zagadnienia rozwoju Krajowego Systemu Elektroenergetycznego (Development of the National Power System). Seminarium SnRGEP, Gdansk, Poland.
- Mantorski Z. (1998). Is There any Electricity Market in Poland? Proc. of the 21<sup>st</sup> IAEE Annual International Conference, Quebec, pp. 465-472.
- Mantorski Z. (1999). Polish Electricity Sector on the Way Towards European Union. Proc. of the 22<sup>nd</sup> IAEE Annual International Conference, Rome, pp. 303-307.

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