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The Expected Effects of the EU Accession on the Electricity Sector in Hungary

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I. Introduction

Electricity as a public utility is an important basic industry – its functioning affects the everyday life of individuals, and it is a factor of production for many industries and services. But the electricity industry is a significant sector of the economy by its sheer size as well. Hungarian electricity companies employ over 25,000 people, possess about 840 billion HUF (over 3 billion EUR) of equity capital, 1260 billion HUF (around 5 billion EUR[1]) worth of assets, and produce around 70 billion HUF (280 million EUR) earnings before tax yearly. About 3.8 % of Hungary's GDP is spent on electricity consumption.

Due to its importance as a public utility and its technological characteristics that create natural monopolies in certain segments of electricity supply, the industry is traditionally heavily regulated (including price regulations). Furthermore, states are often involved in corporate ownership. But the worldwide trend of liberalization and privatization has affected the electricity industry as well: this process is most pronounced in North America and Western Europe. The European Union is now committed to the liberalization of the electricity industry – the creation of a competitive market is seen as a major step towards a unified European electricity market. Accession countries have to adopt these values as well: the opening of their electricity industries will be inevitable after joining the European Union. This of course will cause significant structural changes in the industry.

Hungary is in a favorable position twofold: first, the new Electricity Act, taking effect on the 1. January 2003, was created in the spirit of harmonization to the community law. Market opening has recently begun. Second, the majority of the Hungarian electricity industry has already been privatized: major Western European and American energy companies are present on the market by now, and market structures appear to have stabilized. Still, it is difficult to foretell what will happen as market opening goes forth – recent examples of the industries in Western Europe show a diversified picture as well. It may be an advantage for accession countries that they can adopt the most successful regulations and institutions – but then, there is no guarantee that these will work equally everywhere.

This paper aims to analyze the Hungarian electricity industry at its present situation and attempt to draw conclusions about the effects of the EU accession. The rest of the paper is structured as follows. Section II deals with legal harmonization, a central question of accesion. Section III focuses on price regulation and price developments – an issue that concerns regulation as well as market developments. Section IV gives a brief account of the demand side. Section V analyzes supply side issues: ownership and market structure, foreign trade, and employment effects. Finally, Section VI summarizes the results and the main implications for both economic policy and corporate strategies.

[1] The exchange rate used throughout the paper is 1 EUR = 250 HUF.

II. Regulatory Issues

Electricity industry is in a peculiar position from the regulatory point of view. It is a vital public utility, its functioning affects practically every segment of the economy on a significant scale. The electricity industry underpins economic growth and development, and contributes to the material welfare and comfort of the population in every aspect of the daily life of individuals. Therefore the reliable and economically efficient functioning of the electricity industry is of strategic interest. Furthermore, some segments of this industry are natural monopolies: transmission and distribution lines are very costly to set up and maintain. The industry must function as a system: production, transmission, distribution and supply ('retail trade') are physically linked. If the industry is decentralized, then the coordination of these activities requires a system operator with monopolistic powers. Household consumption is an issue of social policy too. Extensive regulation is thus required to set the standards of safe and reliable electricity supply and to promote economic efficiency in order to protect consumers against monopolies. 'Efficiency' in the end should mean cheap electricity. A further important objective of regulation is environmental protection.

In sum, the electricity industry has traditionally been a heavily regulated industry (including widespread price regulation) with monopolies and state-owned companies. The worldwide phenomenon of liberalization has affected the electricity industry as well: the trend to more open and liberalized electricity markets is most pronounced in North America and Western Europe. This process is not accompanied by deregulation however: it is more appropriate to speak of re-regulation, the reshaping of rules to accomodate them to a more competitive market environment. In fact, the introduction of competition raises the importance of regulation as a means of protection against monopolies.

The EU accession is another aspect of the regulatory issue: Hungary must adopt the community law including its implications for the electricity industry. As the EU aims to create a liberalized, single electricity market, this issue is closely related to the question of market opening. This section of the paper analyzes the legal background of the Hungarian electricity industry: to what extent does it harmonize with that of the EU? What further measures must be taken? We shall focus on two questions in this section: market opening, the freedom of capital flows.

a) Market opening in the EU and Hungary

The European Union is committed to a large-scale liberalization in its electricity sector: the creation of a competitive electricity market is an important step in creating a common European market. This was manifested in the Electricity Directive (Directive 96/92/EC of the European Parliament and the Council of december 1996 concerning common rules for the internal market in electricity). In short, the Directive lays down that all consumers shall gradually become eligible to choose their electricity supplier. Member states can prescribe obligatory public utility service to maintain the safety of supply. The Directive also rules that the access to the electricity network must be open to all producers and suppliers; vertically integrated electricity companies must unbundle their activities to prevent cross-subsidization between competitive and monopolistic segments; and the remaining monopolies (e.g. in transmission and distribution) should operate in a transparent, undiscriminative and accountable way. An amendment has been proposed to the original Directive in 2002 (Amended proposal for a Directive amending the Electricity and Gas directives and Amended proposal for a Regulation on cross-border exchanges in electricity. COM (2002) 304 final of 07/06/2002). Based on the first experiences of liberalization, this amended Directive seeks to make corrections to the original one. It also proposes the quickening of the liberalization process: all non-household

consumers should become eligible to choose their supplier by 2004, while households should gain this right by 2007.

Accession countries also have to commit themselves to the goal of liberalization. Taking this into consideration beside the fact that developments in the privatized Hungarian electricity industry outgrew its legal framework, the Parliament of Hungary passed a new Electricity Act in 2001.[2] The legislation was delayed considerably by the opposition of interest groups in the electricity industry. This new law took effect on the 1. January 2003. We shall now examine some elements of the Electricity Directive and the amended proposal for a new Directive, and compare the new Hungarian Electricity Act to their requirements.

1. Creation of new generation capacities

Considering the creation of new generation capacities the present Directive allows both authorization (all new capacities must automatically be approved if they meet the criteria in the authorization process) and tendering (new capacities are determined by the authorities, investors can tender for their creation and operation). The amendment proposes that only authorization should be acceptable – tendering should be reserved to cases when the safety of supply or the protection of the environment requires it, and if capacities created through the authorization process are insufficient. Furthermore, small plants (under 15 MW) and distributed generators should be entitled to a simplified authorization process by the amended directive.

The new Electricity Act is in accord with the requirements of the present and the proposed amended Electricity Directives as well. The establishment of new power plants with a capacity of at least 50 MW, their expansion, the increase of their capacity, selection or change of the fuel used, the termination of electricity generation or the decommissioning of a power plant are subject to authorization. The criteria of these permissions are set by the Hungarian Energy Office (HEO) and they must be open. If the criteria are met, the HEO has to issue the permission. The Hungarian Energy Office can now invite tenders to build new power plants only if supply does not meet domestic demand in the long run. The establishment of plants under 50 MW does not require permission by the authorities.

2. Transmission system operation

Member states are required to create independent transmission system operators. These are responsible for the operation, maintenance and development of the transmission network as well as the safe, reliable and effective operation of the whole electricity system. Since they constitute a monopoly, their independence will ensure that no producer or supplier gets unfair advantage at the distribution of transfer capacities. The present Electricity Directive requires independence in the management; the proposed new Directive takes this further by prescribing the legal independence of system operators.

The Hungarian legislation is very unique in this respect: the electricity system has an independent system operator whose exclusive task is the coordination and operation of the system. The system operator, MAVIR is a state-owned company; its ownership rights are practiced by the Minister of Economy and Transportation. The system operator is the central element of the electricity system, it can influence the operation of other licensees: information requirements are (on paper) strict in order to maintain the transparent, undiscriminative and accountable operation of the transmission system. The transmission network is (in at least 75%) owned, operated and maintained by a separate company, the transmission network licensee, OVIT (an affiliate of the state-owned electricity conglomerate MVM).

3. Distribution system operation

[2] Act CX of 2001 on Electricity

The rules of transmission system operators also apply to distributors: their independence is required too. They may be obliged to supply consumers on their territory; the tariffs of such operations can be regulated. The proposed new Directive demands legal independence here as well.

Hungarian distributors have independent accounting from public utility suppliers, but their legal separation is not required. The purpose of this looser regulation is to reduce costs shifted to consumers by allowing cross-subsidization between distribution and supply.[3] Obviously this situation will have to change as the new EC Directive comes into force.

4. Unbundling

Vertically integrated electricity companies have to keep separate accountings for their activities in different segments of the electricity sector. This should have prevented cross-subsidization between competitive and monopolistic sectors. As it turned out, this is insufficient: the proposed amended Directive orders the legal sepatation of monopolistic activities (transmission, distribution) from competitive ones (generation, supply).

The Electricity Act prescribes the unbundling of activities. The main rule is that all licensed activites should be pursued in legally independent companies: each licensed activity requires a separate license, has its own accounting, and all other, non-licensed activities mujst have a separate accounting as well. The system operator, the transmission licensee and the distributors, the operator of the organized electricity market, public utility suppliers and wholesale cannot perform any other licensed activities in the electricity industry. There is one exception to this: as mentioned in c), distribution and public utility supply (and wholesale trade) can be performed within the same company – in this case, only accounting unbundling is required. Separation in the ownership of licensees is not required, the sole exception to this rule is the independent system operator, which must be a state-owned company.[4] The measuring of electricity flows and consumption are assigned to the network licensees (the transmission network licensee and the distributors).

5. Access to the network

According to the Directive, member states must ensure non-discriminatory third party access: every participant of the electricity market should gain access to the network under the same, non-discriminatory conditions. If this is achieved, then transactions between participants can be physically realized – this is an important precondition for competition in generation and supply. The Directive allows the choice between negotiated (nTPA) or regulated (rTPA) third party access and a single buyer system. Negotiated third party access means that users of the network enter into bilateral contracts with the owner of the network, and access tariffs are determined in these agreements. Regulated third party acces means that every user gains access to the network under determined (and regulated) and open conditions and tariffs. In the single buyer system consumers must buy the electricity through a selected agent. The proposed new Directive will only allow regulated third party access. Regulators should first authorize these conditions and tariffs in the rTPA system.

By the law, the Hungarian transmission network licensee MVM and the distributors must make their networks available for all producers, traders, authorized consumers, public utility suppliers and the public utility wholesaler. The network charge is regulated by the authorities. Conditions of the network access cannot be discriminative, allow ground for abuse, contain unnecessary restrictions or endanger the safety and quality of supply. These conditions must be public. This means regulated third party access by the terms of the Electricity Directive, therefore the Hungarian regulation is in accord with the proposed new Directive in this respect.

[3] Preamble to the Act CX of 2001 on Electricity

[4] 180/2002. (VIII.23.) Korm. rendelet 57.§.

6. Regulation

Member states must create effective regulatory and control mechanisms to prevent abuse of market power and predatory behaviour. The new Directive will demand the establishment of national regulatory authorities.

The Hungarian Energy Office was responsible for the supervision of the electricity sector even before the new Electricity Act. This new Act further extended its responsibilities as well as its instruments. The Energy Office is intended to be a strong administrative authority whose tasks regarding the electricity industry are the protection of national, consumer and investor interests.

The national interest – manifested in the energy policy – is enforced thorugh the licensing and authorization process. Consumer interests are represented in the authorization of Operating Codes, Electricity Supply Codes, Distribution Codes, General Terms of Businesses, the setting of quality criteria, consumer protection and price regulation. The safety of investors is protected through the licensing system, the authorization of the above mentioned codes, and pricing. The promotion of competition is an important new task.[5]

In order to achieve these goals the Energy Office has the following tools at its disposal: granting, modifying and withdrawal of licenses; authorization of the Codes and Gernaral Terms of Businesses of licensees; preparation of regulated prices; gathering of information and analysis of the electricity system; setting quality standards of supply. The Office can impose fines; its decrees can only be contested in court. Practice shows however, that the Energy Office still does not have sufficient powers to effectively control the market.

The following activities fall under price regulation in the Hungarian electricity industry: „transmission and distribution, grid control by the independent system operator, sale of contracted public electricity produced by generators, trade between public utility wholesalers and public utility suppliers and to electricity sold to public utility consumers."[6] Prices are prepared by the Hungarian Energy Office on the principle of minimum cost, and they are enacted by decree of the Minister of Economy and Transportation. The Energy Office has to supervise these prices by the request of any party concerned.

Stranded costs incur at the public utility wholesaler: they arise subsequent to the re-negotiation of long-term supply contracts with power plants securing electricity production for public utility consumers. They are to be covered by a charge collected and managed by the system operator. It is collected together as a part of the system charge, but it is not considered an income of the system operator. Payments to the public utility wholesaler must be authorized by the Energy Office in advance. This procedure is intended to fulfil the intention of the legislators to minimize stranded costs. As consumers pay the system charges, they cover the stranded costs as well.

7. Market opening

Member states had to adopt the principles and rules of the Directive into their regulations by the 19. February 1999. This took place in every member country, with minor delays on occasion. Market opening was intended to be a gradual process: the consumption limit of eligible consumers was to decline step by step, reaching 9 GWh per year in 2003. According to the proposed amended Directive all non-household consumers will become eligible by 2004, then households by 2007. Countries could opt for earlier liberalization, and many of them did: most countries are well ahead of schedule, and 5 countries completely opened their electricity markets before 2003.

[5] Preamble to the Act CX of 2001 on Electricity

[6] Act CX of 2001 on Electricity, 95.§ (1)

Since the 1. January 2003 consumers with a yearly consumption of at least 6.5 GWh are eligible to choose their supplier on the Hungarian electricity market. This means that the free market is small at present, but it is expected to grow as the consumption limit will gradually be lowered. There are reasons against immediate liberalization. For example electricity prices in Hungary do not contain the costs of excess capacities as in most Western European countries. Liberalization would normally lower prices by eliminating these costs; in Hungary necessary investments in environment protection could drive prices upwards instead. Furthermore, some Hungarian plants produce electricity at uncompetitive costs and producers generally do not have comparative advantages over neighbouring countries.

In general, the new Electricity Act of Hungary taking effect on the 1. January 2003 harmonizes with regulations inside the European Union – it was indeed one of the main intentions of the legislation.

b) Freedom of capital flows

Another issue concerns the freedom of capital flows. The Treaty of Rome prohibits any restrictions of capital flows between member countries as well as between member countries and third parties. A communication of the European Council[7] rules that restrictions are compatible with the community law only under very specific circumstances. Restrictions can take two basic forms: either the regulators have to authorize the acquisition of shares beyond a threshold ratio, or the government retains special rights in the management of a (previously state-owned) private company in the form of a golden share. Any such interventions must comply four requirements according to the European Court: they must be (1) undiscriminative, (2) absolutely essential for public interest, (3) suitable to achieve the goals set, (4) finally, they must not exceed the necessary scale to achieve these goals. According to the Treaty of Rome the only valid goal can be public order and security; it cannot be an economic goal.

Ex-ante authorization has not been validated by the European Court yet, only the possibility of ex-post prohibition is acceptable. The Electricity Act gives the Hungarian Energy Office the right to authorize the acquisition of majority ownership. Furthermore, the Office is obliged to prohibit such acquisitions if they lead to excessive market concentration. The explicit purpose of this regulation is the protection of competiton on an electricity market that is dominated by vertically integrated multinational companies that have begun to concentrate their investments in Hungary.[8] Once inside the European Union, this regulation cannot be maintained.

By decree of the Privatization Act[9] the state has retained priority shares ('golden shares') after the privatization of certain state-owned companies. The state currently owns priority shares in 15 companies of the electricity industry: 8 power plants, all 6 suppliers and the OVIT (the national electric transmission line company). The ownership rights are exercised through the Minister of Economy and Transportation. Corporate decisions require the approval of the priority shares' owners in various questions including the change of share capital, change of rights belonging to shares, mergers, changes in the enterprise form, election of board members. State-owned priority shares can be the conditions of concessions as well.[10] These regulations do not correspond with the community law of the EU. The 2002 country report of the EU points out that Hungary has to modify the Privatisation Act and revise the state's priority rights regarding private companies.[11]

[7] Communication of the Commission 19/07/1997

[8] Preamble to the Act CX of 2001 on Electricity

[9] Act XXXIX of 1995

[10] Act XCVII of 1995

[11] 2002 Regular Report on Hungary's Progress towards Accession

III. Price control and price developments

At present, in Hungary as well as in EU member countries, the prices of public utility electricity are regulated. Even today, price control by authorities plays an important role in the government regulation of natural monopolies. The process of price regulation in Hungary is introduced in the following section. Price developments are discussed then, and a brief comparison to international price levels is given.

1. The method of regulation: price caps

The Hungarian Energy Office, the authority for price preparation, conducts cost supervisions every for years for power plants, suppliers, the public utility wholesaler and the system operator. It assesses justified costs, and a 'fair', 8.5 % return on assets is also acknowledged in the prices. Between the cost reviews a price cap is applied: prices can be increased by the consumer price index (hence: CPI), reduced by a productivity correction factor. There is a sole exception to the price cap: changes of fuel prices are acknowledged in the actual prices. The last cost reviews took place in 2000, and a new price regulation period began in 2001. From 2004 wholesale electricity prices will be liberalized.

Price capping is a widespread method of price control. In this case regulators limit the maximum of price increases in a given period – it is practically an indexation formula. The general formula of indexation is

$$P_{max} = P_{inf} - X,$$

where

P_{max} = upper limit of average price increase (price factor) in %

P_{inf} = average rate of inflation (inflation factor) in %

X = efficiency factor.

If we calculate for example with 5 % inflation and 3 % growth of efficiency (productivity), the upper limit to price increases will be 2 %. (Obviously the upper limit can be negative. In this case the average prices in the given sector need to be reduced.)

Price caps raise many methodological questions. These issues include the following among others:

- What price index should be used, how should justified costs be measured?
- What efficiency factors should be used?
- How to control whether regulations have been obeyed? In other words, how to measure actual average price changes? (Sanctioning of rule-breaking is a further issue.)
- What are the anticipated and non-anticipated effects of regulation? (E.g. to what extent does regulation distort the structure of sales and the relative prices?)

The principle of price caps appears in Hungary in the price regulation of energy as well as that of telecommunication.[12] Price caps in the electricity and gas industries are ex-ante: price changes can amount to the price factor. The inflation factor in use is the forward-looking yearly CPI estimate of the National Bank of Hungary, while factor X is subject to bargaining (its value varies around 0.6–0.7 %). If for example the NBH forecasts 5 % inflation and X equals 0.7, then the average price increase can be 4.3 % at most. The increase of individual prices is then regulated by the price authority: it „distributes" this average price increase among the roughly 100 different tariffs in such a way that the Laspeyres price index weighed with the previous year's values gives the average price increase given by the price decree.

In telecommunication – and in the international practice – regulation is ex-post. In this case the inflation factor is still forward-looking, but its planned value in the act on the state budget must be used. If the actual CPI (measured by KSH) differs from the previous yearly forecast, the inflation factor must be corrected by 2/3 of the difference. According to the current regulation the value of factor X is 3 % - a considerable efficiency growth is thus recognized in the ministerial decree. If the forecast was 6 % for the base year, 5 % for the actual year, and the measured inflation in the base year was 8 %, then the price factor is 5 + 1.33-3 = 3.33 %.

In the case of ex post price regulation the price cap only determines the average rate of price increase. The price authority supervises the actual change of prices after each year, and if a company increased its prices by a value that is greater than allowed, then the permitted price increase for the next year will be reduced by the double of the difference.[13]

2. The inflation index

It is seen from the Hungarian example that the price index can be a forward-looking estimate as well as a backward-looking factual data, and it can refer to consumption or a segment of production. In the case of forward-looking indexes authorities try to use some „official" index – for example the CPI estimated by the Ministry of Finance, used during the planning of the budget, or the CPI estimation of the NBH. the use of CPI is not necessarily desirable as the purpose of the inflation index is to capture cost increases of companies and include them into the price increases. The CPI may cover a totaly different bundle of goods than the actual input basket of firms. This can be remedied in the case of backward-looking indexes by using some sort of producer price index. (In the energy industry, for example, backward-looking industrial price indexes were used for a long time, adjusted by energy price changes.) In an economy with decreasing rate of inflation backward-looking indexes are impractical as they systematically over-estimate actual price increases. However, „official" estimates are only calculated for the CPI in Hungary, hence the compromise.

3. The productivity growth factor

The productivity growth factor is explicit, its forward-looking insertion into the formula encourages companies to increase their cost efficiency. For telecommunication this factor is significant, for electricity it is substantially lower, but both are fictive values: the are not connected directly to any indicator of the sector or the economy. Price caps however encourage efficiency growth beyond the productivity factor within a price regulation period, because its gains remain in the sector as realized profit. Table 1 gives a comparison of productivity growth.

Table 1 Volume indexes of gross production per employee, previous year = 100

[12] Electricity prices are regulated by the 65/2002 GKM decree, while telecommunication prices by the 3/2002 MeHVM decree. Gas prices have no valid pricing mechanisms since the 1. July 2002. Note that specific regulations change with time, but these do not affect our argument.

[13] At the introduction of price regulation it was unknown to firms how the authority will control the actual price increases. This formula was still under evaluation during the writing of this paper.

Sector	1999	2000	2001
Electricity, gas, steam and water supply	107,5	112,3	100,1
Transportation, storage, postal services, telecommunication	92,0	107,8	108,3

(Source: KSH)

The actual change of productivity is not captured by the productivity growth factor of the sector, rather it follows cycles in demand and price regulation. (In the electricity industry, the new pricing cycle began in 2001.)

4. Control of price increases by the price cap

At present there is no need for the control of price increases in the electricity sector since all prices are regulated ex-ante, and only slight structural changes may take place between periods that influence the average price and sales revenues. In the case of the internationally widespread ex-post regulation, where only the average rate of price increase is limited, the measuring of actual price increase is an important issue. Since it is a posteriori measuring, Paasche and Fisher indexes can be calculated instead of the ex-ante type Laspeyres index. In this case the calculation of Paasche price indexes is the most convenient.

5. Effects of regulation: the evidence of data

Table 2 summarizes available price indexes for the actual and base periods.

Table 2 Price indexes for the target (2001) and base (2000) years

Index	Previous year =100
Consumer price index	109,2
Consumer price index for telecommunication	105,3
Industrial producer price index	105,2
Industrial domestic sales price index	109,4
Forecast of the National Bank	108,0
Forecast of the Ministry of Finance	107,0
MF forecast for the previous year	107,0
CPI of he previous year	109,8

(Sources: KSH, Ministry of Finance, NBH)

According to the logic of price caps, the maximum average price increase for the electricity in 2001 can be 8-0.7 = 7.3 %. For telecommunication this ceiling is 7+1.9-3 = 5.9 %.

The distribution of price increases among individual tariffs is the task of the price authority or the companies, according to different regulations. The price authority may choose to raise all tariffs at a common rate, in this case any price index will give the required rate of price increase. This is not typical however, because tariffs rose at different rates in recent years first to prevent cross-subsidization, then because political the need to differentiate tariffs.

6. The evolution of prices

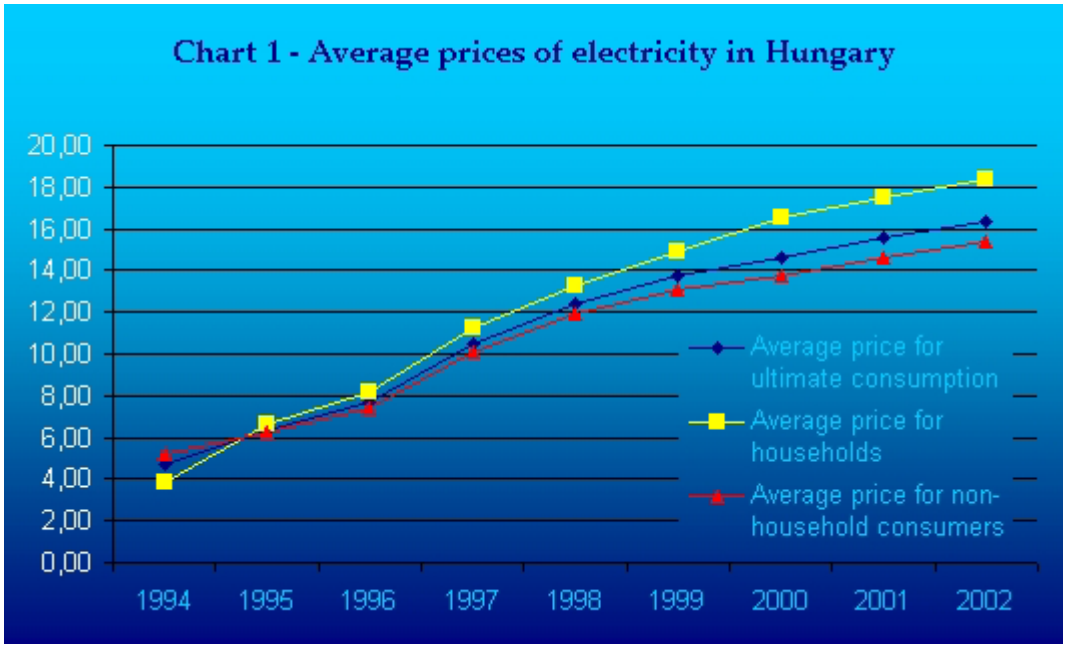
The most recent official price increase took place on the 1. February 2003. Table 3 summarizes the information on recent years' price increases.

Table 3 Prices and price changes 2001-2003

	Prices HUF/kWh			Change %	
Category	2001.	2002.	2003	2002.	2003
	January	January	February	January	February
Average for ultimate consumption	15,5	16,3	18,0	5,0	10,0
Household (average)	17,5	18,3	19,9	4,8	8,6
General ("A")	21,0	22,0	23,7	4,8	7,7
Guided ("B")	9,7	10,2	11,6	5,2	13,7
Employee ("C")	5,7	6,0	6,6	5,3	10,0
Non-household (average)	14,6	15,4	17,0	5,1	10,8
By voltage					
high voltage (average)	9,8	10,4	11,6	5,5	12,2
medium voltage (average)	13,1	13,8	15,2	5,1	10,5
low voltage (average)	18,8	19,7	21,9	5,0	10,8
By pricing					
Capacity charge (average)	12,6	13,3	14,8	5,2	11,4
Public lighting (average)	25,6	26,9	29,0	5,1	7,9
Base price (average)	20,4	21,4	23,6	4,9	10,0

(Source: HEO)

The average change of electricity prices can be followed on the following chart.

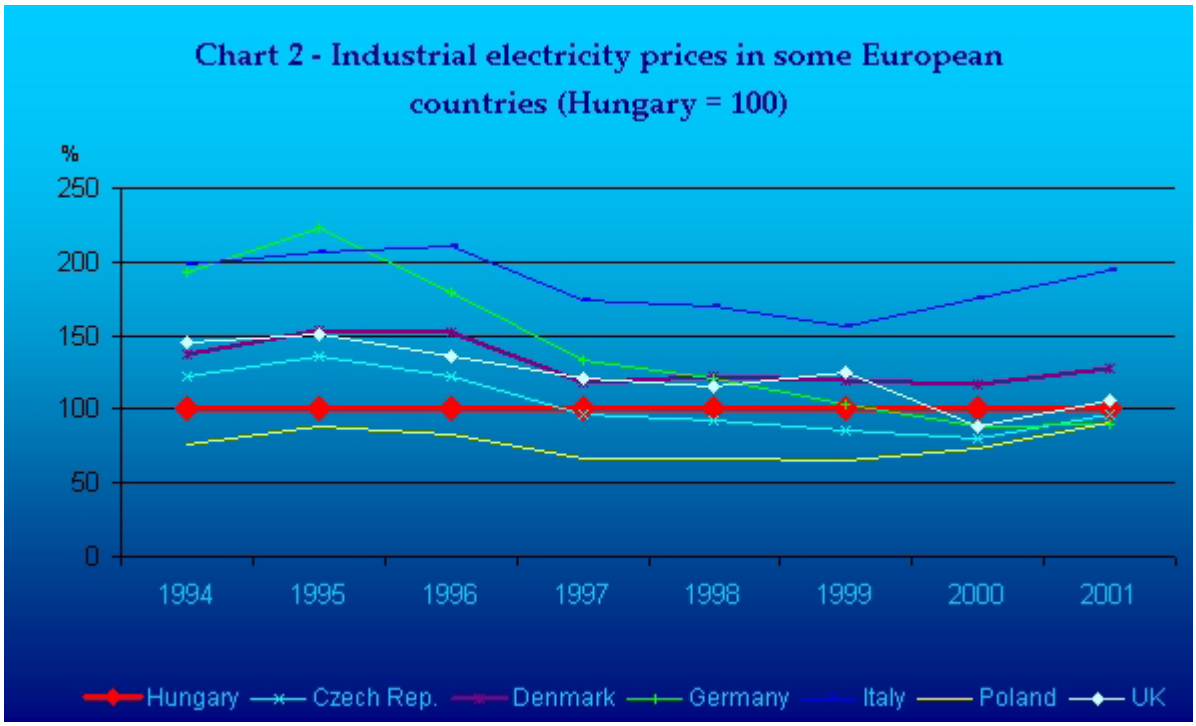


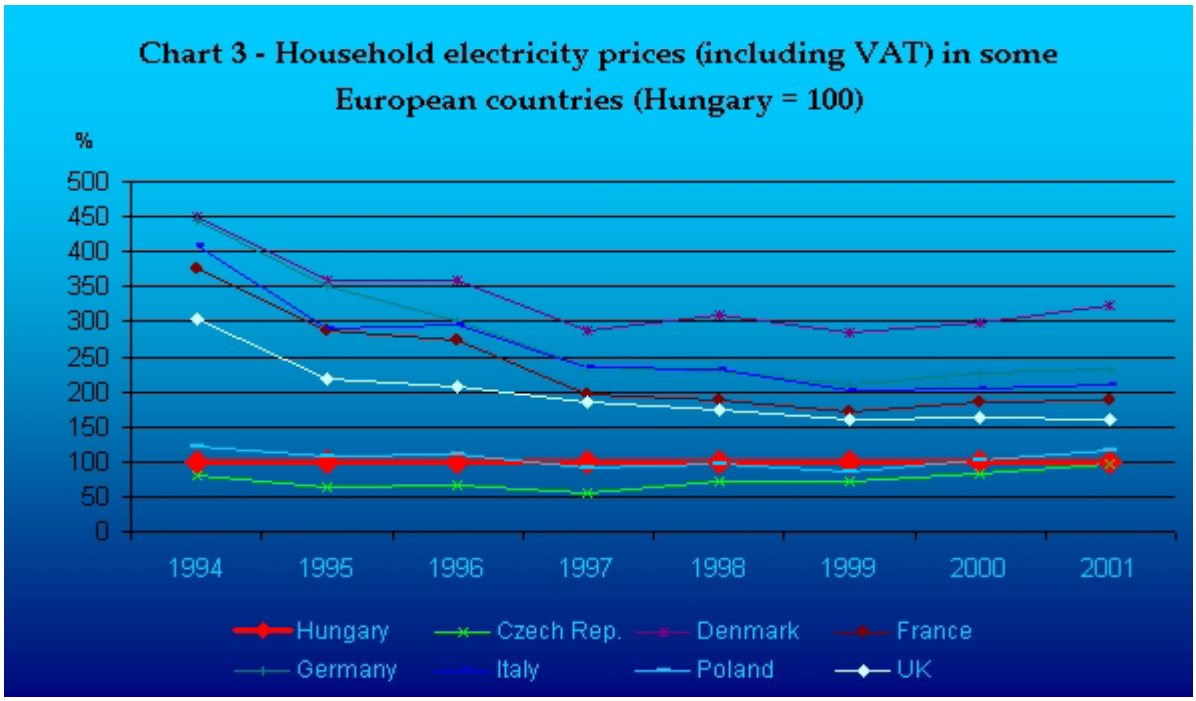
Both household and non-household prices increased at a rate below the rate of inflation in the last three years.

From 2003 price regulation changes in accord with the new Electricity Act and market opening. Authorized consumers purchase electricity on the free market – its price can be about 6-10 % lower than public utility prices, based on the scarce experiences. Public utility consumers continue to buy electricity at regulated prices. From January 2003, prices consist of two elements: the price of the actual product (this can be regulated or market price), and system charges (which is regulated for all consumers). The latter cover the justified expenses of the system operator, the transmission and distribution companies.

7. An international comparison of prices

Numerous factors hinder the international comparison of electricity prices. Taxes and subsidies can differ and the exchange rate may cause distortions as well. Still, the magnitude of price differentials are visible on Charts 2 and 3.





(Source: IEA)

Hungarian electricity prices are lower than the European average, but the difference of household prices decreased substantially. Since 1995 inflatory pressures in electricity prices have disappeared, the current price levels are not suppressed.

Some comparative figures based on more elaborate Eurostat statistics are summarized in Table 4.

Table 4 Prices in 2000

	Medium-size household (Eurostat Dc, 3500 kWh)	Small industrial consumer (Eurostat Ic, 160 MWh)	Medium-sized industrial consumer (Eurostat IeGWh)	Large industral consumer (Eurostat Ii, 70 GWh)
Hungary	63	79	49	38
Sweden	65	49	39	21
Germany	107	81	52	37
France	91	78	55	43

(Source: Eurostat and HEO calculations)

At the direct comparison one must take into consideration that in Hungary wages, real estate prices and environmental costs are significantly lower than in Western Europe. The wage cost per employee in the Hungarian electricity industry is 830 EUR per month, while 4300 EUR in Germany. This means that the costs of the Hungarian electricity sector are yearly 1.4 billion EUR (350 billion HUF) lower than if companies paid German wages. This 350 billion HUF cost advantage from suppressed wages explains in itself 80 % of the difference between the Hungarian and German energy prices. The German net prices are only an average of 10-20 % higher than Hungarian electric energy prices, and in the case of large consumers enjoying the advantages of competition they are definitely lower.

8. Network tariffs

After market opening an international comparison of regulated network charges becomes important. The results of a recent study regarding network charges are summarized next.

The Hungarian electricity system resembles the Portugese and the Dutch by the length of the transmission lines. The Portugese electricity consumption is similar to the Hungarian (36.7 TWh), the Dutch consumption in contrast reaches 100 TWh.

Yearly (unit) transmission costs are higher in Hungary than expected by the average of similar countries within the EU, but the effective value of the „transmission fee" is much lower (similar to the cases of Denmark and Ireland).

Transmission fees introduced in Hungary on the 1. January 2003 are somewhat simpler than in other counties analyzed. The main features of the Hungarian transmission fee:

- exclusively energy-based (like in Denmark and Finland),
- homogeneous for the whole country (like in most countries),
- initially paid exclusively by consumers (like in Belgium, Denmark, France and Germany),
- does not differentiate between peaks and valleys (like in Belgium and Germany),
- its value is expected to be around 5.5 EUR/MWh, placing Hungary into the group of „low transmission fee" countries (together with Sweden, Holland, Norway and Germany),

- Hungary will show the closest resemblance to Eastern Denmark with the exception of the fact that in Denmark three different zone-time transmission fees are applied.[14]

[14] Two system operators function in Denmark, and their tariff structures are slightly different. In Western Denmark producers must pay transmission fees as well.

IV. Demand Side Effects

This section deals with electricity demand in Hungary. The size and structure of current consumption is analyzed, and an estimate of future electricity demand is presented. Household electricity consumption is then investigated in detail, revealing that Hungarian households spend an unusually large share of their incomes on electricity. Finally, consumer satisfaction with the quality of electricity supply is addressed.

a) The size and structure of consumption

1. Size of consumption

The following table summarizes the number of electricity consumers in Hungary between 1990-2001. This is a basic measure of the size of the market.

Table 5 The number of consumers

Year	1990	1995	1996	1997	1998	1999	2000	2001
Total	4784	5019	5050	5075	5085	5103	5122	5118.4
including								
household	4375	4563	4583	4598	4642	4768	4787	4787.2
other	409	456	467	477	442.7	335.06	335.1	331,.2
including								
productive sectors	87	92	94	100	102	102	102	101
unproductive sectors	322	364	373	377	340.7	233.06	233.1	230.12

(Source: HEO)

The number of household consumers is somewhat misleading as weekend houses, garages, etc. are registered by suppliers as separate consumers. Still, the figures represent the dynamics of growth. The amount of consumption over the past few years is relatively stable. According to the newest data[15] total electricity consumption in 2002 was 39.8 TWh, which means a 1.1 % increase from 2001. Based on own preliminary calculations 0.5 precentage points are explained by weather, the rest is real increase in the quantity.

The distribution of production changed. The 13.9 TWh production of Paks fell by 1.2 % behind its 2001 production, and it supplied 35 % of all energy demand. The production of other public generators declined at the same rate. Growth was significant in the foreign trade balance, net imports in 2002 were 4.3 TWh, exceeding the previous year by more than 1/3. After the recent disturbance in Paks, Block 2 of the nuclear plant is expected to be out of service for at least a year – this will reduce the share of Paks for some time.

Fundamental trends of the previous decade are illustrated on the following four charts.

[15] Source: Energia Központ Kht, 2002. évi gyorsinformáció

Chart 4 - Volume index of GDP, total energy consumption (PJ) and electricity consumption (MWh), 1980=100%

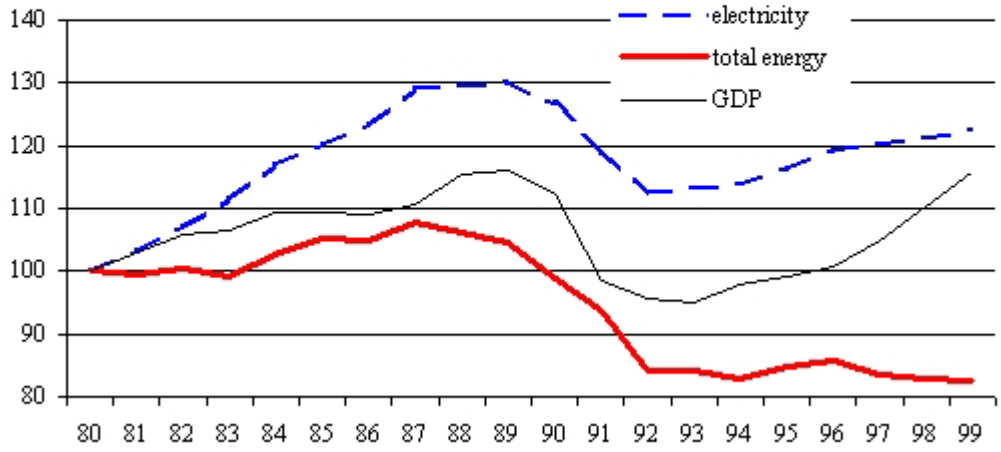


Chart 5 - Industrial production, energy and electricity consumption in the industry, 1980=100%

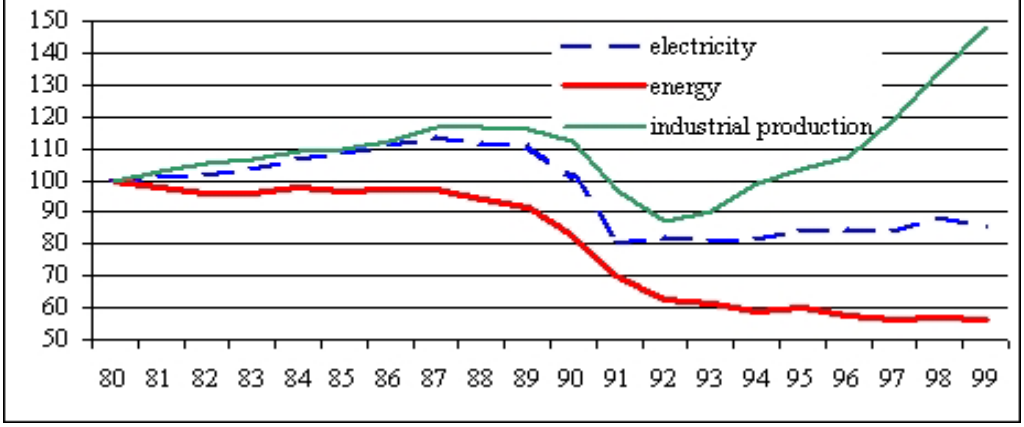
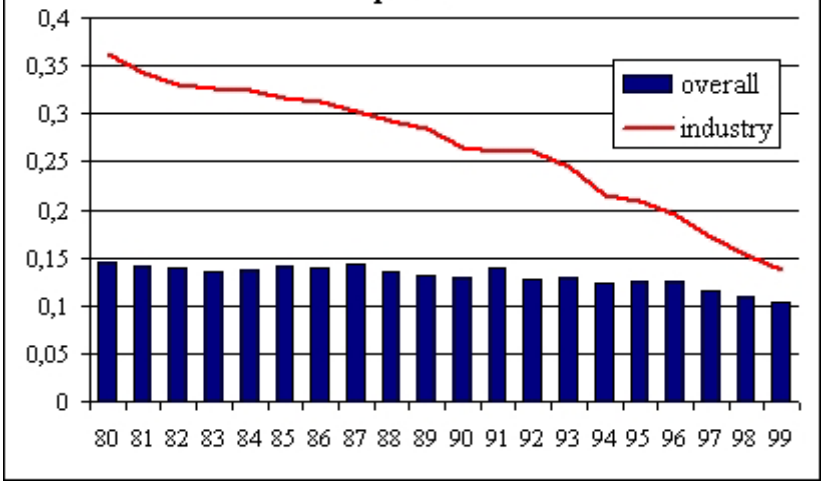
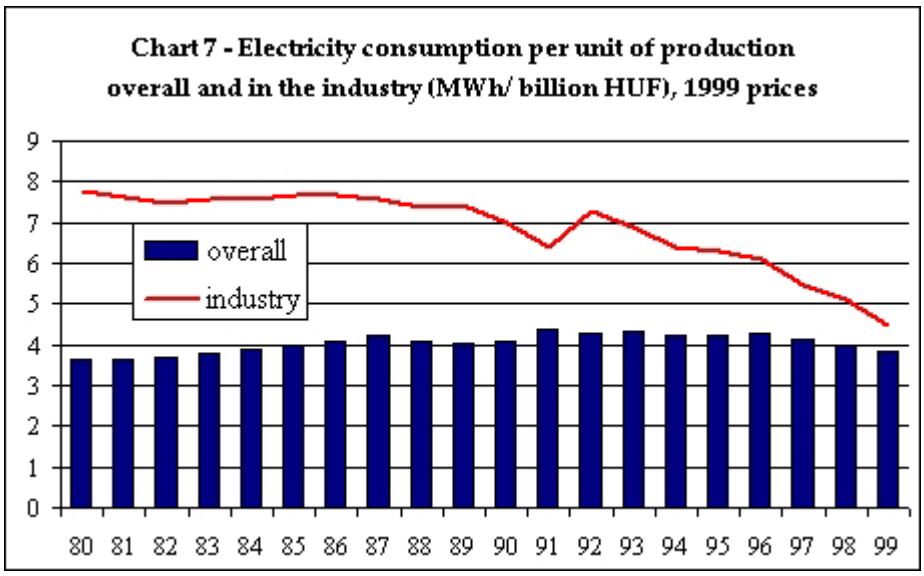


Chart 6 - Energy consumption per unit of production overall and in the industry (PJ/billion HUF, 1999 prices)





(Source: KSH)

Total energy consumption and electricity consumption both declined parallel with the transformation crisis of the Hungarian economy. Economic growth returned in 1994, but only electricity consumption followed its trend, total energy consumption kept declining until 1999, and while the GDP in 1999 reached the level of 1989, total energy consumption remained more than 20 % below the figures in 1989. Decline in the use of electricity is most striking in industry. Industrial production has been growing since 1993, the volume of industrial production in 1999 was 28 % higher than in 1989. Energy consumption in the industry has continously been declining since as early as 1980, its 1999 value is only the half of the 1980 level, around 60 % of the 1989 level. Electricity consumption grew slightly in the 1980s, then deteriorated from 1987, and stagnated after the upswing of production as well. In 1999 industrial consumption of electricity was 25 % lower than in 1989.

Relative energy consumption is best illustrated by energy consumption per unit of value added.[16] Overall, the 1980s were characterized by stagnation-slow growth of relative consumption, while it declined in the 1990s (with the exception of 1992, the year after the great slump in production). In the industry energy consumption per unit of value added has been declining as a tendency, transition did not cause structural changes. Energy consumption per unit in 1999 was less than half of its 1989 value.

The situation is slightly different if electricity consumption is considered. For the whole of ther economy consumption per unit grew moderately until 1996. It has shown some decline ever since, but it is still just 6 % below its 1989 value. This increase of consumption per unit is not caused by industry, for its consumption has been declining practically without any breaks, and by 1999 fell to 60 % of the 1989 level.

[16] Value added was calculated on the unchanged base price of 1999.

2. The structure of consumption, expected trends

Table 6 Electricity sold, GWh and %

Year		1997	1998	1999	2000	2001
Total		29270	29947	30033	30631	31647
	Households	9780	9751	9803	9792	10130
	Productive sectors	15004	15358	14806	15201	15244
	Other consumers	4486	4838	5424	5638	6273
%						
	Households	33,4	32,6	32,6	32,0	32,0
	Productive sectors	51,3	51,3	49,3	49,6	48,2
	Other consumers	15,3	16,2	18,1	18,4	19,8

(Source: HEO)

The share of households is stable around 1/3, the weight of productive sectors is slowly deteriorating.

According to the 2001 survey of the economic research institute Gazdaságkutató Intézet (GKI) the following trends are expected in the next years.

1. The following table illustrates the expected electricity demand of the Hungarian economy between 2000-2015.

Table 7 Projected demand for electricity (TWh)

	1999	2005	2010	2015
Productive sectors	28,4	32,4	34,2	36,4
Households	9,7	10,7	12,0	12,9
Total	38,3	43,1	46,2	49,3

2. The year-on-year growth rate of average electricity demand will move around 1.4-1.6 % for the productive sector, 1.7 % for households, while the total electricity demand of the economy will grow by 1.5-1.7 % y/y.

3. An average 5 % y/y annual growth of GDP is assumed; 0.3-0.35% growth of electricity demand is expected to be generated by 1 % growth of the GDP.

4. In the productive sector the energy demand per unit is expected to deteriorate further, although its rate will gradually dampen. Expected demand of households is determined by prices in the first half of the period, and the fast modernization and replacement of household installations in the second half.

5. Further improvements in the consumption per unit on the national level are not going to be induced by structural changes as in the 1990s, but by continuing restructuring on the micro level, and by radical changes in technology.

6. The prognosis of electricity demand was evaluated by assuming the evolution of a knowledge-based economy. Alternate growth paths affect GDP growth, not the expected demand for electricity.

7. Partly due to the differences in the initial position, and partly due to the change of production and household consumption structures, the growth of the Hungarian economy's demand for electricity differs from international trends. In developed countries electricity demand grows at a rate close to the GDP growth rate. In Hungary, electricity demand's growth rate will fall behind GDP growth in the next 15 years.

b) Energy costs of households

Household statistics (hence HS) of the KSH[17] supply information on the energy costs and their weight in the consumption basket of the Hungarian population. The newest version of HS is that of 2001, but data broken down by deciles were last published in 1999. A detailed analysis of household energy consumption (hence HEF) was carried out in 1996 with the support of EUROSTAT, but it has not been repeated due to the lack of financial resources.

Table 8 The structure of energy consumption by spendings and the quantity of heat

Source of energy	Structure of consumption %	
	By spendings	By the quantity of heat
Electricity	35,4	10,5
Natural gas	29,3	38,9
PB gas	6,8	2,9
Central heating	15,3	18,3
Coal, briquet, coke, other	13,2	29,4
Total	100,0	100,0

(Source: own calculations based on HS and HEF)

It is visible that electric energy is relatively very expensive, while natural gas and „other" methods of heating (wood and other solid fuels including lignite-based fuels) are cheap.

If one intends to view energy consumption by its purpose, the 1996 data of HEF are available. It is not expected to have changed considerably since then.

Table 9 Structure of energy consumption by purpose (based on thermal values)

Sources of energy	Heating	Water heating	Cooking	Other	Total
Electricity	13.8	43.2	8.5	34.5	100
Natural gas	75.8	6.6	17.6	0	100
PB gas	8	0.5	85.9	5.6	100
Central heating	81.3	18.7	0	0	100
Coal, briquet, coke, other	83.1	1.5	15.4	0	100
Total	70,3	11,0	14,9	3,8	100

(Source: own calculations based on HS and HEF)

The amounts of money spent on different sources of energy, and their weight in total consumption can be found in various splittings in household statistics. It is practical to consider data based on income deciles. (From this point, fuels are not taken into consideration.)

Spendings on energy amount to 12 % of all spendings for an average household. The largest portion of this is spent on electricity (37 % of energy costs, 4.4 % of all personal spendings), second in rank is pipeline gas (31 % of energy costs, 3.7 % of personal spendings), the third is central heating (14 % of energy costs, 1.7 % of personal spendings).

Appendix A shows differentials by income deciles. Note that the weight of energy costs declines with the increase of income: in the lowest decile it is 14 %, in the highest just 8 %.

[17] Household statistics were calculated by data on 10144 households in 1998 and, 10185 households in 1999. Since these statistics are created by samples, sampling errors occur apart from non-sampling ones (such as refusal to answer, false data, etc.) – that is, results are also affected by random effects.

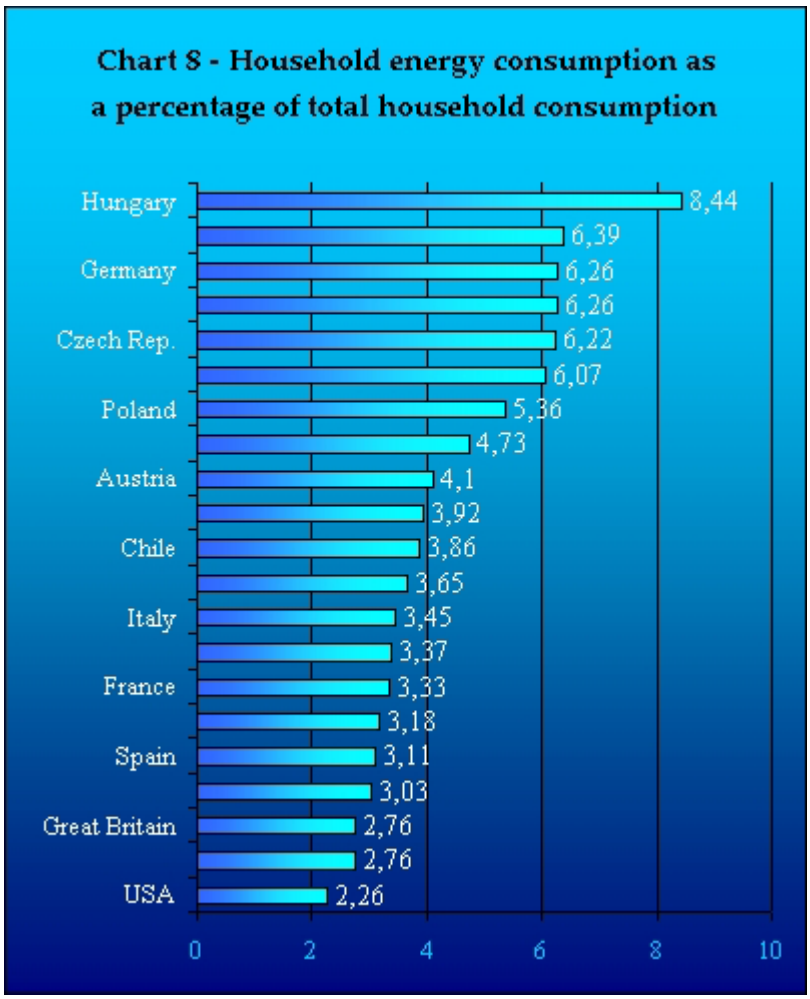
According to Hungarian household statistics energy consumption accounts for around 12 % of all personal spendings. International comparison is hindered by multiple factors:

- Household statistics usually record energy spendings by value; comparisons can be distorted by tax systems as well as by differences between the purchasing power and the nominal exchange rate of currencies. Comparability of quantities can only be ensured with unified methodologies and specialized household surveys on energy consumption. The most recent such survey was carried out in the EU in 1995, and in 11 transition countries (including Hungary) in 1996 with the assistance of EUROSTAT. The results of these surveys can be used for deeper analyses.

- If the weight of the value of energy spendings is in question, it is convenient to use the values in household statistics. The main source of problem here is the basis of comparisons, total spendings. These are strongly influenced by payments in kind, transfers, production for own consumption and other imputed incomes. The EUROSTAT recommends (in compliance with the principles of the SNA) the imputation of everything possible. Hungarian household statistics include production for own consumption, transfers between households, but many important imputed elements are omitted, the most prominent being the imputed rent of own apartments (which does in fact appear on the consumption side of GDP). This is a significant item – if it is taken into account, the weight of energy spendings remains below 12 %.

Figures of the Euromonitor for 1998[18] relate energy spendings of households to total household spendings by the definition of the SNA, using a common methodology. The following chart shows electricity spendings of households as a percentage of their total spendings. It is clearly visible that energy spendings in Hungary are strikingly high. Other Easter Central European countries are on the same level as Germany, Denmark and Sweden.

[18] World Consumer Income and Expenditure Patterns, Euromonitor 1999



c) The quality of electricity supply

A study on electricity consumer satisfaction (Rekettye-Orosdi 2003) indicates that price is a dominant factor of satisfaction for both household and non-household consumers, and that most consumers are dissatisfied with them (almost 93 % of consumers hold prices important, but only 53 % are content with them). Further crucial factors are the quality of supply and the recovery of failures. These are understandably more important for non-household consumers who are more sensitive to quality than to price. The importance of price is stable over time, but quality has gained importance for all consumers. According to the experience of developed countries, the sensitivity of consumers to the quality of electric energy will increase with the spread of information technology.

The quality of supply is a major weakness in the Hungarian electricity industry. Total failure indicators are summarized in Table 10. It is difficult to compare individual years, partly due to external circumstances such as weather conditions. Totalled average values also blur extreme values created in the fields of services. Since failure indicators are evaluated jointly by the Energy Office and the supplier companies, their objectivity can be compromised.

Table 10 Failure indicators

Total failure indicators	Unit	1995	1996	1997	1998	1999	2000	2001
Number of failures	cases	9501	10544	8595	10231	9948	8063	7835
Lost electric energy	MWh	3614	4668	3688	4232	5146	4489	4408
Loss indicator	x 0.1 %	0,109	0,138	0,108	0,123	0,149	0,128	0,123
Average failure time	minutes	57,4	72,5	57	64	78,2	67,2	64,4
Loss per consumer	kWh/consumer	0,721	0,895	0,726	0,839	1,009	0,876	0,856

(Source: HEO)

The figures do not show systematic trends. There has been some improvement between 1999-2001 – electricity companies initially did not take sufficient measures to improve the quality of their services, but their investments into the networks may come to fruition eventually. However, improvements are not of a significant scale, as the values of 2001 are still worse than those in 1995. The question remains whether market opening will bring about an improvement in the quality of services.

A reliable Hungarian electricity system can be a comparative advantage in attracting high-tech industries, while power shortages, unexpected malfunctions and long recovery times can discourage these investments. Reliability can only be attained on the system level: it involves among others large reserve capacities, efficient system operation, sufficient hedging mechanisms against price volatility, reliability of the network hardware, the elimination of electricity stealing. Therefore policymakers and companies should work together to promote the reliability of supply. Incentives must be created to encourage investments into the network since these investments only bring results in the longer run, while saving on these investments can increase profitability in the short run.

In 2000 the Energy Office imposed fines on four electricity suppliers for the deterioration of the quality of their services. The suppliers appealed to court, and the court overruled the decision of the HEO. Because the HEO is assigned with the task of consumer protection, it is obvious that the imbalance in the bargaining powers of the companies and the HEO is unfavorable for customers.

V. Supply Side Effects

Three supply side issues are analyzed in detail: the structure of the electricity markets – wholesale and retail –, foreign trade in the electricity industry, and employment effects.

a) Market Structure

The Hungarian electricity industry is headed towards liberalization. The main purpose of liberalization is to promote economic efficiency – this is best achieved through competition. The electricity industry is by nature far from the textbook models of competition. Certain elements in the supply of electricity – transmission and distribution – are natural monopolies due to the very large fixed costs. Also, certain services (ancillary services) need to be supplied at system level – hence the need for a system operator. Therefore when speaking of the liberalization of the electricity industry one should understand it as the liberalisation of generation and supply, while providing 'fair' access to the network and ancillary services.

This section will analyze the current market situation of electricity generation and supply in Hungary. As the new Electricity Act introducing competition to the industry took effect only recently, data are only available on the situation prior to liberalisation. In the case of generation this does not cause difficulties, because the same power plants and the same companies continue to generate electricity. But the market for electricity (both wholesale and retail) is split in two: public utility supply and „free market" supply for authorized customers. The Electricity Act is very strict in this separation: public utility suppliers cannot sell electricity to authorized consumers and a public utility wholesaler can only appear on the wholesale market „if the amount of electricity contracted for public utility purposes remains below the extent of its obligation to supply."[19] Also, electricity traders are not entitled to selling electricity for public utility purposes (except for the case mentioned above). Most of our data describe the old public utility market. At this moment this is the dominant market segment – the free market is marginal, but this is expected to change in the future.

Foreign capital is already widely present in the Hungarian electricity industry. Starting with the privatization of electricity suppliers in 1995, the industry attracted substantial foreign investments. These are strategic investors with long time horizons; they are mainly Western European and American integrated energy companies. Around 52 % of all equity in the electricity sector is in foreign control; for generation it is 31 %, for suppliers 87 %. Penetration of foreign capital to electricity generation generally started later, and the state-owned MVM retains strong positions.

1. The Wholesale Market: Electricity Generation

The wholesale market for electricity is characterized by the position of producers. Electricity is produced in various power plants but not all of them are likely to influence price and the quantity of supply on the free market. There are 10 major, possibly influential power plants in Hungary. Their installed capacity, 6631 MW (in 2000) is around 80% of the total, while their production, 32.9 TW (in 2000) accounts for 95% of domestic production and covers 85% of all domestic consumption. The following analysis will cover these plants.

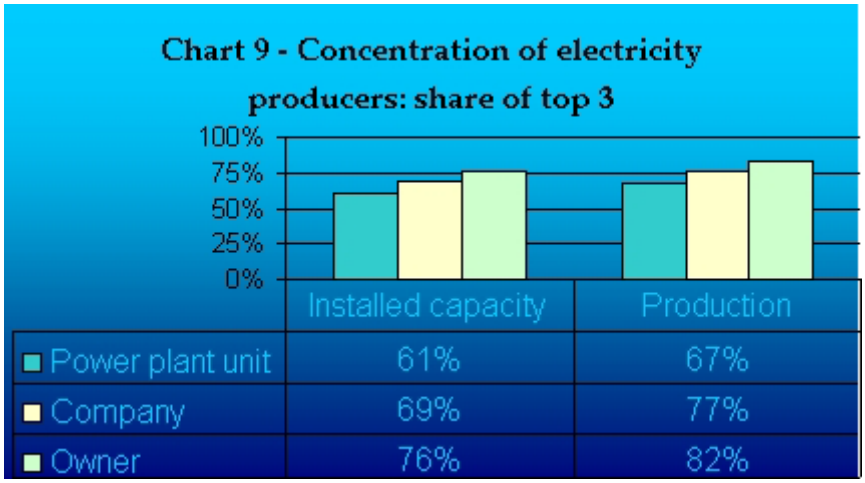
Various questions arise when creating indicators of market structure. First: what are the observation units? One can examine power plant units, companies or owners. All of these approaches are valid. Since power plant units may use different technologies, different fuels and require different amounts of maintenance, they will operate with different marginal costs. Another possibility is to consider companies, because one

[19] Act CX. of 2001 on Electricity, 44.§ (1)

company may own more power plants and can cross-subsidise less economic units to maintain their market share for example. The third approach, the comparison of owners is justified by the same principle as before: owners controlling more companies can cross-subsidize less profitable generator companies – and their weaker performance may not necessarily have technological reasons. Hungarian electricity companies are typically owned either by major multinational companies or largely state-owned companies (usually the MVM) – it is plausible to assume that they consider singular power plants and affiliates as parts of their portfolios, and try to maximize their profits at the portfolio level.

Another issue is the question of attributes to be investigated. One can consider technological parameters like installed capacity, production, or economic parameters like different income categories.

Chart 9 summarizes some indicators of market concentration for the market of major power plants. When calculating these figures only the installed capacity and production of these plants was taken into account, other, smaller plants were omitted.



(Source: own calculations, HEO)

It can be seen that electricity generation in Hungary is rather concentrated. This concentration is more pronounced in actual production than in installed capacity. This can be explained by the fact that the nuclear power plant in Paks, the biggest generator both in installed capacity and actual production, operates at the highest capacity utilization ratio as well. Note that the market is more concentrated on the corporate level, and even more so on the level of owners: while the top 3 producer plants account for 67 % of production, the top 3 owners control 82 % of the major generating capacities. It is worthwhile to distinguish between Hungarian and foreign-based owners because the Hungarian conglomerate MVM is still the the greatest player simply by owning the nuclear power plant. Furthermore, the MVM has large (although not majority) shares in the second and third biggest generators. Table 11 shows the share of Hungarian and foreign owners in the top 3 electricity generators (based on production in 2000).

Table 11 Ownership structure of the top 3 generators

Owner	Share
State and municipial	0,1%
Hungarian 'private'	74,2%
Foreign	25,7%

(Source: HEO)

The greatest generator companies, responsible for 3/4 of total production, are mainly in the hands of Hungarian 'private' investors – note that the greatest of these, the MVM is a state-owned company, so it can be concluded that the bulk of electricity generation is directly or indirectly controlled by the state.

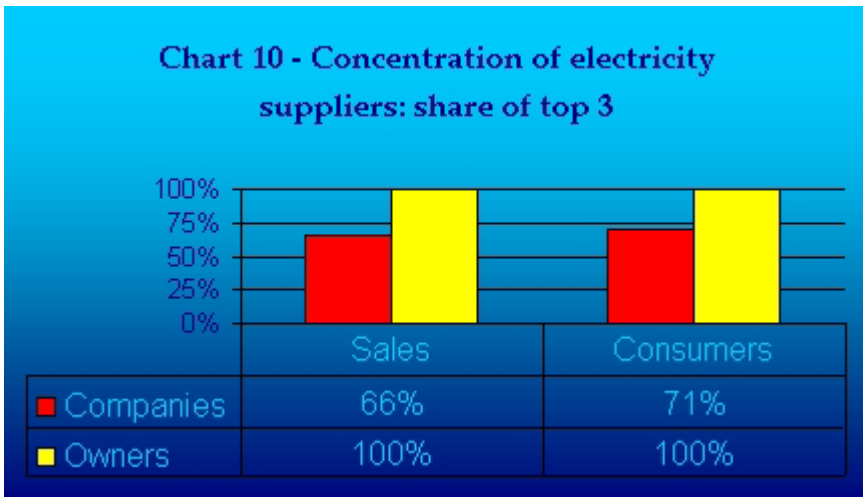
Most of the free capacities of Hungarian power plants belong to those with higher marginal costs: Paks utilizes over 86 % of its installed capacities, and other large plants with relatively low marginal costs utilize over 75 % as well. Since the Hungarian electricity system is very rigid and concentrated, it needs considerable secondary reserves, which are supplied by relatively expensive plants, usually gas turbines.

Since the Hungarian electricity generating sector does not possess significant excess capacities – note that Hungary is a net electricity importer – each generator is indispensable to the system. This increases their market power: even the smaller units can behave as monopolists and drive up wholesale prices – these will be liberalized in 2004. There are various techniques to maintain the security of supply and tackle the problem of excessive market power. In Hungary, the system operator MAVIR organizes auctions where power plants can (in the case of primary reserves, must) offer reserve capacities in exchange for a fee eventually paid by consumers (as part of the system operation charges). In case of shortage these capacities must put at the disposal of the system operator. Also, a well-functioning power exchange can dampen price volatility and enhance the security of supply with hedging and other types of contracts. There are attempts for such a power exchange but it is far from being fully operational at present.

Perhaps the best way to promote competition would be the increase of relatively cheap electricity import – partly from the other Visegrád countries. This would force domestic producers to lower their prices – although prices should not drop too low because it could undermine the profitability of domestic producers and discourage further investments in new generation capacities.

2. The Retail Market: Suppliers

Most of our data cover public utility suppliers on the 'old' market. Again we can examine supply companies and their owners. The attributes will be the electricity sold to consumers and the number of consumers. Since public utility suppliers are organized on a regional basis, differences of population, economic development, etc. within the country affect their market share as well. Chart 10 summarizes the indicators: the share of the top 3 public utility suppliers.



The concentration of sales and number of consumers is rather similar. All 6 public utility suppliers are in the control of 3 foreign-based companies. Since the prices of public utility wholesale trade and supply are regulated, this concentration is not threatening competition directly, although it certainly makes the cooperation of public utility suppliers easier and adds to their bargaining power.

Some data is available on the 'free market'. Five electricity traders were granted licenses on the 1. January 2003, while three more have applied for licenses and are expected to get them during the year. Their projected total revenue in 2003 is about 91.7 billion HUF (around 405 million USD).[20] It seems that their presence is going to be concentrated, at least in the short run: the biggest trader accounts for 56 % of all sales, while the top 3 for 81 %. Total capacity supply by power plants for the free market is expected to be around 250-300 MW in 2003.

b) Foreign Trade

This section analyzes two questions. First, trade in electricity, which is in fact more a question of demand than supply, because Hungarian generators do not produce electricity for export purposes. Import electricity is a source of supply however, and it can influence domestic suppliers by posing competition. Second, the effects of the exchange rate policy are discussed: this influences the supply side through various channels like financing, expected returns, imported investment goods and fuels.

1. Cross-border trade of electricity

Hungary does not produce electricity for export, in fact the country imports around 3000 GWh of electricity every year (roughly 10 % of total consumption). Another 3-4000 GWh of electricity are transferred through Hungary. The trade balance in 2001 showed 3314 GWh net electricity imports worth 21.7 billion HUF, while the total turnover was 10,723 GWh worth 65.5 billion HUF.[21]

Foreign trade is limited by cross-border transfer capacities. Some of these capacities are reserved for security reasons, while a large portion is bound by long-term contracts of the MVM. The rest is available for 'free market' import. The system operator MAVIR organizes capacity auctions to allocate free capacities – deliveries are then executed by the order of the offers. Table 12 summarizes cross-border capacities (where data was available).

[20] For the sake of comparison: the sum of the revenues of public utility suppliers in 2001 was 493.1 billion HUF

[21] Approximately 75 and 226 million USD respectively at the exchange rate of 290 HUF/USD

Table 12 Cross-border capacities (in MW)

Country	Total Transfer Capacity	Net Transfer Capacity	Net Transfer Capacity (regulated)	Notified Transmission Flows	Available Transfer Capacity
Austria	900	700	460	0	460
Slovakia	900	700	460	190-350	110-270
Croatia	1000	900	460	0	460
Ukraine	500	500	460	175-250	210-285
Total	3300	2800	1840	365-600	1240-1475

(Source: HEO)

Net transfer capacity equals the transfer capacity remaining after the deduction of transfer capacity reserves. Since imports from any country cannot exceed the secondary reserves of the electricity system, transfer capacity to each country is reduced to 460 MW. Notified transmission flows include long-term import contracts of the MVM. The final column shows the capacities currently available for 'free market' import. Projected demand exceeds these capacities. As owners of electricity suppliers happen to own power plants on the other side of the border, they may plan to import electricity from their own generators.

It is interesting to mention that the current long-term import contracts of the MVM are rather expensive: the weighed average price is about 36 EUR/MWh or 9 HUF/kWh for three large contracts securing yearly 3909 GWh.[22] Some of these contracts will not expire until as long as 2014. Price information on other sources of import is scarce, but taking the electricity markets of Frankfurt and Leipzig as benchmarks, electricity import from the CENTREL region should cost maximum 30 EUR/MWh or 7.5 HUF/kWh. If we consider the available capacities of major Hungarian power plants, we find that 59 % of these plants generate electricity at a marginal cost lower than this 7.5 HUF/kWh in January, and 47 % in July. This is a rather soft indicator considering the assumptions on import prices – but it still indicates that generators in Hungary should prepare for an intense competition once imports are fully liberalized and proper import capacities are installed. It also explains the desire of electricity traders and suppliers to create additional import capacities.

It must be mentioned that the information on cross-border electricity trade is highly asymmetric: interpretations of definitions are loose and information is often withheld. If the foreign trade of electricity is to expand and grow in significance, more transparency will be required from the system operator and MVM as well.

2. Effects of the exchange rate

The current managed floating exchange rate mechanism is going to change with the accession to the EMU (expected in the second half of the decade). The trend of real appreciation due to the catch-up of productivity to the Western European level (the Balassa-Samuelson effect) is expected to continue after EMU accession as well. In the current exchange rate system it translates into a pressure of nominal appreciation combined with higher inflation rate, while inside the monetary union it will appear purely as extra inflation. This element of the real exchange rate appreciation is by all means an equilibrium process.

The electricity industry has four main connections to external markets, thus affected by the exchange rate. These are: foreign liabilities, returns expected by foreign owners, import of capital goods and import of fuel.

Most Hungarian electricity companies operate with obsolete financing structures: their leverage is lower than the international average; most credits are concentrated at a handful of power plants. The transmission

[22] Note that an exchange rate of 1 USD = 290 HUF was used during these calculations while the current (May 2003) exchange rate is around 1 USD = 220 HUF.

company has virtually no debt, while similar companies abroad have leverages of 100-150 %. This is likely to be explained by the fact that amortization was over-indexed by regulators before 2001, giving a very cheap source of finance for investments. New large projects involve considerable external finance however, and these include mainly long-term credits in foreign currencies (USD or EUR). Since foreign assets of companies are insignificant, they are in a net foreign debtor position. Exchange rate appreciation reduces the debt of these companies, but it can only be realized gradually as the debts are paid back. Accounting rules do not allow companies to include these gains in their earnings, but the effective economic position of firms does improve; furthermore, with the adoption of the euro, they will realize a one-time gain at conversion.

Expected returns are an important factor because foreign companies have large interests in the Hungarian electricity industry. In 2001 about 48 billion HUF dividends (about 190 million EUR) were paid from Hungarian electricity companies to foreign-based owners. Since returns in euro are relevant to these owners, an appreciation of the forint may lower expected returns, in part compensating for Hungary's sovereign risk premium. However, there seems to be no incentive for owners to lower their profit expectations in HUF, although the Energy Office brought up this argument during the price talks in 2001.

Investments in the Hungarian electricity industry are mainly associated with the operation, maintenance and replacement of existing capital goods: the network infrastructure has been set up, and new capacities are not required at present because demand grows slowly. These installations and machineries are manufactured by a few multinational companies – their products can be treated as tradable goods. Services related to investments are also provided by international firms, often for payments in foreign currencies. Thus it is correct to assume that their prices are on Western European levels. Non-tradable elements in investments (labor, real estate, environmental costs, etc) are considerably lower in Hungary.

Imported fuels include natural gas, oil, nuclear fuel, and to a lesser extent, coal. Imported electricity is considered here, as well. The total elasticity of electricity to the trend of the exchange rate is 0.38. This means that if the nominal exchange rate appreciates by one percent, electricity prices are expected to increase by 0.38 percent (assuming liberalized electricity prices).

It is clear that the appreciation of the forint is very favorable for the Hungarian electricity industry. Significant cost advantages can be realized in the long run thanks to the equilibrium appreciation due to the Balassa-Samuelson effect. These gains can be translated into three phenomena: 1. higher profit rates, 2. lower prices, 3. decreasing inflatory pressures within regulated prices. There are no significant inflationary pressures in the current price of electricity, the last option is not relevant at present. Whether lower prices will prevail shall depend on the will and strength of regulators to channel these gains to consumers against the interest of electricity companies. In the long run, price regulation will lose importance with market opening, and the level of competition will determine the distribution of gains between suppliers and consumers.

c) The Effects of EU Accession on Employment

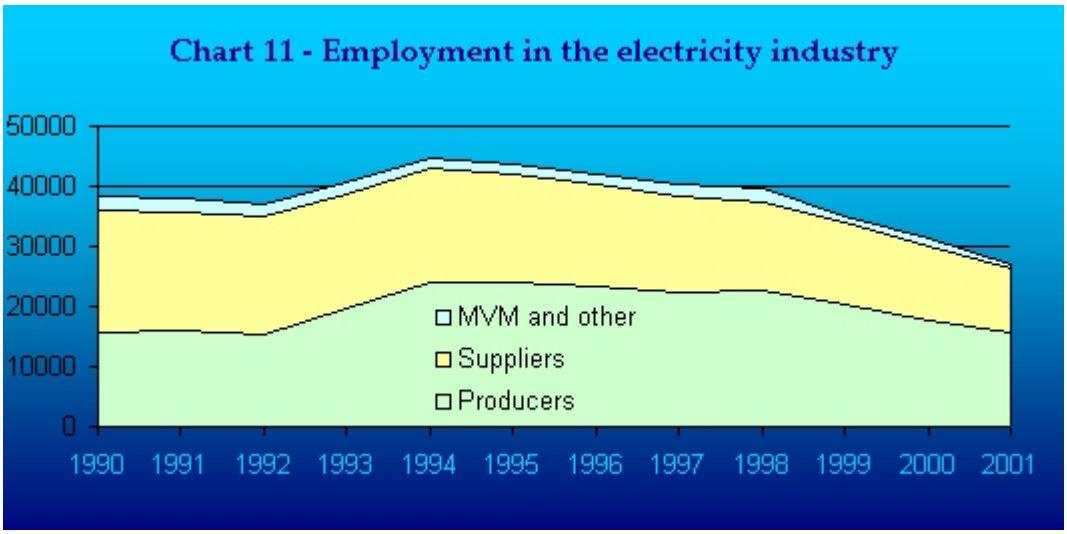
The EU electricity markets undergo significant structural changes – the process of liberalization has further increased its magnitude. These changes affected labor markets as well: in the 1990s over 250,000 jobs were lost in the 1990s. This trend is expected to continue: another 25 % reduction of jobs is expected in the next five years.[23] The Western European energy markets are mature, therefore the demand for electricity is not expected to show high growth rates. Furthermore, liberalization has brought about increasing market concentration, mergers, take-overs. Services provided by electricity suppliers expand; competitive pressure forces companies to shift their emphasis from core activities (distribution of electricity to tied clients and

[23] This section is largely based on The Effects of Liberalisation of the Electricity and Gas Sectors on Employment

technical services) towards trading, marketing, project management, customer service, business development and information and communication technology.

This new environment changes the patterns of employment as well. Non-standard forms of employment, mainly outsourcing of activities is gaining ground. Traditional electricity companies had an ageing workforce, mainly semi-skilled and skilled technical workers with „jobs for life". This system is now changing: semi-skilled and skilled technical occupations suffer the most from downsizing, usually in a „socially responsible" manner through early retirement, combined withcaps on new recruitment. A greater emphasis is put on re-training, flexibility and external mobility on the labor market. Contracting out often leads to a deterioration of employment as well.

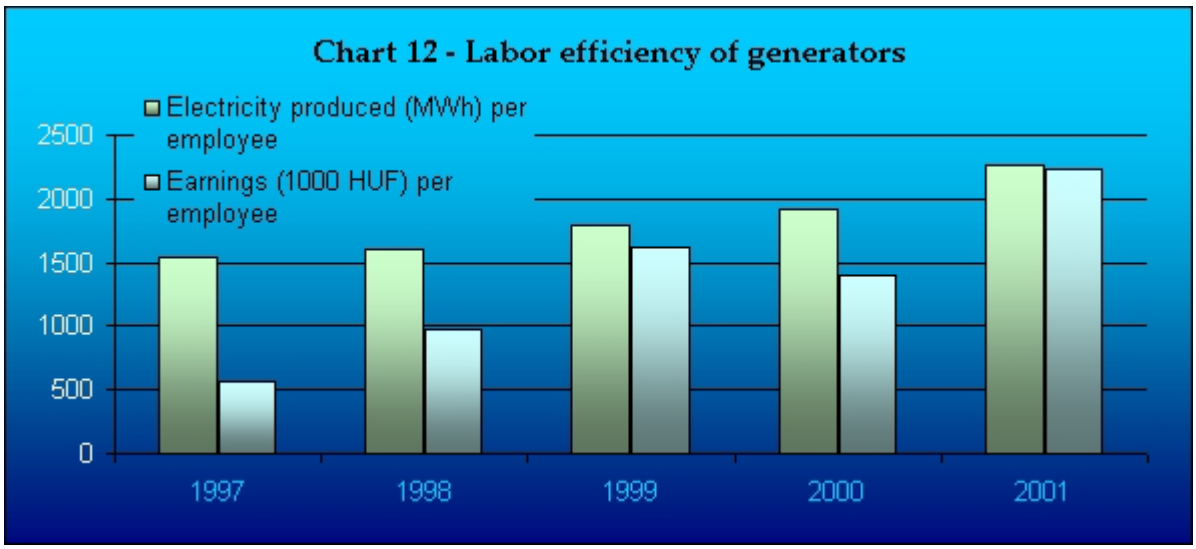
With the accession to the EU and the integration of the Hungarian energy market to the forming united European market, Hungarian electricity suppliers will have to face the same competitive pressures, and will possibly take the same measures in employment as the Western European companies. Another source of pressure for the reduction of jobs is the overemployment in the formerly state-owned sector. It is partly a remnant of the old socialist system, but also a characteristic of most state-owned enterprises around the world. Layoffs have already begun after the privatization of electricity suppliers and certain power plants. Chart 11 shows the aggregate employment data of the Hungarian electricity industry.

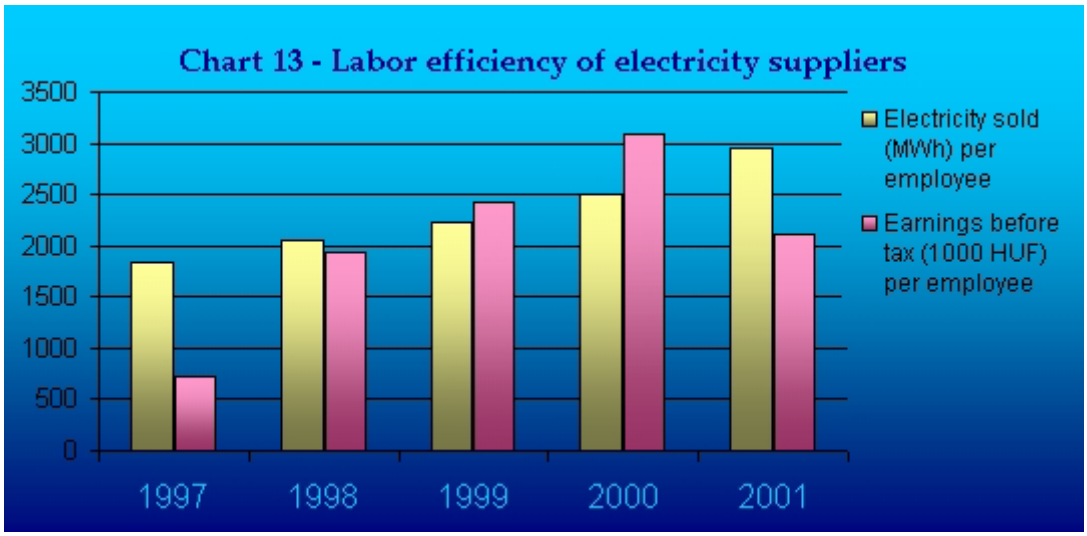


Between 1994 and 2001 employment in the sector declined by nearly 40 %. Employment at suppliers has decreased constantly, but its pace accelerated dramatically after their privatization in 1995: 60 % of their workforce was laid off until 2001. Contracting out has also gained significance during this period according to profit and loss statements of public utility suppliers.

Generators experienced a slighter, 35 % reduction of jobs since 1994. Individual firms show alternate patterns: most of them opted for gradual downsizing, but its pace sometimes quickened after 1997-98. Layoffs have affected almost every company, but ownership seems to have influenced its rate: power plants with foreign owners cut 43 % of their staff between 1994 and 2001, while plants under Hungarian- (directly or indirectly state-) controlled plants cut 27 %. If increasing competition forces the closing of inefficient power plants, employment figures will drop further.

The trend suggests further movement downwards, and it is underpinned by evidence from annual reports of electricity companies: many of them maintain reserve funds for future separation payments – staff cuts have limits however. Charts 12-13 illustrate the labor efficiency of electricity producers and suppliers respectively.





Natural indicators (electricity produced / sold per employee) have improved continuously; indicators of profitability show variability, but their upswing since 1997 is clearly noticeable. Layoffs were not associated with reductions in production or supply capacities, they resulted in the improvement of labor efficiency. They reflect structural change and improving competitiveness. Wages, although increasing, are significantly lower than in Western Europe (around 1/5 of the German wage level).

As a summary, labor efficiency has increased, and it can be associated with foreign ownership of electricity companies. Investors have brought new Western European employment trends and patterns to Hungary, structural changes have begun and are likely to continue in the same manner as in Western Europe.

VI. Conclusions and Policy Implications

Our main results regarding the expected effects of EU accession to the Hungarian electricity industry are the following.

a) Growth effects

Hungary lacks comparative advantages for electricity export while domestic demand grows at a rate that is lower than the overall economic growth. Electricity demand is determined by GDP growth and not the other way around. Therefore, the electricity industry in itself is not expected to act as an engine of growth. Nor is it expected to attract energy-intensive industries through cheap electricity. On the other hand, it can have a beneficial effect on the economy by providing reliable electricity at an internationally competitive price. The emphasis is on quality and reliability, suiting the demand of Hungary's industrial and service sectors. At present the quality of supply is an issue that needs to be worked upon.

b) Foreign trade

Hungary does not export electricity – this is not expected to change. Electricity import is constrained by cross-border capacities. Demand for import capacities is expected to rise with market opening; imports with competitive prices may crowd out inefficient domestic power plants. However, since reserve capacities are scarce, these domestic plants can act as monopolists and drive up wholesale prices in the absence of competitive imports.

Exchange rate appreciation is favorable for the electricity industry. Benefits are channelled through the reduction of foreign-denominated debts, the possible lowering of expected returns, and the cheaper import of capital goods and fuel. Whether these gains are realized as increasing profits or lowering prices depends on the bargaining power of the regulators and electricity companies, and eventually, in a competitive environment, on market structure.

c) Foreign investments

A great part of the Hungarian electricity industry has already been privatized: all suppliers are in foreign control, and investments have been made in power plants as well. Foreign owners hold over 50% of all equity capital in the Hungarian electricity industry. Major Western European electricity companies (e.g. RWE, E.ON, EdF) are present on the Hungarian market. Significant Hungarian ownership remains in the generation sector, and exclusive Hungarian presence in transmission. The Hungarian state-owned electricity conglomerate MVM is influential in the industry, but its operations often lack transparency. Its future is unknown at the moment.

d) Employment

Liberalized Western European electricity industries have seen major restructuring and job losses due to increasing competitive pressures. The same process has already started in Hungary, and is expected to continue. It is partly a reduction of overemployment in (previously) state-owned companies, partly an effect of competition. The former argument may have been the case earlier, but in the longer run the latter will be the main driving force of change.

e) Regulation

The new Electricity Act is in line with EU regulations, both actual and projected; the legal and institutional framework for a competitive electricity market has been created. Some modifications need to take place regarding (among others) the control of capital flows and the unbundling of supply and distribution. The status of the President of the Hungarian Energy Office is expected to change, reducing the independence of the Office – this is unfortunate since the HEO will need more authority to be able to promote competition and protect the interest of consumers against possible abuses of market power..

Public utility prices remain regulated, they are slightly lower than Western European averages. Network charges are average by international standards. Wholesale prices will be liberalized in 2004. At present information on liberalized consumer prices is scarce.

f) Market structure

The competitive segments of the industry are concentrated. The nuclear power plant is by far the biggest and cheapest generating capacity of Hungary, it will continue to have an influential role. Generally speaking, foreign owners of generators differ from the owners of suppliers. This might be favorable for competition because there are less opportunities for cross-subsidization between production and supply. However, foreign investors have interests in neighboring countries as well – they treat their Hungarian affiliates as parts of their regional portfolio, and may grant them import energy at a discount, etc. Monopolistic activities are separated according to the law; Western European experience shows that their transparent and accountable functioning is required to reap the benefits of competition.

Since the wholesale market is concentrated and lacks significant excess capacities, wholesale prices might increase on a liberalized market. Competition can be improved by promoting cheaper electricity import.

g) Implications for the economic policy and companies

Price regulation remains an important tool in the hand of the government for the control of natural monopolies in transmission and distribution. It should also encourage electricity companies to invest more into the network to stop the deterioration of the quality of supply. Unbundling of activities should be enforced to promote competition. Since free market conditions favor the strong, the protection of individually weak consumer groups will be another important task of authorities.

Companies have already begun to follow the Western European trends in restructuring: staff cuts and outsourcing indicate that they focus increasingly on their core activities and put more emphasis on efficiency and competitiveness. This process should continue both in foreign- and Hungarian-owned companies. More transparency is expected from the MVM since it is the most influential player on the wholesale market.

On a competitive market electricity suppliers work to achieve consumer satisfaction. Marketing and customer relations will gain importance, and the quality of supply will become a key issue. A reliable Hungarian electricity system can be a comparative advantage in attracting high-tech industries, while power shortages, unexpected malfunctions and long recovery times can discourage these investments. Reliability is a complex issue: it can only be attained on the system level. Therefore it is a common interest of policymakers and companies to improve the reliability of supply.

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Appendix A - *Household consumption of energy*

DATA OF ALL HOUSEHOLDS BY INCOME DECILES, 1999

Name	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	Total
HUF											
All personal spendings	178 180	228 622	263 854	283 022	301 552	337 343	364 983	407 390	471 741	694 319	353 060
from this											
Coal	1 916	2 020	2 213	2 030	2 045	1 732	1 684	1 443	1 341	750	1 717
Briquet, coke	164	301	332	250	268	353	258	309	138	118	249
Firewood	4 088	3932	3 931	3 973	3 462	3 891	3 298	2 932	2 024	1 566	3 310
Oil, petroleum, other	12	103	117	52	81	168	96	141	104	193	107
Central heating	2 045	4 072	3 575	3 642	4 198	5 922	6 822	7 582	9 356	12 256	5 946
Electricity	9 291	11 869	13 124	14 155	15 510	16 146	17 107	17 925	19 614	22 119	15 685
Pipeline gas	4 610	8 006	9 289	10 888	12 735	14 096	15 311	16360	18 690	19 665	12 964
PB gas	2 708	2 592	2 680	2 673	2 460	2 668	2 361	2164	1 860	1 303	2 347
%											
Coal	1.1	0.9	0.8	0.7	0.7	0.5	0.5	0.4	0.3	0.1	0.5
Briquet, coke	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0.1
Firewood	2.3	1.7	1.5	1.4	1.1	1.2	0.9	0.7	0.4	0.2	0.9
Oil, petroleum, other	0	0	0	0	0	0	0	0	0	0	0
Central heating	1.1	1.8	1.4	1.3	1.4	1.8	1.9	1.9	2	1.8	1.7
Electricity	5.2	5.2	5	5	5.1	4.8	4.7	4.4	4.2	3.2	4.4
Pipeline gas	2.6	3.5	3.5	3.8	4.2	4.2	4.2	4	4	2.8	3.7
PB gas	1.5	1.1	1	0.9	0.8	0.8	0.6	0.5	0.4	0.2	0.7
Total	13.9	14.3	13.3	13.2	13.4	13.4	12.9	12	11.3	8.3	12

(Source: own cakculations based on KSH data)

Appendix B - *SWOT analysis of the Hungarian electricity industry*

Strengths	**Weaknesses**
- large-scale presence of foreign investors (financial resources, management skills, etc.) - regulation in place	- quality of supply - small cross-border capacities - lack of transparency in MVM
Opportunities	**Threats**
- imports promote domestic competition - improving quality of supply if competitive pressures increase	- imports may crowd out domestic generation and investments in production capacities - excessive market power on the wholesale market