PRIVATIZATION AND REGULATION OF THE OIL, NATURAL GAS, AND ELECTRIC INDUSTRIES IN HUNGARY

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I. INTRODUCTION

The oil and gas and the electricity industries in Hungary will soon be leaving direct state control. They will become joint stock companies initially owned one hundred percent by the state, but the state plans to sell forty-nine percent of the stock. This change presents great opportunities to introduce additional market forces into the energy sector and to improve the companies' performance, but it also presents serious potential problems. Free from direct government control, the companies will pursue their own interests which are likely to be different from those of their customers or the government. Partial ownership of a company does not give the government appropriate powers in matters of national strategic importance and for consumer protection against the abuse of monopoly power. If the government uses its power as owner of the companies to intervene in management, the commercial ethos within the companies will be compromised and it will be extremely difficult to attract foreign capital. Reform is therefore necessary to establish a stable regime in which the government can achieve its objectives and the managements of the new companies can run their businesses efficiently.

The necessary reforms require the establishment of three basic, interlocking elements:

(1) a new ownership relationship between the state and the companies;
(2) a regulatory system for prices, access, and quality of service, where appropriate; and
(3) other equitable adjustments to avoid undesirable social impacts.

The Hungarian Oil and Gas Trust (OKGT)[1] and the Hungarian Electric Trust (MVMT) are government owned "corporations" or "trusts" under the control of the Ministry of Industry and Trade (IKM). Each company employs about 40,000 people. This paper describes the conversations with OKGT, MVMT, and IKM personnel over a period from August 26, 1991, to September 4, 1991. It also contains observations based on those conversations and some recommendations.

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‡ The views expressed are those of the authors. Do not quote from this discussion paper without permission from the authors.

1. Since this was written, OKGT has been privatized and has taken the name MOL.

II. BACKGROUND

Hungary is a country about the size of Indiana (36,000 sq. miles) with a population about that of Ohio (ten million individuals; five million households). There are nineteen counties in Hungary, but for energy distribution purposes, the country is divided into six regions. Hungary shares borders with Czechoslovakia, Ukraine, Romania (Transylvania), Yugoslavia (Croatia, Slovenia, and Serbia), and Austria. Except for Austria, these countries are currently politically and economically unstable.

Privatization in the Hungarian context is a process whereby the government takes a state owned and operated trust, creates a joint stock company, and moves it to the State Privatization agency. Initially, the stock may be held completely by the government, but the objective is to sell off some portion of the stock.

Many products and services no longer have price controls. No maximum price exists for gasoline and fuel oil, although the government has informally restricted the level to which OKGT can increase gasoline prices. The result is that the price for gasoline is lower in Hungary than in Austria, so Austrians often drive across the border to fill up their tanks. The Office for Fair Competition conducts antitrust-type investigations and enforcement.

The Hungarian Parliament has determined a list of products that still have the maximum price set by government ministries. The maximum prices for natural gas, LPG (propane and butane), and electricity are set currently by the Minister of Industry and Trade in consultation with the Counsel of Ministers, although the Minister of Finance used to fill this role. The maximum price for each commodity in each sector is uniform nationwide.

The price for gas and electricity to households has been heavily subsidized. Although there is a national policy to move prices up to international levels, there is a constant political battle about the speed of that rise. One government official described the transition process to a market economy as "making an aquarium from a fish soup." Another described Communism as bad, but what follows it as worse.

III. THE OIL AND NATURAL GAS INDUSTRY

A. The History of the Oil and Gas Industry in Hungary

In 1933, Standard Oil Co. of New Jersey, in a joint venture with Standard Oil Co. of New York, entered the oil market in Hungary. It discovered and developed two gas fields that produced mostly carbon dioxide (CO_2). In 1938, the joint venture developed its first oil field.

In 1900, Hungary had eighteen refineries. By 1938, they had consolidated into thirteen refineries. Before nationalization, Shell owned the Budapest refinery, and Sun Oil owned a refinery in the southwestern part of the country.

After World War II, Standard Oil Co. of New Jersey had a favorable position until the Iron Curtain came down. They had three highly profitable fields, and the 1851 Mining Law and 1911 Natural Gas Law governed operations. The assets were nationalized in 1948, but the joint venture contract is

technically still in effect. OKGT is the nationalized successor of these activities.[2]

B. OKGT Organization and Activities

On April 19, 1991, the Parliament passed the OKGT restructuring law, which the IKM is charged with administering. Several geologic operations similar to the U.S. Geological Service remained part of the government. The gas distribution companies and several construction companies were spun off.

1. Exploration and Production

Under the old regime, OKGT was often told where or when to drill. With the new reorganization, the exploration arm will be integrated into the production arm,[3] and the new general concession law will allow non-OKGT companies to explore and produce. With a new mining law, foreign companies will be able to invest in Hungarian exploration and development. New laws on royalties, taxes, and regulation at the wellhead or field gate are still needed. Several oil companies have expressed an interest in entering the exploration and production sector, possibly in a joint venture with OKGT.

Hungarian crude oil production is less than two million tons per year. Because CO_2 is available in abundant quantities in Hungary, CO_2 flood techniques are used for enhanced oil recovery in eastern Hungary. The OKGT cost for producing oil is between 8,000 and 11,000 Ft (forints) per ton. The world price is 14,000 Ft per ton. (The exchange rate in 1991 was about 75 Ft per dollar.) Hungary natural gas production in 1990 was 4.9 million cubic meters (162 Bcf) with reserves of about 34 billion cubic meters (1 Tcf) (see Table 1). OKGT estimates that two-thirds of the resources potentially available in Hungary have been discovered.

2. Oil Pipeline and Storage

Crude pipelines, product pipelines, and storage are all part of the OKGT monopoly. Since January 1, 1991, transport has been available and open to all, and the excess capacity decision is made by OKGT. OKGT wants to establish "internationally recognized tariffs," but wants only long-term contracts. OKGT wants to utilize its excess capacity and defines excess capacity as that not needed in the long term.

OKGT reports to the Ministry at the end of every month on stock availability. The government has 600,000 tons of storage in the pipeline (literally), in refineries, and in other tank storage. One-half of this is in strategic storage, 300,000 tons. In addition, 19,000 tons are in tanks bottom storage and 50,000 tons are in refinery inventory storage. The refinery capacity is 27,000 tons per day.

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2. Hungary passed a new mining law in 1965 and a new gas law in 1969. Both of these are basically safety laws regulated by the National Mining Safety Board (OBF).

3. OKGT claims that this will create profit incentives, make them more business oriented, and allow them to compete with other companies. It is not clear why.

TABLE 1: NATURAL GAS MARKETS IN HUNGARY

	1989	1990	Percent Change	Planned 1991
Hungarian Units				
Production:				
Natural Gas *(10^9 m^3)*	6.07	4.87	−20	5.25
LPG *(kilotonnes)*	337	331	−2	331
Imports:				
Natural Gas *(10^9 m^3)*	5.90	6.31	7	6.04
LPG *(kilotonnes)*	14	7	−50	7
Exports:				
Natural Gas *(10^9 m^3)*	.02	.02	4	.01
LPG *(kilotonnes)*	49	22	−55	.01
U.S. Units				
Production:				
Natural Gas *(Bcf)*	214	172	−20	185
LPG *(thousand barrels)*	3909	3840	−2	3840
Imports:				
Natural Gas *(Bcf)*	208	223	7	213
LPG *(thousand barrels)*	162	81	−50	81
Exports:				
Natural Gas *(Bcf)*	1	1	4	0[1]
LPG *(thousand barrels)*	568	255	−55	81
Trillion Btu				
Production:				
Natural Gas	200	160	−20	173
LPG	15	15	−2	15
Imports:				
Natural Gas	194	208	7	199
LPG	1	0[2]	−50	0[2]
Exports:				
Natural Gas	1	1	4	0[2]
LPG	2	1	−55	0[2]

Note: One cubic meter is set to 35.315 cubic feet; one cubic foot of natural gas is set to 932 Btu, a conversion implicit in Table 4. One metric ton of LPG is set to 11.6 barrels, or to 43.68 million Btu.
Source: OKGT Annual Report 1990 and Internal OKGT documents.

[1] Less than .5 Bcf.
[2] Less than .5 TBtu.

3. Oil Imports and Exports

About seventy-five percent of the oil is imported. In 1990, this amounted to 6.5 million tons of crude oil imported. Currently, OKGT receives about fifty percent of its crude oil imports from the former USSR at the market price. (Previously, crude oil from the USSR was sold at below market prices.) The remaining imports come from Iran, Libya, and Nigeria. Non-USSR

crude oil gets to Hungary through the Adria Pipeline with a port on the Yugoslav coast.

The Adria oil pipeline and the Friendship pipelines (oil and natural gas), from Russia, are running currently at far below capacity. The Adria pipeline has a capacity of thirty-four million tons per year at the Croatian seaport, Knk Island, and later splits into various directions, delivering to Belgrade and Budapest. On September 11, 1991, Croatia, for the first time, shut down the leg into Serbia. The Serbs want a long-term contract to use the Friendship line from Russia and subsequent shipment through Hungary. The question is, who guarantees the long-term contract?

The Adria Pipeline has the capacity to deliver ten million tons per year into Budapest. The twenty-year deal, however, with the Yugoslavians has expired. For 1991, they had take-or-pay contracts. There is an opportunity for inexpensive expansion of the pipelines up to about eighteen million tons a year. Since the Hungarian consumption could be completely accommodated by the current capacity, expanison considerations are for export and national security. A proposal with Yugoslavia for a thirteen-year deal is in negotiation. Both Shell and BP use the oil pipelines to import and use the OKGT refineries.

Both the Czech and Slovak Republics have expressed interest in becoming customers of the Hungarian transport system. In 1991, there was a three million ton transit contract. In 1992, it will become a two million ton contract with the Czechs and a one million ton contract with the Slovaks.

4. Downstream Oil

Under the old regime, OKGT owned and operated all the retail filling stations. There are about 740 such stations in Hungary, a small number by Western European standards. The locations are not particularly advantageous; many location decisions appear to have been driven more by political than market considerations. In recent years, Shell, BP, and AGIP have opened filling stations in Hungary, and now anyone can construct and operate a filling station. Currently, OKGT owns about 270 stations outright and another 70 in partnership with AGIP. OKGT also sells products to independent dealers.

5. Natural Gas

OKGT's high pressure natural gas transmission system is 4,000 kilometers (2,500 miles) long with pipes of diameters from 100 to 120 millimeters (25 to 30 inches) under pressure from 1 to 64 mega Pascals (70 to 900 psi). There are three large compressor stations, each with a ten megawatt capacity.

Six regional distribution companies transport gas under low pressure to consumers.[4] On July 1, 1991, they became independent from OKGT but remain state-owned companies. The distribution system will have a twenty to

4. Gas distribution companies are: Budapest, TGAZ (NE), DGAZ (SE), KGAZ (W), AGAZ (NW), and DDGAZ (SW).

forty-five percent local ownership. OKGT now sells gas to these distribution companies at the citygate.

Hungary also has the capacity to import significant amounts of natural gas from the Russian pipeline. They now import 6.3 billion cubic meters (210 Bcf) per year, which is fifty-six percent of total consumption, from Russia on one of the Friendship pipelines. They also export natural gas to Yugoslavia, Czechoslovakia, Romania, and Serbia. Currently, the pipeline to Romania is not operational. In 1991, 2.5 million cubic meters of natural gas was delivered to Serbia. A second contract is being negotiated to ship 3.6 billion cubic meters per year.

OKGT has three underground storage fields. One, in the northeast, can deliver 20 million cubic meters a day (700 Mmcf) with a storage capacity of 1.4 billion cubic meters (49 Bcf). It stores both Russian and domestic gas. The second field in the southeast, can deliver 2 to 2.5 million cubic meters (70 to 88 Mmcf) per day with a capacity of 200 million cubic meters (7 Bcf). It stores domestic gas. The third storage facility, in the west, has a capacity of 2 to 2.5 million cubic meters a day (70 to 88 Mmcf) and a capacity of 350 million cubic meters. It stores primarily domestic gas.

There is also a contract for the import of 4.8 billion cubic meters per year from the former USSR, with two billion cubic meters coming from western Siberia and 2.8 billion cubic meters coming from the Hamburg field. There is no payment due on the gas from the Hamburg field until 1997, because it is a barter deal for a sulfurization plant the Hungarians built in Russia. This contract has a potential for extension to 2008.

The primary security issue is assurance against disruptions of Russian gas deliveries. For example, in December 1989, Hungary got a telex from Russia stating that, "because of technical reasons, we will not be able to supply your contract amount." There have been twenty interruptions since then. Since the 1991 coup attempt, the crude oil and gas have been flowing at a very high level. Future contracts are considered to be potentially problematic, although OKGT seems confident that there will not be any long-term problem.

Hungary's dependence on Russian supplies carries considerable risks for both commercial and national security. Hungary wants to build strategic interconnections with Austria so they can have access to the western grid. Hungary may also build storage for other countries, such as Serbia, Austria, Yugoslavia, and Czechoslovakia, using some of their abandoned oil fields.

Developing alternatives to Russian gas is not easy, however. The European natural gas system (both East and West) is very rigid. Germany's consumption is thirty percent Russian gas and Germany holds the key to flexibility. Germany also has some abandoned salt domes they can use for storage. The Czechs and the Poles have very little production capability. OKGT has also had discussions with StatOil in Norway, since StatOil has a company policy of negotiating country-by-country and will not negotiate with coalitions of countries.

A second option is an LNG terminal and pipeline using the Adriatic port at Knk Island. The line would include Zagreb and Budapest. This system would serve Italy, Yugoslavia, Czechoslovakia, Austria, and possibly Poland.

The Hungarians are currently studying the feasibility of importing up to 7.8 billion cubic meters per year.

6. Natural Gas Consumption

Hungary's consumption is fifty percent Russian gas and fifty percent domestic production. Households are on volumetric rates (see Tables 2 and 3). The price increased from 0.15 Ft per megajoule in 1990 to 0.23 Ft per megajoule in 1991. (At 34 megajoules per cubic meter of gas, 75 forints equal $1, and 33 cubic feet equal one cubic meter, the 1991 price to households is about $3 per Mcf, about half the U.S. price.) Brown coal is more expensive than natural gas (see Tables 4 and 5).

TABLE 2: NATURAL GAS CONSUMPTION

	Natural Gas				LPG			
Sector	1989	1990	Percent Change	Planned 1991	1989	1990	Percent Change	Planned 1991
Hungarian Units	*Billion cubic meters*				*kilotonnes*			
Household	1.9	1.9	4	2.0	291	308	6	308
Commercial	0.4	0.4	−8	0.4	9	10	11	12
Industrial	5.1	4.7	−8	4.5				
Electric power generation	2.9	2.6	−11	2.7				
Others	1.6	1.6	4	1.6				
TOTAL	11.8	11.2	−5	11.2	300	318	6	320
U.S. Units	*Billion cubic feet*				*Million Barrels*			
Household	66	69	4	71	3.38	3.57	6	3.57
Commercial	14	13	−8	13	.10	.12	11	.14
Industrial	181	166	−8	161				
Electric power generation	101	90	−11	94				
Others	55	57	4	56				
TOTAL	417	395	−5	394	3.48	3.69	6	3.71

Note: One cubic meter is set to 35.315 cubic feet; one metric ton of LPG is set to 11.6 barrels.
Source: Internal OKGT documents.

Customers who consume more than 200 cubic meters per hour are classified as industrial. Commercial customers consume less than 200 cubic meters per hour. The old way of pricing industrial gas to consumers was a pure demand charge at the plant gate (100% take-or-pay).

The industrial customers now get a choice. They can pay a two part demand/commodity tariff or a volumetric rate (see Table 6). The volumetric rate is higher than the pure demand charge rate on a 100% take (load factor) basis. If they exceed the maximum consumption quantity rates under the pure demand charge, they pay an overrun rate which is higher than the volumetric rate.

TABLE 3: NATURAL GAS PRICES IN HUNGARY

Sector	1990	1991	Percent Change
Hungarian Units			
Household *(Ft/MJ)*	0.15	0.23	53
Commercial *(Ft/MJ)*	0.22	0.35	59
Large Customers			
Demand *(Ft/MJ/hours)*	155	280	81
Gas Price *(Ft/MJ) Oct-Mar*	0.148	0.252	70
Gas Price *(Ft/MJ) Apr-Sept*	0.143	0.247	73
Chemical Industry *(Ft/m³)*[1]	4.01	7.22	80
Gas Distribution Enterprises *(Ft/MJ)*	0.13	0.222	71
U.S. Units			
Household *($/MMBtu)*	2.08	3.19	53
Commercial *($/MMBtu)*	3.05	4.86	59
Large Customers			
Demand *($/MMBtu/hour)*	2152	3887	81
Gas Price *($/MMBtu) Oct -Mar*	2.05	3.50	70
Gas Price *($/MMBtu) Apr-Sept*	1.99	3.43	73
Chemical Industry *($/Mcf)*[1]	1.49	2.69	80
Gas Distribution Enterprises *($/MMBtu)*	1.80	3.08	71

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint), the approximate exchange rate in August 1991; 1 Btu is set to 1,054.8 Joules; one cubic meter is set to 35.315 cubic feet. Recent inflation is approximately 25 percent annually.
Source: Internal OKGT documents.

[1] The chemical industry delivery is from the high pressure pipelines.

7. The Natural Gas Distribution Companies

After the distribution companies were spun off from OKGT, they formed an association and now have contracts with OKGT. The Ministry is not involved. In the negotiation of the gas price between OKGT and the gas distribution companies, each distributor negotiates individually with OKGT but the association monitors the price. It appears that the new distribution association acts, at least informally, to make these negotiations collective. A price committee in OKGT's Department of Economics advises OKGT on price negotiation; in effect, they establish a reservation price for negotiation. In 1991, there was virtually no mark-up between the wholesale price and the household (residential) price (see Table 3). The distribution companies must recover their costs on other business. This creates the need for a subsidy to distribution companies with a heavy residential load or for a change in the pricing policy.

In the future, the world natural gas price, that is the gas import price, will be used as a standard for gas wellhead pricing. All end-user prices will be

TABLE 4: HOUSEHOLD HEATING COSTS

Hungarian Units

100 *MJ*		1990 Unit Price		1990 *Ft/100 MJ*	1991 Unit Price		1991 *Ft/100 MJ*	Percent Change
2.17 *Kg*	LPG, Bottled							
	Winter	12.00	*Ft/Kg*	26.0	21.50	*Ft/Kg*	46.7	79
	Summer	8.80	*Ft/Kg*	19.1	15.90	*Ft/Kg*	34.5	81
2.88m^3	Natural Gas	0.15	*Ft/MJ*	15.0	0.23	*Ft/MJ*	23.0	53
2.73 *liters*	Light Oil	12.00	*Ft/l*	32.8	20.00	*Ft/l*	54.6	67
27.8 *Kwh*	Electric Power							
	Day	2.45	*Ft/Kwh*	68.1	3.70	*Ft/Kwh*	102.9	51
	Night	1.30	*Ft/Kwh*	36.1	1.90	*Ft/Kwh*	52.8	46
7.27 *Kg*	Brown Coal				3.34	*Ft/Kg*	24.3	76
3.79 *Kg*	Black Coal				8.24	*Ft/Kg*	31.2	76
3.55 *Kg*	Coke				11.26	*Ft/Kg*	40.0	65

U.S. Units

MMBtu		Unit Price		*$/MMBtu*	Unit Price		*$/MMBtu*	Percent Change
11.15 *gal*	LPG, Bottled							
	Winter	0.32	*$/gal*	3.61	0.58	*$/gal*	6.48	79
	Summer	0.24	*$/gal*	2.65	0.43	*$/gal*	4.79	81
1.073 *Mcf*	Natural Gas	1.94	*$/Mcf*	2.08	2.98	*$/Mcf*	3.19	53
7.61 *gal*	Light Oil	0.60	*$/gal*	4.55	1.00	*$/gal*	7.58	67
293.1 *Kwh*	Electric Power							
	Day	3.2	*cents/Kwh*	9.45	4.9	*cents/Kwh*	14.28	51
	Night	1.7	*cents/Kwh*	5.01	2.5	*cents/Kwh*	7.33	46
169.1 *lbs*	Brown Coal				39.95	*$/ton*	3.37	76
88.1 *lbs*	Black Coal				98.56	*$/ton*	4.33	76
82.6 *lbs*	Coke				134.69	*$/ton*	5.55	65

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint); 1 Btu is set to 1,054.8 Joules; one cubic meter is set to 35.315 cubic feet; 932 Btu to one cubic foot of natural gas (since 2.88 cubic meters are given as equal to 100 MJ); 42 gallons to the barrel; 11.6 barrels of LPG to a metric ton; 2,000 lbs to the ton; 0.26418 gallons to the liter.
Source: Internal OKGT documents.

based on alternative fuels. In Hungary there is no internal competition yet to set prices.

8. TIGAZ Bottling Plant

We visited a TIGAZ Propane and Butane Bottling Plant outside Budapest and had conversations with the plant manager and OKGT personnel. Current LPG production is 331 kilotons per year. All LPG is consumed in the residential or commercial sector. On July 1, 1991, TIGAZ was separated from OKGT. According to the manager of the plant, this plant lost money in

TABLE 5: ENERGY COSTS ADJUSTED FOR HEATING EFFICIENCY

Energy Source	Efficiency	Energy Cost *Ft/100 MJ*	Energy Cost *$/MMBtu*	Cost Related to Natural Gas
LPG, Bottled				
Winter	0.85	54.9	7.62	203
Summer	0.85	40.6	5.63	150
Natural Gas	0.85	27.1	3.76	100
Light Oil	0.80	68.3	9.47	252
Electric Power				
Day	1.00	102.9	14.28	380
Night	1.00	52.8	7.33	195
Brown Coal	0.65	37.4	5.18	138
Black Coal	0.70	44.6	6.19	165
Coke	0.75	53.3	7.40	197

Note: 1 U.S. dollar is set to 76 Ft; 1 Btu is set to 1,054.8 Joules.
Source: Internal OKGT documents.

1990 and is making a small profit in 1991.[5]

Currently, TIGAZ is connected to OKGT by a pipeline from the Budapest refinery, making bilateral negotiations difficult. The old approach was to have a transfer price set by central authority. The concept of an independent regulator to resolve pricing conflicts is not well developed.

The plan for TIGAZ is that the Ministry of Industry and Trade or the government would retain a fifty-one percent ownership because of a desire to keep prices low. Currently, the propane and butane maximum prices are about one-fourth the price of gasoline on an energy equivalent basis, so the idea to use propane and butane to fuel cars has occurred to some. Since there

TABLE 6: INDUSTRIAL NATURAL GAS TARIFFS, 1991

Type of Consumption	Base Price	Maximum Gas Price
Hungarian Units	*Ft/MJ/hour*	*Ft/MJ*
Demand/Commodity	280	0.262
Pure Commodity	—	0.380
U.S. Units	*$/MMBtu/hour*	*$/MMBtu*
Demand/Commodity	3886	3.64
Pure Commodity	—	5.27

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint); 1 Btu is set to 1,054.8 Joules.
Source: Magyar Kozlony, 1991 49. szam (official government tariff)

5. Accounting systems in Communist countries differ from western capitalist systems. Capital costs often appear to be left out of claims of profitability.

is an insufficient supply of propane and butane, however, the government has outlawed its use in cars. Despite this, some people have converted their cars to propane and butane.

Retail competition seems to be a very strange concept to TIGAZ. The TIGAZ manager stated that the old "franchise" system was set up for optimal lowest cost distribution, so it would be foolish for anyone to compete. They appeared, mentally, to restrict the venue for competition to new, non-existent, markets. Though they expressed a strong belief in competition, it appeared to be more from current fashion than experience or conviction.

9. Open Access

OKGT has no problems in determining excess capacity. The OKGT pipeline manager said that, "what is good for OKGT is good for the country." Different prices would be charged for country trans-shipment and deliveries inside the country. If Hungary joins the European Community (EC), however, EC rules would probably prohibit a difference between the domestic transit price and the national transit price.

They currently have non-discriminatory "postage stamp" rates for deliveries in the country, currently 670 Ft per 1000 cubic meters ($.25/Mcf). The price is set by dividing interest, operating costs, and profits by actual volumes. Fair competition laws prevent price discrimination among customers, although they can give large customer discounts. There is no prohibition against bypass.

IV. THE ELECTRIC INDUSTRY

The electric industry was nationalized forty years ago and is still under government control. In the restructuring, a new corporation will be established initially to operate the power stations, transmission network, and distribution network. Later, separation of transmission, distribution, and generation will be addressed.

Domestic installed capacity is 7,200 megawatts. The Paks nuclear plant in south central Hungary generates forty percent of the domestically produced power. Coal produces about thirty-four percent. Some of the coal plants may be uneconomic due to low grade coal and high production costs.

Almost all imports are from Ukraine on the 750 kV Friendship line. The 1,100 megawatt contract with the Soviet Union is now priced at 5.1 cents per kilowatthour (hard currency/U.S. dollars). Imports from the former USSR have been as high as twenty-five percent of consumption.

The household or residential price of electricity is currently about three cents per kilowatthour (see Table 7). Electric pricing cannot discriminate based on the household location; there is one national, uniform household price. The industrial price is greater than six cents per kilowatthour. In 1992, there is a fifty percent increase proposed for residential customers and a ten percent increase for industry. Retail prices are about sixty percent of EC prices.

They are currently developing principles of pricing for electricity. There

TABLE 7: ELECTRICITY SALES AND REVENUE, 1990 AND 1991

Sector	Consumption 1990 Months 1-6	Consumption 1991 Months 1-6	Percent Change	Revenue 1990 Months 1-6	Revenue 1991 Months 1-6	Percent Change	Average Rate 1990 Months 1-6	Average Rate 1991 Months 1-6	Percent Change
Hungarian Units	*Billion Kwh*			*Billion Ft*			*Ft/Kwh*		
Household	4.90	5.23	107	7.40	11.85	160	1.50	2.26	151
Public Lighting	0.31	0.30	98	1.75	2.28	130	5.70	7.60	133
Commercial	1.29	1.33	103	6.66	9.36	141	5.17	7.02	136
Large consumers	9.43	8.44	90	30.94	39.97	129	3.28	4.73	144
Railroads	0.41	0.36	88	0.96	1.14	119	2.33	3.15	135
Metro/Trolleys	0.19	0.19	102	0.54	0.73	135	2.86	3.80	133
Areas of communals	0.07	0.08	117	0.11	0.22	200	1.70	2.92	172
Domestic Total	16.62	16.00	96	48.45	65.74	136	2.91	4.10	141
Border Exchanges	0.09	0.04	44	0.17	0.12	70	1.77	2.80	158
Total	16.72	16.00	96	48.61	65.74	135	2.90	4.10	141
Household	4.90	5.23	107	7.40	11.85	160	1.50	2.26	151
Productive Consumption	11.72	10.77	92	41.05	53.88	131	3.50	5.00	143
U.S. Units	*Billion Kwh*			*Million US $*			*Cents per Kwh*		
Household	4.90	5.23	107	97.4	156.0	160	2.0	3.0	151
Public Lighting	0.31	0.30	98	23.0	30.0	130	7.5	10.0	133
Commercial	1.29	1.33	104	87.6	123.2	141	6.8	9.2	136
Large consumers	9.43	8.44	90	407.1	525.9	129	4.3	6.2	144
Railroads	0.41	0.36	88	12.6	15.0	119	3.1	4.1	135
Metro/Trolleys	0.19	0.19	102	7.1	9.6	135	3.8	5.0	133
Areas of communals	0.07	0.08	117	1.5	2.9	200	2.2	3.8	172
Domestic Total	16.62	16.00	96	637.5	865.0	136	3.8	5.4	141
Border Exchanges	0.09	0.04	44	2.2	1.5	70	2.3	3.7	158
Total	16.72	16.00	96	639.6	865.0	135	3.8	5.4	141
Household	4.90	5.23	107	97.4	156.0	160	2.0	3.0	151
Productive Consumption	11.72	10.77	92	540.1	709.0	131	4.6	6.6	143

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint).
Source: MVMT Internal documents.

is a maximum authorized price, but the method for setting this is mostly political. The current tariffs are presented in Tables 8, 9, and 10. MVMT states that the maximum authorized price must include expenses plus acceptable profit, including inducing factors (incentives).

Cost factors are submitted to the IKM for price adjustments. They include wages, O&M, interest, fuel cost, and depreciation. Currently, short-term variable costs exceed revenues. Short-term borrowing costs are thirty percent.

The proposal by MVMT is to set the price without government approval and within the following constraints: (1) the total level of the price will increase by less than two Ft per kwh; (2) for households, the increase will be kept to fifty percent; and (3) the large customers' prices will be negotiated.

MVMT says it is aware of its monopoly power and that it should not be exercised!

The industrial sector tariffs are multi-part (see Table 8). There is one demand charge for baseload and one for peak load service. Actual usage charges differ among peak hours (600-800 and 1400-1800), non-peak day hours (800-1400 and 1800-2200), and night hours (2200-600).

TABLE 8: ELECTRIC TARIFFS FOR LARGE CONSUMERS (INDUSTRIAL), 1991

	Demand		Usage		
	Base	Peak	Peak	Day	Night
Hungarian Units	*Ft/Kwh-yr*			*Ft/Kwh*	
Base	2040	4440	4.50	3.00	2.25
Main Distribution *(120 KV)*	2160	4560	4.60	3.10	2.30
Medium Voltage *(20 KV)*	2220	4620	4.70	3.20	2.35
Average Voltage I	2340	4800	3.60	3.60	2.50
Average Voltage II	1260	2520	5.50	5.50	2.60
Small Voltage I	2460	4980	3.70	3.70	2.70
Small Voltage II	1360	2640	5.70	5.70	2.80
U.S. Units	*$/Kwh-yr*			*Cents/Kwh*	
Base	26.84	58.42	5.9	3.9	3.0
Main Distribution *(120 KV)*	28.42	60.00	6.1	4.1	3.0
Medium Voltage *(20 KV)*	29.21	60.79	6.2	4.2	3.1
Average Voltage I	30.79	63.16	4.7	4.7	3.3
Average Voltage II	16.58	33.16	7.2	7.2	3.4
Small Voltage I	32.37	65.53	4.9	4.9	3.6
Small Voltage II	17.89	34.74	7.5	7.5	3.7

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint).
Source: Arszabalyozas, 26. szam (official government tariff).

They have shutoff controls for some residences in peak periods. If the household has a control, it pays the night rate in the daytime. There are penalties for tampering with the meters or exceeding the maximum authorized demand.

In the near term, no capacity additions are envisioned, but, further into the future, plans are for small plants and imported coal. Siting a nuclear plant would be difficult because of the incident at Chernobyl. Clean air and foreign investors are considered to be an important factors in future plans.

V. THE STATE AUTHORITY FOR ENERGY SAFETY AND INFORMATION

The State Authority for Energy Safety and Information collects data on quantity and quality, but no data on price. It forecasts quantities, implements a curtailment plan if a shortage occurs, makes conservation recommendations, and inspects for safety. It also maintains a registry of boilers and records of chemical cleaning and oil and gas accidents.

TABLE 9: ELECTRIC TARIFFS FOR GENERAL CONSUMERS (COMMERCIAL), 1991
KILOVOLTS (REAL & REACTIVE POWER)

Kilovolts	*Hungarian Units*		*U.S. Units*	
2.5 (up to)	1440	*Ft/yr*	18.95	*$/yr*
3.5 (up to)	2280	*Ft/yr*	30.00	*$/yr*
5.0 (up to)	3540	*Ft/yr*	46.58	*$/yr*
	720	*Ft/yr*	9.47	*$/yr*
	6.2	*Ft/Kwh*	8.2	*cents/Kwh*
	3.0	*Ft/Kwh*	3.9	*cents/Kwh*

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint).
Source: Arszabalyozas, 26. szam (official government tariff).

The Authority also has the responsibility for the rights-of-way licenses for electric, hot water, steam, and other networks. The managers described the process as collecting the rights-of-way agreements from other authorities.

TABLE 10: ELECTRICITY TARIFFS, 1991

	Peak	Day	Night	Other
Hungarian Units		*Ft/Kwh*		
Railroads	4.50	2.70	2.00	—
Households	—	3.50	1.90	—
Public Light	—	—	—	4.20
U.S. Units		*cents/Kwh*		
Railroads	5.9	3.6	2.6	—
Households	—	4.6	2.5	—
Public Light	—	—	—	5.5

Note: 1 U.S. dollar is set to 76 Ft (Hungarian Forint).
Source: Arszabalyozas, 26. szam (official government tariff).

What happens if the other authorities do not agree to the right-of-way? They said this was not a problem historically! In the new regime, private property disputes must be recognized in right-of-way cases.

The Energy Efficiency Office with the Authority was established at the suggestion of the World Bank with its objectives to promote energy efficiency, disseminate information, make recommendations on energy conservation, and demonstrate the efficiency of certain projects. There is also the Poland, Hungary Assistance for Economic Reconstruction (PHARE) program, under the auspices of the EC, to establish an energy center.

Under Hungary's statistical law, data collection is assigned to the National Statistical Agency which may delegate its authority. The authority has been delegated to the Information and Safety Ministry. They collect some data without clear legal authority. The energy information system provides

data to the IKM, the Bureau of Central Statistics, the Organization of Economic Cooperation and Development (OECD), the World Bank, the International Energy Agency (IEA), and the EC. The information provided includes energy quantity balances by industrial sector, utilization, and region. The agency also has a public information function, but dissemination is not very widespread because there is very little budget for it.

Short and long run quantity projections (translated as prognostications) are a carryover from the Five-Year plans. (Although maximum prices were published for price regulated goods, the maximum is not always the price charged.) Now the agency makes these projections for the IEA and sells its services to large companies.

The IEA has recently criticized Hungary's forecasts because they are established on the wrong basis, that is, without any reference to prices or costs. The Ministry is ready to collect cost and price data but as yet it does not have the authority or the budget.

VI. Observations and Recommendations

A. Government Objectives

The "Hungarian Energy Policy" document sets out the government's priorities for the energy sector. The problem now is to assess to what extent the operation of market forces in the energy sector will achieve these objectives.

Simplifying somewhat, the government has four main objectives. The first, and most fundamental, is to ensure that there are sufficient energy supplies. In general, monopoly energy companies have been quite good at building sufficient capacity to meet demand, although probably not at the lowest cost.

The government's second objective is to improve the security of the supply of all forms of energy. To achieve this, it is proposed that positive steps be taken to import energy from more diverse sources. For example, there should be greater use of the Adria oil pipeline and connection to the Western natural gas and electricity systems. In addition, the government wishes to increase levels of strategic stocks of all fuels. This will improve its ability to withstand temporary supply interruptions. The energy companies will also most likely pursue a policy of diversity in their purchasing and holding stocks (they do not want to be left with nothing to sell or to be in a weak negotiating position with the former Soviet Union), but they may put a lower priority on this than the government.

The government's third objective is to ensure that energy prices send the correct signals to the rest of the economy. Prices should be set to reflect the full cost of supply. Correct energy prices will mean that consumption and investment decisions in the rest of the economy are rationally based. Self-financing of the energy industries will ensure that they never require support from the central budget.

Lastly, given the large amount of assets and the numbers of people employed in the energy industries, the government wants to be sure that those resources and labor are being used efficiently. Given their monopoly posi-

tions, the energy companies have only very limited incentives to improve their efficiency. Costs will not be controlled as rigorously as they should be. Measures will therefore have to be designed to strengthen the incentives to efficiency.

The government also has a number of constraints in framing its energy policy. It must comply with its international obligations to limit the impact of the energy industries on the environment. In addition, the government wishes to avoid the immediate collapse of the coal industry.

B. A Regulatory Body

There are areas which are not of strategic national importance, but are important and politically sensitive, the most important of which is price-setting. In these areas, governments in Western countries tend increasingly to delegate the decisions to an independent regulatory body. The government will usually set the parameters within which the regulatory body will work, give it powers and duties, and tell it what factors it can take into consideration. The government will usually be responsible for appointments to the top posts in the regulatory body and will receive an annual report on the body's activities. However, once appointed, the regulator will be responsible for regulating the industry (or industries) without direct interference from the government.

The regulatory body is often given the job of protecting the consumer against abuse of monopoly power. The regulatory body therefore has the primary authority to prevent the industry from unduly discriminating against particular customers or groups of customers. It is also usually responsible for monitoring and enforcing the standards of service the companies achieve to ensure that they are not reducing the quality of service to increase profits.

The independence of the regulatory body from government takes these sensitive issues outside the political arena. The regulatory body provides a focal point where different interest groups can argue their cases and feel that they are being listened to. This approach tends to increase public acceptability of the decisions.

C. Additional Observations

Economic efficiency is an important guiding principle. If economic efficiency is achieved, all members of society can be better served and concepts of social justice can be achieved at their highest levels. When there are no economies of scale, and the service or good is not considered a necessity, competition is usually considered to be capable of achieving economic efficiency with few social injustices (e.g., caviar is not a necessary good; a first class seat on an airplane is not a necessary service.)

Electricity and natural gas are considered necessities. When the market has economies of scale and the service or good is considered a necessity, concession competition and/or economic regulation are considered appropriate to control monopoly abuse. The regulation should attempt to make the provider of the good or service set prices at marginal cost.

Under current conditions of rapid change, shifts in the distribution of national income and industrial restructuring mean true marginal costs may be more difficult to ascertain than is usually the case in Western capitalist systems. Until a system for accurately estimating marginal costs is attainable, surrogates will be necessary. Two possibilities are alternative fuel pricing and yardstick pricing. Alternative fuel pricing sets prices based on market prices of close substitute fuels. For example, natural gas prices could be based on gasoil (No. 2) prices. Electricity prices could be based on nearby countries' electricity prices. Yardstick pricing is based on a comparison of the performance of similar firms or operations within or outside the country. Import prices can also serve as the basis for marginal cost calculation.

On the supply side, when incremental projected revenues exceed incremental projected costs, a project should be undertaken. This will only work if the allocation of funds to projects is subject to a "hard" budget constraint. Without such a constraint, social inefficiencies result. The incremental costs should include externalities like environment costs and national security insurance costs. Currently some of the government owned industries simply stop paying their bills if they run out of money. This is known as a "soft" budget constraint. The government hopes to avoid this problem through privatization and regulation. Several approaches and their effects are presented in Table 11.

TABLE 11: REGULATORY APPROACH AND EFFECTS

Approach	Productive Efficiency Incentives	Consumer Welfare		Gov't Revenues
		Short Term	Long Term	
Cost-based:				
Soft-Budget	Very low	Good	Very bad	Subsidy
Hard-Budget	Low	Good	Bad	Some
Price Cap	Medium	Good	Good	More
Value of service pricing	Medium	Bad	Bad	Most
Yardstick regulation	High	Good	Good	More

The government pricing policy is to "reflect international value." This policy will require significant increases in natural gas and electricity prices to households. This, in turn, will significantly increase revenues. Both industries have significant sunk capital investments that are difficult to value. To value the capital of these companies one could either estimate replacement costs or value the assets by the discounted stream of revenues they are expected to produce. The government also needs to make capital structure decisions. Debt holders have little or no say in management but have first call on the net income. The government may be better off creating and selling debt. Private investors are being actively sought.

With increased energy prices, costs to households will increase. These

increases may bring serious hardships to fixed income consumers, and it is important to mitigate these hardships to maintain the social consensus for the program.

Improving efficiency within the energy industries is best done through the ownership function. As owner, the government has an interest in ensuring that its assets are used as productively as possible. Clearly, there are some conflicts between the roles which the government is playing in assuming these powers. In particular, there is a conflict between the ownership function (which will seek to maximize the value of the companies) and the government's other powers (including those it delegates to the regulatory body) which may well reduce the value of the company or make the business more difficult to run. Delegation to the regulator removes only part of this conflict. The ownership function within the state should be separated as much as possible from its other powers.

Open access policies for regulated industries are generally pursued to allow other segments of the industry to develop competitive markets. In the oil and gas industry, open access allows competitive development of the exploration and production sector. In the electric industry, power generation (the production of electric energy) can become more competitive.

The principles are simple. The implementation can be difficult. If capacity is available on a long or short term basis, access must be granted to qualified customers (shippers or transmitters). A contract with a maximum price and standard terms and conditions must be available. With the availability of the standard contract, parties may agree to an alternative contract with different prices, terms, and conditions. The company should be required to periodically publish the available transmission capacity between key points in the system for the short and long terms.

If capacity is not available, the company must build additional capacity upon request and charge the requestor the incremental cost of capacity. Unless otherwise agreed, standard terms and conditions would be used. This construction process must be consistent with the environmental and other relevant laws. If the capacity cannot be constructed, the regulatory body must determine equitable pricing and distribution of capacity. If the existing capacity holder gives up capacity, that holder should be fairly compensated.

D. Transition to Privatization

It is very important that the rules of the transition of the government from owner to regulator be well planned and have a high degree of certainty. Initially, the government must decide capitalization (amount of equity and debt), wage incentives, and new taxes (e.g., excise taxes) for each firm. It should then phase out of these decisions and into regulating prices and quality of service. It must also plan strategic diversification and income supplements to mitigate the impact of price increases upon those in need.

There are several problems that privatization may create. Rapid transitions can cause high transactions costs of vertical disintegration, ownership conflicts, creation of unregulated bilateral monopolies with high sunk costs, shortage of market institutions (for example, banking systems and share hold),

and high levels of uncertainty. These problems are especially important in the energy markets of eastern Europe.

VII. Summary and Conclusions

The multiple roles of government remain a problem. The government is simultaneously owner, regulator, and guardian of national security. These roles all pull it in different directions and threaten to lead to muddle. In this light, the idea of retaining fifty-one percent ownership may be problematic.

The concepts of privatization, competition, regulation, and optimal planning are mixed. The expression "honest market behavior" was used several times by various Hungarians, but appeared to be only a slogan or shibboleth. They appear to accept price negotiation between bilateral monopolies to be a market process. Obtaining rights-of-way in a system where private property becomes more meaningful will be another problem.

There are uniform national prices and some resistance to deviating from them. Pricing concepts for tariffs are sophisticated but appear not to be linked to costs. Discounting and discrimination are seen as social problems and are not perceived as fair. Significant work needs to be done in developing decentralized financial markets and internal financial planning inside the newly privatized corporations.

Nevertheless, Hungary's political debate appears to be converging on problems that remain difficult for such systems in Western capitalist countries: residential subsidies, price discrimination, greater use of market forces, and the downsizing of firms. Yet the Hungarians appear to be in a position to become a market center for Southeastern Europe.

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