

DATA FOR ECONOMETRIC ANALYSIS OF ENERGY DEMAND  
FOR EASTERN EUROPEAN COUNTRIES

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July 1975

WP-75-79

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Introduction.

Econometric analysis is one of the principal directions of the studies of energy demand at IIASA. It contains a series of studies [1], [2] including some characteristic countries for the world energy economy. This analysis of the Eastern European countries covers the characteristic features and advance over the international estimate made up to now in the field of energy analysis. The first step in these studies of the energy economy of the countries with planned economies along with some methodological problems is the collecting of data. This work began two months ago directed by Prof. William D. Nordhaus. In the following the state and the results of this work are briefly presented.

1. On the approach of data collecting.

The econometric regression analysis is an iterative one. The first step of this work corresponds to a "universal" approach characterized by an attempt to analyze the energy consumption of the principal consumer sectors (industry, transport, residential) of the energy economy of the countries with planned economy using a set of variables (GNP, NMP, prices and some other variables generally used in economic analysis). The results of this step of data collecting, the econometric analysis based on this data and the preliminary analysis now under way at IIASA on methods of forecasting energy demand used in the countries of planned economy will be the basis for the more detailed and definite data collecting.

This will be used for several studies of energy demand and other studies in the energy project, of which one of the most important could be a regional model of energy development for the countries of planned economy.

The sources of information up to now were the data received from the national committees of IIASA (Bulgaria, Czechoslovakia, Poland and the USSR), national statistical yearbooks, statistical yearbooks of COMECON, statistical yearbooks of the United Nations, annual bulletins of statistics (of energy, coal, gas, electricity) published by the United Nations and other statistics from the library of IIASA, IAEA, Wiener Institut für Internationale Wirtschaftsvergleiche, Österr. Institut für Ost- und Südosteuropaforschung in Vienna. More details on this matter are given in the next chapter and in the references.

## 2. Present State of Data Collecting.

The general outline of the data needed for the first step of econometric analysis is given in Table 1. The collected data is given for each country for the time period from 1960 to 1973 and presented in three kinds of tables:

1. Macroeconomic data
2. Energy consumption
3. Fuels and electricity prices.

The annex contains gas conversion factors. In the following the state is given by countries.

### Bulgaria

The sources of information are the national statistical yearbooks, statistics of energy, coal and electric energy published by the United Nations and statistical yearbooks of COMECON. Table I-1 contains GNP from 1960 to 1973 (except 1966, 1969, 1970) at current prices and indexes, NMP (1960-1973) in current prices and indexes, population, average monthly income, basic exchange rate, consumer price indexes from 1960 to 1973.

Table I-2 shows the total consumption of coal (total, hard, brown), lignite, crude oil, gas oil and electricity (1960-1973); consumption of coal (total, hard, brown), lignite and electricity in industry (1960-1973), consumption of coal (total, hard, brown) and electricity in transport (1960-1973), consumption of electricity in energy and residential (1960-1973). The data on consumption of coal on energy and residential is not complete. Table I-3 represents electricity prices in industry and transport (1970-1973), gas oil prices in transport (1960-1973), coal price in residential (1960-1973) and electricity in residential (1965-1973).

#### Czechoslovakia

The sources of information are the statistical yearbooks of Czechoslovakia and the annual bulletin of statistics of the United Nations (of coal, gas, energy). Some data of fuel consumption in industry, transport, and residential and fuel prices in industry (1960-1965) is not specified. A letter from IIASA to Dr. Vasko (chairman of the IIASA Committee of Czechoslovakia) asking to help us obtain these data was given by Prof. Häfele to Dr. Vasko in the course of his visit in Czechoslovakia. The data are presented in 3 tables: Table II-1 shows GNP, NMP in current prices and indexes (1960-1973), population (1960-1973), average monthly income (1960-1961, 1964-1973), basic exchange rate (1960-1973), consumer price index (1962, 1963, 1965-1971), capital goods price index (1967-1973). Table II-2 contains total consumption of coal (hard, brown) crude oil, gas oil, natural gas, electricity (some of the data marked with a dot is the data of production); consumption of coal, natural gas, electricity in industry and residential (1963-1973); consumption of coal, liquid and electricity in transport (1963-1973).

#### Hungary

The data for Hungary is collected without any help from the Hungarian Committee of IIASA. The sources of information are statistical yearbooks of the Hungarian Central Statistical Office.

Almost all the data on consumption of fuel and electricity is available, but not complete because of language difficulties. Table III-1 presents NMP in current price and indexes, population, average monthly income, basic exchange rate, consumer price index from 1960 to 1973, capital good price indexes (1968-1972). Table III-2 contains consumption of coal (total, hard, brown), lignite, crude oil, gas oil, motor fuel, natural gas, electricity (1960, 1965-1973) total in industry, in transport, in residential, consumption of coal, liquid, natural gas in energy sector (1960-1973). The data of petrol prices in transport (1970-1973 and of hard coal, natural gas and electricity in residential (1960-1973) is given in Table III-3.

#### Poland

The data for Poland is based mainly on the information from statistical yearbooks and special statistics of energy given to IIASA by the Committee of Poland and completed with data from statistical yearbooks of COMECON and United Nations. The data for Poland is relatively complete and includes the following: In Table IV-1 GNP, NMP in current prices and indexes, population, average monthly income, basic exchange rate (1960-1973), consumer price indexes (1962, 1964-1971). Table IV-2 shows consumption of coal (hard, brown) liquid, natural gas and electricity - total and in the energy sector (1960-1973); consumption of coal (hard, brown), natural gas and electricity in industry and residential (1963-1973), consumption of coal and electricity in transport (1960, 1963-1973). Table IV-3 contains petrol price in transport (1960-1965, 1970-1973) and coal, gas and electricity prices in residential (1960-1973).

#### USSR.

The first source of information of the energy economy of the USSR was the "National Economy of USSR" received by Dr. Tsvetanov from the State Committee of USSR for Science and Technology. A set of books of this kind of collecting data from 1955 to 1974 was promised. According to the latest information an order was given to

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the Institute of Scientific and Technical Information to send these books to IIASA. During the two months, data collecting for the USSR was based on the statistical yearbook of the USSR, statistical yearbooks of COMECON, annual bulletins of statistics for Europe of the United Nations. The published statistical data for the USSR energy economy is not specified by consumer sectors. This question was largely discussed with Academician M. Styrikovich during his visit to IIASA (May 1975). It was promised that these data would be prepared and sent to IIASA. The collected data contains the following: Table V-1 - NMP in current prices and indexes, population, average monthly income, basic exchange rate (1960-1973), capital good price indexes (1964-1971). Table V-2 contains electricity consumption (total and in industry) (1960-1973), natural gas consumption in industry (1965-1973). Some of the data of coal, crude oil and natural gas is in production (marked by dots) because the published data covers only production. Table V-3 presents average coal and natural gas, prices in industry (1970-1972), gas and electricity prices in residential (1972-1973).

### 3. Concluding Remarks

The data collected until now for Bulgaria, Czechoslovakia, Hungary, Poland and the USSR is about 80% of the data needed for the "first step" of collecting which will give the possibility of analysis corresponding to the econometric analysis for the countries with market economies.

Further work in collecting data could, in my opinion, go in three directions:

1. To supplement the already collected data by closer collaboration with the National Committees of IIASA.
2. To include in the scope of the data the other countries of COMECON (German Democratic Republic and Rumania).
3. To collect data for other independent variables for a more detailed regression analysis of energy demand--such as investment, capital stock, labor productivity, weather data

and some other variables. The results are necessary for preliminary analysis of methods of forecasting energy demand in the countries with planned economies and for comparison of energy options.

The collected data needed to be checked, especially correspondence between GNP and NMP in current prices and in indexes.



TABLE I.

## DATA REQUIREMENTS FOR ECONOMETRIC ANALYSIS OF ENERGY DEMAND

	UNIT	AGGREGATE	SECTORS :			
			ENERGY-SECTOR	INDUSTRY	TRANSPORTATION	RESIDENTIAL AND COMMERCIAL
<u>PRICES</u>	LOCAL CURRENCY PER:	-	-	HARD (COAL)	HARD (COAL)	HARD (COAL)
	$10^6$ BTU	-	-	LIQUID (HEAVY FUEL OIL)	LIQUID (GASOLINE)	LIQUID (LIGHT FUEL OIL)
		-	-	GAS (NATURAL)	GAS	GAS (TOWN AND NATURAL)
		-	-	ELECTRICITY	ELECTRICITY	ELECTRICITY
<u>CONSUMPTION QUANTITIES</u>	BOTH NATURAL UNITS (METRIC TONS, KWH, etc) AND $10^6$ BTU		HARD (COAL)	HARD (COAL)	HARD (COAL)	HARD (COAL)
			LIQUID	LIQUID	LIQUID	LIQUID
			GAS	GAS	GAS	GAS
			ELECTR.	ELECTRICITY	ELECTRICITY	ELECTRICITY

MACRO-ECONOMIC STATISTICS	U N I T S	A G G R E G A T E S :
	LOCAL CURRENCY	
" "		" " " - CURRENT "
INDEX NUMBERS		G.N.P (G.D.P.) DEFLATOR
INDEX NUMBERS		CONSUMER PRICE INDEX
MILLIONS		POPULATION
1US\$ TO LOCAL CURRENCY		EXCHANGE RATE
LOCAL CURRENCY		WAGE RATES (HOURLY EARNINGS IN MANUFACTURING, MEN + WOMEN)
INDEX NUMBERS		CAPITAL GOODS PRICE (DEFLATOR)
CELSIUS DEGREES		WEATHER: DEVIATIONS FROM THE NORMAL FOR THE YEAR; FIRST QUARTER

Table I-1. Macroeconomic Data for Econometric Analysis of Energy Demand for Bulgaria

Aggregates	Units	Years													
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
G N P	10 <sup>6</sup> lev	10310.1	1082.5	12010.0	19168.3	14486.3	15976.5	...	19655.4	21634.2	...	...	26959.5	29088.0	31354.2
G N P	index	100	105	115	124	137	151	168	187	203	219	238	254	275	
N M P	10 <sup>6</sup> lev	4488.8	4715.8	5158.8	5675.8	6203.7	6635.6	7273.6	7853.0	8556.0	9349.8	10527.4	10411.4	11241.7	12141.5
N M P	index	100	103	109	118	129	138	154	168	178	196	210	225	242	
Popula- tion	10 <sup>6</sup>	7.905	7.981	8.045	8.111	8.177	8.230	8.285	8.335	8.404	8.464	8.515	8.558	8.595	8.643
Average monthly income	lev	78.3	84.7	86.7	89.6	90.3	92.4	96.4	107	114	117	124	127	131	139
Basic ex- change rate	lev US-\$1			1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.078	1.078
Consumer price index A.	index	100	100.9	104.0	106.5	106.8	106.3	106.0	106.2	110.5	110.3	109.9	109.8	109.8	110.2
B.	index	100		106.3	111.2	111.5	111.0	111.0	111.0	119.5	119	119.2	119.4		

Note: ... data not available

Table I-2. Energy Consumption in Bulgaria

Units	Y e a r s													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<b>Total</b>														
Coal total 10 <sup>3</sup> t	15935	18054	22262	23791	27567	29300	30053	32644	34677	35014	35855	35349	35752	
Hard coal 10 <sup>3</sup> t	701	1068	510	1658	2284	2819	3783	4282	4546	5009	6062	7148	7342	6286
Brown coal 10 <sup>3</sup> t	10017	9806	10572	10605	10463	10291	9540	8749	8171	7524	7299	6897	7024	
Lignite 10 <sup>3</sup> t	5308	7120	10032	10902	14285	15516	16731	19614	21960	22481	22496	21304	21386	
Crude oil 10 <sup>3</sup> t	120	81	83	83	120	2425	2983	3263	3548	5184	6030	7852	8528	9942
Gas oil 10 <sup>3</sup> t	441	48	42	265	500	930	921	1229	1449	...	...	...	...	...
Electricity 10 <sup>6</sup> KWh	4685	5450	6133	7278	8706	10285	11811	13788	15799	17521	19616	21266	23275	25221
<b>Industry</b>														
Coal total 10 <sup>3</sup> t	10245	12558	14911	16915	19950	21569	23192	26097	28953	29696	30009	29918	30277	
Hard coal 10 <sup>3</sup> t	486	514	568	1220	1670	2326	2618	2975	3468	3762	4698	5481	5622	
Brown coal 10 <sup>3</sup> t	6031	6250	6220	6466	1093	5978	5685	5513	5208	4956	4446	4272	4280	
Lignite 10 <sup>3</sup> t	3728	5794	8123	9230	12190	13266	14890	17609	20777	20978	20866	20165	20375	
Electricity 10 <sup>6</sup> KWh	2491	2996	3338	3921	4738	5555	6786	7798	8795	9715	10735	11825	12354	13325
<b>Energy</b>														
Hard coal 10 <sup>3</sup> t	2632	2809												
Lignite 10 <sup>3</sup> t	2068	3839				11711	13187	15231	16009	16728	15826			
Liquid 10 <sup>3</sup> t	41	43												
Electricity 10 <sup>6</sup> KWh	317	430	517	643	971	1047	1278	1524	1707	1958	2040	2181	2445	2394
<b>Transport</b>														
Coal total 10 <sup>3</sup> t	2145	1703	1553	1275	1052	1074	969	815	736	709	631	690	585	
Hard coal 10 <sup>3</sup> t	16	472	639	665	504	484	391	405	322	308	265	345	250	
Brown coal 10 <sup>3</sup> t	1934	1216	915	609	547	590	578	408	414	365	365	346	330	
Electricity 10 <sup>6</sup> KWh	96	114	128	186	223	253	293	335	376	435	483	574	669	712
<b>Residential</b>														
Hard coal 10 <sup>3</sup> t														
Brown coal 10 <sup>3</sup> t				3758	3999	3803	3010	2373	2536	2389	2201	1637	1611	113
Electricity 10 <sup>6</sup> KWh	530	647	698	879	986	1180	1363	1609	1841	2171	2469	2827	3227	3647



Table II-1. Macroeconomic Data for Econometric Analysis of Energy Demand for Czechoslovakia

Aggregates	Unit	Y e a r s													
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
GNP	10 <sup>9</sup> Kor index	348,9	362,5	373,5	373,1	384,9	405,6	434,8	559,7	596,6	628,9	676,9	715,5	759,3	803,3
GNP	10 <sup>9</sup> Kor index	100	172,9	175,4	171,4	172,6	119,7	128,3	137,0	146,0	153,9	165,7	175,1	185,7	
NMP	10 <sup>9</sup> Kor index	100	106,7	108,3	105,9	106,6	178,5	194,9	231,0	257,0	265,7	280,4	294,7	312,4	329,0
Population	10 <sup>6</sup>	13.654	13.780	13.860	13.952	14.058	110,2	120,3	126,0	135,7	145,7	153,7	161,5	171,1	203,0
Av. monthly earning	Kor	1436	1477	...	...	1538	14.159	14.240	14.305	14.362	14.416	14.334	14.390	14.481	14.578
Basic Ex- change rate	Kor/ US-\$1	7,2	7,2	7,2	7,2	7,2	1574	1613	1683	1790	1900	1971	2041	2113	2180
Consumer price index (1969=100)	A index B index	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	6,63	6,63	6,63
				99	100	100	102	102	104	105	100	102	101		
				100	100	100	101	100	102	103	100	100	100	106,6	106,6
									100	103	105,9	106,6	106,6	106,5	106,6

Table II-2. Energy Consumption in Czechoslovakia

Units	Y e a r s													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<b>Total</b>	26422	29992	31118	30193	30737	29745	28684	27762	28130	29038	29663	30732	30047	29598
Hard coal $10^3t$	55475	62068	65818	69993	71972	69042	69855	67181	70835	72262	81783	84791	85566	81249
Brown coal $10^3t$	137	154	177	180	1779	6151	6574	7312	8015	9585	9954	11636	12762	14048
Crude oil $10^3t$	1170	1364	1457	1653	1779	...	...	...	3422	3897	...	11712	12724	...
Gas oil $10^6m^3$	487	500	784	729	927	965	1070	1017	1108	1185	2475	2759	3002	3329
Natural gas $10^6KWh$	20427	22687	24612	25511	27654	29811	37225	35852	42240	45780	41456	44021	46628	48988
<b>Industry</b>														
Hard coal $10^3t$				6709	6891	6626	6445	5932	8001	6128	8558	8894	6775	6313
Brown coal $10^3t$				26010	26336	26366	26918	25122	29678	25601	25905	31441	26591	23124
Liquid $10^9kcal$						5722	6274	5206	2624	2940	3429	3430	4928	5214
Natural gas $10^6KWh$	15671	17924	18764	19874	21267	22643	23883	25182	6135	7422	9173	10422	11104	12557
Electricity $10^6KWh$									26625	24887	30484	32160	33871	33916
<b>Energy</b>														
Hard coal $10^3t$	1690	3042	2229	2349	2264	2821	3478	3014	3216	3740	3617	3531	3351	3380
>4500Kcal/kg $10^3t$	3785	2607	3194	3089	3015	2484	1993	2651	2659	2103	2168	2762	2633	2865
Brown coal $10^3t$	16675	17600	19560	21479	22379	22379	21115	21858	25448	27408	28556	31010	33636	35453
Liquid $10^3t$	31	91	121	128	174	175	196	289	224	328	356	425	443	529
Natural gas $10^9kcal$	4690	3856	1598	1212	552	294	339	448	543	686	1224	1242	2618	2069
Electricity $10^6KWh$	1531	1759	1874	2050	2370	2411	2644	2888	3273	3586	3785	4050	4378	...
<b>Transport</b>														
Hard coal $10^3t$				2548	2720	2407	2051	1883	1824	1469	1332	1209	1027	809
Brown coal $10^3t$				6877	6149	5450	5087	4289	3664	3095	2869	1882	1619	1304
Liquid $10^3t$				...	1380	1737	1788	1906	190	129	92	60	34	22
Electricity $10^6KWh$	865	780	1272	...	1477	723	786	827	719	1076	918	1070	967	959
<b>Residential</b>														
Hard coal $10^3t$				1477	1059	723	786	827	719	1076	918	1070	967	959
Brown coal $10^3t$				10400	11148	11807	11160	11471	6347	14281	14037	7241	6319	6078
Natural gas $10^9kcal$						303	334	441	441	602	756	1001	1274	1526
Electricity $10^6KWh$	1496	1659	1819	1967	2173	2326	2537	2739	3284	3577	3997	4391	4931	5441



Table III-1. Macroeconomic Data for Econometric Analysis of Energy Demand for Hungary

Aggregates	Units	Y e a r s																
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973			
GNP	$10^9$ for																	
GNP	index	57					73											
NMP	$10^9$ for	142.0	148.9	156.7	165.1	173.5	170.5	189.7	207.5	224.7	253.1	272.4	294.3					
NMP	index	100	105	111	117	122	122	132	143	150	162	170	181	190				
Population	$10^6$	9.984	10.006	10.050	10.072	10.104	10.148	10.160	10.197	10.236	10.275	10.338	10.368	10.398	10.432			
Av. monthly income	for	1575	1599	1638	1702	1757	1766	1856	1915	1928	2012	2139	2241	2326	2484			
Basic exchange rate	for/ US\$1	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	11.737	10.81	10.81	10.81
Consumer price index (1968=100)	A, index	100	101	101	101		103	106	106	100	101	102	104					
	B, index		102	102	101		104	110	112	100	100	101	103					
Capital goods index (previous year=100)	index									105.9	101.8	102.3	101.6	101.9				



Table III-2. Energy Consumption in Hungary

Units	Y e a r s														
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	
Total															
Coal total	28056	28175*	28651*	30479*	31548*	33479	32511	30384	29348	29018	29683	28717	28398	29065	
Hard coal	4236			6169	7390	6817	6744	5795	6405	6378	6314	5796	5633	5299	
Brown coal	19573			26115	26636	26253	25239	19591	19867	19659	18652	17067	15910	15562	
Lignite	4247					4827	4425	3219	3076	2982	4627	5554	6855	8204	
Crude oil	2608	1457*	1641*	1757*	1801*	3898	4197	4495	5033	5393	6038	6060	7205	8053	
Gas oil	595					961	1074	1170	1253	1454	1789	1869	1522	1289	
Motor spirit	209					348	380	436	506	535	628	737	848	927	
Natural gas	428	327*	340*	611*	784*	1280	1752	2920	2873	3426	3667	3898	4270	4969	
Electricity	6686	7313	7979	8724	9648	10404	11229	12093	12841	13762	15008	16254	17356	18622	
Industry															
Coal total	21256					24701	24181	23016	22008	21370	22104	21844	22590	23595	
Hard coal	2612					4549	4691	4470	4815	4706	4487	4416	4206	4150	
Brown coal	14714					16144	15712	15016	14161	13840	13041	11926	11546	11257	
Lignite	3929					4008	3726	3219	3032	2824	4576	5502	6838	8188	
Crude oil	2608					3898	4617	4642	5033	5393	6038	6659	7312	8038	
Gas oil	100					109	100	110	152	166	197	209	299	299	
Motor spirit	34					54	58	66	81	91	100	111	127	132	
Natural gas						1237	1680	2301	2785	3293	3454	3586	3855	4410	
Electricity	5115	5630	6018	6387	7025	7461	7978	8452	8900	9329	9940	10397	10851	11555	
Energy															
Hard coal	1028	1162	1183	1263	1227	1400	1655	1802	2016	1903	1827	1849	1862	1884	
> 4500Kcal/kg															
Hard coal	6617	7006	8040	1396	1453	1483	1989	2092	2016	1903	1827	1849	1862	1884	
< 4500Kcal/kg															
Brown coal	2938	3208	3213	11419	11734	12051	11585	10460	9678	9597	11110	11917	13480	14923	
Liquid	97	179	195	253	481	554	646	588	617	778	960	1126	1190	1101	
Natural gas	568	245	287	1448	1535	2086	2925	5072	6651	8778	7217	6451	7166	9703	
Electricity						1049	1122	1253							

Table III-2 continued.

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<u>Transport</u>														
Coal	2187			1739	1788	2119	2024	1638	1479	1548	1749	1512	1261	1168
Hard coal	1080			875	611	1493	1314	...	934	840	943	772	603	557
Brown coal	1107					576	670	...	545	687	756	740	656	609
Gas oil	160					291	333	367	379	402	442	462	498	492
Motor spirit	47					69	78	91	96	110	136	166	166	172
Electricity	275	290	324	370	415	424	573	602	636	699	778	924	946	1069
<u>Residential</u>														
Coal	3480					5080	4888	4406	4448	4708	4517	3876	3322	3304
Hard coal	381			605	911	697	704	723	417	635	718	400	582	450
Brown coal	2781			4805	5118	5260	5068	...	4004	3952	3772	3436	2727	2853
Gas oil	3					21	...	...	49	111	256	328	7	...
Motor gas	35					85	103	116	131	141	165	200	260	325
Natural gas	172					224	234	356	455	630	903	1245	1368	1820
Electricity	548	615	685	761	866	991	1126	1268	1425	1606	1817	2045	2312	2550

Table III-3. Fuels and Electricity Prices in Hungary

Units	Y e a r s													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<u>Transport</u>														
Benzin (86) for/l							3.0					3.0	3.0	3.0
<u>Residential</u>														
Hard coal for/100kg	22.0	22.0	22.0	22.0	22.0	22.0	27.5	27.5	27.5	27.5	27.5	27.5	26.1	26.1
Natural gas for/m <sup>3</sup>	0.78	0.79	0.79	0.80	0.81	0.84	0.84	0.84	0.86	0.81	1.45	1.39	1.41	1.41
Electricity for/KWh	1.21	1.20	1.17	1.15	1.12	1.08	1.03	0.99	0.97	0.94	0.91	0.89	0.87	0.85

Table IV-1. Macroeconomic Data for Econometric Analysis of Energy Demand for Poland

	Y e a r s													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
GNP	931.3	1057.9	1119.4	1182.0	1281.1	1387.7	1483.9	1599.1	1742.8	1848.4	1968.0	2201.0	2443.6	
GNP index	100	113.6	120.2	126.9	137.4	149.0	159.3	171.7	187.1	198.5	211.3	236.3	262.4	
MNP	375.8	410.7	426.1	460.1	497.0	531.3	567.2	605.6	668.8	696.1	749.2	855.0	947.8	
MNP index	100	108				135	145	153	166	171	180	195	215	238
Population	29795	30133	30484	30904	31339	31551	31811	32163	32426	32671	32658	32909	32202	33512
Av. monthly income	1683	1729	1780	1851	1898	2013	2095	2195	2296	2384	2459	2504	2780	
Basic exchange rate			4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	3.68	3.68	3.68
Consumer price index (1963=100)			99	100	101	102	103	105	107	108	109	109	113	
			102	100	101	103	102	103	106	108	111	113		

Table IV-2. Energy Consumption in Poland

	Units	Y e a r s													
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<b>Total</b>															
Hard coal	10 <sup>3</sup> t	87717	90454	93366	97523	99365	98965	100715	101065	103888	109724	112380	116463	120170	121908
Brown coal	10 <sup>3</sup> t	4281	5058	5941	10128	15530	18064	19928	20439	23012	26785	29139	30945	34096	44168
Crude oil	10 <sup>3</sup> t	908	943	1304	1628	1990	3555	3747	4058	5753	6949	7435	8368	10001	11432
Natural gas	10 <sup>6</sup> m <sup>3</sup>	549*	734*	821*	983*	1231*	1378	1376	1570	2768	5840	6176	6863	7319	7737
Electricity	10 <sup>6</sup> KWh	29609	32558	35357	36912	40053	43347	47254	51579	55844	60211	64587	69814	76266	82533
<b>Industry</b>															
Hard coal	10 <sup>3</sup> tce				26236	27720	27302	27056	27443	23365	21623	22227	21871	21412	31979
Brown coal	10 <sup>3</sup> tce				841	852	604	483	451	76	190	223	118	165	260
Natural gas	10 <sup>9</sup> Kcal						13273	15770	20078	19895	22629	29545	31593	32874	35115
Electricity	10 <sup>6</sup> KWh	19897	22617	24450	25785	28191	30263	32565	35818	38117	40770	43407	46294	50007	54017
<b>Energy</b>															
Hard coal	10 <sup>3</sup> t	15595	20329	20918	20212	19549	18591	19440	20719	21934	23221	24385	26336	28417	32319
Brown coal	10 <sup>3</sup> t	1807	2736	3691	7038	12167	15124	17767	18552	21288	24624	26636	28483	32290	32804
Liquid	10 <sup>3</sup> t	9	19	27	45	96	84	79	89	103	167	334	381	417	486
Natural gas	10 <sup>6</sup> m <sup>3</sup>	299	310	416	420	406	460	352	273	293	462	651	810	978	623
Electricity	10 <sup>6</sup> KWh	1918	2208	2504	2705	2999	4051	4394	4780	5141	4580	4868	5371	5934	6551
<b>Transport</b>															
Hard coal	10 <sup>3</sup> tce				10174	9530	8906	8484	8025	7686	7150	7273	6841	6452	5368
Electricity	10 <sup>6</sup> KWh	684	503	990	810	1315	1468	1738	2021	2264	2562	2821	3078	3242	3361
<b>Residential</b>															
Hard coal	10 <sup>3</sup> t				16621	17549	17871	17932	19012	19809	20932	22611	23098	22271	22947
Brown coal	10 <sup>6</sup> t				706	794	619	227	111	108	232	563	740	379	163
Natural gas	10 <sup>9</sup> Kcal						1054	1122	1247	1779	1610	1968	...	...	...
Electricity	10 <sup>6</sup> KWh	5593	5456	5989	5823	6015	6677	7768	8407	9651	10519	10278	11278	14278	15366

Table IV-3. Fuel and Electricity Prices in Poland

	Units	Y e a r s													
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<u>Industry</u>															
Hard coal	zl/t												248	258	
Brown coal	zl/t														
Liquid	zl/t														
Natural gas	zl/m <sup>3</sup>														
Electricity	zl/KWh														
<u>Transport</u>															
Benzin (78oct)	zl/l	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	5.0	5.0	5.0
<u>Residential</u>															
Hard coal	zl/t	250	250	250	500	500	500	500	500	500	500	500	550	550	550
Natural gas	zl/m <sup>3</sup>	0.5	0.5	0.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Electricity	zl/KWh	0.39	0.39	0.39	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9



Table V-2. Energy Consumption in USSR

Units	Y e a r s													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<u>Total</u>														
Hard coal $10^6$ t	343.6	377.0	386.4	395.1	408.9	375.2	439.2	451.4	441.6	451.0	408.2	416.5	426.8	436.7
Brown coal $10^6$ t	134.2	133.5	130.9	136.6	145.1	147.4	146.4	143.8	139.3	140.5	144.7	150.1	152.4	153.4
Crude oil $10^6$ t	129.4	166.1	186.2	206.1	223.6	198.3	265.1	288.1	250.0	264.4	282.0	297.0	317.6	336.0
Natural gas $10^6$ m <sup>3</sup>	41979	58981	73525	89832	108566	118589	142962	157445	169101	181121	180972	193393	201259	213416
Electricity $10^9$ kWh	292.2	327.5	369.1	411.6	457.6	505.2	544.6	585.9	636.2	685.2	735.7	793.7	850.4	904.9
<u>Industry</u>														
Hard coal $10^3$ t														
Brown coal $10^3$ t														
Liquid $10^3$ t														
Natural gas $10^9$ kcal														
Electricity $10^9$ kWh	207.5	231.7	260.9	287.4	317.8	349.4	372.9	399.7	429.9	458.1	488.4	520.5	552.9	585.6
<u>Transport</u>														
Hard coal														
Liquid														
Electricity $10^9$ kWh	17.7	20.5	23.9	29.2	32.9	37.1	40.6	43.8	48.7	51.6	54.4	58.2	61.5	64.8
<u>Residential</u>														
Hard coal														
Liquid														
Natural gas $10^9$ kcal						42520	45996	58984	66437	56302	61642	66052	65949	79579
Electricity $10^9$ kWh						83.8	...	...	106.9	121.9	134.6	151.6	166.6	...



Table V-3. Fuel and Electricity Prices in USSR

Units	Y e a r s													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<u>Industry</u>														
Hard coal rub/t														
Brown coal rub/t													20.0	20.0
Liquid rub/l													8.0	8.0
Natural gas rub/m <sup>3</sup>														
Electricity rub/KWh													0.020	0.020
<u>Transport</u>														
Benzin rub/l													0.10	0.10
<u>Residential</u>														
Natural gas rub/m <sup>3</sup>													0.011	0.011
Electricity rub/KWh													0.04	0.04

A n n e x  
Gas Conversion Factors  
[Kcal/m<sup>3</sup>]

C o u n t r i e s	Y e a r s										
	1965	1966	1967	1968	1969	1970	1971	1972	1973		
Czechoslovakia	G	10000	10000	10000	8860	8860	8600				
	N		9150	9150		7497	7822	7822	7822	7822	
Hungary	G	7462	8615								
	N			8689	8321	8402	8728	8670	8777	8250	
Poland	G	9100	9100								
	N			8570	8570	8570	8435	8200			
USSR	G	10970	10970	10970	10970						
	N					8330	8330	8330	8330	8330	

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