PN-ABS-108

RESOURCE MANAGEMENT ASSOCIATES
of Madison, Inc.

SUBCONTRACTOR REPORT

THE IMPACT OF FUEL AND ENERGY PRICES ON LITHUANIAN MACROECONOMIC INDICATORS, 1990-2000

Prepared by
Aleksandras Vasiliauskas
Ovidijus Balsys
Salomeja Girijotiene
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Henrikas Ziaunys
Venantas Maciekus

University of Vilnius Economics Faculty and the
Professor A. Vasiliauskas Economics Consulting Company

Prepared for
RESOURCE MANAGEMENT ASSOCIATES OF MADISON, INC.

December, 1992

**US AID EMERGENCY ENERGY PROGRAM
FOR EASTERN AND CENTRAL EUROPE**

(USAID Contract #: EUR-0015-C-1006-00)

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PREFACE

The work in this report is being carried out within the framework of the U.S. Emergency Energy Program for Eastern and Central Europe and the Baltic Republics under a Resource Management Associates of Madison, Inc. (RMA) contract with the U.S. Agency for International Development. RMA, as Prime Contractor to USAID, is currently implementing the Energy Pricing Reform Project and the Industrial Energy Efficiency Project in Romania, Czechoslovakia and Lithuania. The report is one of a series describing the activities, results and recommendations of the projects.

Enclosed is the report entitled "The Impact of the Fuel and Energy Price Increases on Lithuanian's Macroeconomic Indicators, 1990-2000". The authors, A. Vasiliauskas, O. Balsys, S. Girijotiene, A. Misiunas, H. Ziaunys and V. Maciekus are at the University of Vilnius, Department of Economics.

The report demonstrates that Lithuanian economic analysts are well on their way to understanding the short and medium term macroeconomic impacts of fuel price changes on industrial output and structure and on standard of living.

This is a working document published informally by RMA. To present the results of the project with the least possible delay this report has not been prepared in accordance with procedures appropriate to our formally printed documents. The report was not edited and received only very light review by RMA. Comments were made on the first draft of the paper. RMA does not necessarily endorse the views expressed or the findings presented in the text. The document's subject matter warrants its distribution.

ABSTRACT

The Impact of Fuel and Energy Price Increases on Lithuanian Macroeconomic Indicators, 1990-2000.

by, A. Vasiliauskas, O. Balsys, S. Girijotiene, A. Misiunas, H. Ziaunys and V. Maciekus
December, 1992

Nearly the total fuel and energy resources utilized in Lithuania are imported from the single supplier, Russia, which is therefore in a position to dictate the energy prices. This combined with the price liberalization and other steps toward market-oriented economy, have had a painful impact on the economy in terms of production, consumption and standard of living.

The purpose of this research is to analyze the changes in the fuel and energy consumption caused by the rise in prices of energy resources that took place in Lithuania in 1992 and the expected impacts of those changes on the industrial inputs and outputs through the year 2000. The analysis employed the RMA Industrial Sector Energy Demand Model.

The rise of fuel and energy prices, to levels approaching world market prices, caused an increase in production costs and prices throughout the economy. The respective price indices were obtained with the use of the input-output model of the Lithuanian economy.

The main result of the research can be summarized as follows:

1. The increase in fuel and energy prices in 1992 did not have a significant direct impact on actual energy consumption in Lithuania. Rather the industrial energy consumption decrease was caused by production decline, not by rising prices per se. Energy consumption by the residential sector decreased slightly as well, but to a lesser degree than one would anticipate the price response would be.

2. The rise in prices of fuel and energy resources between 1990 and 2000 will manifest itself through structural adjustments of the economy. The majority of the structural adjustments will be made by 1994, with a gradual decline in production, from the energy-intensive components of the industrial sector and energy consumption (energy intensity) throughout the modeling period.

3. Industrial growth is anticipated to begin in about 1995. By 2000, production levels are forecasted to reach approximately 65% of the 1990 level in 1990 dollars.

4. The impact of the price increases upon standard of living is difficult to asses. The impacts are the result of a chain-reaction of various economic processes. The recent, 1990-1992 rise in energy prices are estimated to have caused 75-85% increase of the minimum level of subsistence (i.e. the Lithuanian poverty line).

ERRATA

General:

1. In general, tables and figures are not numbered nor are they referred to by number in the text. When a table or figure is referred to it generally found on the following page.

2. The model used in the second component of the report (beginning on page 53) is an input output model that was developed over the years by economists in Lithuania, including some of those on the study team. This model has a different set of baseline assumptions then were used in the RMA Industrial Sector Energy Demand Model scenarios.

Page Specific:

Page(s)	Comment(s)
title page	The title of the report has been edited to "The Impact of Fuel and Energy Price Increases on Lithuania's Macroeconomic Indicators, 1990-2000".
16	The table is for scenario 1.
28-33, 35-38 & 42-52	The set of figures and tables summarize the modeling output of the two scenarios.
59 & 60	The two tables show the impacts of rising fuel prices on industrial output structure and prices, in a stepwise fashion. The first scenario, data columns 1 and 2 on page 59, show the effects of increasing the price of natural gas by 68.5%. The second scenario, data columns 3 and 4, shows the additional effect of raising coal prices 25%. The third scenario shows the additional effect by increasing the price of oil extraction by 35.7%, and so forth.
61	The odd-numbered data columns are for January 1, 1990, and the even-numbered data columns are for June 12, 1992.
62-65	The figure at the top of each page is for January 1, 1990 and that on the bottom of each page is for June 12, 1992. The fill pattern on the graphs for the service sector is cross-hatched horizontal and vertical lines.

Prof. Aleksandras Vasiliauskas Economics
Consulting Company

THE IMPECT OF THE FUEL AND ENERGY RISE IN PRICES ON THE LITHUANIA'S MACROECONOMIC INDICATORS IN YEARS 1990-2000

The final report by the contract with Resourse Management Associates of Madison, Inc.

Vilnius, 1992

Contents

Foreword

Nearly total amount of the fuel and energy resources, utilised in Lithuania, is imported from the single supplier - Russia, who is, therefore, in a position to dictate the energy prices. This, combined with the price liberalisation and other steps toward market-oriented economy in Lithuania, has a painfull impact on the main economy indicators - production, consumption and living standard.

The purpose of this research was to analyse the changes in the fuel and energy consumption, caused by the rise in prices of energy resources that took place in Lithuania in 1992, and the expected impacts of those changes on the industrial inputs and outputs.

The rise of the fuel and energy prices to the world market level causes the increase of the production costs and prices throughout the whole economy. The respective price indices were obtained with the use of the input-output model.

The rise in prices of the various goods and services inevitably tells upon the standard of living and the structure of personal consumption. The impact assessment is presented in the fourth chapter of this Report.

The main results of the conducted research can be summarised as follows:

1. The rise in the fuel and energy prices in 1992 did not have any significant impact on the actual energy consumption in Lithuania. The industrial energy consumption decrease was caused mainly by the production decline, not by the rise in prices. The energy consumption by the population decreased slightly as well, but to a lesser degree than the rise in prices.

2. The rise in prices of the fuel and energy resources in the period of 1990-2000 will manifest itself as a structural changes that will take place till the year 1994 with both the production decline and the energy consumption decrease in the background.

3. The industrial growth is expected to start around the year 1995, and by the year 2000 the production level is forecasted to reach approximately 30% of the 1990 year level (in comparative prices of 1990).

4. The impact of the fuel and energy resources rise in prices on the population's living standard is hard to estimate. It is the result of the chain-reaction of various economic processes. By the approximate estimations the rise in energy prices caused about 75-80% of the subsistence minimum index's growth.

The analysis was conducted at the Department of Systems Analysis of Economy at Vilnius University by the group of researchers:

1. Prof. Dr. Aleksandras Vasiliauskas.
2. Assoc. Prof. Dr. Ovidijus Balsys.
3. Assoc. Prof. Dr. Salomėja Girijotienė.
4. Assoc. Prof. Dr. Algimantas Misiūnas.
5. Assist. Prof. Dr. Henrikas Žiaunys.
6. Assist. Prof. Venantas Mačiekus.

1. The Changes in the Fuel and Energy Consumption Pattern in Year 1992

The other countries experience indicates that the switch to the world market prices of the fuel and energy resources is usually accompanied by the reduction of their consumption. That is the result of the negative elasticity of energy demand by price. The steep increase in energy prices causes the lessening of the competitive ability and the production reduction in the major energy consuming industries. This leads to the structural changes in economy with an increase of the percentage shares of the less energy consuming sectors. The general tendency of the changes in the fuel and energy consumption is the decline of the production's energy-intensivity.

The rise of the fuel and energy prices to the world market level in Lithuania should have an influence, primarily, on the consumption level of those sorts of fuel and energy resources, utilisation of which is measurable with the available devices. First of all, it is electricity and oil products.

The data on electricity consumption by industrial sectors and by population in 1992 in Lithuania is presented in Table 1.1. It shows that the total electricity consumption in Lithuania has decreased from 3.429.423 thous. kwh in the 1st quarter to 1.991.684 thous. kwh in the 3rd quarter. That makes up just about 52,5 % of electricity consumption level in the 4th quarter of 1991. It should be pointed out that the real use of the electricity prices, that is - minus the infla-

Table 1.1.

The Electricity Consumption in Lithuania in 1st-3rd quarters of year 1992

№	Industry sectors	1st quarter			2nd quarter			3rd quarter		
		Consumption planned accord.to 4th quart., 1991,level, thous.kWh.	Actual consumption, thous. kWh	Actual consumption compared to planned, %	Actual consumption, thous. kWh	Actual consumption compared to 1st quart. level,%	Actual consumption compared to planned 1st quart level, %	Actual consumption, thous. kwh	Actual consumption compared to 2nd quart level,%	Actual consumption compared to planned 1st quar level,%
1	2	3	4	5	6	7	8	9	10	11
1.	Total Consumption	3791746	3429423	90,44	2419229	70,54	63,80	1991684	82,33	52,53
	including:									
2.	Energy and Fuel	262619	230655	87,83	181710	78,75	69,19	95644	52,64	36,42
3.	Machinery	131394	109210	83,12	91793	84,05	69,86	58389	63,61	44,44
4.	Chemical and Pharmaceutical	326769	222207	68,00	181707	81,77	55,61	185600	102,14	56,80
5.	Electronics and electronic equipment	132975	92911	69,87	94648	101,87	71,18	92048	97,25	69,22
6.	Building Materials	198291	177939	89,74	122106	68,62	61,58	116614	95,50	58,81
7.	Light Industry	170852	160458	93,92	148483	92,54	86,91	111971	75,41	65,54
8.	Wood Processing	112068	91098	81,29	78863	86,57	70,37	76371	96,84	68,15
9.	Agriculture	1131681	1045652	92,40	513287	49,09	45 35	356269	69,41	31,48
10.	Forestry	6760	6415	94,90	4357	67,92	64,45	3575	82,05	52,88
11.	Building and Construction	66922	58387	87,25	35864	61,42	53,59	34395	95,90	51,40

Table 1.1. (Cont.)

1	2	3	4	5	6	7	8	9	10	11
12.	Transport and Comunications	73359	65784	89,67	53720	81,66	73,23	49378	91,92	67,31
13.	Trade and Services	61586	54305	88,18	41243	75,95	66,97	24619	59,69	39,98
14.	Education and Culture	26409	22877	86,63	16612	72,61	62,90	9997	60,18	37,85
15.	Social Insurance and Health Care	31124	28276	90,85	22175	78,42	71,25	21176	95,49	68,04
16.	Other Sectors	208894	200460	95,96	154976	77,31	74,19	140265	90,51	67,15
17.	Municipalities	310177	304484	98,16	257958	84,72	83,16	168903	65,48	54 45
18.	Population	539866	538832	99,81	405281	75,21	75,07	423702	104,54	78,48

tion, began only from September 1, 1992. Therefore, the electricity consumption decline in 1992 was mostly the result of the industrial output reduction caused by the shortage of both the raw materials and the production realisation markets. For example, by the official data Lithuania's industrial output in the first nine months of 1992 was just about 45 % of the output produced in the same period in 1991. The artificially speeded up destruction of kolkhoz system, aggravated by the severe draught, caused the similar situation in agriculture as well. The electricity consumption in this sector has decreased almost three times in nine months of 1992 (i.e., from 1 045 652 thous. kwh in the 1st quarter to 356 269 thous. kwh in the 3rd quarter). If the seasonal fluctuations are not to be taken into account, the major cause of such significant decline is to be looked for in the ruination of the large stock-breeding farms that were the major users of electricity for both technological and heating purposes.

It could be asserted that the populations share of electricity consumption has not declined during the analysed period (20 % less consumption in the 3rd quarter is caused by the seasonal elestricity consumption fluctuations). Probably populations reaction to the rise in electricity price will manifest itself by the end of this year.

The percentage shares of electricity consumption by sectors in the first three quarters of 1992 are given in the Table 1.2. The share of the major electricity consumer - Agriculture - has declined from 30,7 % in the 1st quarter to 18,1 % in the 3rd quarter. On the contrary, population's share of electricity consumption has risen from 15,8 % to 21,5 % and

Table 1.2.

Nº	Industry sectors	1st quart. consumption planned according to 4th quart., 1991, level	Actual electricity consumption in 1st quarter	Electricity consumption in 2nd quarter	Electricity consumption in 3rd quarte
1.	Energy and Fuel	6,93	6,76	7,56	4,86
2.	Machinery	3,46	3,20	3,82	2,97
3.	Chemical and Pharmaceutical	8,62	6,52	7,56	9,43
4.	Electronics and electronic equipment	3,51	2,73	3,94	4,67
5.	Building Materials	5,23	5,22	5,08	5,92
6.	Light Industry	4,51	4,71	6,17	5,69
7.	Wood Processing	2,95	2,67	3,28	3,88
8.	Agriculture	29,85	30,66	21,34	18,09
9.	Forestry	0,18	0,19	0,18	0,18
10.	Building and Construction	1,76	1,71	1,49	1,75
11.	Transport and Comunications	1,93	1,93	2,23	2,51
12.	Trade and Services	1,62	1,59	1,72	1,25
13.	Education and Culture	0,70	0,67	0,69	0,51
14.	Social Insurance and Health Care	0,82	0,83	0,92	1,07
15.	Other sectors	5,51	5,88	6,44	7,12
16.	Municipalities	8,18	8,93	10,73	8,58
17.	Population	14,24	15,80	16,85	21,52
	Total:	100,00	100,00	100,00	100,00

Table 1.3.

The Consumption of Oil Products in Lithuania in 1st-3rd Quarters of the year 1992

Sort of Oil Product	January		February*		March		April		May	
	Price of 1 tonn (roubles)	Consumption (thous. tonns)	Price of 1 tonn (roubles)	Consumption (thous. tonns)	Price of 1 tonn (roubles)	Consumption (thous. tonns)	Price of 1 tonn (roubl.)	Consumption (thous. tonns)	Price of 1 tonn (roubl.)	Consumption (thous. tonns)
Gasoline №76	4725	0,01	11970	103,99	11970	47,1	14630	28,0	14630	45,9
incl. private consumption	4725	0,0	11970	19,3	11970	8,7	14630	6,1	14630	10,6
Gasoline №92	5400	19,1	13000	17,6	13000	16,7	16900	7,2	16900	11,9
incl. private consumption	5400	12,3	13000	10,5	13000	9,1	16900	4,9	16900	7,1
Diesel Fuel	3630	72	9480	61,8	9480	49,8	9480	54,5	9480	35,6
Furnace Fuel	1877	41,2	4211	42,3	4211	19,6	6299	25,4	6299	25,3
incl. private consumption	399	14,2	399	16,5	399	12,2	399	15,0	399	19,7
Heavy Fuel Oil	1266	247,7	2788	253,2	2788	223,4	4328	172,5	4328	192,7

* since 22nd of February

Table 1.3. (Cont.)

Sort of Oil product	June**		July***		August		September	
	Price of 1 tonn (roubles)	Consumption (thous. tonns)	Price of 1 tonn (roubles)	Consumption (thous. tonns)	Price of 1 tonn (roubles)	Consumption (thous. tonns)	Price of 1 tonn (roub.)	Consumption (thous. tonns)
Gasoline N°76	18620	44,6	25270	25,3	25270	35,2	39900	21,3
incl. private consumption	18620	11,8	25270	9,9	25270	11,7	39900	6,9
Gasoline N°92	23400	12,5	29900	6,3	29900	12,4	39900	9,3
incl. private consumption	23400	7,4	29900	4,8	29900	9,7	39900	6,7
Diesel Fuel	13036	84,1	16590	47,9	16590	31,5	29625	23,4
Furnace Fuel	9424	23,2	12900	17,1	12900	8,5	26520	5,0
incl. private consumption	399	23,2	800	1,9	800	4,6	800	0,7
Heavy Fuel Oil	5554	62,9	6992	258,5	6992	51,0	18600	0,0

** since 3rd of June

*** since 3rd of July

exceeded that of the Agriculture. The Chemical and Pharmacentical industry is the only other that has manifested the noticeable increase in electricity consumption share: from 6,5% to 9,4 %. One of the explanations could be that this industry hasn't suffered such an acute shortage of the raw materials as other industries and that helped it to maintain relatively slower production decline.

The data presented in the Table 13 shows the prices of oil products and their consumption in the particular months of 1992. Note that it is the operative data, therefore the error margin is up to 5 %. It is clear, however, that the rise in gasoline prices usually lessens it's consumption in the following month. The absence of the heavy fuel oil consumption in September is explained by the absence of it's import from abroad.

Summing up, it can be stated that the major decrease in electricity consumption was caused by the industrial output decline, not by the rise of energy prices. The rise of oil products prices, similarly, had an unsignificant impact on their consumption. The lower consumption of gasoline in September can be explained by it's shortage, not by the rise in price.

2. The Impact of the Fuel and Energy Price Changes on the Energy Resources Inputs and Industrial Outputs

The forecasts of the industry growth rates (r_i)

Taking into account the international trade situation, privatisation course, traditional features of the national industry and other socioeconomic factors, two industry development scenarios are considered here. It should be pointed out that their differences are not essential: they mainly concern the development forecasts for the first three industry branches (Agriculture, Food and Beverage, Metal and Machinery).

The growth forecasts for the first two branches are identical within both development scenarios, because the Agriculture virtually determines the volume of the raw materials used by the Food and Beverage industry. Analysis of the present situation shows that up to the end of 1992 the substantial decline of outputs in these branches is going to take place (r=-20%). According to the First Scenario the decline continues up to the year 1994 as well, but the rate of decline is considerably smaller in the latter period: r=-3%. By the Second Scenario the stabilisation of the situation (r=0) is foreseen already in the period of 1992-1994. Quite a distinct growth of outputs of the industries in question is forecasted for the period of 1995-2000. It is faster by the First Scenario: r_3=5%, r_4=7%, r_5=10%, and a little bit slower by the Second - r_3=5%, r_4=5% and r_5=7%. Therefore, according to the First Scenario, we are in "the deeper pit", but with the possibility of the faster "climb out". There is the big decline in the volume of outputs (r=-20%) anticipated in

the third industry - Metal Prds and Machinery - up to the year 1992. A little bit more optimistic development of this industry is forecasted by the First Scenario: stabilisation is anticipated in 1993-1996, and the slight growth is expected in 1997-2000 (r_4=2%, r_5=3%). By the Second Scenario, the decline in outputs of this industry branch is taking place in the period of the 1993-94 as well. During this, in our opinion, it approaches the critical ("minimal") limit below which the further decline is practically impossible. This situation keeps up to the year 2000. That could be explained in such way: this industry branch should be both reconstructed and structurally changed in course to match the needs of Lithuanian economy.

The decline of the volume of outputs in the fourth industry (Construction and NF Min Pro) is expected to take place up to the year 1994 (r_1=-15%, r_2=-5%), the stabilisation - in the period of 1995-1996, and the growth of outputs (r_4= =r_5=5%) is forecasted afterwards.

The most optimistic forecasts are for the fifth industry branch (Light Industry). The decline in outputs here continues up to the year 1992 only (r_1=-10%) and the stabilisation is anticipated in the period of 1993-1994. Afterwards comparatively fastpaced growth follows (r_3=5%, r_4=r_5=10%) by the First Scenario, and, a little bit slower (r_3=5%, r_4=7%, r_5=10%) - by the Second.

For the sixth branch (Wood and Paper) the decline in outputs continues up to the year 1994 (r_1=-10%, r_2=-5%). Starting from the year 1995 the production growth is fore-

casted: r_3=3%, r_4=3%, r_5=5%. Such forecasts are valid for both Scenarios. The decline in Chemical industry by both Scenarios will continue up to the year 1994 (r_1=-15%, r_2= =-5%). The increase in outputs bound to be started in year 1995 will be a little bit slower by the Second Scenario (r_3= =2%, r_4=3%, r_5=5%).

The development of the eight industry branch (Petroleum and Refining) is the same by both Scenarios. Due to the impaired provision of the raw materials, on one hand, and the anticipated drop in the production demand - on another, the significant decline in outputs up to the end of 1992 is expected (r_1=-25%). This decline will continue (r_2=-5%) up to the year 1994 as well. Starting from the year 1995, due to the anticipated appearance of the alternative sources of raw materials and the respective rise in the production export possibilities, the increase in outputs (r_3=10%, r_4=15%, r_5=5%) is forecasted. The biggest rate of growth is scheduled for the period of 1997-1998.

Summing up the forecasts of the industry growth, the following points should be outlined:

1. Significant decline in outputs throughout the entire industry is going to take place up to the year 1992.

2. The lowest general output of industry is expected in 1994.

3. Although the production growth is observed in the period 1995-2000, the level of output for the year 1992 will not be achieved by any industry in the year 2000.

Base year		Projected years		(Can specify up to 5 future years)		
1990	1992	1994	1996	1998	2000	

1990 ENERGY CONSUMPTION BY SECTOR AND FUEL

	Electric (GWH)	Heat (TJ)	Gas (Ktce)	Fuel Oil (Ktce)	Other	Other	Other
Agriculture	2700	660	199	663	0.00	0.00	0.00
Food & Beverage.	480	630	313	240	0.00	0.00	0.00
Metal Prds & Machinery	1250	550	325	190	0.00	0.00	0.00
Construction & NF Min Prod	1160	710	420	1172	0.00	0.00	0.00
Light Industry	610	320	142	90	0.00	0.00	0.00
Wood & Paper	560	440	207	171	0.00	0.00	0.00
Chemical	1190	700	383	236	0.00	0.00	0.00
Petroleum & Refining	460	410	0	1034			
Other	210	360	86	23	0.00	0.00	0.00
TOTAL	8620.0	4780.0	2075.00	3819.00	0.00	0.00	0.0

1990 ENERGY PRICES (Roubles/quantity of fuel)

	Electric (R/KWH	Heat (R/GJ)	Gas (R/m^3)	Fuel Oil (R/tonne)	Other	Other	Other
	0.03	1.99	0.03	24.50			

1990	TOTAL OUTPUT (E6 R)	PROJECTED ANNUAL EXOGENOUS GROW 1991-92	1993-94	1995-96	1997-98	1999-200
Agriculture	6335	-20%	-3%	5%	7%	10%
Food & Beverage.	3580	-20%	-3%	5%	7%	10%
Metal Prds & Machinery	3444	-20%	0%	0%	2%	3%
Construction & NF Min Prod	3394	-15%	-5%	0%	5%	5%
Light Industry	2865	-10%	0%	5%	10%	10%
Wood & Paper	691	-10%	-5%	3%	3%	5%
Chemical	485	-15%	-5%	5%	5%	5%
Petroleum & Refining	428	-25%	-5%	10%	15%	5%
Other	615	-15%	0%	5%	5%	5%
TOTAL	21837					

Base year 1990		Projected years 1992	1994	(Can specify up to 5 future years) 1996	1998	2000	
1990	ENERGY CONSUMPTION BY SECTOR AND FUEL						
	Electric (GWH)	Heat (TJ)	Gas (Ktce)	Fuel Oil (Ktce)	Other	Other	Other
Agriculture	2700	660	199	663	0.00	0.00	0.00
Food & Beverage.	480	630	313	240	0.00	0.00	0.00
Metal Prds & Machinery	1250	550	325	190	0.00	0.00	0.00
Construction & NF Min Prod	1160	710	420	1172	0.00	0.00	0.00
Light Industry	610	320	142	90	0.00	0.00	0.00
Wood & Paper	560	440	207	171	0.00	0.00	0.00
Chemical	1190	700	383	236	0.00	0.00	0.00
Petroleum & Refining	460	410	0	1034			
Other	210	360	86	23	0.00	0.00	0.00
TOTAL	8620.0	4780.0	2075.00	3819.00	0.00	0.00	0.0
1990	ENERGY PRICES (Roubles/quantity of fuel)						
	Electric (R/KWH 0.03	Heat (R/GJ) 1.99	Gas (R/m^3) 0.03	Fuel Oil (R/tonne) 24.50	Other	Other	Other
1990	TOTAL OUTPUT (E6 R)		PROJECTED ANNUAL EXOGENOUS GROW 1991-92	1993-94	1995-96	1997-98	1999-200
Agriculture	6335		-20%	0%	5%	5%	7%
Food & Beverage.	3580		-20%	0%	5%	5%	7%
Metal Prds & Machinery	3444		-20%	-2%	0%	0%	0%
Construction & NF Min Prod	3394		-15%	-5%	0%	5%	5%
Light Industry	2865		-10%	0%	5%	7%	10%
Wood & Paper	691		-10%	-5%	3%	3%	5%
Chemical	485		-15%	-5%	2%	3%	5%
Petroleum & Refining	428		-25%	-5%	10%	15%	5%
Other	615		-15%	0%	5%	5%	5%
TOTAL	21837						

Some Changes of the Price Model Initial Parameters

There were some changes made in the Price Model. By them we aimed to take into account the following phenomena:

- the substantial changes of the fuel and energy prices that took place in Summer-Autumn of 1992 (and are continuing still);

- the further decline of the used in Lithuania currency unit's purchasing power.

Valuating the influence of the latter factor, we assumed that the currency unit's purchasing power on October 1, 1992, was just about 0,03-0,032 of that in January 1, 1991. Although the official statistics claims that it is 0,00475, it should be noted that such number is obtained using the price index only. By our opinion, the average labour income's rise, the average price index and the price index of the first-necessity goods should be taken into account, when calculating the money purchasing power index. Notably, the first-necessity goods price index is much higher than the officialy used price index. Moreover, we think that, if the consumption pattern of the particular social groups was taken into account, the currency's purchasing power indicator could be even smaller.

The relative fuel and energy prices used in the calculations are given in the Target Increases in Real Energy Prices Table.

Some changes are made in the data on the production elasticity of fuel and energy prices.

By our opinion, those elasticities are overestimated for the Petroleum and Refining Industry. The dependency of the pro-

duction output upon the fuel and energy (especially, oil) prices is considerably smaller. Currently the volume of Refined Oil Refining Factory Output is subject to the general possibility of the raw oil supply, the necessity to meet the basic domestic needs for petroleum products and to ensure at least the minimal use of the factory's capacities. The role of the raw oil price is rather insignificant. Therefore we reduced the output elasticity of the oil price from 0,5 to 0,1. The magnitudes of both the production elasticity of the electricity price and the production elasticity of the heat price are reduced for this industry as well. Now they both are equal 0,3 (instead of 0,5 as it was previously).

TARGET INCREASES IN REAL ENERGY PRICES (in Roubles):

	Electric (R/KWH	Heat (R/GJ)	Gas (R/m^3)	Fuel Oil (R/tonne	Other 0	Other 0	Other 0
1992	0.12	20.00	0.03	630.00			
1994	0.18	25.00	0.05	800.00			
1996	0.18	25.00	0.05	800.00			
1998	0.18	25.00	0.05	800.00			
2000	0.18	25.00	0.05	800.00			

ENERGY PRICE RESPONSE FOR EACH SUBSECTOR AND FUEL TYPE:

	Electric	Heat	Gas	Fuel Oil	Other	Other	Other
Agriculture	-0.20	-0.20	-0.20	-0.20			
Food & Beverage.	-0.30	-0.30	-0.30	-0.30			
Metal Prds & Machinery	-0.40	-0.40	-0.40	-0.40			
Construction & NF Min Pro	-0.40	-0.40	-0.40	-0.40			
Light Industry	-0.20	-0.20	-0.20	-0.20			
Wood & Paper	-0.30	-0.30	-0.30	-0.30			
Chemical	-0.30	-0.30	-0.30	-0.30			
Petroleum & Refining	-0.40	-0.40	-0.40	-0.40			
Other	-0.10	-0.10	-0.10	-0.10			

OUTPUT PRICE RESPONSE FOR EACH SUBSECTOR AND FUEL TYPE:

	Electric	Heat	Gas	Fuel Oil	Other	Other	Other
Agriculture	-0.20	-0.20	-0.20	-0.20			
Food & Beverage.	-0.10	-0.10	-0.10	-0.10			
Metal Prds & Machinery.	0.00	0.00	0.00	0.00			
Construction & NF Min Pro	-0.20	-0.20	-0.20	-0.20			
Light Industry	0.00	0.00	0.00	0.00			
Wood & Paper	-0.20	-0.20	-0.20	-0.20			
Chemical	-0.50	-0.50	-0.30	-0.50			
Petroleum & Refining	-0.30	-0.30	-0.30	-0.10			
Other	0.00	0.00	0.00	0.00			

The Interpretation of the Calculation Results

1. The Analysis of the Gross Industrial Product Structure

The Gross Industrial Product structure is presented in the table by mln. rubles in comparable prices of Jan. 1, 1991.

The volume of the Agriculture production in 1992 is about 43% of the 1990 year level. Such result is rather fair reflection of the present situation in the Agriculture, aggravated both by the drought and by the economic disorder. However, in our calculations this result was also determined by the substantial rise in prices of the fuel and energy resources during 1992 and especially this Autumn. By our opinion, the real response to the rise in prices will manifest itself no sooner than in 1993-1994. Therefore, rather cautiously accepting the calculations results for the 1992, we, nevertheless, expect that the calculated output level for the year 1994 (i.e. the year till which the Agricultures decline, although insignificant, is predicted) is quite plausible. Begining from 1995 rather stable growth of the Agriculture production volumes is forecasted, and the 56% of the 1990 output level is expected to be achieved by the year 2000. Until 1990 Lithuania's agriculture was orientated towards imported forage supply and exported considerable amount of production to the East. Due to the essential change of the situation in the last few yeers, the forecasted volume of the agriculture output is likely to be sufficient for Lithuania's needs.

The prospects of the Food and Beverage industry should depend on the use of the available local raw materials. The dynamics of Lithuania's agriculture output, the structural

GROSS INDUSTRIAL PRODUCT (Mln Rubles)

	Sc	1990	1992	1994	1996	1998	2000
1. Agriculture	1	6335	2698	2364	2607	2985	3611
	2			2513	2771	3055	3497
2. Food and Beverage	1	3580	2005	1805	1990	2278	2757
	2			1918	2115	2332	2670
3. Metal Prd and Machinery	1	3444	2204	2204	2204	2293	2433
	2			2117	2117	2117	2117
4. Construction and NF Min Prd	1	3334	1608	1343	1343	1480	1632
5. Light Industry	1	2865	2321	2321	2559	3096	3746
	2					2929	3544
6. Wood and Paper	1	691	433	358	380	403	444
7. Chemical	1	485	225	174	192	212	233
	2				181	192	212
8. Petroleum and Refining	1	428	173	150	182	241	265
9. Other	1	615	444	444	490	540	595
10. TOTAL	1	21837	12111	11164	11946	13528	15718
	2			11339	12137	13289	14977

GROWTH RATE BY SECTORS (%)

	Sc	1992	1994	1996	1998	2000
1. Agriculture	1	-34,74	-6,39	5,0	7,0	10,0
	2		-3,49		5,0	7,0
2. Food and Beverage	1	-25,17	-5,11	5,0	7,0	10,0
	2		-2,17		5,0	7,0
3. Metal Prd and Machine-ry	1	-20,0	0	0	2,0	3,0
	2		-2,0		0	0
4. Construction and NF Min Prd'	1	-31,16	-8,64	0	5,0	5,0
5. Light Industry	1	-10,0	0	5,0	10,0	10,0
	2				7,0	
6. Wood and Paper	1	-20,86	-9,03	3,0	3,0	5,0
7. Chemical	1	-31,82	-12,09	5,0	5,0	5,0
	2			2,0	3,0	
8. Petroleum and Refining	1	-36,51	-6,6	10,0	15,0	5,0
9. Other	1	-15,0	0	5,0	5,0	5,0
10. TOTAL	1	-25,53	-3,99	3,44	6,41	7,79
	2		-3,24	3,46	4,64	6,16

changes in domestic consumption and rather significant decline of the latter undoubtedly will have an effect upon the Food and Beverage production. Due to the influence of these factors the decrease in industry's output till the and of 1994 is predicted The production volume in 1992 will be about 56% of the 1990 yea level. After the year 1995, like in the Agriculture, the Food and Beverage industry's growth is foreseen. Approximately 3/4 of the 1990 output level should be attained in the year 2000.

Metal Prds and Machinery industry is bound to reach the "bottom of the pit" already in this year, i.e. in 1992. The further decline of this industry is, by our opinion, hardly pos ble. However, taking into account both the essential structural changes and reconstruction of this industry, the rise in prices of the raw materials, fuel and energy resources as well as res trictions on their supply from the East, it would be unwise to expect the real growth of Metal Prds and Machinery production. Just about 65% of the 1990 level of output is forecasted for the year 2000.

The present critical situation is aggravated by the curren economic policy of the Government of Lithuania that doesn't pro vide the proper incentives for saving and investment. This and the very high costs of the fuel and energy resources (due to th price increases) gives us grounds to believe that the forecas- ted trajectory of development for the fourth industry (Construc tion and NF Min Prod) is quite plausible. It is predicted that in the year 1992 the volume of output will be about 47% if com- pared with the 1990 year level. The decline of production is forecasted to last till the year 1994 as well. During the next two years the stabilisation that turns into an insignificant

growth is forecasted. However, even as late as in the year 2000 roughly the 1992 year level of output will be achieved only.

The most optimistic scenario of development is for the Light Industry. The lowest annual rate of production decrease is foreseen here (about - 10% till the year 1992). The stabilisation will take place in the period 1992-1994 with rather fast growth afterwards. The output level of the year 1990 is expected to be exceeded as soon as in 1996. The forecasted volumes of output for the year 2000 excee the 1990 year level by 30% approximately. In our opinion, such an optimistic forecast is well founded. First, it keeps in line with the national traditions in this field of economic activity. Second, there are relatively good possibilities for the reorganisation of the production process in the Light Industry, and the raw materials supply problems are not very acute here too. Third, the characteristic feature of this industry is the lowest intensity of the fuel and energy resources use if compared with other industries. Taking into account the fast-paced rise of the fuel and energy prices this is especially important.

Wood and Paper industry, on the contrary, demonstrates one of the highest intensity of the fuel and energy resources use - it is in the third place by this criterion. Moreover, it is one of the most environmentally harmful industries. Therefore, the calculations shows that an essential output decrease in this industry should be expected: in 1992 - about 62%, in 1994 - about 52% and in the year 2000 - just about 34% of the 1990 year level.

Industries № 7 (Chemical) and №8 (Petroleum and Refining occupies respectively the first and the second place by the intensity of the fuel and energy use criterion. Due to that the

dynamics of their development is most influenced by the change both in the fuel and energy supply and in the prices of the latters. Therefore, it is quite plausible that, as it is predicted in the forecast, in 1992 already the output of the Chemical Industry will be less than a half (about 46%) and in 1994 - just about 36% of the 1990 year output level. No essential changes of the situation are expected to take place till the year 2000 - the volume of output for this year will be about the same as in 1992.

By our opinion, petroleum refining scale in Lithuania heavily depends on the following factors:

- domestic demand for the refined oil products in Lithuani
- restrictions on the oil supply from the East;
- industrial capacity of the oil refining factory in Mažeikiai and the necessity to maintain it at least at the minimal level;
- use of the oil export-import facilities either in Latvia or in Lithuania.

The oil price increase should not have a significant effect upon the output of this industry in the immediate future. Most likely the response to the rise in oil prices will manifest itself only at the end of the forecast period, i.e. about the year 2000.

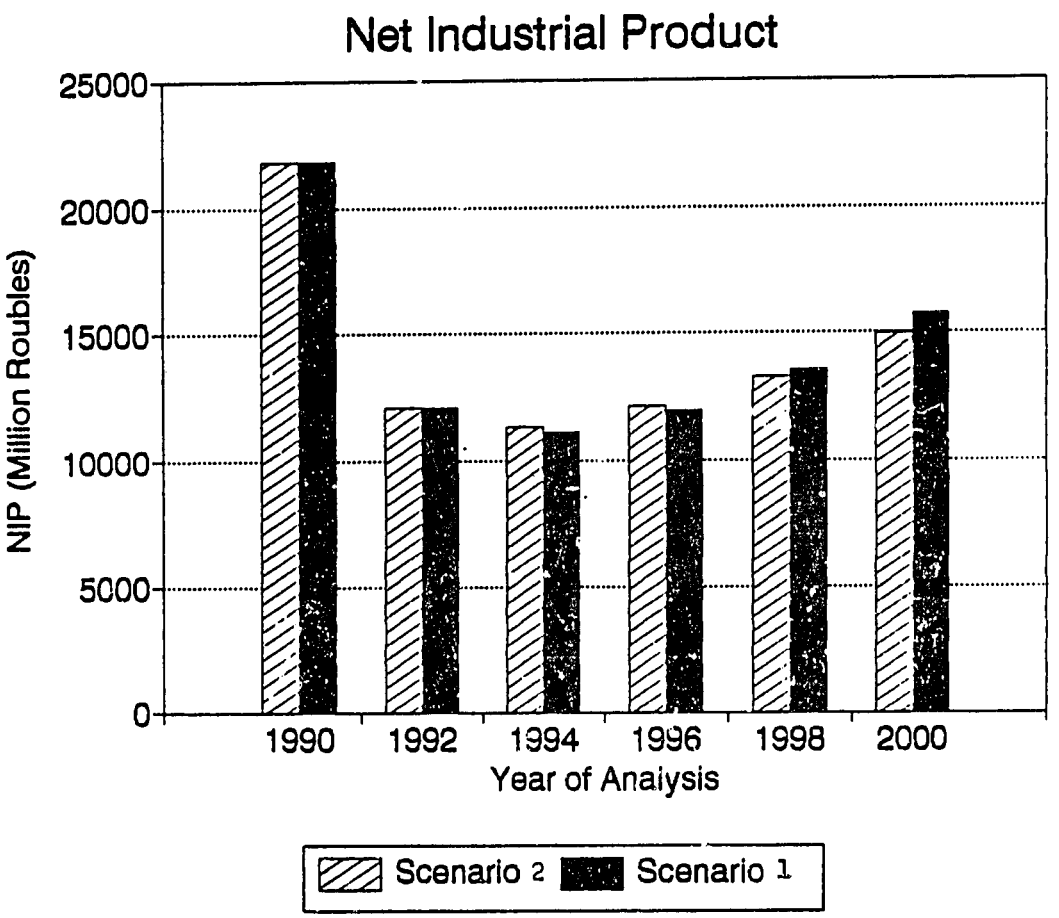
Forecasting the Petroleum and Refining industry' development we took the following premises into account:

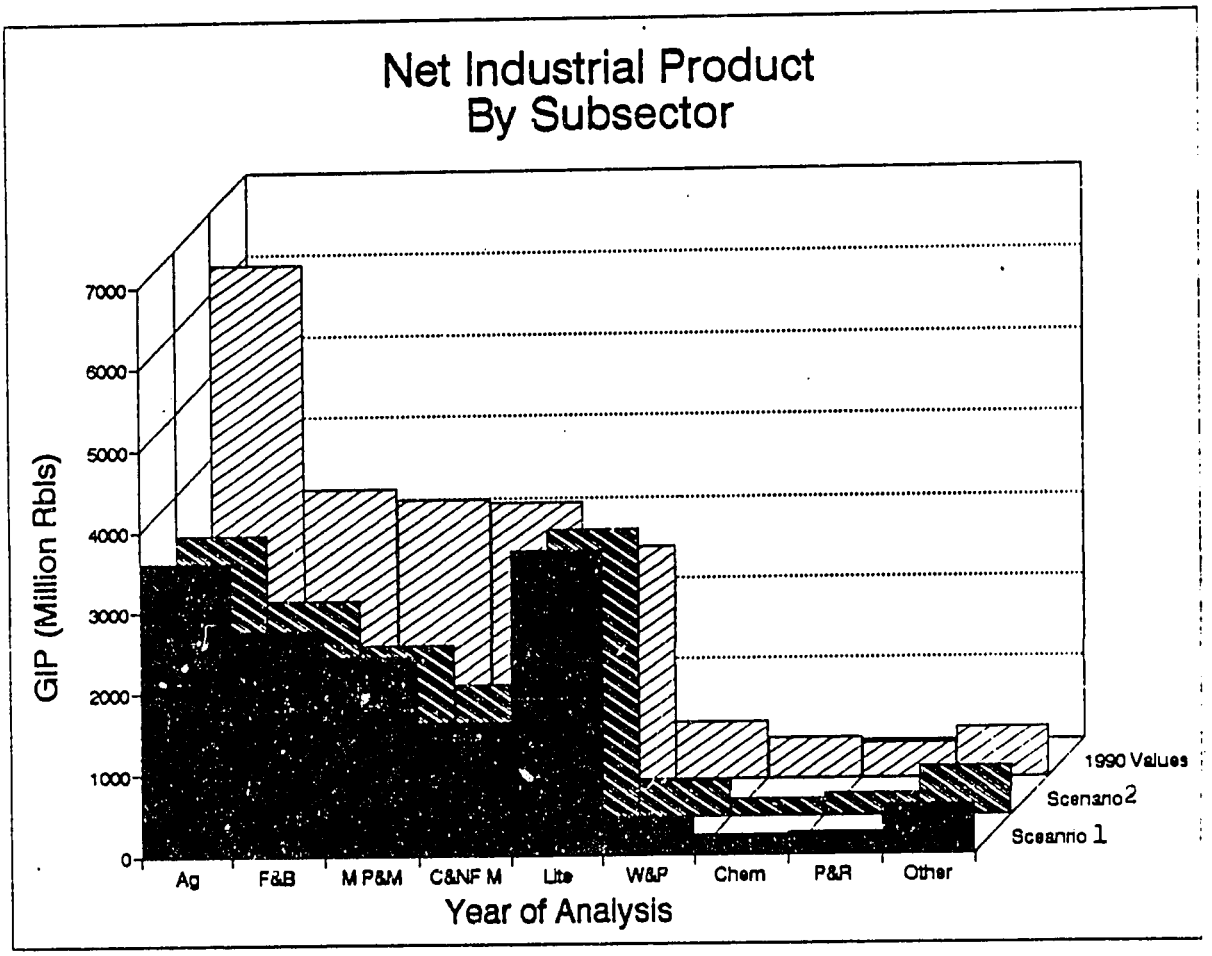
- Mažeikiai Oil Refining factory will process no more than 5 mln. tons of the raw oil in 1992;
- the planned oil export-import terminal on the Baltic coast will not begin to operate till 1995 (such outlook is supported

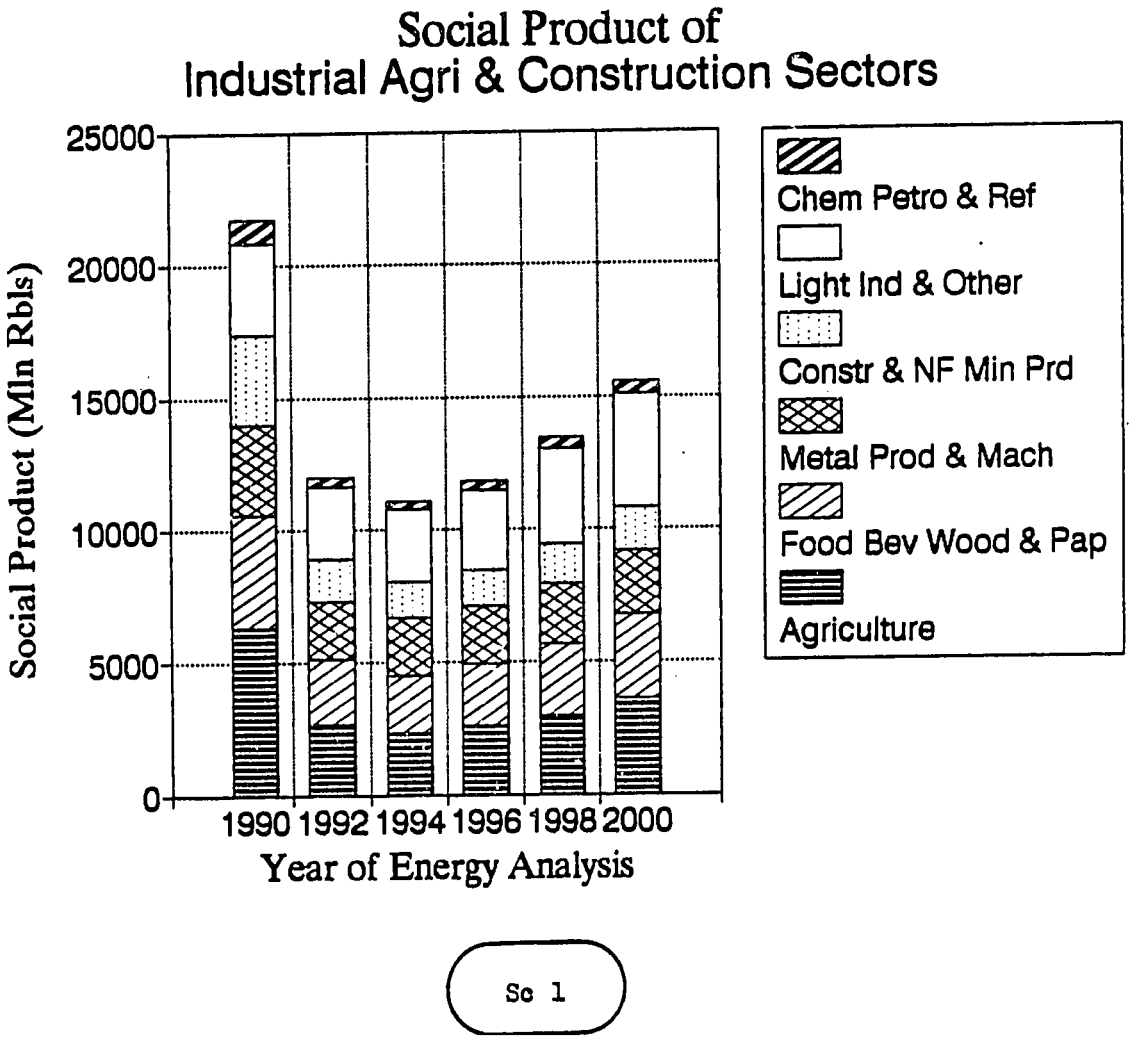
by the IMF experts as well);

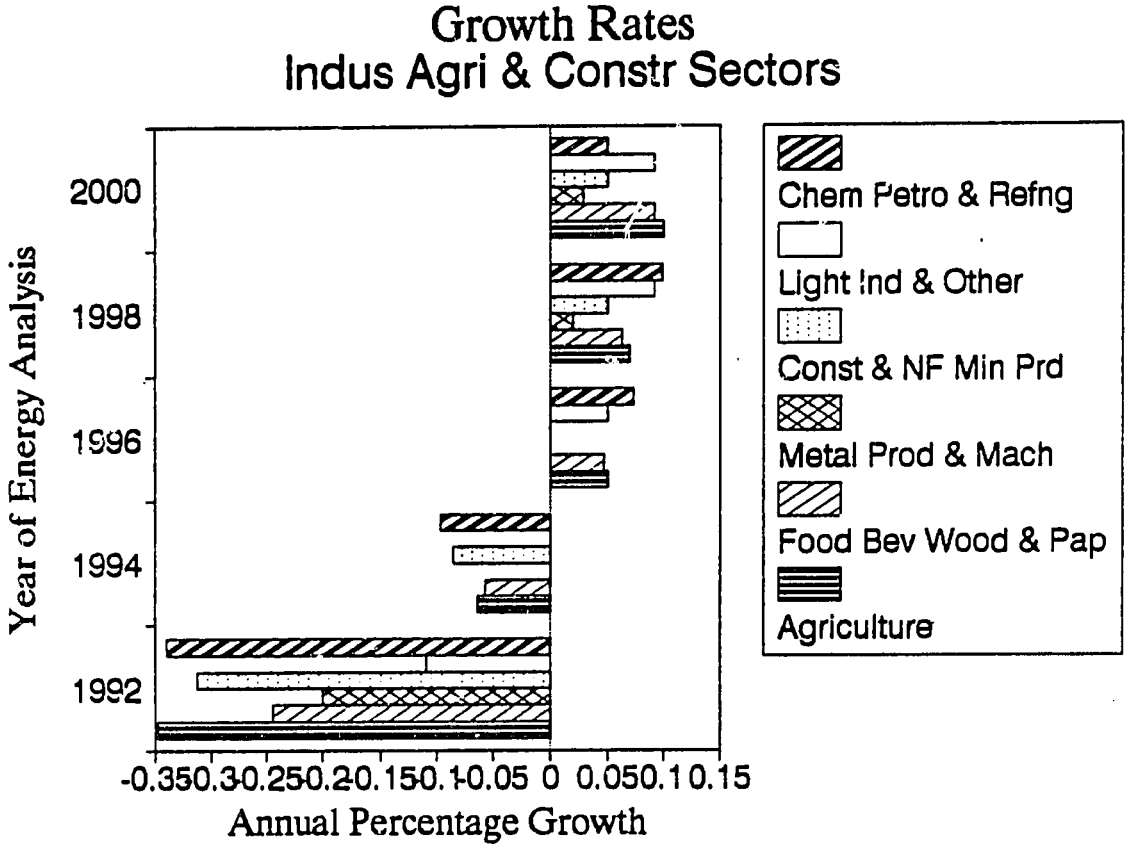
- 4 mln. tons of the rew oil should be roughly enough to meet the Lithuania's domestic needs for the oil-refinement products.

Summing up, the calculation results show the following: in 1992 the Gross Industrial Product will be about 40% of the 1990 year level; decline of the outputs is expected to continue till the end of the year 1994 - then 35% of the 1990 year output level will be reached; from 1995 the industrial recovery will begin and the 65% level of the 1990 year output is forecasted for the year 2000.

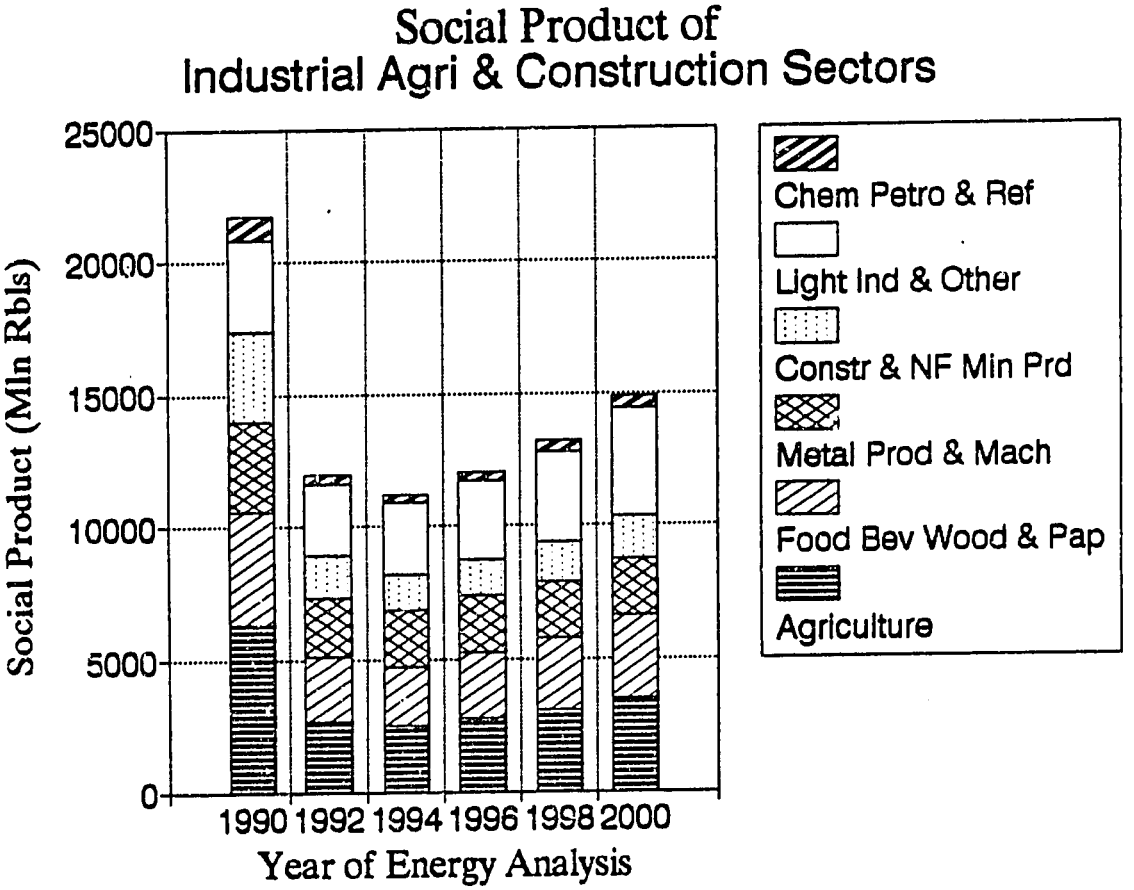

Net Industrial Product
25000
20000
15000
10000
5000
0
NIP (Million Roubles)
1990
1992
1994
1996
1998
2000
Year of Analysis
Scenario 2
Scenario 1


Net Industrial Product
By Subsector
GIP (Million Rbls)
7000
6000
5000
4000
3000
2000
1000
0
Ag
F&B
M P&M
C&NF M
Lite
W&P
Chem
P&R
Other
Year of Analysis
1990 Values
Scenario 2
Scenario 1

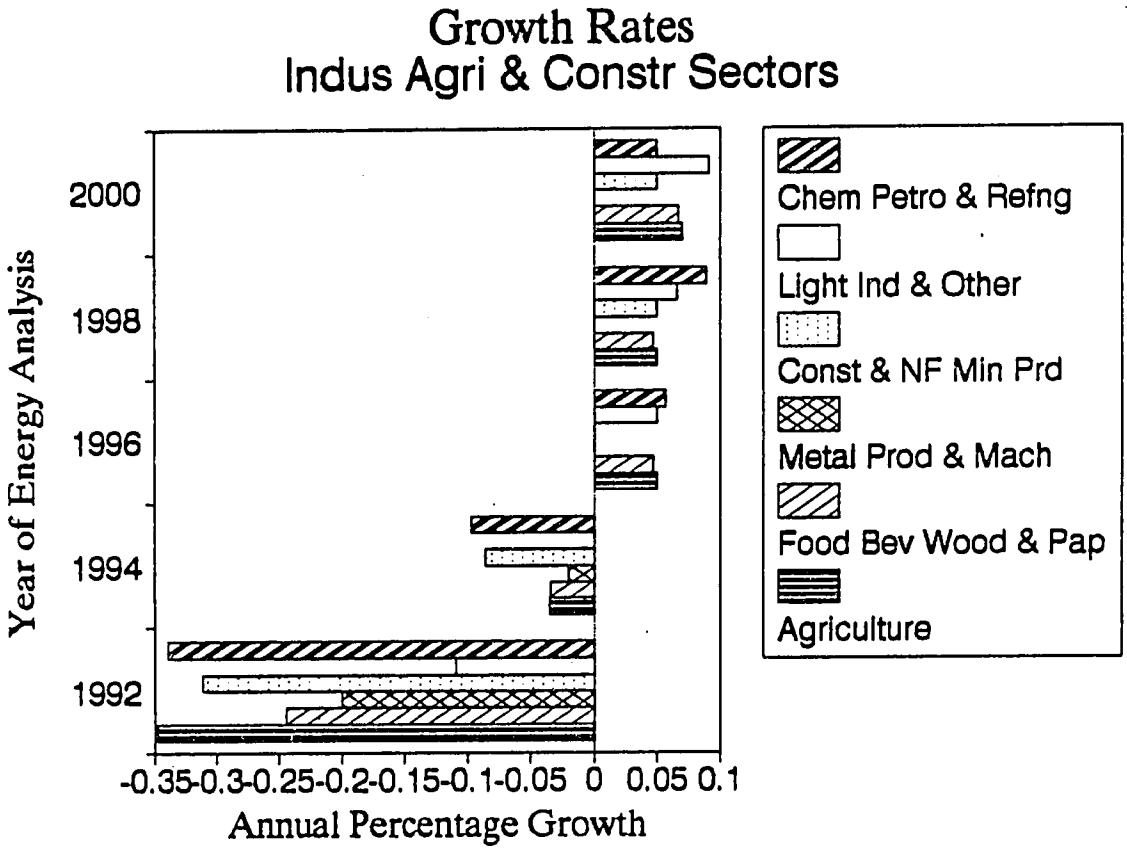

Social Product of
Industrial Agri & Construction Sectors
Social Product (Mln Rbls)
25000
20000
15000
10000
5000
0
1990 1992 1994 1996 1998 2000
Year of Energy Analysis
Chem Petro & Ref
Light Ind & Other
Constr & NF Min Prd
Metal Prod & Mach
Food Bev Wood & Pap
Agriculture
Sc 1


Growth Rates
Indus Agri & Constr Sectors
Year of Energy Analysis
2000
1998
1996
1994
1992
-0.35 -0.3 -0.25 -0.2 -0.15 -0.1 -0.05 0 0.05 0.1 0.15
Annual Percentage Growth
Chem Petro & Refng
Light Ind & Other
Const & NF Min Prd
Metal Prod & Mach
Food Bev Wood & Pap
Agriculture

So 1


Social Product of
Industrial Agri & Construction Sectors
Social Product (Mln Rbls)
25000
20000
15000
10000
5000
0
1990 1992 1994 1996 1998 2000
Year of Energy Analysis
Chem Petro & Ref
Light Ind & Other
Constr & NF Min Prd
Metal Prod & Mach
Food Bev Wood & Pap
Agriculture

Sc 2


Growth Rates
Indus Agri & Constr Sectors
Year of Energy Analysis
2000
1998
1996
1994
1992
-0.35-0.3-0.25-0.2-0.15-0.1-0.05 0 0.05 0.1
Annual Percentage Growth
Chem Petro & Refng
Light Ind & Other
Const & NF Min Prd
Metal Prod & Mach
Food Bev Wood & Pap
Agriculture

Sc 2

2. The Analysis of the Structural Changes

The data of the following three Tables will be used here: Energy Consumption Intensity by Sector, Percentage Shares of Industrial Output, Percentage Shares of Energy Use.

Some quite important deductions could be drawn even at the perfunctory inspection of the presented data. That is:

1) the main structural changes will be accomplished till 1994;

2) the structural changes will take place with both the rapid production decline and the very significant decrease of fuel and energy use (just about 30% of 1990 level in year 2000 in the background;

3) the structural changes will be accompanied by the substantial quantitative changes in the energy consumption intensity: it will decrease in all industries and the most affected will be the largest energy users of 1990.

For the initial examination of the structural changes the simple inequations could be employed. Let us assume that t_i - percentage share of the industrial output, where i - index of the industry (current number in Tables), i = 1, 2, ..., 9; f_i percentage share of the energy used in the i^{th} industry, i=1,2,...,9; v_i - level of the energy consumption intensity, i=1,2,...,10.

The main inequations for these variables could be written as

$$t_1 > t_2 > t_3 > t_4 > t_5 > t_6 > t_7 > t_8 > t_9$$

1990 $f_4 > f_1 > f_8 > f_7 > f_3 > f_2 > f_6 > f_5 > f_9$

$$v_8 > v_7 > v_6 > v_4 > v_{10} > v_9 > v_3 > v_1 > v_2 > v_5$$

PERCENTAGE SHARES OF INDUSTRIAL OUTPUT (%)

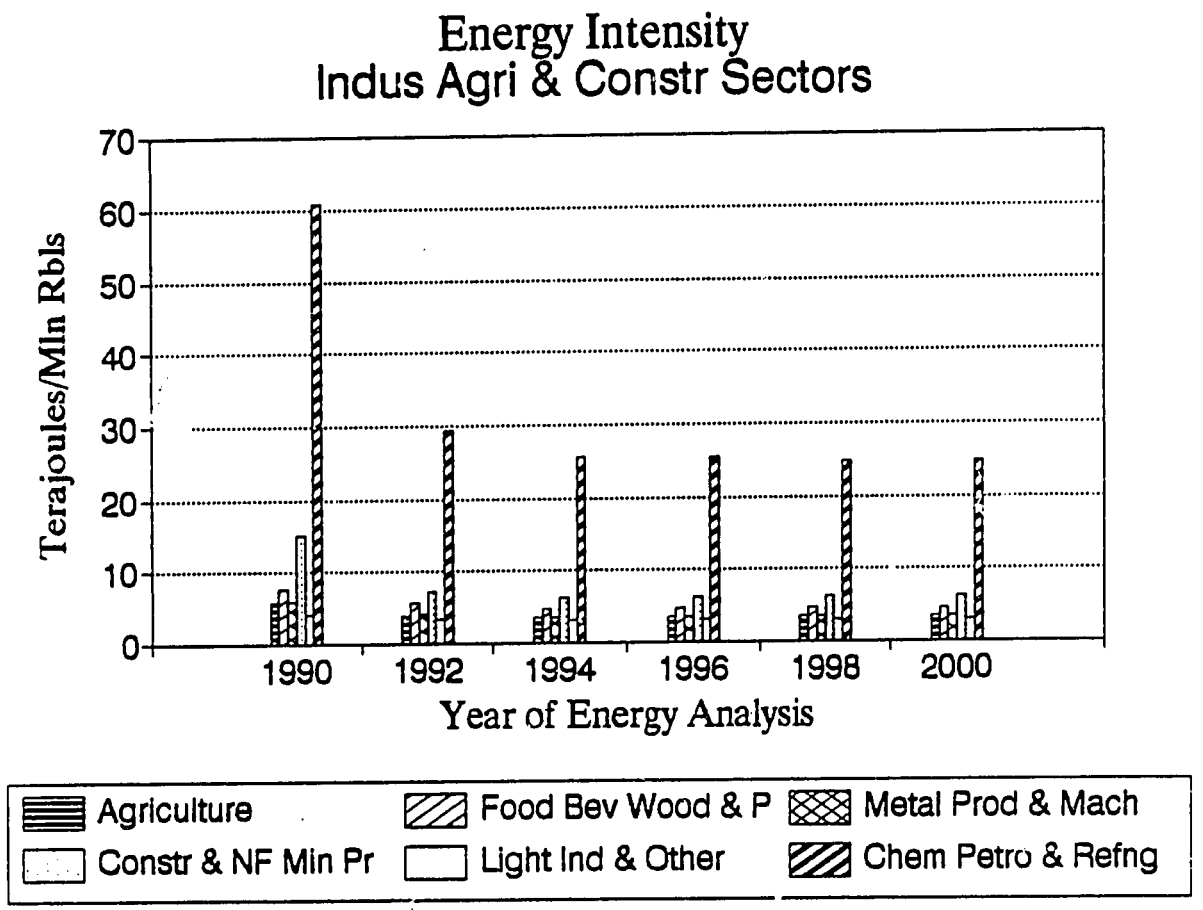
	Sc	1990	1992	1994	1996	1998	2000
1. Agriculture	1	29,01	22,28	21,18	21,82	22,06	22,98
	2			22,16	22,83	22,99	23,35
2. Food and Beverage	1	16,39	16,55	16,17	16,66	16,84	17,54
	2			16,92	17,43	17,55	17,83
3. Metal Prd and Machinery	1	15,77	18,20	19,74	18,45	16,95	15,48
	2			18,67	17,44	15,93	14,13
4. Construction and NF Min Prd	1	15,54	13,28	12,03	11,24	10,94	10,38
	2			11,84	11,06	11,14	10,90
5. Ligth Industry	1	13,12	19,16	20,79	21,42	22,88	23,83
	2			20,47	21,08	22,04	23,66
6. Wood and Paper	1	3,16	3,57	3,21	3,18	2,98	2,83
	2			3,16	3,13	3,03	2,97
7. Chemical	1	2,22	1,86	1,56	1,61	1,57	1,49
	2			1,54	1,49	1,45	1,42
8. Petroleum and Refining	1	1,96	1,42	1,35	1,52	1,78	1,69
	2			1,33	1,50	1,81	1,77
9. Other	1	2,82	3,67	3,98	4,10	3,99	3,79
	2			3,92	4,04	4,06	3,98
10. TOTAL	1	100	100	100	100	100	100
	2						

PERCENTAGE SHARES OF ENERGY USE (%)

	Sc	1990	1992	1994	1996	1998	2000
1. Agriculture	1	17,09	15,73	16,33	16,77	17,00	18,02
	2			17,16	17,71	17,73	18,20
2. Food and Beverage	1	8,90	11,53	11,58	11,90	12,06	12,78
	2			12,17	12,56	12,58	12,91
3. Metal Prd and Machinery	1	9,66	13,71	14,55	13,55	12,48	11,60
	2			13,81	12,93	11,74	10,53
4. Construction and NF Min Prd	1	24,71	17,90	16,27	15,16	14,79	14,29
	2			16,08	15,06	15,08	14,90
5. Light Industry	1	4,47	9,31	10,88	11,17	11,97	12,69
	2			10,75	11,10	11,54	12,52
6. Wood and Paper	1	6,49	9,23	8,54	8,43	7,92	7,65
	2			8,44	8,38	8,08	7,98
7. Chemical	1	11,09	12,26	10,55	10,83	10,58	10,22
	2			10,43	10,16	9,79	9,67
8. Petroleum and Refining	1	15,52	0	5,90	6,64	7,78	7,52
	2			5,83	6,60	7,93	7,84
9. Other	1	2,07	4,44	5,40	5,55	5,42	5,23
	2			5,34	5,51	5,52	5,46
10. TOTAL	1	100	100	100	100	100	100

ENERGY INTENSITY BY SECTOR (TJ/E6R)

	1990	1992	1994-2000
1. Agriculture	5,63	3,74	3,49
2. Food and Beverage	5,18	3,70	3,24
3. Metal Prd and Machinery	5,85	4,00	3,33
4. Construction and NF Min Prd	15,18	7,15	6,12
5. Light Industry	3,25	2,58	2,37
6. Wood and Paper	19,58	13,70	12,03
7. Chemical	47,67	34,92	30,57
8. Petroleum and Refining	75,61	21,90	19,78
9. Other	7,01	6,42	6,14
10.TOTAL	9,55	5,30	4,50


Energy Intensity
Indus Agri & Constr Sectors
Terajoules/Mln Rbls
70
60
50
40
30
20
10
0
1990
1992
1994
1996
1998
2000
Year of Energy Analysis
Agriculture
Constr & NF Min Pr
Food Bev Wood & P
Light Ind & Other
Metal Prod & Mach
Chem Petro & Refng

Sc 1,2

$t_1 > t_5 > t_3 > t_2 > t_4 > t_9 > t_6 > t_7 > t_8$

1994 $f_1 > f_4 > f_3 > f_2 > f_5 > f_7 > f_6 > f_9 > f_8$

$v_7 > v_8 > v_6 > v_9 > v_4 > v_{10} > v_1 > v_3 > v_2 > v_5$

$t_5 > t_1 > t_2 > t_3 > t_4 > t_9 > t_6 > t_7 > t_8$

2000 $f_1 > f_4 > f_2 > f_5 > f_3 > f_7 > f_6 > f_9 > f_8$

$v_7 > v_8 > v_6 > v_9 > v_4 > v_{10} > v_1 > v_3 > v_2 > v_5$

The following conclusions could be drawn from these inequations:

1) fuel and energy consumption structure in 1990 is practically incomparable with the output structure;

2) in the period 1994-2000 the fuel and energy consumption structure draws considerably closer to the output structure;

3) the biggest percentage share of industrial output in year 2000 is that of the Light Industry, which has the lowest fuel and energy consumption as well. Note that in year 2000 the Output Percentage Shares inequation is almost reverse of the Energy Consumption Intensity inequation, i.e. the more energy consuming industry - the smaller (as a rule) it's output's share.

The additional remarks need to be made about some specific changes. The analysis of both the output and energy consumption dynamics in particular industries reveals the following:

1. The Agriculture's percentage share of industrial output decreases considerably from 29% to 21-23%. This is one of the basic changes that takes place along with the output decline in volume. Undoubtedly this is connected with the fuel and energy price changes, although other factors mentioned above have the considerable influence as well. It should be noted here that

those changes are not accompanied by the corresponding changes in the dynamics of the energy consumption percentage share . The latter rises insignificantly from 17% to just 18%.

2. The Building and Construction's percentage share of output decreases considerably from 15,5% to 10,5-11%. It coincides with the rapid decrease of the industry's fuel and energy consumption share - from 24,7% in 1990 to 14-15% in 2000 year.

3. The Light Industry becomes the most important industry in year 2000 - it's output share rises from 13,1% up to 17%. The biggest rise of the fuel and energy consumption share is forecasted for this industry as well: from 4,5% in 1990 up to 13% in 2000 year.

4. The very intensive structural changes are expected both in Chemical Industry and Petroleum and Refining. The change in Chemical Industry's percentage share of total output is just about 0,7%, but this means that the intensity of changes is 0,7/2,2. This indicator is 1,5/2 in Petroleum and Refining Industry, which is characterised by the very rapid decline of relative portion of the total fuel and energy consumption. The latter indicator, on the other hand, is practically stable in Chemical Industry.

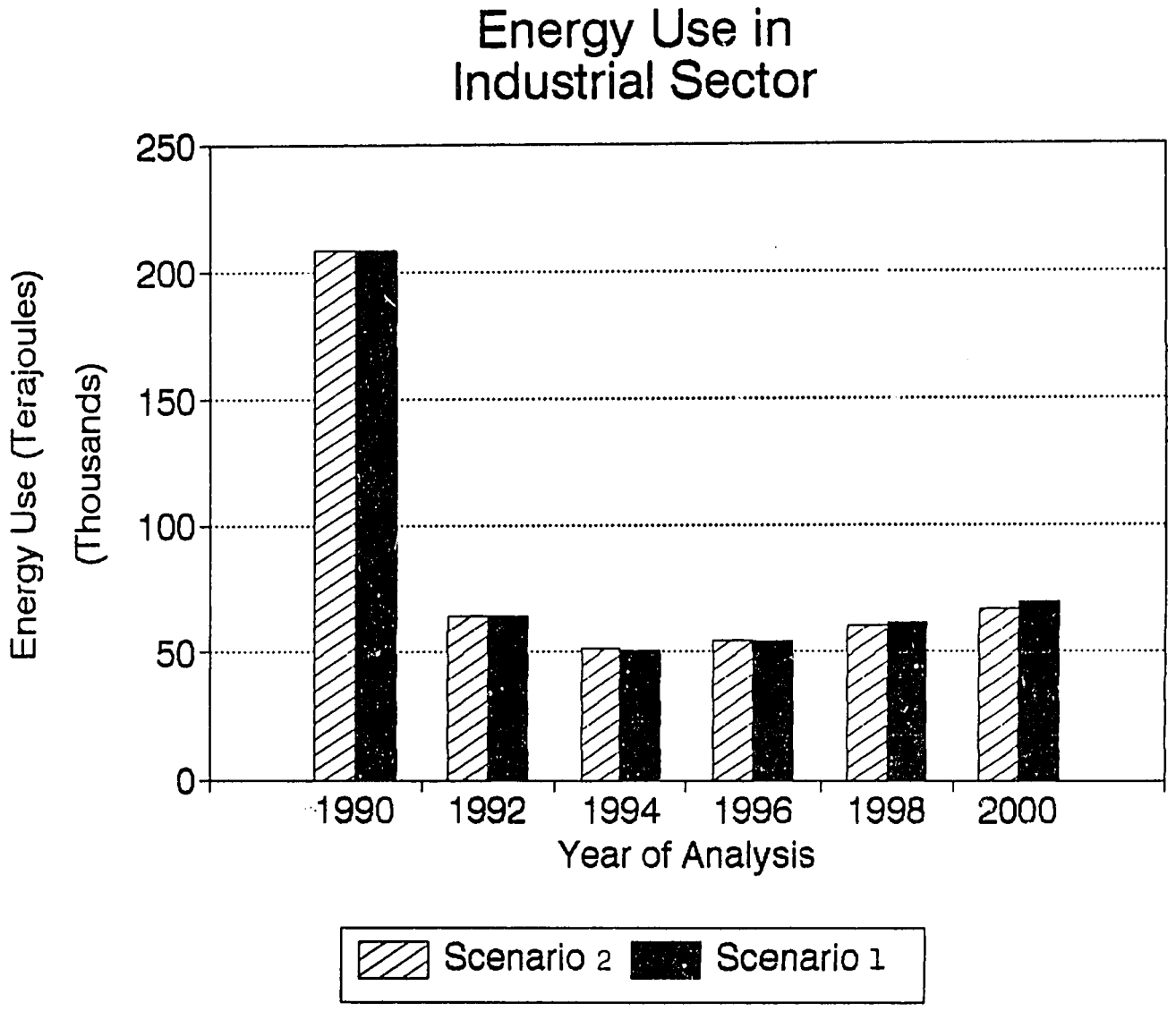
5. The changes in output shares of the remaining industries, i.e. Food and Beverages, Machinery and Metal Prds, Wood Processing and Cellulose, are comparatively insignificant. It should be noted that the relative portion of the fuel and energy consumption in Food and Beverage industry is rising from 8,9 up to 13% throughout the whole forecast period.

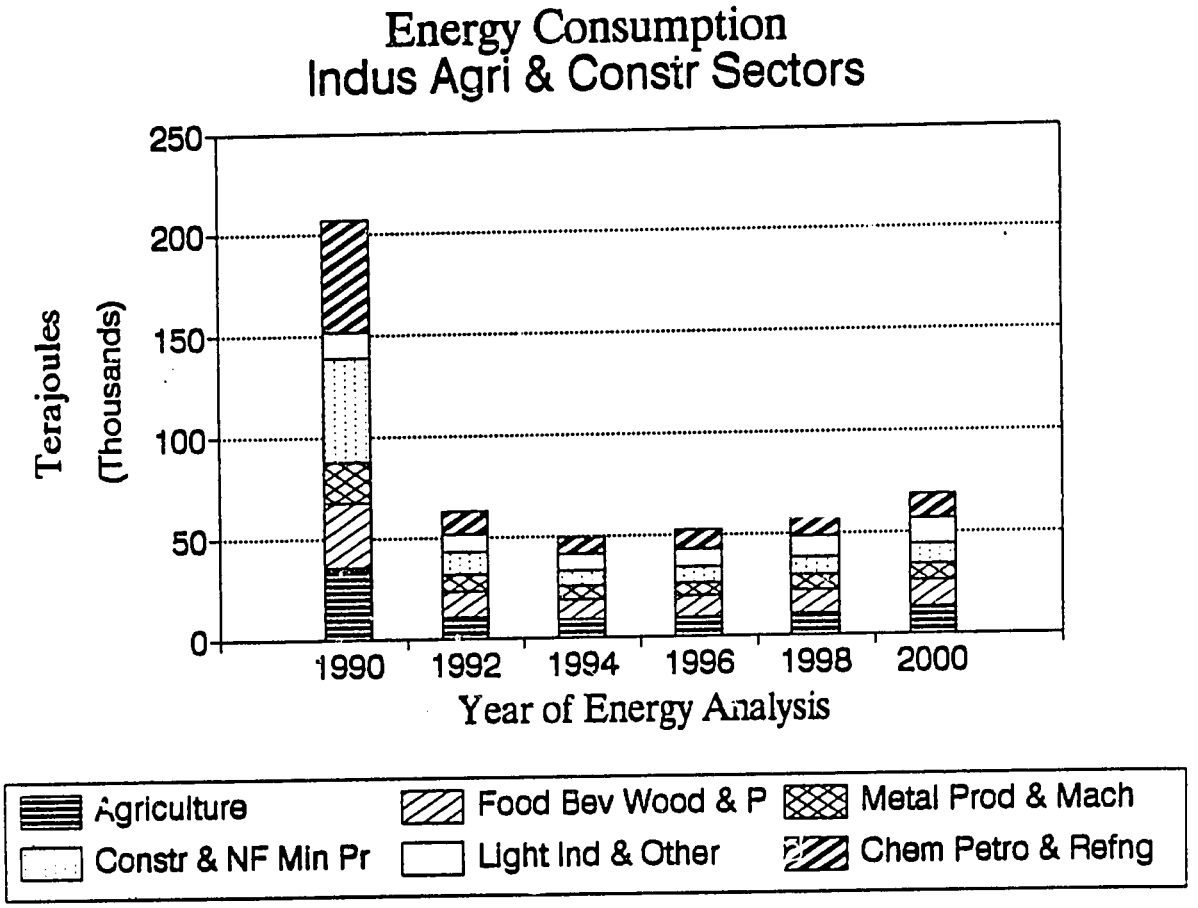
This indicator's dynamic curves are outwards convexed both in Machinery and Metal Prds and in Wood Processing industry; the peak is reached in 1992-1994. However, in both cases the 2000 year level is just a little bit higher than in 1990.

Industrial Fuel Use By Subsector (TJ)

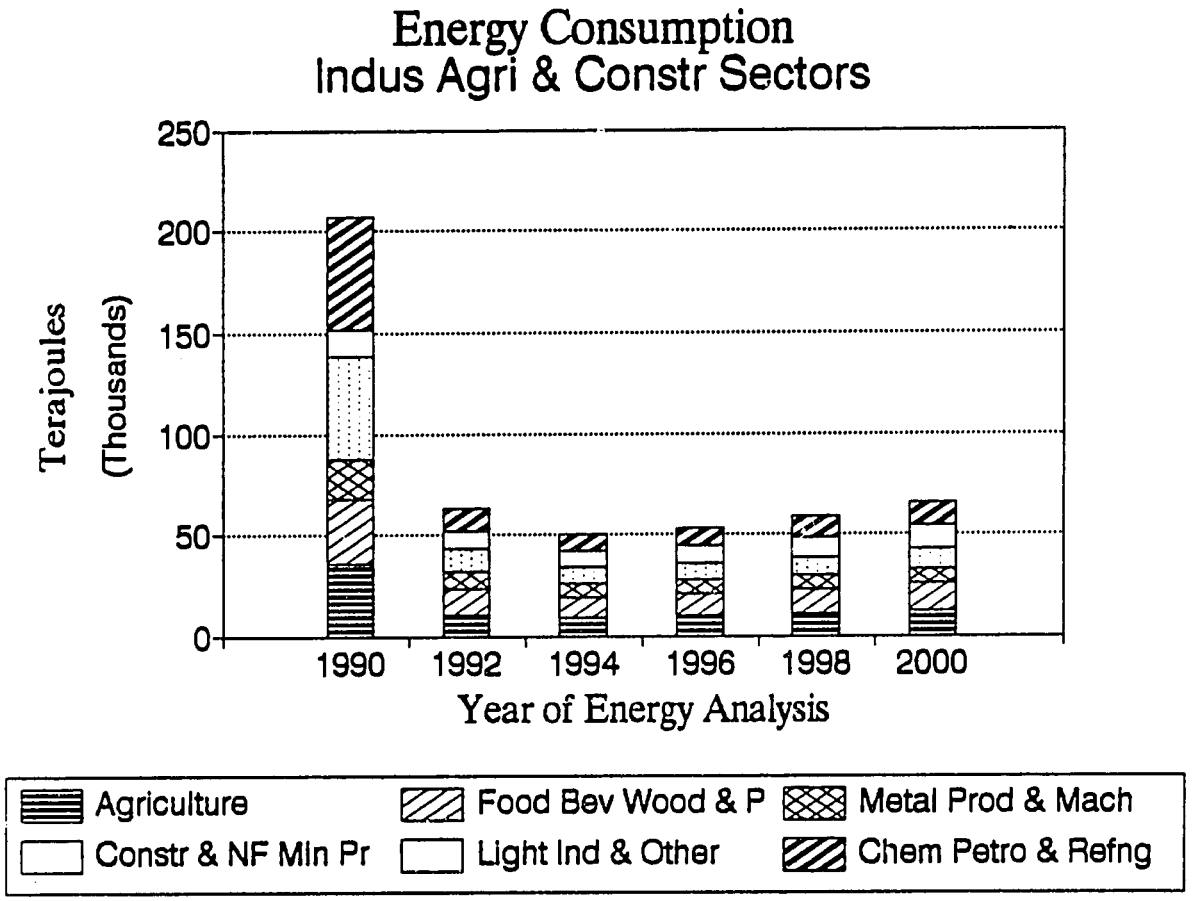
Scenario 1
2

	Sc	1990	1992	1994	1996	1998	2000
1. Agriculture	1	35600	10100	8240	9090	10400	12600
	2			8760	9660	10700	12200
2. Food and Beverage	1	18600	7410	5850	6450	7380	8930
	2			6220	6850	7550	8650
3. Metal Prd and Machinery	1	20100	2810	7340	7340	7640	8110
	2			7050	7050	7050	7050
4. Construction and NF Min Prd	1	51500	11500	8210	8210	9060	9980
5. Light Industry	1	9310	5980	5490	6050	7330	8860
	2					6930	8390
6. Wood and Paper	1	13500	5930	4310	4570	4850	5350
7. Chemical	1	23100	7870	5330	5870	6470	7140
	2				5540	5880	6480
8. Petroleum and Refining	1	32400	3780	2980	3600	4760	5250
9. Other	1	4310	2850	2730	3010	3320	3660
10. Total	1	209000	64200	50500	54200	61200	69900
	2			51100	54600	60100	67000


Energy Use in
Industrial Sector
Energy Use (Terajoules)
(Thousands)
250
200
150
100
50
0
1990
1992
1994
1996
1998
2000
Year of Analysis
Scenario 2
Scenario 1


Energy Consumption
Indus Agri & Constr Sectors
Terajoules
(Thousands)
250
200
150
100
50
0
1990
1992
1994
1996
1998
2000
Year of Energy Analysis
Agriculture
Constr & NF Min Pr
Food Bev Wood & P
Light Ind & Other
Metal Prod & Mach
Chem Petro & Refng

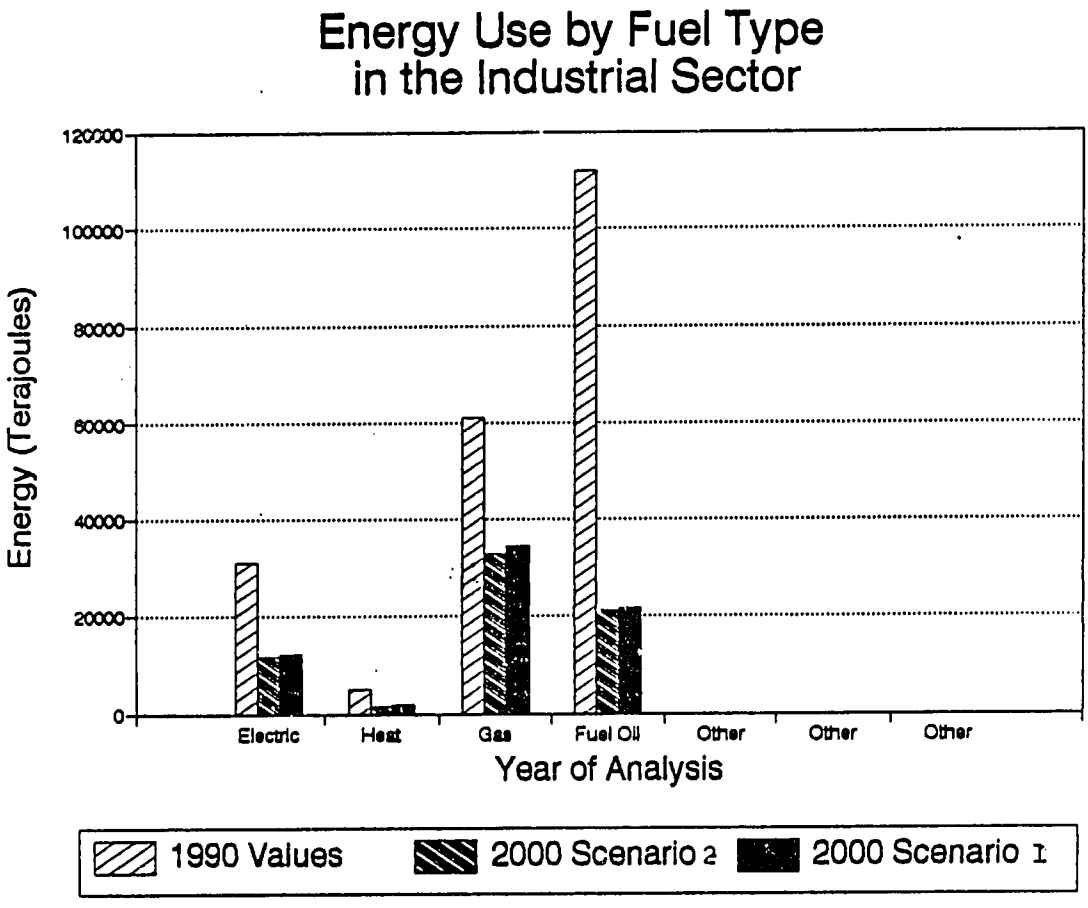
Sc 1

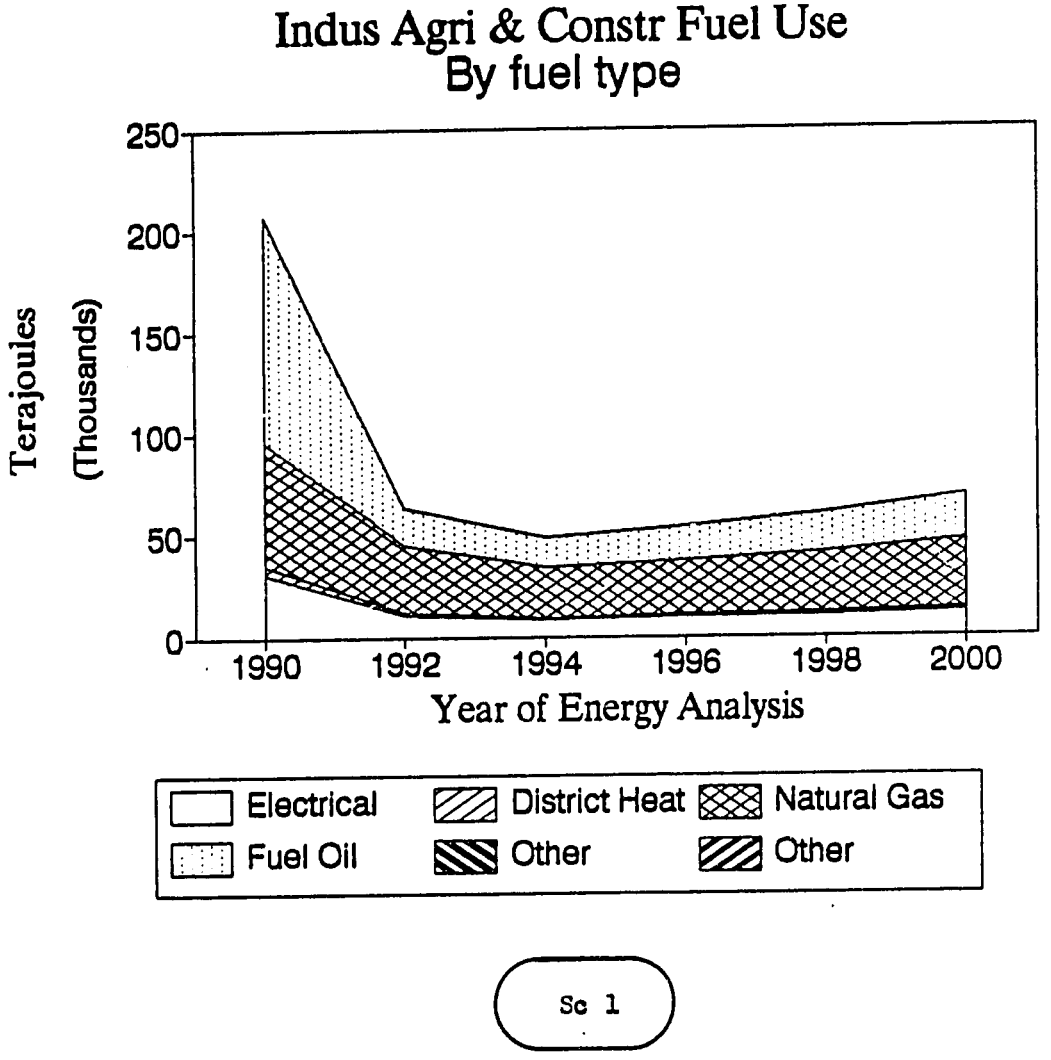

Energy Consumption
Indus Agri & Constr Sectors
Terajoules
(Thousands)
250
200
150
100
50
0
1990
1992
1994
1996
1998
2000
Year of Energy Analysis
Agriculture
Food Bev Wood & P
Metal Prod & Mach
Constr & NF Min Pr
Light Ind & Other
Chem Petro & Refng

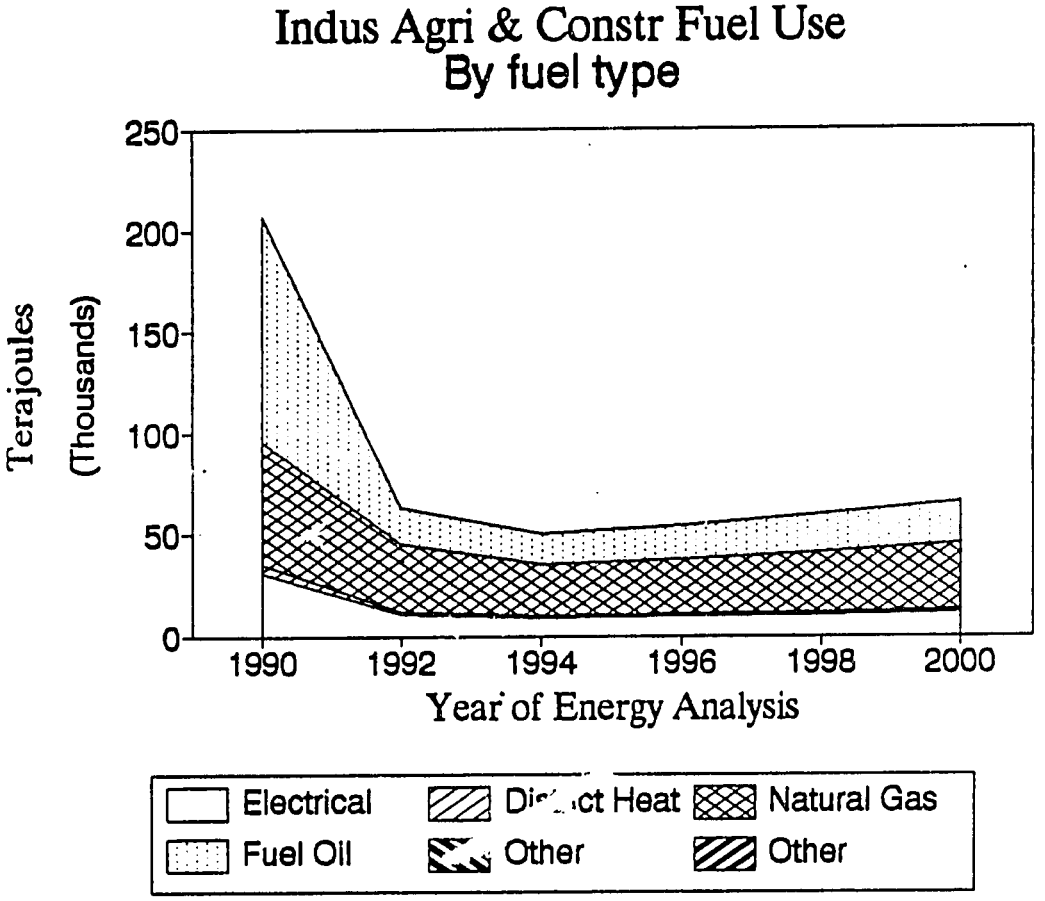
Sc 2

INDUSTRIAL FUEL USE BY FUEL TYPE (TJ)

	Sc	1990	1992	1994	1996	1998	2000
1. Electric	1	31000	10900	8710	9380	10600	12200
	2			8850	9480	10400	11600
2. Heat	1	4780	1360	1160	1260	1420	1620
	2			1170	1270	1390	1560
3. Gas	1	60800	33600	25700	27300	30300	34400
	2			25800	27300	29500	32700
4. Fuel Oil	1	112000	18400	14900	16300	18900	21600
	2			15200	16500	18800	21100
5. TOTAL	1	209000	64200	50500	54200	61200	69900
	2			51100	54600	60100	67000


Energy Use by Fuel Type
in the Industrial Sector
Energy (Terajoules)
120000
100000
80000
60000
40000
20000
0
Electric
Heat
Gas
Fuel Oil
Other
Other
Other
Year of Analysis
1990 Values
2000 Scenario 2
2000 Scenario 1


Indus Agri & Constr Fuel Use
By fuel type
Terajoules
(Thousands)
250
200
150
100
50
0
1990
1992
1994
1996
1998
2000
Year of Energy Analysis
Electrical
District Heat
Natural Gas
Fuel Oil
Other
Other
Sc 1


Indus Agri & Constr Fuel Use
By fuel type
Terajoules
(Thousands)
250
200
150
100
50
0
1990
1992
1994
1996
1998
2000
Year of Energy Analysis
Electrical
Fuel Oil
Natural Gas
Other
Other

Sc 2

Industrial Energy Model

Energy Intensities

Base Year 1990 Scenario 1,2

Energy Intensity (TJ/mlnR) 1990 Rbls Sector

	Electric	Heat	Gas	Fuel Oil	Aggregat
Agriculture	1.534	0.104	0.920	3.066	5.625
Food and Beverage	0.483	0.176	2.562	1.954	5.185
Metal Prds and Machinery	1.307	0.160	2.765	1.616	5.848
Construction and NF Min Prod	1.230	0.209	3.626	10.118	15.184
Light Industry	0.766	0.112	1.452	0.920	3.251
Wood and Paper	2.918	0.637	8.777	7.251	19.582
Chemical	8.833	1.443	23.138	14.257	47.672
Petroleum and Refining	3.869	0.958	0.000	70.785	75.613
Other	1.229	0.585	4.097	1.096	7.008
TOTAL:	1.421	0.219	2.784	5.124	9.548

Industrial Energy Model
Projected Year 1992

Energy Intensity (TJ/mlnR) 1990 Rbls Sector

	Electric	Heat	Gas	Fuel Oil	Aggregat
Agriculture	1.159	0.066	0.917	1.602	3.744
Food and Beverage	0.317	0.088	2.549	0.742	3.695
Metal Prds and Machinery	0.745	0.063	2.746	0.441	3.996
Construct.and NF Min Prod	0.702	0.083	3.602	2.761	7.148
Light Industry	0.579	0.070	1.447	0.481	2.577
Wood and Paper	1.915	0.318	8.733	2.737	13.704
Chemical	5.798	0.722	23.022	5.383	34.924
Petroleum and Refining	2.207	0.380	0.000	19.314	21.902
Other	1.068	0.465	4.090	0.792	6.415
TOTAL:	0.897	0.113	2.772	1.521	5.303

Industrial Energy Model
Projected Year 1994 - 2000

Energy Intensity (TJ/mlnR) 1990 Rbls Sector

	Electric	Heat	Gas	Fuel Oil	Aggregat
Agriculture	1.069	0.063	0.828	1.527	3.487
Food and Beverage	0.281	0.082	2.187	0.690	3.240
Metal Prds and Machinery	0.634	0.058	2.239	0.401	3.332
Construction and NF Min pr.	0.597	0.076	2.936	2.509	6.118
Light Industry	0.534	0.067	1.307	0.458	2.366
Woodsand Paper	1.696	0.298	7.492	2.548	12.034
Chemical	5.134	0.675	19.751	5.010	30.570
Petroleum and Refining	1.877	0.348	0.000	17.554	19.779
Other	1.026	0.454	3.887	0.773	6.140
TOTAL:	0.780	0.104	2.299	1.338	4.522

LEAP Input: PROPORTIONAL INCREASES FOR FUELS (RELATIVE TO BASE YEAR)

	Sc	1992	1994	1996	1998	2000
1. Electric	1	0,3503	0,2807	0,3024	0,3414	0,3935
	2		0,2850	0,3056	0,3346	0,3753
2. Heat	1	0,2851	0,2430	0,2632	0,2972	0,3396
	2		0,2458	0,2649	0,2918	0,3269
3. Gas	1	0,5523	0,4221	0,4486	0,4981	0,5659
	2		0,4250	0,4486	0,4845	0,5383
4. Fuel Oil	1	0,1646	0,1335	0,1455	0,1690	0,1933
	2		0,1360	0,1477	0,1681	0,1883

3. The Principles of the Fuel and Energy Rise in Prices Impact Assessment

The price equations are derived from the relationship of indicators in the 1st and 3rd quadrants of the production and distribution input-output table.

The following indications are used:

$i, j = 1,2,\ldots,30$ - industry's index number;

x_{ij} - utilisation of good i (produced by industry i) in production of good j (produced by industry j);

x_j - gross output of industry j;

X - column vector of gross industrial outputs, i.e. $x=(x_j)$, $j=\overline{1,30}$;

a_{ij} - physical input of good i per unit of physical output of industry j;

A - matrix of input-output coefficients a_{ij};

W_j - depreciation of industry j;

V_j - labour costs in industry j;

n_j - net income (profit plus excise tax) of industry j;

g_j - net output of industry j;

G - column vector of net industrial outputs, i.e. $G = (g_j)$, $j = \overline{1,30}$;

y_j - final product of industry j;

Y - column vector of final industrial products, i.e. $Y = (y_j)$, $j=\overline{1,30}$.

The input-output table used in planning purposes is designed in current prices. The following equations are valid here:

output distribution

$$X' = AX' + Y \,, \qquad (1)$$

output value formation

$$X = eA\hat{x} + G \,, \qquad (2)$$

where e - unity vector, $\hat{x}$ - diagonal matrix formed from the elements of vector X.

Such simplified model can be used as an instrument for the price policy design. It makes possible both the analysis and the forecasts of the impacts of specific industry production price changes on the prices and profitability levels in other industries. Moreover, the impacts of particular industry's labour costs, profitability, excise tax, etc., changes, on the general price system can be derived on this model as well.

The presented model gives the general picture of the inter-industrial price relationships. In this specific case the following formula of the net output per rouble of gross output was used:

$$(W_j + V_j + n_j)/X_j$$

where W_j - denotes depreciation, V_j - labour costs,,

n_j - profit, general excise and other income elements.

The basic equation, used for the calculation of production price index changes due to the fuel and energy rise in prices, is

$$(V + n + W)/X(E - A)^{-1} = J \qquad (3)$$

where J - denotes column vector of products price indices.

After the complete cycle of the price impact calculation the input-output coefficient matrix will be obtained from

$$A' = \hat{J}' A^{\circ} \hat{J}'^{-1} \qquad (4)$$

where A' - new matrix of the input-output coefficients, $\hat{J}'$ - diagonal matrix of the final price indices.

The Principal Results of Calculations

The data for calculations was obtained from Lithuania's Production and Distribution Input-Output Table of 1990. It was improved by the additional detailed data on the fuel and energy consumption in manufacturing and non-manufacturing sectors, on the import-export structure.

Using that data and hypothesizing certain industrial consumption structure, Lithuania's economic development forecasts were computed for the period till year 2000 (comparable prices of 1990 were used). One of the development scenarios (Tables 3.1 and 3.2) is used as the basis for the further calculations of the price indices.

Refering to this scenario it can be noted that the major decline of Lithuania's national economy is expected in 1994. (About 60% of the 1990 year level in comparable prices of the same year).

The growth of production begins after that and in 2000th year Lithuania's gross industrial output reaches about 90% of 1990 level (Tables 3.1 and 3.2).

The analysis of the fuel and energy price increase impact on the prices elsewhere and industrial output structure (Table 3.3) was conducted while employing the fuel export-import prices valid for June 12, 1992. Due to the fuel and energy rise in prices, the general price index rises 4,4 times, Industry'

Table 31

THE GROSS INDUSTRIAL OUTPUT OF LITHUANIA
(I Forecast Scenario, mln. roubles, relative prices of the year 1990)

		1990 yr.	1994 yr.	2000 yr.
001	Electricity and Heat	608.5	386.3	548.2
002	Oil- Extraction	103.7	65.5	95.9
003	Oil-Refining	708.3	427.3	643.1
004	Gas	73.0	44.3	66.1
005	Coal	7.6	2.7	6.9
006	Peat	20.6	14.2	19.5
007	Metallurgy	223.3	166.9	201.1
008	Main Chemical Industry	293.3	176.3	269.3
009	Synthetic Resins & Plastics	32.2	25.1	29.2
010	Other Chemical and Chemical Petroleum Industries	273.7	156.7	247.1
011	Machinery and Metal Prds	4083.9	2345.5	3675.9
012	Furniture	194.1	122.1	174.7
013	Cellulose and aper	161.9	106.1	145.9
014	Other Forest and Wood Processsing Industry	453.7	264.7	408.4
015	Cement and Asbestos	111.3	74.7	100.2
016	Ferro-concrete Constructions	292.3	175.9	263.1
017	Other Building Materials	510.9	316.0	459.9
018	Glass and Chinaware	43.7	27.5	39.4
019	Light Industry	3793.5	2359.5	3414.4
020	Meat and Meat Products	775.9	485.5	698.3
021	Milk and Milk Products	331.5	228.7	298.3
022	Other Food Products	3032.0	1875.0	2728.8
023	Other Industry	1360.5	839.9	1224.5
024	Building and Construction	2536.8	1487.4	2283.1
025	Plant Growing	1830.6	1120.7	1647.6
026	Cattle Breeding	4683.1	2890.1	4214.9
027	Transport	936.2	610.8	846.1
028	Communications	52.0	41.4	46.8
029	Services	1054.0	685.8	949.6
030	Other Activities	310.7	210.7	279.8
	TOTAL	28892.8	17733.1	26025.1

Table 3.2

THE STRUCTURE OF THE ECONOMIC DEVELOPEMENT OF LITHUANIA
(I Forecast Scenario, relative prices of the year 1990)

	1990 yr.	1994 yr.	2000 yr.
INDUSTRY - total	60.5	60.3	60.5
Electricity & Heat	2.1	2.2	2.1
Fuel	3.2	3.1	3.2
Metallurgy	.8	.9	.8
Chemical Industry	2.1	2.0	2.1
Machinery & Metal Prds	14.1	13.2	14.1
Wood Processing	2.8	2.8	2.8
Building Materials	3.3	3.4	3.3
Light Industry	13.1	13.3	13.1
Food Prds	14.3	14.6	14.3
Other Industries	4.7	4.7	4.7
BUILDING & CONSTRUCTION	8.8	8.4	8.8
AGRICULTURE	22.5	22.6	22.5
TRANSPORT & COMMUNICATION	3.4	3.7	3.4
SERVICES	3.6	3.9	3.6
OTHER ACTIVITIES	1.1	1.2	1.1
Total:	100	100	100

output price index - 5,4 times, Chemical and Petroleum output price index - 6,5 times, and so forth (see Table 3.3 for details). The evoked by the rise in prices structural changes of industrial gross and net output, input and consumption, are presented in tables and schemes.

Table 3.3

THE FUEL & ENERGY RISE IN PRICES IMPACT ON THE
INDUSTRIAL OUTPUT STRUCTURE AND PRICES
(for 1992.06.12, compared with prices of 1991.01.01)

PRODUKCIJA	Resource price growth index	Other Products price growth index	Resource price growth index	Other Products price growth index	Resource price growth index	Other Products price growth index
001 Electricity and Heat		5.66		5.76		7.35
002 Oil- Extraction		1.69		1.73	35.70	35.70
003 Oil-Refining		1.44		1.46		16.10
004 Gas	68.5	68.50	68.50	68.57	68.50	71.05
005 Coal		1.68	25.00	25.00	25.00	27.20
006 Peat		1.38		1.41		2.29
007 Metallurgy		1.60		1.63		2.54
008 Main Chemical Industry		6.06		6.08		6.64
009 Synthetic Resins & Plastics		9.36		9.39		10.33
010 Other Chemical and Chemical Petroleum Industries		3.52		3.54		4.14
011 Machinery and Metal Prds		1.77		1.79		2.19
012 Furniture		1.91		1.96		2.40
013 Cellulose and Paper		3.47		3.53		4.19
014 Other Forest and Wood Processsing Industry		1.78		1.82		2.30
015 Cement and Asbestos		2.57		2.63		5.76
016 Ferro-concrete Constructions		2.07		2.12		3.21
017 Other Building Materials		2.32		2.43		3.93
018 Glass and Chinaware		4.70		4.71		5.08
019 Light Industry		1.43		1.46		1.66
020 Meat and Meat Products		2.73		3.01		4.57
021 Milk and Milk Products		2.60		2.90		4.28
022 Other Food Products		1.40		1.44		1.92
023 Other Industry		1.51		1.56		1.79
024 Building and Construction		1.48		1.51		2.35
025 Plant Growing		1.77		1.86		2.70
026 Cattle Breeding		1.35		1.41		1.75
027 Transport		1.69		1.73		3.02
028 Communications		1.05		1.07		1.13
029 Services		1.22		1.29		1.45
030 Other Activities		1.51		1.55		1.81
PRICE INDEXES						
Total Prodyction		1.93		1.99		3.06
Total Industry Production		2.23		2.30		3.68
including:						
Energy and Fuel		6.35		6.53		16.73
Chemical and Petroleum		5.09		5.11		5.70
Forest and Wood Processing		2.15		2.20		2.71
Building Materials		2.38		2.46		3.97
Food Industry		1.74		1.85		2.61

Table 3.3 (cont.)

THE FUEL & ENERGY RISE IN PRICES IMPACT ON THE
INDUSTRIAL OUTPUT STRUCTURE AND PRICES
(for 1992.06.12, compared with prices of 1991.01.01)

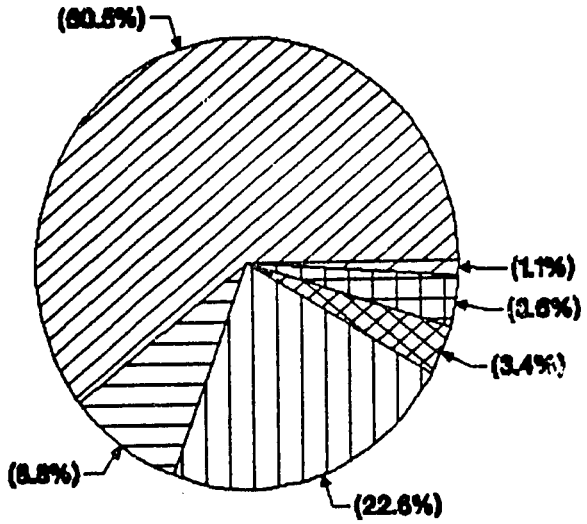
	PRODUKCIJA	Resource price growth index	Other Products price growth index	Resource price growth index	Other Products price growth index	Resource price growth index	Other Products price growth index
001	Electricity and Heat		7.95		12.23	15.2	15.20
002	Oil- Extraction	35.70	35.70	35.70	38.42	35.70	38.44
003	Oil-Refining		16.10	35.00	35.00	35.00	35.01
004	Gas	68.50	71.05	68.50	74.03	68.50	74.05
005	Coal	25.00	27.20	25.00	29.85	25.00	29.87
006	Peat	12.80	12.80	12.80	14.04	12.80	14.06
007	Metallurgy		2.55		3.64		3.65
008	Main Chemical Industry		6.64		7.32		7.34
009	Synthetic Resins & Plastics		10.33		11.46		11.51
010	Other Chemical and Chemical Petroleum Industries		4.14		4.86		4.89
011	Machinery and Metal Prds		2.20		2.68		2.70
012	Furniture		2.44		2.98		2.99
013	Cellulose and Paper		4.19		4.99		5.02
014	Other Forest and Wood Processsing Industry		2.31		2.88		2.90
015	Cement and Asbestos		5.76		9.54		9.57
016	Ferro-concrete Constructions		3.21		4.51		4.54
017	Other Building Materials		3.97		5.78		5.80
018	Glass and Chinaware		5.09		5.53		5.55
019	Light Industry		1.66		1.90		1.91
020	Meat and Meat Products		4.66		6.54		6.57
021	Milk and Milk Products		4.36		6.02		6.05
022	Other Food Products		1.94		2.51		2.52
023	Other Industry		2.01		2.53		2.54
024	Building and Construction		2.36		3.35		3.36
025	Plant Growing		2.75		3.77		3.78
026	Cattle Breeding		1.78		2.19		2.19
027	Transport		3.02		4.57		4.58
028	Communications		1.13		1.21		1.21
029	Services		1.45		1.64		1.65
030	Other Activities		1.82		2.14		2.15
	PRICE INDEXES						
	Total Prodyction		3.08		4.30		4.37
	Total Industry Production		3.70		5.24		5.26
	including:						
	Energy and Fuel		16.87		27.75		28.94
	Chemical and Petroleum		5.71		6.43		6.45
	Forest and Wood Processing		2.72		3.33		3.35
	Building Materials		4.00		5.32		5.34
	Food Industry		2.64		3.35		3.36

Table 3.4

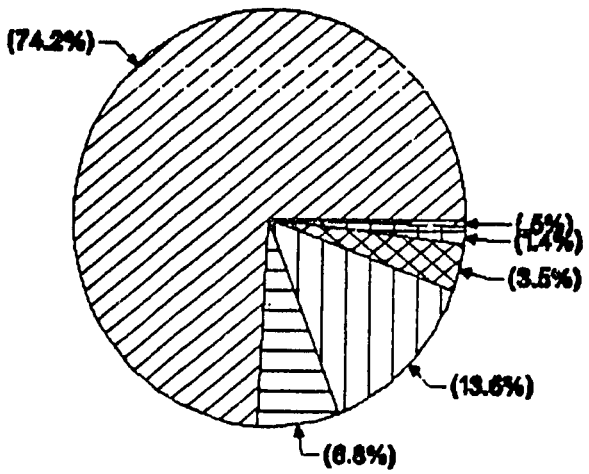
THE IMPACT OF THE FUEL & ENERGY PRICE INCREASES
ON THE STRUCTURE OF MAIN INDICATORS OF ECONOMIC DEVELOPMENT

	Gross Output		National Income		Material costs		Consumption	
	Structu-	Structu-	Structu-	Structu-	Structu-	Structu-	Structu-	Structu-

The Structure of Lithuania's National Economy
(relative prices of the year 1990)

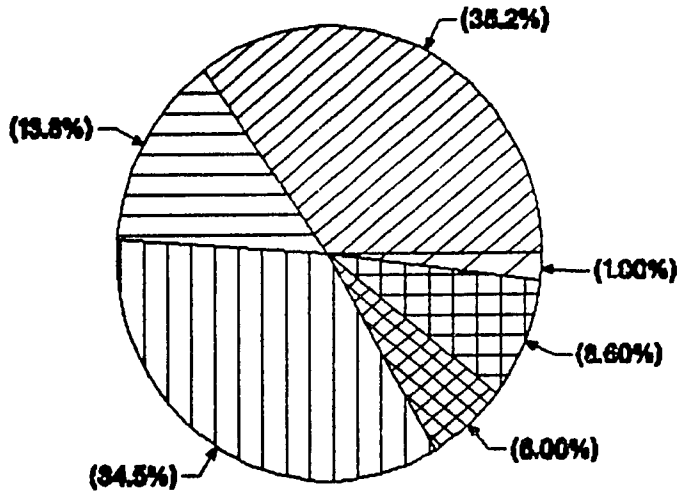


(prices of the 12.06.1992)

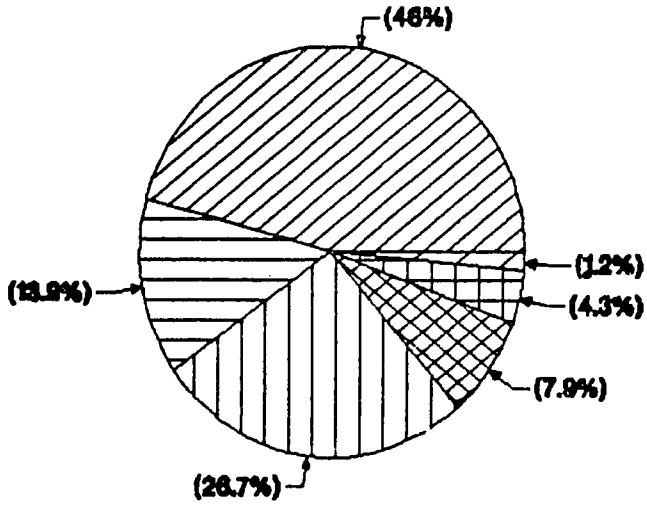


Industry	Building & Construction
Agriculture	Transport & Communications
Services	Other Activities

The Structure of the National Income
(relative prices of the year 1990)

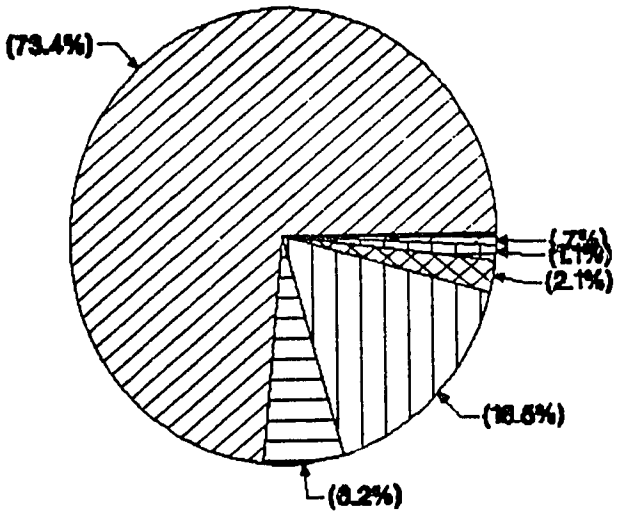


(prices of the 12.06.1992)

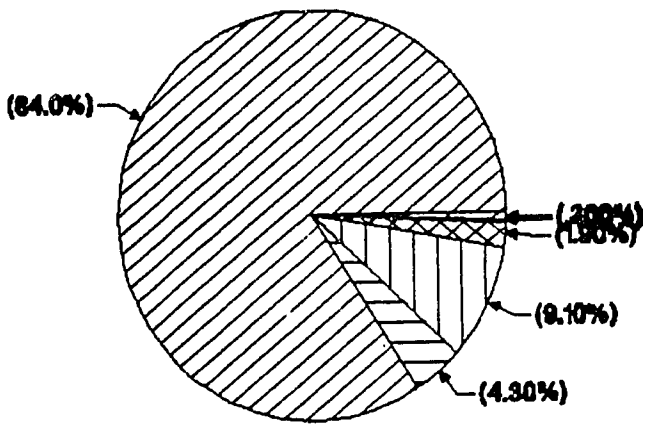


Industry	Building & Construction
Agriculture	Transport & Communications
Services	Other Activities

The Structure of the Material Costs
(relative prices of the year 1990)

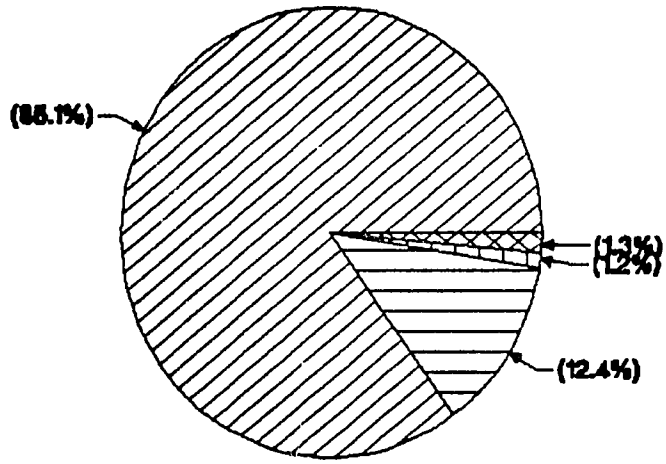


(prices of the 12.06.1992)

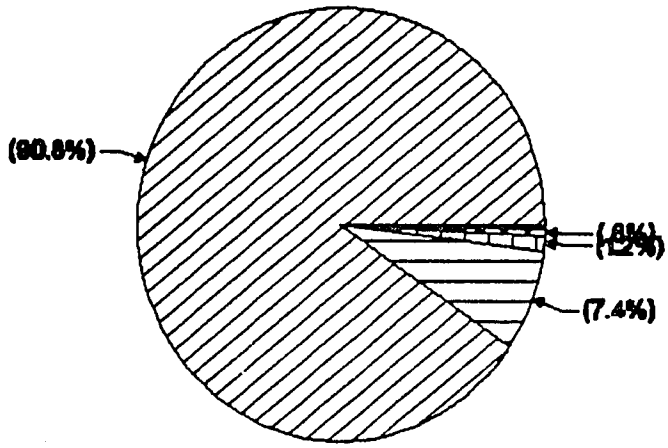


Industry
Agriculture
Services
Building & Construction
Transport & Communications
Other Activities

The Cosumption Structure
(relative prices of the year 1990)



(prices of the 12.06.1992)



Industry
Transport & Communications
Agriculture
Other Activities

4. The Changes of the Living Standard after the Fuel and Energy Rise in Prices

It is advisable to start the assessment of the living standard changes in Lithuania from the scanning of the macro-economic indicators, including Gross National Product structure. One of the main indicators here is the percentage share of the wages, salaries and other labour income in GNP (Table 4.1). As it can be seen from the presented data, it has a tendency to decline that is expected to continue in 1992. The world's experience indicates that such structure of GNP is usually characteristic for countries that are either participating in the arms race or actively preparing for military actions. Therefore it is difficult to explain the presence of such tendencies in Lithuania's economy.

Because of the rise in fuel and energy prices, the significant changes of the personal income and it's disposition structure were highly likely (Table 4.2). The substantial rise of the paid services share in total expenditures was expected. However, it did not come true (according to Table 4.2 it changed just about 10%) due to the reasons we try to explain below.

The rise in prices of the food products and manufactured goods in retail trade is going for a decade by now. It is veiled by the appearance of the same products under new names, usually without any noticeable improvement in their quality. By the experts opinion, one-third of the retail trade growth in value in 1989 was achieved due to the rise in prices.

Consumers were already accustomed to such phenomena and

Table 4.1

Gross National Product of the Republic of Lithuania

	mln. rub.		
	1989	1990	1991
Total	14164.5	14594.1	39355.0
Wages + Salaries and other Labour Income	5250,0	5754.0	13817.0
Contribution for Social Insurance	538.1	574.3	5922.0
Interest Income			
Profit (less bonuses)	5862.0	6046.3	14254.0
Depreciation	2413.0	2440.0	2301.0
Excise Tax	2059.0	2005.0	5244.0
Subsidies	2385.5	2528.6	2183.0
Net Exports	427.9	302.4	400.0
Percentage Share of Labour Income in GNP	37.1	39.4	35.1

P.S. Percentage Share of Labour Income in GNP was:

- 64 % in USA, 1985
- 36,6 % in USSR, 1987

Table 4.2

Personal Income and Expenditures (mln.rb.)

	1990	1991				1991	1992	
		1 quart.	2 quart.	3 quart.	4 quart.		1 quart.	2 quart.
INCOME:								
1.Wage and Salary	5948,9	1807.1	2572.5	3152	5362	12893.6	9358.2	18526
2.Other Labour Income	183.3	61.6	73.4	69.3	168.9	373.2		230
3.Private and State Farming Receipts	874.8	250.3	362.9	346.9	816.6	1776.7	758.5	959
4.Revenues for the Farm Produce Sold	885.2	121.6	543.5	960.6	?	1495.6	725.9	2214
5.Pensions and Allowances	1208.9	444.9	647.1	1017.3	1726.6	3835.9	3274	5495
6.Scholarships	39.8	13.8	32.6	44.8	70.9	162.1	125	256
7.Interest Income	562.5	89.2	80.9	71	714.3	955.4	202.9	286
8.Other Revenues	302.7	216.5	50.4	67.3	53.4	387.6	450.6	453
9.Personal Dividend Income						1157.22		
10.Investment Cheques						578.1		
11.Money Remittances and Credits Received		7.3		11.7		10.43		
Total Income	10005.5	3012.3	4363.3	5740.9	8912.7	23625.9	14895.1	28422
EXPENDITURES								
12.Goods Purchases and Paid Services	8011.1	2373.6	3724.6	4200.6	6424.9	16723.7	10503.5	18514
Goods	7188.1	2054.5	3228.7	3617.7	5887.3	14788.2	9012.0	15461
Services	823	319.1	495.9	582.9	537.6	1935.5	1491.5	3052
13.Personal Taxes and Voluntary Contributions	1192.7	386.4	714.4	714.6	1885.1	3700.5	3360.1	4468
Taxes	712.2	228.4	534.9	527.8	1038.6	2329.7	2200.0	3417
Contributions	480.5	158	179.5	186.8	846.5	1370.8	1160.1	1050
14.Investment Cheques Used						578.1		75
15.Money Remitted	12.5		10.5					
16.Personal Savings Increase	7	545.9	-289.5	244.8	892.9	1394.1	406.3	1775
Total Expenditures	9223.3	3305.9	4160	5160	9202.9	22396.4	14269.9	25083
Income Surplus over Expenditures	782.9	-293.6	203.3	580.9	-290.2	1229.45	625.2	3389

psychologically reconciled with it. Meanwhile, the tariffs of the basic paid services (i.e. residential rent, public services and transport, electricity and heat), similarly as the prices of gasoline and other sorts of fuel, were kept rather stable. That was an accustomed reality as well. Therefore, distinctly observable and rapidly increasing in number attempts to evade the public transport fees and to predate the public services bills could be explained, first of all, by the shocking rise in tariffs to which consumers were unprepared psychologically.

Table 4.3 and Table 4.4 data indicates that there were no significant changes in the structure of the paid services - neither in their share with respect to the total expenditures, nor in the percentage shares of the particular services. The greater changes are expected in 1992.

These statements should not be absoluticised, for they represent the average estimations for the whole population of Lithuania. Meanwhile, the personal income level and, correspondingly, level of living differentiation in Lithuania significantly increased during the past two years. The Lithuanian population structure according to income level per family and families distribution according to income per family member are shown in the schemes 4.1.1, 4.1.2, (calculations are based on the family budget research data provided by the Department of Statistics). Since the official subsistence minimum is 1600 roubles monthly per person (by unofficial estimates it is much higher - about 3500 roubles), it can be asserted that the majority of Lithuania's population is below this limit. Therefore, it's no wonder that for low-income groups of population the boost of prices of public transport and services made them

Table 4.3

The Volume and Structure of the Paid Services

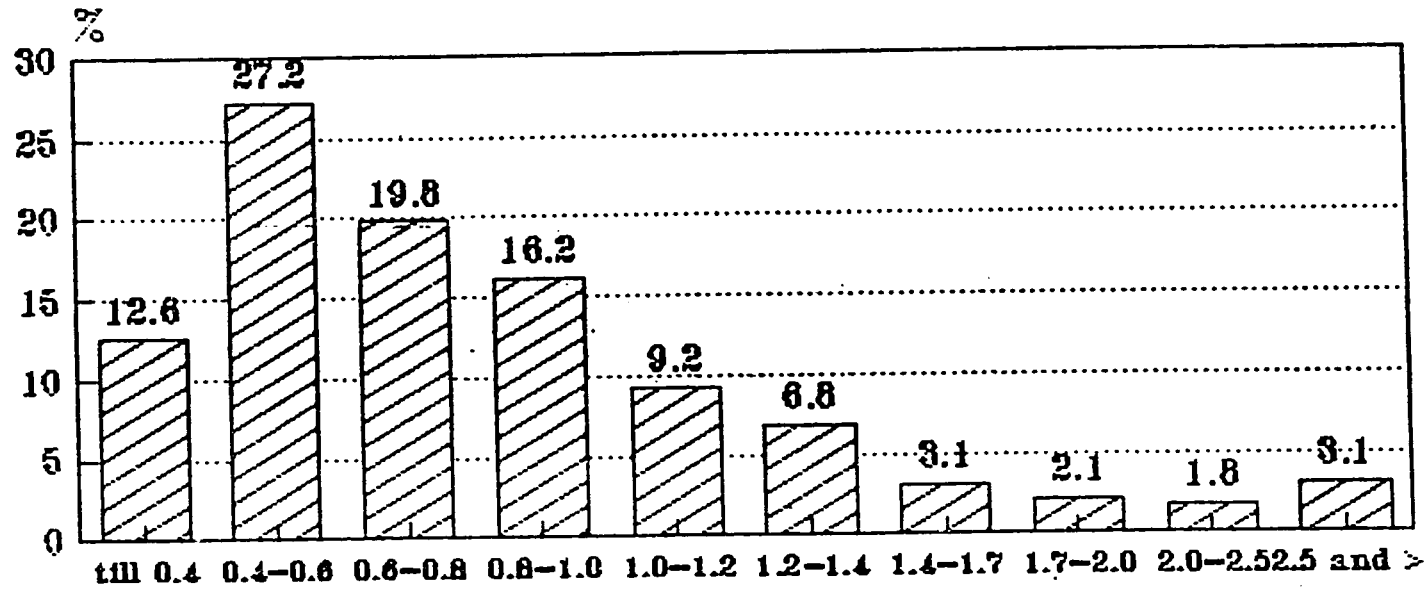
	1989			1990			1991		
	Volume mln.roubles	Percentage in Total Expenditures	Percentage in Paid Services	Volume mln. roubles	Percentage in Total Expenditures	Percentage in Paid Services	Volume mln. roubles	Percentage in Total Expenditures	Percentage in Paid Services
Personal Consumption Expenditures-total	8221.9	100		9367.0	100		21002.3	100	
incl. Paid Services	697.0	8.48	100	823.0	8.78	100	1935.5	9.21	100
including:									
Residential Rent and Public Servicies	195.3	2.37	28.18	195.9	2.09	23.81	277.1	1.32	14.33
Personal Services	95.2	1.16	13.64	99.71	1.06	12.11	646.5	3.08	33.41
Kindergarten	20.2	0.24	2.88	13.98	0.15	1.69	19.05	0.09	0.98
Recreation	34.0	0.42	4.86	41.36	0.44	5.02	188.6	0.89	9.75
Amusement	27.6	0.33	3.94	25.47	0.27	3.09	35.7	0.17	1.84
Railway, Air and Water Transport	73.3	0.89	10.51	83.52	0.89	10.51	163.9	0.78	8.46
Automobiles and Urban Transport	126.4	1.55	18.10	122.00	1.31	14.83	365.6	1.74	18.89
Telephone and Postal Services	61.4	0.75	8.79	70.47	0.75	8.57	153.2	0.73	7.91
Other Services	9.8	0.12	1.40	9.95	0.11	1.22	38.17		
Private Firms Services	53.8	0.65	7.70	160.6	1.71	19.51	47.64	0.41	4.43

Table 4.4

The Volume and Structure of the Public Services

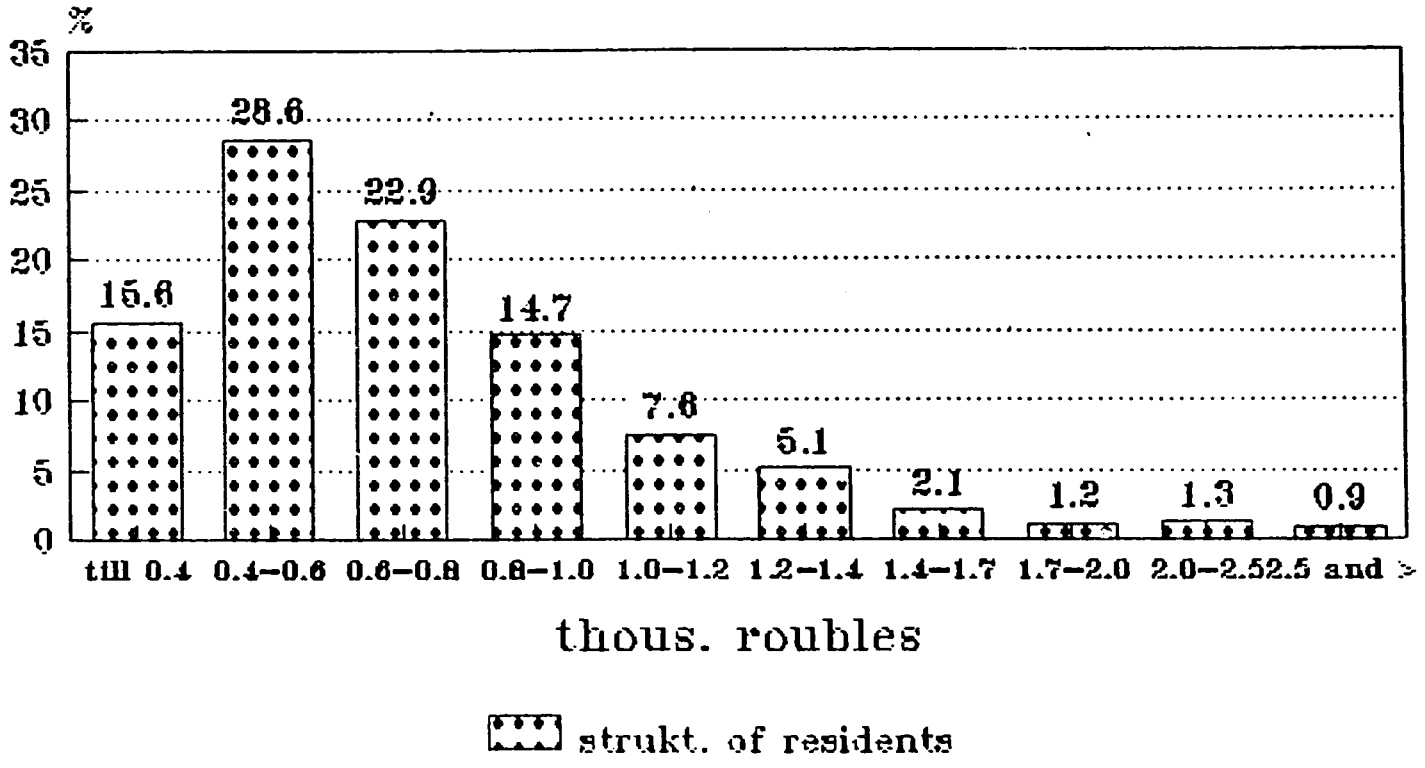
	1990				1991			
	Volume mln.roubl.	Percentage in Total Expend.	Percentage in Paid Services	Percentage in Public Services	Volume mln. roubl.	Percentage in Total Expend.	Percentage in Paid Services	Percentage in Public Services
Personal Consumption Expenditures - total	9367.0	100			21002.3	100		
incl. Paid Services	823.0	8.78	100		1935.5	9.21	100	
incl. Public Services	125.9	1.34	15.33	100	201.81	0,97	10.43	100
incl. Cold Water Supply	7.57	0.081	0,91	6.01	13.51	0.064	0.70	6.69
Gas Supply	22.94	0.24	2.78	18.21	26.94	0.128	1.39	13.35
Central Heating	29.29	0.31	3.55	23.24	45.73	0.228	2.36	22.66
Sewerage	3.65	0.039	0.44	2.89	10.26	0.049	0.53	5.08
Cleaning	1.02	0.01	0.12	0.81	11.98	0.057	0.62	5.94
Hot Water Supply	12.66	0.13	1.54	10.04	27.63	0.131	1.43	13.69
Electricity	48.85	0.53	5.99	38.76	65.76	0.33	3.40	32.59

The Distribution of Families in Lithuania According to Monthly Income per Family Member – 4–th quarter, 1991



All together in 1991 there were 1196400 families in Lithuania

The Distribution of Lithuanian Residents According to Monthly Income per Family Member – 4-th quarter, 1991.



The Population of Lithuania in 1991:
3708836 people

7/8/1992

Table 4.5

The Average Monthly Labour Income of the Lithuanian Industry Workers

(roubles)

	1991						1992				
	04	06	08	10	12	vid.	01	02	03	04	05
1	2	3	4	5	6	7	8	9	10	11	12
General Average	456	590	682	960	2165	751	2279	2798	3240	4118	4978
Manufacturing Industries	504	644	732	1031	2290	804	2455	2950	3338	4284	5087
Nonmanufacturing Industries	326	418	538	822	1855	632	1924	2442	2997	3693	4702
General Industry	533	680	760	1075	2477	876	2632	3187	3508	4556	5364
Electric Paver Supply					4529			3991	6091	8389	10369
Fuel Supply					2178		2787	9423	4132	5927	7477
Food Processing					3351		2856	3607	3545	5037	5999
Agriculture	317		515	816	987	484	1003	1125	1266	1317	1648
Wood and Forest				715		507		1442	2779	3178	3517
Transportation	434	556	696	891	1605	702	2258	2561	3047	3909	5025
Communications	392	0	585	809	1740	633	2176	2309	2967	3408	5367
Building and Construction	512	761	790	1126	2037	829	2606	3569	3933	4608	5549
Trade	389	538	585	887	2027	674	2093	2470	3421	3913	4160
Food and Lodging	288	431	441	625	1145	486	1340	1495	1444	1782	2115
Equipment and Material Supply	637	584	746	1007	1498	759	1938	3391	3379	3571	4791
Information and Computing Services				629	1989	692	1695	2530	3581	3274	3937
Public Services	358	466	555	766	1706		1677	2928	2385	2844	3660
Personal Services	291	368	344	414	706		789	919	1076	1520	1530
Health, Social Security and Sports	303	382	539	924	2170	660	2110	2459	3239	3987	4797
Education	324	428	548	795	1715	583	1896	2488	2963	3605	4848
Culture	270	319	445	672	1583	544	1548	2025	2520	2995	3524
Arts	324	291	364	533		476		1477	1697	1987	2240
Science	383	420	616	833	1491	647	1267	2499	2348	3501	4219
Government	383	528	678	990	2242	755	2377	3026	3922	4871	5777
Crediting and Insurance	676		744	890	2479	950	2242	2719	3581	4209	6055

virtually inaccessible without cheating.

The analysis of the living standard changes shows that the common scheme of balance of the personal income and consumption expenditures is not sufficient for an assessment of their changes. This is especially true with respect to the personal expenditures. This phenomena is caused by the extraordinary investment allowances (over 13 billion non-indexed roubles in total) granted to every citizen by Lithuanian Government for the state property privatisation purposes. The total value of the sold shares of the privatised objects amounted to 7.7 billion roubles in September, 1992, the total value of shares sold via subscription were the next 7.7 billion roubles, and 2.2 billion roubles were received from the state property auctions. Although part of the share purchase expenses are paid in cash, those expenditures are not reflected in the personal income - expenditure balance sheet. Moreover, Lithuanian citizens have already used about 1.1. billion roubles in cash (along with investment allowance money) for the purchase of their appartaments from State. Because of those expenditures population's purchasing power for other needs (food products and manufactured goods) has decreased. Although certain wealth, with possible future returns either in from of dividends or from the sale of shares, was acquired by Lithuanian citizens because of privatisation, it caused the decline of their present purchasing power. Due to that there are very few possibilities left for the progressive changes in the structure of personal consumption expenditures (e.g., structure of personal consumption expenditures in Germany taken as a desirable pattern, Table 4.6).

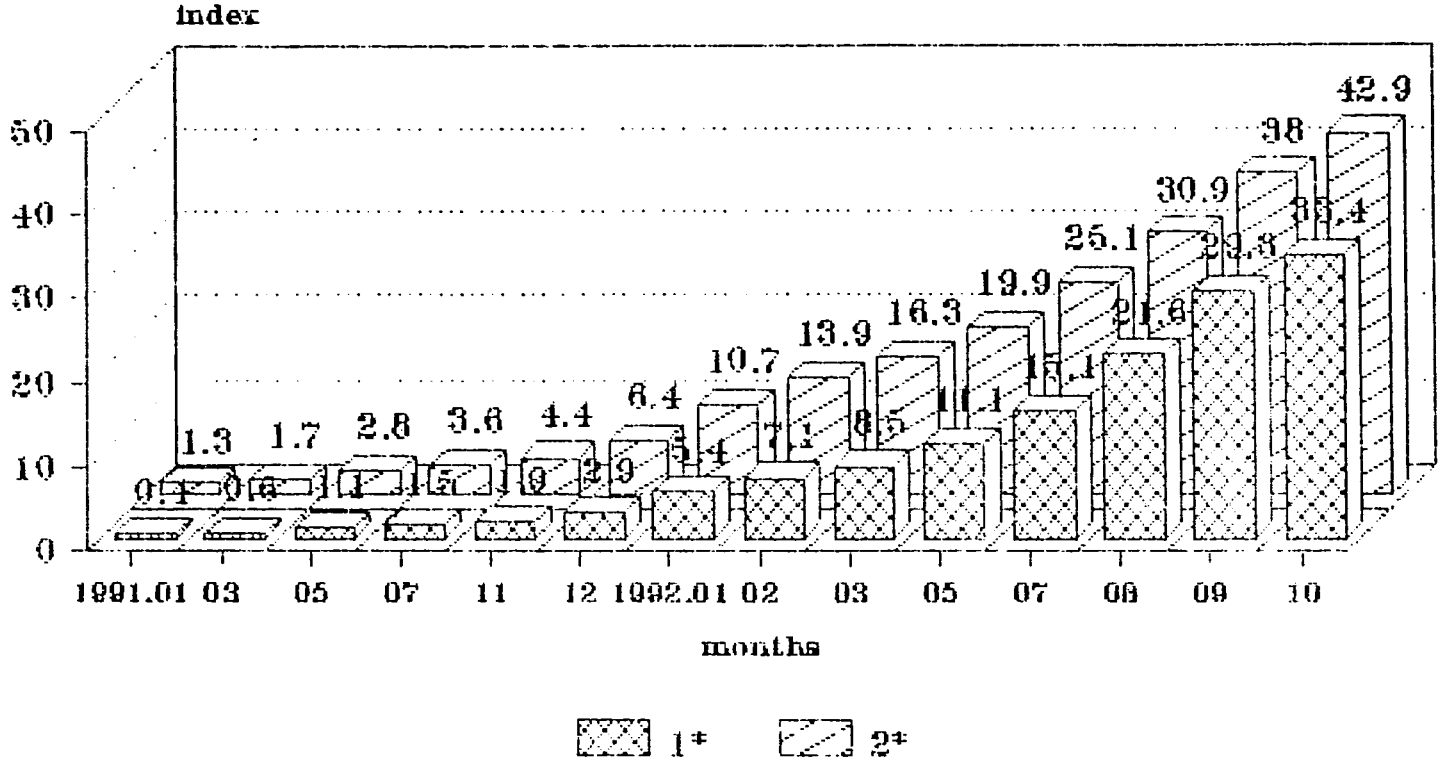
Table

The Final Consumption Structure in 1991

	Germany		f. USSR		Lithuania	
	mln. DM	%	mln.rubles	%	mln.rubles	%
Final Product - total	1415600	100	472405	100	11323	100
Food, Beverages and Tobacco	206680	14,6	176460	37,4	3816	33,7
Clothing and Footwear	98500	7,0	71058	15,0	1902	16,8
Lodgings, Fuel, Electricity	229060	16,2	21030	4,4	467	4,3
Furniture and Household Equipment	109510	7,7	27653	5,9	838	7,4
Medical Services	197210	13,9	27706	5,9	702	6,2
Transport and Communications	184210	13,0	33006	7,0	770	6,8
Education, Culture and Recreation	202330	14,3	58228	12,3	1427	12,6
Other Commodities and Services	188100	13,3	57264	12,1	1381	12,2

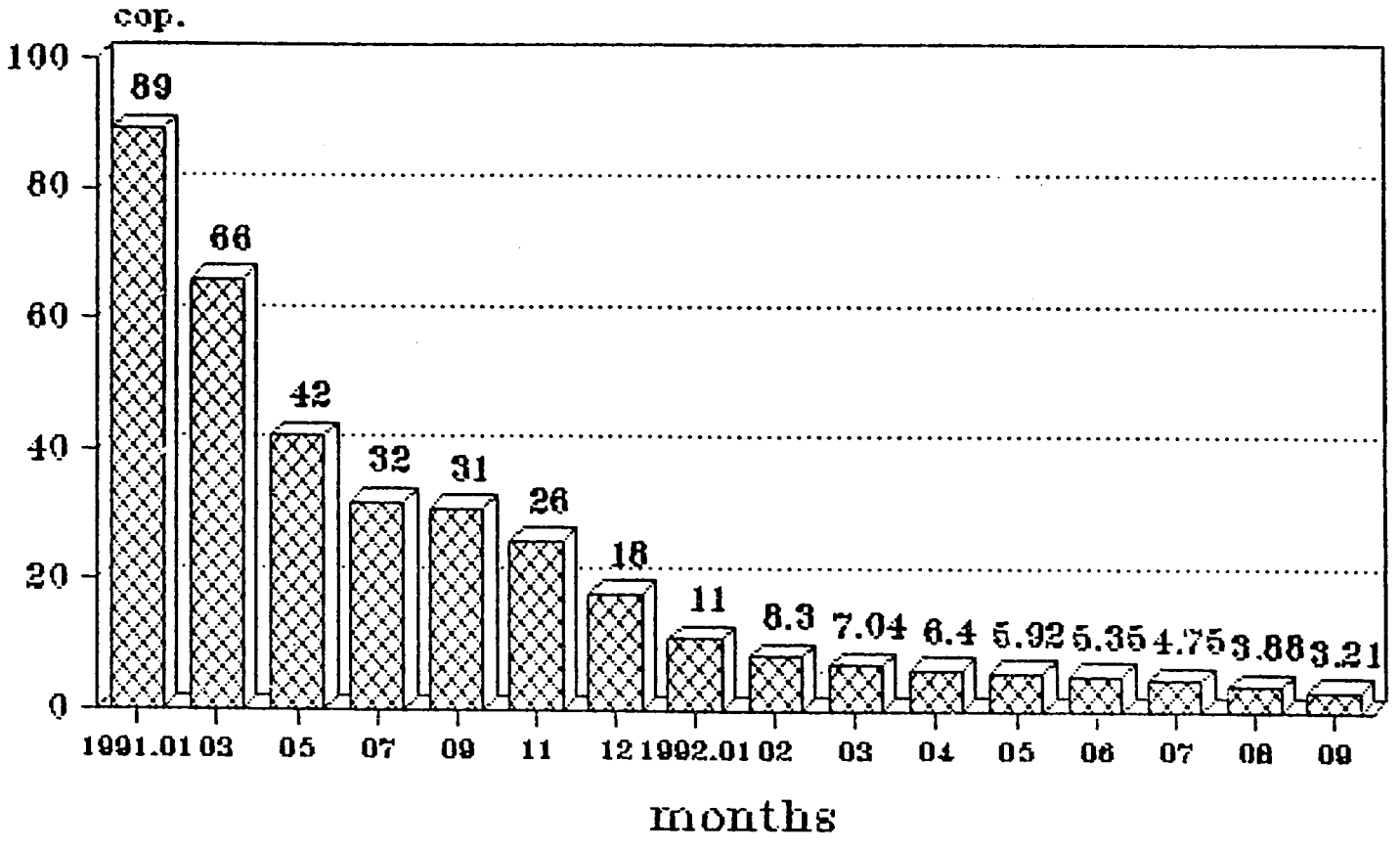
P.S. According to the classification of the UN international comparisons program.

The Dinamics of Living Costs Index



Compared with December, 1990
1* --due to the fuel & energy prices rise
2* --index of living costs

The Dynamics of the Money Purchasing Power



December 1990 – 100 copecks

Money Income and Investment Allowancies Received by Lithuanian Residents and Their Use in Privatisation, Auction, Subscription for Shares and Purchase of Appartments

1. Average population of Lithuania	1991: 3.737.206 people
	1992: 3.764.268 people
2. It's total money income in 1991	23.625.860 thous.rub.
1 quart.1992	14.895.100 thous.rub.
2 quart.1992 (forecast)	16.700.000 thous.rub.
3. State Investment allowancies were paid to	2.644.881 people
Total sum of state investment allowancies (non-indexed)	13.133.485 thous.rub.
4. Privatisation till 04-30-1992	
Number of objects privatised	1644 units
Ownership capital of privatised objects	1.912.377 thous.rub.
State-owned capital of privatised objects	1.823.485 thous.rub.
Value of privatised capital	1.476.540 thous.rub.
Number of privatised means of production	897 units
Value of privatised means of production	20.518 thous.rub.
Value of shares sold	1.546.282 thous.rub.
5. Privatisation from 05-01-92 till 05-07-92	
Number of objects privatised	91 units
Ownership capital of privatised objects	2.780.463 thous.rub.ind.
State-owned capital of privatised objects	2.409.702 thous.rub.ind.
Value of privatised capital	1.707.222 thous.rub.ind.
Number of privatised means of production	4 units
Value of privatised means of production	305 thous.rub.ind.
Value of shares sold	
6. Subscription for Shares till 04-30-1992	
Number of objects privatised by subscription for shares	455 units
Their state-owned capital	1.722.250 thous.rub.

incl. privatised capital	1.375.642 thous.rub.
Nominal price of shares subscribed	1.546.282 thous.rub.

7. Subscription for shares from 05-01-1992 till 07-05-1992

Number of objects privatised by subscription for shares	84 units
Their state-owned capital	2.408.233 thous.ind.
incl. privatised capital	
Nominal price of shares subscribed	

8. Sale by auctions till 06-30-1992

Number of objects intended to sell by auctions	5186 units
Number of objects sold by auctions	2290 units
State-owned capital intended to sell by auctions	214.647 thous.rub.
State-owned capital sold by auctions	133.124 thous.rub.
Investment means received	1.049.857 thous.rub.

9. Sale of the state owned houses and appartaments till 07-03-1992

Number of application for purchase of house (appartament)	520.983 units
Number of houses (appartaments) sold	338.582 units
Total price of houses (appartaments) sold	5.963.985 thous.rub.
Price after privileged discount	5.302.123 thous.rub.
P Payments for houses (appartaments) sold-total	5.236.827 thous.rub.
incl. cash	890.619 thous.rub.
investment allowancy cheques	4.346.208 thous.rub.

the subsistence minimum should have amounted to 2671 roubles in July (instead of the officially used estimation of 1310 roubles). Moreover, if the family budget data and the revealed above inaccuracies of the official price index, were taken into account, the SM level should have bean approximately 3300 roubles in July, 1992. According to this estimation at least half of the population of Lithuania falls into category of persons with the monthly income per family member less than SM. Therefore it is reasonable to guess that the majority of Lithuanian population finds it difficult to pay the bills for public services. It is also reasonable to expect the worsening of the situation by the end of this year besause of the unemployment growth (by expert opinion, the latent unemployment in Lithuania is estimated to be between 75 and 80 thousand people).

Along with other factors such situation to the big measure was caused by the hyperextended social insurance system. The latter prompted mentality of dependents and the corresponding behaviour, lessened work incentives and burdened industry with unbearable taxes. The idea that state m u s t be and i s capable to take care of all was propagated for such a long time, that it still has a deep roots in many people's mentality. This causes constant cries for better living conditions and rising demands for various benefits and privileges. The worldwide experience shows that the best results are achieved when the major responsibility for individuals falls on themselves and their families, and only the relatively small part of it is taken by the society. Therefore it is imperative that the

Table

The Structure of Personal Consumption Expenditures of Lithuanian Families in July, 1992 (percentage shares)

Expenditure Type	Average per Family	Family Group with Monthly Income per Person, rubles								
		up to 500	500-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000-4000	4000-6000	6000-9000	over 9000
Total Expenditures	100	100	100	100	100	100	100	100	100	100	100
incl.											
Food Products	48,7	57,6	58,5	60,0	55,2	51,4	53,0	48,4	42,9	41,5	38,6
Non-food Prds	24,0	20,8	23,3	23,0	23,4	23,9	24,2	25,7	26,3	26,7	26,1
Lodging	2,5	1,9	2,4	2,3	2,5	2,8	2,6	1,9	2,3	9,0	2,2
Fuel	0,5	0,6	0,4	0,4	0,5	0,3	0,6	0,9	0,6	0,6	0,7
Alcoholic Beverages	2,5	3,0	2,6	1,9	2,9	2,1	2,6	2,3	2,7	2,1	3,1
Farming Expenditures	3,6	4,9	2,0	3,5	3,2	3,1	3,2	3,0	2,8	2,9	3,3
Services	6,7	5,8	4,5	5,1	5,4	6,9	6,3	6,2	8,0	7,0	8,2
Taxes	9,9	1,5	2,3	3,4	5,8	6,7	6,9	10,2	13,4	16,2	16,0
Other Expenditures	1,6	3,9	4,0	0,4	1,1	1,0	0,6	1,4	1,0	1,0	1,8

Table

The Structure of Personal Consumption Expenditures of Rural Families in July 1992 (percentage shares)

Expendoture Type	Average per Family	Family Group with Monthly Income per Person, rubles									
		up to 500	500-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000-4000	4000-6000	6000-9000	over 9000
Total Expenditures	100	100	100	100	100	100	100	100	100	100	100
incl.											
Food Products	48,4	52,6	56,1	52,6	53,8	52,7	50,9	47,3	46,9	43,9	41,2
Non-food Prds	21,1	21,5	20,2	21,0	19,5	20,6	19,4	23,7	23,1	22,1	19,8
Lodging	2,9	2,0	2,6	3,0	3,2	3,6	3,1	2,1	2,5	2,4	2,6
Fuel	0,6	0,7	0,5	0,4	0,6	0,5	0,9	1,1	0,9	0,8	0,9
Alcoholic Beverages	3,4	3,6	3,7	3,5	3,4	3,1	3,6	3,7	4,6	4,5	3,3
Farming Expenditures	10,9	12,4	9,6	10,2	8,7	7,8	8,4	9,1	8,3	8,4	10,5
Services	4,6	3,6	3,2	3,4	3,5	3,7	4,7	5,2	4,0	8,8	9,0
Taxes	5,1	0,5	1,2	3,2	4,5	5,8	6,0	6,1	6,3	6,4	10,2
Other Expenditures	3,0	3,1	2,9	2,7	2,8	2,2	3,0	1,7	3,4	2,7	2,5

Table

The Structure of Personal Consumption Expenditures of Urban Families in July, 1992 (percentage shares)

Expenditure Type	Average per Family	Family Group with Monthly Income per Person, rubles									
		up to 500	500-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000-4000	4000-6000	6000-9000	over 9000
Total Expenditures	100	100	100	100	100	100	100	100	100	1000	100
incl.											
Food Products	50,5	58,1	69,8	61,3	59,7	61,1	57,4	51,3	43,2	42,7	39,3
Non-food Prds	25,2	26,6	18,4	19,9	23,4	22,5	22,7	26,3	28,4	27,3	27,5
Lodging	0,7	0	0	0	0,1	0,2	0,2	0,2	0,3	1,5	1,9
Fuel	0,1	0	0	0	0	0	0,1	0,1	0,1	0,2	0,3
Alcoholic Beverages	2,1	3,1	1,8	1,9	2,4	1,6	2,4	1,9	2,2	3,0	3,2
Farming Expenditures	1,0	0,4	0,3	0,6	0,7	0,9	1,1	0,8	1,4	0,6	0,4
Services	7,6	7,8	5,5	9,6	6,8	5,8	7,1	7,5	7,9	8,2	8,3
Taxes	11,9	2,5	3,2	5,9	6,1	7,4	7,9	11,4	15,3	18,4	17,6
Other Expenditures	0,9	1,5	1,0	0,8	0,8	0,5	1,1	1,3	1,2	1,3	1,5

government support should be provided only to those members of the society who are unable to maintain themselves.

Finally, it should be noted that the living standard's decline is indirectly reflected in the personal consumption expenditures structure (calculations based on the family budget data):

Expenditures	IV quart., 1990		IV quart., 1991	
	Per family member in month(roubles)	%	Per family member in month(roubles)	%
Total	211	100	770	100
Incl. Food Prds	57	27	241	31
Non-Food Prds	87	41	295	38
Alc.Liquors	11	5	33	4
Services	18	9	43	6
Taxes and Duties	17	8	90	12
Other Expenditures	21	10	68	9

It is obvious that the percentage share of the necessary expenditures (food products, taxes and duties) is growing up and the share of other's, that could be either postponed or forlorned (some services, non-food products), is decreasing.

A remarkable new tendency in the family budgets was noticed at the end 1991: the rate of personal consumption expenditures growth exceeded the rate of personal income growth.