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ENERGY PRICE REFORM RECONNAISSANCE TRIP REPORT - LITHUANIA

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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 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. This report is one of a series describing the activities, results and recommendations of the projects.

The purpose of the Energy Price Reform Project is to provide to the Government of Lithuania an analytical basis for understanding energy flows in the Lithuanian economy, underlying costs in the provision and use of energy, major environmental consequences of alternative energy strategies, appropriate price levels and economic responses to energy prices, and other information to support the transition to a market-based pricing system.

The purpose of the Industrial Energy Efficiency Project is to rapidly bring expertise, advanced equipment and modern concepts of energy efficiency directly to a cross section of industrial facilities. The program is concentrated on low/no-cost problems which could be remedied with expertise and equipment at hand. Significant potential for improvement was demonstrated while RMA engineering teams were on-site.

This is a working document published informally by Resource Management Associates of Madison, Inc. (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. This report has received only light review, in the interest of timeliness.

Table of Contents

I. Introduction 1

II. Economic Conditions 2

III. Energy Institutions 3

IV. Energy Prices 6

V. Recommended Plan For Assistance 7
- A. Energy Balance Verification 8
- B. Electricity Tariffs 9
- C. Oil and Natural Gas Transit Fees 10
- D. Thermal Energy Tariffs 11
- E. Macroeconomic Structural Adjustment to Energy Price Reform 11
- F. Regulatory Reform 12

VI. Implementation Activities 13

List of Figures

Figure 1. Structure of Energy Management in Lithuania (1991) 4

List of Appendices

Appendix A
Summary of Meetings

Appendix B
Energy Balances

Appendix C
Lithuanian Energy Prices

Appendix D
Net Material Product

Appendix E
Lithuanian Energy Price Reform Working Group

I. Introduction

The purpose of the Energy Price Reform Component of the USAID Emergency Energy Assistance Program for Eastern Europe is to assist countries in their transition to market economies by reforming energy prices and rationalizing their energy policies and management. Two consultants from Resource Management Associates of Madison, Inc. (RMA), Dr. Mark Hanson and Dr. Jack Huddleston, traveled to Lithuania during the period January 13-25, 1992. A daily summary of meetings is provided in Appendix A.

The RMA Team collaborated with Government of Lithuania (GOL) institutions, including the Ministry of Energy, the Ministry of Economy, the Ministry of Finance, the Ministry of Environment, the National Power Board, the Institute for Energy Research (formerly the Academy of Sciences), and the University of Vilnius in establishing an Energy Price Reform Working Group (see Appendix E) and establishing a plan of activities during the period through June 1992.

This report describes the energy supply, use, and pricing situation in Lithuania; defines the strategic energy issues facing Lithuania; and defines a program of assistance in rationalizing energy prices and improving the management of energy, consistent with a market economy.

The dominant factors complicating the market transition of the Lithuanian economy at the present time are the disintegration of the rouble and the heavy trading pattern with the Republics of the former Soviet Union. The importance of the ongoing collapse of the rouble can not be overstated. In the last year, the rouble/U.S. dollar exchange rate has gone from .6R/1$ (official) to 130R/1$ (official) and 380R/1$ (January 13 bank auction in Lithuania). The dollar purchasing power is greatly overstated in Lithuania and reflects the extreme scarcity of dollars relative to the rouble. Economic conditions in Lithuania are not primarily responsible for the collapse, but rather the larger events in the former Soviet Union. Attempting to establish energy prices at the present time is a difficult task and will remain so until currency stability is established. An independent, national currency appears likely to be established in the coming months. In this event, currency stability will remain an issue.

This situation is far more severe than in Eastern Europe where the nations have their own currencies. While these currencies are taking a beating in the trading for scarce dollars, they are not in "free fall." Because of the controlled fall, and the possibility that deceleration or even stability might be achieved (e.g. the current stability of the Czech crown) in the future in the exchange market, there is promise for a return to some stability in prices. Establishing energy costs and prices in Eastern Europe is, therefore, an easier task.

II. Economic Conditions

A comprehensive statement of economic conditions in Lithuania is beyond the scope of this trip report. A brief summary of economic conditions is provided for some perspective on energy prices, flows, and management.

The tables included in Appendix D present a picture of a moderately growing economy during the period 1970 to 1990. Per capita net material product was growing at about a 3.5% annual rate. As this measure excludes many measures of service, it is difficult to compare this measure to gross national product or gross domestic product that would be typically used in a market economy. As the service sector has been the most rapidly growing segment of industrial market economies during this period, the use of a net material measure may understate economic growth.

A difficult problem for the Lithuanian economy is its historic dependence on trade with the republics of the former USSR. While some products such as milk products, meat, and furniture can be sold on other markets, other products such as tuners for black and white televisions and electronic parts for military equipment may have little or no market value. Faced with the loss of some markets and shortage of supplies for making other products, the Lithuanian economy has now entered a contraction and restructuring phase. Energy shortages were appearing, particularly for transportation fuels. Other reported shortages include metals, cotton, wool, sugar, and vegetable oils.

Within this context, the Ministry of Economy is in the midst of pursuing privatization, with some firms available for sale only to domestic buyers while others are being opened to international purchasers. Five hundred larger plants have been identified for privatization, but only one hundred have been privatized so far. One thousand other plants were put up for auction, but only five hundred were bought. An additional one hundred and fifteen plants were identified for hard currency sales, but the process is just starting and no plants have been sold. So far, the majority of commercial entities that have been privatized have been small shops and plants.

Lithuania is relatively poor in natural resources, but has a relatively well educated work force and a good infrastructure system. During the course of macroeconomic restructuring, both market forces and perhaps deliberate policy are expected to lead to a mix of firms oriented to hard currency exports and requiring relatively low material inputs.

III. Energy Institutions

An elaborate diagram of the institutional structure for the Ministry of Energy in Lithuania is shown in *Figure 1*. The diagram portrays both the main offices of the Ministry, as well as the major operating units. It is not known at the present time how many of the operating units may be spun off as independent private or public entities. For example, the energy construction firm might well be transformed into one or more private firms.

There are a few major features which describe the current process for energy pricing. Prior to independence, energy prices were set on essentially a cost plus profit basis including taxes. Because of various distortions in the accounting system as well as the use of quotas, prices were more the consequence of management decisions than the key input driving management decisions. In other words, management decisions were made on energy supply. Energy prices resulted from the costs associated with the management decisions. At the present time, the Ministry of Energy and the GOL in general is struggling with making price adjustments which incorporate increasing costs of energy imports. An extremely complicating factor is that these price adjustments, which have been large, are being rapidly undercut by the collapse of the rouble. They also do not reflect necessary changes that will be required in accounting practices.

The various operating units, for instance the Power Board, work with the Ministry of Energy in establishing energy prices. These prices are essentially recommendations that are then forwarded to "the Government" for consideration, adoption, or modification. The government is essentially the President and key cabinet Ministers. In other words, in the current environment, energy prices are a highly political decision.

Figure 1. Structure of Energy Management in Lithuania (1991)

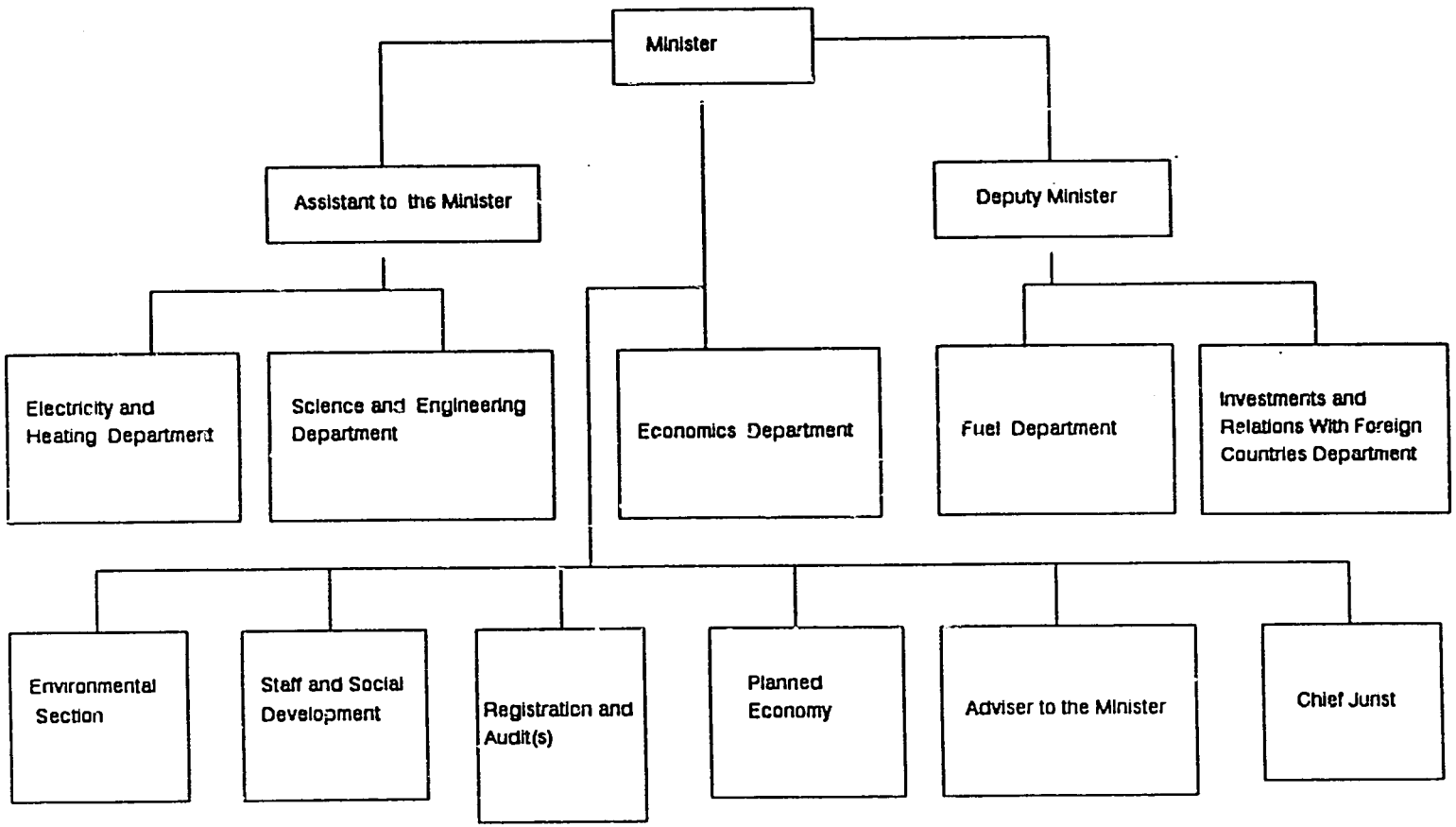

Figure 1. (Continued)

State Utilities and Organizations Which Depend on the Ministry of Energy

Specific State Utilities
The Ignalina Nuclear Power Station
Mazeikiai Refinery
Lithuanian Energy System
Networks of Electricity
Alytus Heat Networks
Siauliai Utility of Electrical Equipment
Gas of Lithuania
Gas Utilities
Liquid Gas
State Utility of Gas Equipment
Heat

Other State Utilities and Organizations
Fuel of Lithuania
Energy Construction Utility
Vilnius Heat and Power Generation Station
Kaunas Energy
Kaunas Ferro-Concrete Structures and Parts Production Plant
Gas Main Construction Utilities
Research Center of Specialists in Energetics
Research Center of Specialists in Gas
Design Institute of Networks of Electricity
Utility of Information of Specialists in Energetics
Joint Stock Company "Energetics"
Maintenance Utility of Maizlia
Joint Stock Company of Energy Technology
Geoterma State Utility
VIKTA Engineering Center
Water Supply Utilities

IV. Energy Prices

Lithuania has set large energy price increases in an attempt to move toward international price levels. Despite these difficult decisions, current energy prices (for the period January to April 1992) are far below international prices if an exchange of 120 roubles per dollar is used. Current energy prices are shown in Appendix C for all energy forms except natural gas. (Natural gas prices are being obtained.)

The most recent price increases were enormous in size. For example, residential electricity increased from .06 rouble per kWh to .35 rouble per kWh. The industrial rate increased from .05-.07 rouble per kWh to .30 rouble per kWh. These extraordinary changes have been negated in terms of their international price comparisons by the fall of the rouble. Their impact on consumers, however, has been substantial as wages have failed to keep up with price increases. The use of private motor vehicles, for example, has fallen considerably due to the large increases in the price of gasoline.

V. Recommended Plan For Assistance

In the face of the free fall of the rouble, a general energy strategy can be identified and progress achieved in energy price reform. The essence of the strategy can be expressed in reducing the differential between the value of energy imports and energy exports (primarily electricity) and petroleum product and natural gas transit fees. Such an outcome is the logical consequence of market reform as driven by energy prices.

Current estimates of annual energy import requirements are on the order of $1.5 billion, if paid in dollars. Based on a trade accord with the Russian Republic signed in January 1992, hard currency will not be used this year as an exchange medium in importing energy. Rather, the "clearing principle" will be used to trade goods. The clearing principle is commonly used in trade between nations which do not have convertible currencies. Items that are to be traded are assigned dollar values (at international prices in this case) and a balanced trade arrangement is made for goods desired by both countries.

Lithuania's energy exports are primarily in the form of electricity to Latvia, Kaliningrad, and Byelorus and amounted to 12 billion kWh in 1991. At $.03 per kWh, these exports would have a value of $360 million. (With the completion of 1,600 MW of pumped storage capacity, the value of electricity sales should be increased even further by the export of significant amounts of peaking power.)

The difference between energy imports and electricity exports is about $1.1 billion if priced at international market prices. With the advent of prices moving towards or at market levels and targeted programs to improve energy efficiency, it is reasonable to expect that energy use will decline, even if there is no decline in economic activity. (There is early evidence that industrial production is falling and will be falling during the next two years.) Thus, energy imports, whether paid in dollars or in equivalent goods, are expected to decline from the $1.5 billion level. Because of the anticipated improvements in the use of electricity, it should be possible to maintain or even increase electricity exports.

Based on preliminary findings of the AID Industrial Efficiency Project and a report by the Lithuanian Ministry of Energy (Energy Conservation Policy in Lithuania, 1991), a 20% to 30% improvement in energy efficiency appears possible. This improvement, combined with some decline in output, would reduce Lithuania's energy import requirement towards the $1 billion level and net energy imports towards $600 million. Whether electricity exports should be increased would depend on the cost characteristics of Lithuania's power sector, the operating status of the two operating units at the nuclear power plant at Ignalina, and the status of the new pumped hydro power station.

In the context of a total $3 billion (very approximate value) import requirement for all goods, such a decrease in imports needs represents a major improvement in the Lithuanian situation. If exports can be mostly maintained, this would permit an increase of over $500 million per year in imported capital and consumer goods.

The objective of a plan of assistance in the energy price reform is to establish the basis for market-based prices which will serve to reduce the net negative energy trade balance through the export of appropriately priced energy products and through the incentives provided to domestic consumers to use energy efficiency. A further decline in the negative trade balance will occur due to macroeconomic adjustments to energy prices. The purpose of the Price Reform Project is not to advocate certain macroeconomic adjustments, however, the assessment of energy price reform is supported by an understanding of these changes.

The specific proposed areas of assistance which were identified in collaboration with the Lithuanian Energy Price Reform Working Group are:

1. Energy Balance Verification
2. Electricity Tariffs
3. Oil and Natural Gas Transit Fees
4. Thermal Energy Tariffs
5. Macroeconomic Structural Adjustment Study
6. Market-based Regulatory Institutions

Specific assistance in these areas is discussed in the following sections.

A. Energy Balance Verification

A number of complete or partial energy accounts were available to the Project Team. The most complete was a new set of balances provided by the Ministry of Economy, shown in Appendix C. Based on statements of members of the Working Group as well as the Project Team review of available data, there are inconsistencies in the energy accounts or energy database. These inconsistencies are attributed to the management procedures within the former USSR where different branches (power, oil and gas, industry etc.) collected and reported data without verification of consistency in definition. This data was reported to Ministries in Moscow, without first developing a coordinated, consistent data base in Lithuania.

An early task for the Working Group then is the verification of the most recent Ministry of Economy energy accounts. If the accounts do not stand up to scrutiny, available information will be used to derive a revised account which will form the basis for energy pricing and policy studies.

Although no decisions have been made at this point, it is anticipated that the Institute for Physical and Engineering Problems of Energy Research at Kaunas (Lithuanian Academy of Sciences) will undertake this task for the Working Group.

Task: Review and verify recent Ministry of Economy energy balances.

Time Frame: Complete review by April 15.

Who: Institute for Energy Research at Kaunas.

Product: Memorandum to Working Group with final energy balance tables.

Contract: RMA to contract with the Institute for Energy Research.

B. Electricity Tariffs

Electricity Tariffs are a major issue area for the Ministry of Energy and the Lithuanian Power Board. The Ministry of Energy believes that current utility rates reflect cost of service. However, both the Ministry of Energy and the Power Board share concerns over the inability to generate retained earnings and therefore the ability to make investments. Some key issues which the Working Group and Project Team identified are:

- adjustments in accounting procedures regarding depreciation
- the need for fuel adjustment clauses or other means for adjusting to the changing cost of fuel purchases
- allowance for funds used during construction as part of the rate base
- the inclusion of pollution control costs and emission taxes
- the cost of peak power production and its influence on rate design in light of the introduction of pumped storage capacity.

The consideration of these issues is important for the establishment of domestic and export power tariffs. Current power rates are shown in Appendix B. Because of Lithuania's large nuclear base load capacity (2,650 MW operating) and large peak power capability that soon will be in operation (1,600 MW pumped storage), Lithuania's important role in the regional power pool (Baltics plus adjoining areas from St. Petersburg to Kaliningrad) will be increasing. It is important for economic reasons as well as for international relations that export tariffs be firmly established on an openly determined cost of service basis with due attention to marginal cost issues.

The recommended program is for the Project Team to work closely with the Institute at Kaunas, the Power Board, the Ministry of the Environment and the Ministry of Energy on this issue. The Institute at Kaunas has an existing, linear programming costing model of the power sector which will assist in estimating necessary tariffs. The Project Team will provide assistance on upgrading accounting methods, rate design, and international contracting.

Task: 1) Update electricity tariffs based on current costs. 2) Compare Lithuanian accounting procedures versus market procedures. 3) Work with Working Group in making recommendations for tariff redesign.

Time Frame: Task 1 by April 15; Task 2 preliminary by April 15 and final by June 15; Task 3 during April workshop and up to June meeting.

Who: Task 1 by the Energy Research Institute; Task 2 by RMA; Task 3 is joint effort by the Institute, the Working Group, and RMA.

Product: Task 1, a report; Task 2, a report; Task 3 a report stating recommendations for immediate tariff changes and directions for further work to complete tariff redesign by institutions in Lithuania.

Contract: Task 1 utilizes a subcontract with the Energy Research Institute.

C. Oil and Natural Gas Transit Fees

Lithuania has recently taken over ownership of the crude oil, oil product, and natural gas pipelines within its borders. As such, it is incurring costs of operation of these pipelines and must consider appropriate transit fees. Transit fees are relatively new to the Working Group and it was agreed that the Project Team would take the lead in assembling information on transit fees in market-economies. This information would be used in conjunction with cost information as it emerges in Lithuania to begin to establish transit fees.

Task: Develop a report summarizing transit fee arrangements in a number of market economies.

Time Frame: Preliminary report by April 15 and final report by June 15.

Who: RMA.

Product: Report reviewing transit fees in market economies and recommendations for fee setting procedures and approximate levels in Lithuania.

Contract: none

D. Thermal Energy Tariffs

A significant portion of delivered energy in Lithuania is provided in the form of steam and hot water. This is particularly true for space heating needs. Unfortunately, much of the service provided is without meters or controls, apart from central controls and opening windows. The Institute at Kaunas has a modeling capability for thermal systems, but is eager to improve its understanding in this area. As a first step, it is anticipated that the Institute at Kaunas will use its model to provide an understanding of current costs. The next stage of the analysis may be to adjust those costs to include the introduction of meters and controls where technically feasible and to include such design and costs in all future installations where district heating applications are appropriate.

Task: 1) Update thermal tariffs based on current costs. 2) Compare Lithuanian accounting procedures versus market procedures. 3) Work with Working Group in making recommendations for tariff redesign.

Time Frame: Task 1 by April 15; Task 2 preliminary by April 15 and final by June 1; Task 3 during April workshop and up to June meeting.

Who: Task 1 by the Energy Research Institute; Task 2 by RMA; Task 3 is joint effort by the Institute, the Working Group, and RMA.

Product: Task 1, a report; Task 2, a report; Task 3 a report stating recommendations for immediate tariff changes and directions for further work to complete tariff redesign by institutions in Lithuania.

Contract: Task 1 utilizes a subcontract with the Energy Research Institute.

E. Macroeconomic Structural Adjustment to Energy Price Reform

An important concern to the Working Group, particularly the Ministry of Economy, is the macroeconomic adjustment to market reform. In addition to a broad, general interest in what is likely to happen to the economy, there is a specific interest in how this will influence energy sector investments and subsequently, energy prices. The Working Group adopted a comparative approach to addressing this question.

The Project Team agreed to provide microcomputer based models similar to those used in Romania and Czechoslovakia to explore price responses in the industrial and transportation sectors. These models will be fully operational by the April working sessions. Secondly, the University of Vilnius will undertake a macroeconomic study of price responses using the linked Input-Output model for the Lithuanian economy. The results of these two approaches will be compared for adjustments to both models at the April workshop sessions.

Task: 1) Input/Output model modification to reflect impact of energy and other prices changes; 2) Adoption of RMA Industrial and Transportation models from Czechoslovakia and Romania to Lithuania; 3) Analysis based on use of both sets of models.

Time Frame: Task 1) Initial modifications and runs by April 15; Task 2) Modifications and runs by April 15; Task 3) Amplified modifications, runs, and analysis by June 15.

Who: Task 1) by Faculty of the Economics Department at the University of Vilnius; Task 2) by RMA; Task 3) during April and June meetings and period in between.

F. Regulatory Reform

The Working Group expressed great interest in the operation of market-based independent regulatory commissions. Based on this interest, the Project Team agreed to provide information on U.S. regulatory bodies and enabling legislation for consideration in Lithuania. The Working Group in general, and the Ministry of Energy in particular, saw the necessity and value of moving energy pricing decisions out of administrative government.

Task: Summary Report and examples of regulatory bodies, legislation, and administrative codes.

Time Frame: Initial report by April 15 and final report by June 15.

Who: RMA

Product: Report.

Contract: None.

VI. Implementation Activities

The proposed implementation activities include two working sessions in Lithuania as well as a Baltic Regional Energy Price Reform Seminar to be held jointly with Latvia and Estonia, coordinated by RCG Hagler/Bailly Inc. The Project Teams efforts will be further assisted by the utilization of contracts for work by the Institute for Physical and Engineering Problems of Energy Research at Kaunas (an NGO) and by a private firm formed by faculty members of the Economics Department at the University of Vilnius.

A workshop at which progress on the six work areas will be evaluated and collaborative work conducted is tentatively scheduled for the weeks of April 20 and April 27, 1992. A second and final workshop is tentatively scheduled for June and would be held to coincide with a Baltic Regional Energy Price Reform Seminar. The RMA personnel for these workshops have been tentatively identified; Mark Hanson, Jack Huddleston, and Carlton Bartels.

A number of these activities, such as the development of electric tariffs, would benefit by support beyond that which can be provided in the current program. Some possibilities to be explored include the utility-to-utility programs where experts from a U.S. utility (possibly Wisconsin Power and Light or Northern States Power) could work with the Lithuanian Power Board. The Vilnius-Madison Sister City Program might be a mechanism by which a current or former Commissioner from the Wisconsin Public Service Commission could work with the Ministry of Energy and the Lithuanian Parliament in exploring enabling legislation for an independent regulatory body.

APPENDIX A
Summary of Meetings

Date: January 15, 1992

Place: Ministry of Energy

Attending: Mark Hanson, Jack Huddleston, Mike Ellis

Saulius Kutas
Deputy Minister
Ministry of Energy

Kazys Zilys
Department Director
Ministry of Energy

Ms. Ada Macezinskiene
Director, Economics Department
Ministry of Energy

1. The RMA Team opened the meeting with an introduction of the Lithuanian Energy Price Reform Component and the objectives of the Reconnaissance Trip. Various options were discussed for areas of technical assistance and collaboration as well as modes for cooperation.

2. The Ministry of Energy provided an update of the energy situation in Lithuania, including selected new prices for electricity (35 kp/kWh for residential service) and crude oil ($132 per tonne).

3. The Counterpart Working Group was discussed in terms of representation of various Ministries and Institutes, numbers of individuals, roles, and time requirements. The RMA team made the observation that the amount of time committed would be proportional to the usefulness of the Working Group to the Lithuanian Energy Policy process. It is unclear how much this discussion was understood as the various Ministries and Institutes are not used to working together on cross-cutting issues.

It was agreed that the composition of the group would include the Ministry of Energy, the Ministry of Economy, the Ministry of Environment, Ministry of Finance, the Institute of Energy Research, the Power Board, and Vilnius University. The total number of individuals in the Working Group would be between 10 and 20. The first meeting of the group was set for Friday, January 17.

4. The RMA team offered the possibility of providing a presentation or two on a range of topics within the Energy Pricing Reform. Mr. Zilys expressed considerable interest in Least-Cost Utility Planning. A presentation was tentatively planned for January 22.

Date: January 16, 1992

Place: Ministry of Energy

Attending: Hanson, Huddleston, Zilys, and Macezinskiene

Dr. Antanas Juska
Director of Power and Thermal
Ministry of Energy

Mr. Rimantas Shukis
Deputy Head of Department
Ministry of Energy

1. Arrangements for the Friday Working Group meeting were reviewed.

(Second Meeting)

Place: Ministry of Economy

Attending: Hanson, Huddleston, Juska, Shukis

Mr. Algirdas Motulas
Chief of the Investments Bureau
Ministry of Economy

1. The purpose of the Energy Price Reform Component and the Reconnaissance Trip were presented.

2. Mr. Motulas presented an overview of the energy use situation in the Lithuanian economy, trading patterns for energy and non-energy products, the privatization policies and progress, and economic strategies to deal with Lithuania's situation. It was noted that current costs for Lithuania's energy needs are on the order of $1.5 billion per year. Energy exports of electricity are primarily to Kalingrad and Byelorus and are far smaller in volume than the energy import. 12 Billion kWh per year are exported at the present time out of a total production of 29 billion kWh. At $.03 per kWh (approximate European price for wholesale electricity), this would be worth about $360 million.

Mr. Motulas believed that the economy needed about $1.5 billion of other materials imports, for a total of $3 billion in imports. Lithuania exports very little for hard currency at the present time, but its exports with the Commonwealth Republics at dollar value are considerable. Recent agreements for next year with the Russian Republic are for 70% of this year's volumes for imports and exports. Important imports are for natural gas and fuel oil.

3. Mr. Motulas and Mr. Shukis promised to provide as much data as possible before the RMA team leaves Lithuania.

4. The RMA team agreed to provide a presentation on the industrial and transportation sector energy pricing models as developed for Romania and Czechoslovakia on January 21 for the Working Group.

Date: January 17, 1992

Place: Ministry of Energy

Attending: Lithuanian Energy Price Reform Working Group (see Appendix B)

1. Deputy Minister Kutas opened the meeting with introductions. This was followed by an introduction by the RMA Team of the USAID Energy Price Reform Component and a brief overview of the activities within the project and the followup Regional Energy Program by USAID. The role of the working group was discussed.

2. The RMA team provided a description of potential issues to be addressed within the project. These included energy costing and pricing, the response of the Lithuanian economy to energy price adjustment and broader economic adjustments, environmental impacts, and balance of trade issues. Pricing issues surrounding the import of energy and the export of electricity were discussed.

3. An open discussion session followed the statements of the RMA Team.

4. Data on current energy prices, historical and current economic trends (prepared for the IMF), were provided to the team.

5. A schedule was set for the remaining trip as follows:

January 20	-	Meeting with the Institute of Energy Research
	-	Presentation on Energy Pricing Models, including environmental impacts (note that this date is revised from earlier date)
January 22	-	Demand Side Management and Least-Cost Planning Presentation
	-	Meeting with Mr. Nicholson, U.S. Embassy
January 23	-	Working meeting with full Working Group

Date: January 20, 1992

Place: Institute for Energy Research at Kaunas

Attending: Economics Studies Department

A wide ranging discussion was held on energy pricing issues. The Institute staff presented their past and ongoing work in the energy economics, pricing, and planning area. The Team presented some ideas for pricing needs and explored possible participation of the Institute in the project. The Institute Team, led by Vitas Jankauskas, expressed a desire to fully participate in the working group and in working on the project.

(Second Meeting)

Place: Ministry of Economy

Attending: Energy Price Reform Working Group and additional people from the various ministries and the University of Vilnius.

Jack Huddleston presented a seminar on the modeling of energy price responses in an economy, with particular attention to the industrial and transportation sector. He drew heavily on the Czechoslovakian and Romanian experience, which was of great interest to the Lithuanian attendees. A lengthy question and answer session followed.

Date: January 21, 1992

Place: Ministry of Energy

Attending: Ada Macezinskiene, Rimantas Lukosevicius, Hanson and Huddleston

A lengthy working session was held in the morning and afternoon on current energy pricing practices in Lithuania and potential areas for change based on market experience.

(second meeting)

Place: Vilnius University, Department of Economics

Attending: Department Faculty

A discussion was held on the research and teaching activities of the department and the department's potential interest and role in the project. In particular, macroeconomic analytical procedures were discussed including the potential role for the Department in the Energy Price Reform Project.

Date: January 22, 1992

Place: Liteuva Hotel

Attending: Ron Nicholson (AID), Vinrod Shrivastava, Mike Ellis, Mark Hanson and Jack Huddleston

This meeting was for the purpose of briefing the AID representative, Ron Nicholson. Ron Nicholson brought Vinod Shirvastava, a consultant, so that RMA might be able to provide advice for his visit. After discussing those issues, an update on the Price Reform Project was given and general discussions were held.

(second meeting)

Place: Ministry of Education

Attending: Energy Price Reform Working Group and additional personnel from the Ministries and University.

Mark Hanson presented a seminar on Least-Cost Energy Planning and the role of independent regulatory commissions in that process.

(third meeting)

Place: Ministry of Energy

Attending: Ada Macezinskiene and R. Luksevicius

The energy pricing working session from the previous day was continued.

Date: January 23, 1992

Place: Ministry of Energy

Attending: Energy Pricing Reform Working Group

A summary working session was held during which recommendations from the team were presented regarding overall project plan and specific tasks for the team and working group. A consensus was easily reached.

APPENDIX B
Energy Balances

ENERGY BALANCES

(Millions tons of oil equivalent)

Lithuania

Def 7.6
NE 4.8
12.4
@ $130/ton

Transactions	Total				
	1970	1975	1980	1985	1990
1. Primary production	1.104	0.855	2.699	13.774	13.447
2. Net trade	6.511	9.103	9.598	1.757	2.336 ⇒ $3.4x10^6
2.1. Imports	7.003	17.247	15.085	14.026	13.526 ⇒ $1.76x10^9
2.2. Exports	-0.464	-8.155	-5.484	-12.526	-10.901 ⇒ $1.42x10^9
2.3. Stock changes	-0.029	0.011	-0.003	0.257	-0.290
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	7.615	9.958	12.297	15.531	15.783
4. Electricity and heat generation	-1.370	-1.549	-2.015	-3.173	-3.844
4.1. Electricity generation	-1.062	-1.175	-1.523	-2.563	-3.267
4.2. Heat generation	-0.308	-0.374	-0.492	-0.610	-0.577
5. Other consumption	-0.450	-0.494	-0.504	-1.136	-1.255
6. Non-energy use	-0.297	-0.475	-0.875	-1.020	-0.901
7. Final consumption	5.498	7.442	8.901	10.202	9.783
7.1. Industry	1.592	2.727	3.247	4.112	3.535
7.2. Construction	0.194	0.225	0.230	0.223	0.205
7.3. Transport	1.268 ~~1.187~~	1.389 ~~1.292~~	1.749 ~~1.495~~	1.823 ~~1.526~~	1.714 ~~1.372~~
7.4. Agriculture	0.395	0.550	0.789	0.796	0.871
7.5. Households	0.964 ~~1.045~~	1.156 ~~1.343~~	1.487 ~~1.741~~	1.524 ~~1.318~~	1.993 ~~2.355~~
7.6. Other consumers	0.985	1.397	1.398	1.733	1.360

24

ENERGY BALANCES

(Millions tons of oil equivalent)

Crude oil and oil refinery balances in Lithuania

Transactions	1980	1985	1989	1990
1. Primary production	-	-	-	0.004
2. Net trade	2.176	11.687	12.790	9.522
2.1. Imports	2.204	11.622	12.790	9.510
2.2. Exports	-	-	-	-
2.3. Stock changes	-0.028	0.064	-	0.012
3. Gross consumption	2.176	11.687	12.790	9.527
3.1. Other consumption	-	0.008	0.005	0.004
4. Oil refinery	2.176	11.679	12.785	9.522
5. Production				
5.1. Heavy fuel oil	1.156	5.647	5.626	3.195
5.2. Light fuel oil	-	0.018	0.322	0.424
5.3. Diesel oil	0.553	2.591	2.582	2.146
5.4. Jet kerosine	-	0.971	1.066	0.671
5.5. Gasoline	0.313	1.656	2.111	2.095
5.6. Liquified gas	-	0.197	0.272	0.264
5. Total liquid product	2.022	11.079	11.980	8.787
Share of %	92.92	94.86	93.70	92.28
7. Other product of oil and loss	0.155	0.600	0.805	0.737
share of %	7.12	5.14	6.30	7.73

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ENERGY BALANCES

(Millions tons of oil equivalent)

L i t h u a n i a

Transactions	Liquid fuels 1970	1975	1980	1985	1990
1. Primary production	-	-	2.036	11.110	9.372
2. Net trade	4.315	6.482	6.049	-2.166	-2.096
2.1. Imports	4.457	13.310	10.250	9.224	7.555
2.2 Exports	-0.154	-6.878	-4.237	-11.557	-9.335
2.3. Stock changes	0.011	0.050	0.036	0.166	-0.316
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	4.315	6.482	8.085	8.953	7.276
4. Electricity and heat generation	-2.004	-3.297	-4.293	-3.902	-2.533
4.1. Electricity generation	-1.503	-1.834	-2.345	-1.934	-0.885
4.2. Heat generation	-0.501	-1.463	-1.948	-1.968	-1.648
5. Other consumption	-0.152	-0.252	-0.179	-0.560	-0.705
6. Non-energy use	-0.006	-0.001	-0.004	-0.180	-0.230
7. Final consumption	2.158	2.932	3.608	4.210	3.808
7.1. Industry	0.475	0.915	1.100	1.566	1.192
7.2. Construction	0.097	0.129	0.147	0.150	0.095
7.3. Transport	1.255 ~~1.174~~	1.348 ~~1.151~~	1.674 ~~1.422~~	1.765 ~~1.171~~	1.652 ~~1.210~~
7.4. Agriculture	0.254	0.352	0.415	0.345	0.380
7.5. Households	0.032 ~~0.113~~	0.045 ~~0.232~~	0.057 ~~0.341~~	0.143 ~~0.437~~	0.281 ~~0.523~~
7.6. Other consumers	0.030	0.143	0.105	0.242	0.207

ENERGY BALANCES
(Millions tons of oil equivalent)

Lithuania

Transactions	Solid fuels				
	1970	1975	1980	1985	1990
1. Primary production	0.978	0.710	0.477	0.851	0.360
2. Net trade	1.276	1.136	1.010	0.848	0.789
2.1. Imports	1.317	2.133	1.915	0.758	0.763
2.2. Export	-0.001	-1.008	-0.966	-0.001	-
2.3. Stock changes	-0.040	-0.039	-0.039	0.091	0.026
2.4. Marinc bunkers	-	-	-	-	-
3. Gross consumption	2.254	1.845	1.487	1.299	1.149
4. Electrisity and heat generation	-0.457	-0.304	0.215	-0.151	-0.102
4.1. Electrisity generation	-0.024	-0.005	-0.008	-0.006	-0.003
4.2. Heat generation	-0.433	-0.299	-0.208	-0.155	-0.099
5. Other consumption	-0.093	-0.033	-0.028	-0.019	-0.052
6. Non - energy use	-0.124	-0.087	-0.048	-0.055	-0.029
7. Final consumption	1.580	1.422	1.194	1.063	0.067
7.1. Industry	0.245	0.135	0.102	0.060	0.050
7.2. Construction	0.040	0.015	0.005	0.001	0.006
7.3. Transport	0.003	0.005	0.005	0.004	0.004
7.4. Agriculture	0.089	0.080	0.058	0.086	0.041
7.5. Other consumers	0.461	0.542	0.414	0.364	0.274
7.6. Households	0.742	0.644	0.606	0.548	0.592

ENERGY BALANCES

(Millions tons of oil equivalent)

L i t h u a n i a

Transactions	Gaseous fuels				
	1970	1975	1980	1985	1990
1. Primary production	-	-	-	-	-
2. Net trade	1.107	1.530	2.548	3.610	4.672
2.1. Imports	1.107	1.530	2.548	3.645	4.818
2.2 Exports	-	-	-	-0.004	-0.146
2.3. Stock changes	-	-	-	-	-
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	1.107	1.530	2.548	3.610	4.672
4. Electrisity and heat generation	-0.708	-0.755	-1.277	-2.191	-3.349
4.1. Electrisity generation	-0.070	-0.027	-0.073	-0.380	-1.315
4.2. Heat generation	-0.538	-0.720	-1.204	-1.811	-2.034
5. Other consumption	-0.040	-	-0.014	-0.070	-0.016
6. Non-energy use	-0.168	-0.387	-0.823	-0.795	-0.643
7. Final consumption	0.191	0.388	0.434	0.567	0.664
7.1. Industry	0.082	0.150	0.225	0.282	0.262
7.2. Construction	0.014	-	0.001	0.003	0.006
7.3. Transport	-	0.021	0.025	-	0.025
7 7.4. Agriculture	0.003	0.015	0.004	0.014	0.027
7.5. Households	0.048	0.075	0.106	0.147	0.220
7.6. Other consumers	0.034	0.125	0.072	0.111	0.123

ENERGY BALANCES

(Millions tons of oil equivalent)

L i t h u a n i a

Transactions	Nuclear energy				
	1970	1975	1980	1985	1
1. Primary production	-	-	-	1.974	3.4
2. Net trade	-	-	-	-	-
2.1. Imports	-	-	-	-	-
2.2. Exports	-	-	-	-	-
2.3. Stock changes	-	-	-	-	3.452 -
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	-	-	-	1.974	3.4
4. Electrisity and heat generation	-	-	-	-1.974	-3.4
4.1. Electrisity generation	-	-	-	-1.974	-3.4
4.2. Heat generation	-	-	-	-	-0.0
5. Other consumption	-	-	-	-	-
6. Non-energy use	-	-	-	-	-
7. Final consumption	-	-	-	-	-
7.1. Industry	-	-	-	-	-
7.2. Construction	-	-	-	-	-
7.3. Transport	-	-	-	-	-
7.4. Other consumers	-	-	-	-	-
7.5. Agriculture	-	-	-	-	-
7.6. Households	-	-	-	-	-

ENERGY BALANCES

(Millions tons of oil equivalent)

L i t h u a n i a

Transactions	Electricity				
	1970	1975	1980	1985	1990
1. Primary production	-	-	-	-	-
2. Net trade	-0.187	-0.044	-0.009	-0.535	-1.029
2.1. Imports	0.122	0.224	0.372	0.429	0.390
2.2. Exports	-0.309	-0.268	-0.381	-0.954	-1.420
2.3. Stock changes	-	-	-	-	-
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	-0.187	-0.044	-0.009	-0.535	-1.029
4. Electrisity and heat generation	0.633	0.773	1.003	1.803	2.443
4.1. Electirsity generation	0.633	0.773	1.003	1.803	2.443
4.2. Heat generation	-	-	-	-	-
5. Other consumption	-0.092	-0.120	-0.174	-0.260	-0.339
6. Non-energy use	-	-	-	-	-
7. Final consumption	0.354	0.609	0.819	1.008	1.075
7.1. Industry	0.212	0.358	0.415	0.496	0.486
7.2. Construction	0.006	0.009	0.018	0.022	0.022
7.3. Transport	0.009	0.015	0.020	0.021	0.021
7.4. Agriculture	0.036	0.080	0.154	0.193	0.232
7.5. Households	0.044	0.068	0.093	0.120	0.152
7.6. Other consumers	0.047	0.079	0.118	0.151	0.162

ENERGY BALANCES

(Millions tons of oil equivalent)

L i t h u a n i a

Transactions	Hydro and geothermal energy				
	1970	1975	1980	1985	1990
1. Primary produkction	0.098	0.082	0.100	0.082	0.083
2. Net trade	-	-	-	-	-
2.1. Imports	-	-	-	-	-
2.2. Exports	-	-	-	-	-
2.3. Stock changes	-	-	-	-	-
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	0.098	0.082	0.100	0.082	0.083
4. Electrisity and heat generation	-0.098	-0.082	-0.100	-0.082	-0.083
4.1. Electrisity generation	-0.098	-0.082	-0.100	-0.082	-0.083
4.2. Heat generation	-	-	-	-	-
5. Other consumption	-	-	-	-	-
6. Non-energy use	-	-	-	-	-
7. Final consumption	-	-	-	-	-
7.1. Industry	-	-	-	-	-
7.2. Construction	-	-	-	-	-
7.3. Transport	-	-	-	-	-
7.4. Agriculture	-	-	-	-	-
7.5. Households	-	-	-	-	-
7.6. Other consumers	-	-	-	-	-

ENERGY BALANCES
(Millions tons of oil equivalent)

LithuaNia

Transactions	Other forms of energy				
	1970	1975	1980	1985	1990
1. Primary produktion	0.028	0.063	0.097	0.148	0.180
2. Net trade	-	-	-	-	-
2.1. Imports	-	-	-	-	-
2.2 Exports	-	-	-	-	-
2.3. Stoök changes	-	-	-	-	-
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	0.028	0.063	0.087	0.188	0.180
4. Electrisity and heat generation	-0.028	-0.063	-0.087	-0.148	-0.180
4.1. Electrisity generation	-	-	-	-	-
4.2. Heat generation	-0.028	-0.063	-0.087	-0.148	-0.180
5. Other consumption	-	-	-	-	-
6. Non-energy use	-	-	-	-	-
7. Final consumption	-	-	-	-	-
7.1. Industry	-	-	-	-	-
7.2. Construction	-	-	-	-	-
7.3. Transport	-	-	-	-	-
7.4. Agriculture	-	-	-	-	-
7.5. Bouseholds	-	-	-	-	-
7.5. Other consumers	-	-	-	-	-

ENERGY BALANCES
(Millions tons of oil equivalent)

Lithuania

Transactions	Steam and hot water 1970	1975	1980	1985	1990
1. Primary production	-	-	-	-	-
2. Net trade	-	-	-	-	-
2.1. Imports	-	-	-	-	-
2.2 Exports	-	-	-	-	-
2.3. Stock changes	-	-	-	-	-
2.4. Marine bunkers	-	-	-	-	-
3. Gross consumption	-	-	-	-	-
4. Electrisity and geat generation	1.292	2.180	2.9	3.472	3.417
4.1. Electrisity generation	-	-	-	-	-
4.2. Heat generation	1.292	2.180	2.9	3.472	3.417
5. Other consumption	-0.073	-0.089	-0.1	-0.119	-0.145
6. Non-energy use	-	-	-	-	-
7. Final consumption	1.219	2.092	1.845	3.354	3.272
7.1. Industry	0.658	1.159	1.403	1.700	1.646
7.2. Construction	0.036	0.071	0.058	0.047	0.074
7.3. Transport	0.001	0.0001	0.024	0.033	0.011
7.4. Agriculture	0.002	0.023	0.157	0.143	0.191
7.5. Households	0.098	0.323	0.595	0.566	0.748
7.6. Other consumers	0.413	0.506	0.609	0.865	0.602

APPENDIX C
Lithuanian Energy Prices

LITHUANIAN ENERGY PRICES as of 1-Jan-1992
exchange rate (roubles/US$) = 120

FUEL TYPES	PRICES	
Electricity	Roubles/Kwh	$US/kwh
Residential:		
day rate	0.35	0.0029
night rate*	0.16	0.0013
Other:		
demand charge**	150	1.25
use charge	0.30	0.0025
Export to:		
Byelorussia	0.36	0.0030
Latvia	0.35	0.0029
Kaliningrad	0.35	0.0029

*Applied to metered residents between 11pm to 7am.
**In the units Roubles/KW*yr and $US/KW*yr

Thermal Energy	Roubles/GJ	$US/GJ
Residential:		
space & water	11.46	0.10
Enterprises and other consumers:		
state firm	85.76	0.71
state energy system		
demand charge*	1648.35	13.74
use charge	42.04	0.35
Greenhouses, garages and studios:		
state firm	85.76	0.71
state energy system	50.17	0.42

*In the units Roubles per month for 1 GJ/hour.

Oil Products

Retail:

	Roubles/litre	Dollars/litre
Gasoline*		
76 octane	3.5	0.03
92 octane	4	0.03
Diesel,40-62 cetane	3	0.03

	Roubles/tonne	Dollars/tonne
Reactive fuel	1957	16.31
Boiler Fuel w/ ash	1268	10.56
Oil fuel, low ash	1270	10.58
Stove fuel for home	1877	15.64

*gasoline and deisel prices include a road and value added tax.

Wholesale:

	Roubles/tonne	Dollars/tonne
Gasoline		
76 octane noneth	1857	15.48
92 octane noneth	3080	25.67
92 octane ethylized	2195	18.29
Diesel		
40 cetane high Q	1825	15.21
62 cetane high Q	1825	15.21
40 cetane low Q	1775	14.79
62 cetane low Q	1775	14.79
Reactive fuel	1860	15.50
Boiler Fuel w/ ash	1170.5	9.75
Oil fuel, low ash	1172.5	9.77
Stove fuel for home	1785	14.88

Liquid Gas		
Residential:	Roubles per resident month	Dollars per Resident month
with gas stoves and hot H20.	8.93	0.074
with gas stoves but no hot H2O	14.92	0.12
for hot H2O	16.82	0.14
	Roubles/m^2 of floor*month	Dollars/m^2 of floor*month
for space heat	3.02	0.025
for greenhouses	26.27	0.22
Retail Prices:	Roubles/GJ	Dollars/GJ
propane and butane		
0.3kg cap. tank	31.34	0.26
2.05kg cap. tank	31.22	0.26
	Roubles/litre	Dollars/litre
LPG for vehicles	1.85	0.015
	Roubles/GJ	Dollars/GJ
LPG for vehicles	75.2	0.63
	Roubles/tonne	Dollars/tonne
liquid gas from distrib stations	2130	17.75
	Roubles/GJ	Dollars/GJ
liquid gas from distrib stations	46.81	0.39
Wholesale Prices:	Roubles/tonne	Dollars/tonne
Propane-butane mix	1775	14.79
Technical Butane	1775	14.79
LPG for Vehicles	1785	14.88
Butane	1795	14.96
Isobutane	2350	19.58
Propane-propilane	1783	14.85

APPENDIX D
Net Material Product

LITHUANIA: NET MATERIAL PRODUCT
(in millions of roubles; base year)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total	5777.2	5741.9	6158.9	6304.2	6564.2	6907.1	7177.9	7465.4	8150.3	8853.4		
I. Personal consumption of material values and services	4,563.2	4,752.4	4,816.5	4,903.4	5,101.5	5,349.0	5,493.9	5,704.1	6,187.5	6,739.1		
Food, beverages and tobacco	2,428.1	2,509.2	2,690.4	2,759.9	2,848.5	2,916.7	2,959.3	3,161.1	3,695.4	3,978.5		
Clothing, foot-wear and haberdashery	1059.7	1129.9	1035.7	1036.7	1096.6	1149.8	1142.4	1206.2	1307.2	1421.1		
II. Paid services	403.0	418.8	440.0	460.4	486.3	512.9	548.2	589.2	663.5	741.7		
Housing	131.1	139.0	151.3	160.9	174.7	192.4	209.4	215.4	243.9	247.7		
Transportation	151.8	158.0	160.8	165.4	169.2	170.1	177.1	183.2	188.9	204.6		
Communication	29.0	30.6	38.6	36.0	39.9	41.7	42.5	46.6	54.1	61.4		
Education	22.6	22.8	23.5	23.2	23.3	24.7	24.7	26.9	25.5	27.3		
Other	68.5	68.4	65.8	74.9	79.2	84.0	94.5	117.1	160.1	200.7		
III. Unpaid services	911.0	850.5	902.4	940.4	976.4	1,045.2	1,135.8	1,172.1	1,299.3	1,372.6		

Table A1 Table 1

LITHUANIA: NET MATERIAL PRODUCT
(in millions of roubles at current prices)

	1970	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Net material product	4.284.5	5.368.5	5.867.0	6.483.9	7.011.4	7.240.6	7.424.1	7.513.7	7.922.1	8.279.9	8.912.5	9.549.8	9.997.2
By final use													
Consumption	2.980.2	3.934.2	5.165.4	5.373.8	5.492.3	5.632.3	5.868.3	6.189.3	6.378.7	6.551.7	7.173.5	7.759.6	
Of which:													
Personal consumption	2.726.8	3.501.8	4.503.2	4.752.4	4.816.5	4.903.4	5.101.5	5.349.4	5.493.9	5.704.1	6.187.5	6.739.1	
Social consumption	253.4	432.4	663.2	621.4	675.8	728.9	766.8	839.9	884.8	947.6	986.0	1.020.7	
Accumulation	1.201.9	1.516.6	1.149.8	1.543.1	1.825.0	1.682.7	1.653.6	1.829.8	2.186.5	2.064.8	2.642.1	2.301.4	
Net fixed investment	727.4	1.044.2	861.5	793.4	807.7	914.4	968.1	1.100.0	1.274.0	1.772.0	1.325.0	1.209.0	
Others	474.5	472.4	287.5	749.7	1.017.3	768.3	967.5	729.8	914.5	292.8	1.317.1	1.092.4	
Of which:													
Change in stocks	424.5	509.3	378.7	737.5	957.7	784.3	893.1	684.0	759.5	599.7	910.6	818.4	
Unfinished construction	50.0	-36.9	-91.2	12.2	59.6	-16.0	74.4	45.0	155.0	-306.9	406.5	274.0	
Foreign balance	10.9	125.3	499.5	515.5	375.4	163.1	449.5	620.8	751.5	549.7	1.017.1	625.7	
Exports of goods and non-factor services	x	x	x	x	x	x	x	x	x	x	x	x	
Imports of goods and non-factor services	x	x	x	x	x	x	x	x	x	x	x	x	
Losses on fixed capital and stocs	33.3	43.0	51.1	62.5	69.5	88.7	52.7	116.2	185.4	113.1	114.0	114.3	
Net material product per capita (roubles)	1.336.0	1.623.0	1.715.0	1.878.0	2.022.0	2.071.0	2.106.0	2.113.0	2.266.0	2.281.0	2.429.0	2.577.0	

Table A1. Lithuanin: National Accounts (Own Methodology)
(in millions of roubles at current prices)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Material product produced													
I. Gross social product	9.578.5	15.564.7	16.507.3	17.924.4	18.623.1	19.546.6	20.169.1	21.139.6	22.214.6	23.588.7	24.835.8	25.097.1	34.006.8
Industry	5.183.5	9.335.5	9.755.4	10.629.9	10.509.4	10.776.5	11.074.3	11.782.3	12.558.7	13.053.5	13.892.7	13.554.1	23.346.9
Construction	947.8	1.449.7	1.450.5	1.600.2	1.717.2	1.941.4	2.065.0	2.102.7	2.446.4	2.502.2	2.567 6	2.536.8	2.003.9
Agriculture	2.644.4	3.039.9	3.399.3	3.686.4	4.331.6	4.683.4	4.775.1	4.985.7	4.939.3	5.564.5	5.91[illegible].9	6.335.1	5.390.0
Forestry	5.8	6.8	6.2	7.3	7.7	7.4	18.3	19.1	19.4	22.3	23.0	21.1	15.9
Transport and communication	258.2	506.0	530.3	584.2	588.0	595.9	715.9	770.7	765.4	830.0	865.3	988.4	985.7
Commerce and catering	221.3	431.3	452.9	450.1	461.6	485.2	506.2	528.6	541.1	605.3	672.4	760.1	1.259.1
Material-technical services	43.2	88.4	116.1	122.8	124.5	145.8	179.1	172.7	190.2	200.8	202.5	192.0	362.2
Purveyance	38.9	72.3	78.0	71.0	74.3	79.9	85.6	80.7	83.4	74.7	97.8	101.9	67.3
Other material production	62.5	71.5	72.7	78.0	78.6	78.7	84.6	83.6	86.1	180.0	138.8	230.2	269.3
Information-statistical services	-	-	-	-	-	-	33.0	31.2	36.6	42.7	57.1	75.0	62.0
Payments from Foreign Trade Organizations	172.9	563.3	645.9	694.5	730.2	752.4	631.4	582.3	548.0	512.7	400.7	302.4	244.5
II. Material inputs	5.374.0	9.697.7	10.043.4	10.913.0	11.382.5	12.122.5	12.655.4	13.217.5	13.934.7	14.676.2	15.286.0	15.009.9	18.865.9
Industry	3.669.9	6.662.1	6.923.2	7.628.6	7.884.8	8.383.1	8.627.4	9.002.3	9.499.5	9.980.2	10.411.9	10.147.4	14.316.0
Construction	516.1	773.7	761.3	850.2	926.9	1.030.2	1.039.4	1.088.2	1.273.0	1.277.6	1.317.1	1.198.5	992.7
Agriculture	1.030.8	1.913.8	1.995.1	2.035.9	2.180.8	2.299.5	2.452.8	2.563.9	2.560.1	2 754.6	2.889.2	3.004.8	2.671.2
Forestry	.7	.8	.7	.8	.9	.8	7.9	8.3	8.3	9.2	9.5	8.7	6.6
Transport and communication	93.3	226.6	235.8	255.7	244.4	253.8	348.7	367.6	381.4	395.5	404.7	402.5	275.1
Commerce and catering	40.2	78.7	82.7	88.5	90.8	96.3	104.8	109.9	128.7	133.9	142.0	161.5	378.8
Material-technical services	6.0	12.8	13.0	14.8	15.8	16.4	17.6	18.6	20.6	21.8	23.8	25.7	47.5
Purveyance	6.2	12.2	13.6	14.4	15.4	16.6	20.5	19.4	19.9	14.3	22.3	25.7	47.5
Other material production	10.8	17.0	18.0	24.1	22.7	25.8	26.7	28.3	29.6	72.3	44.1	84.3	125.8
Information-statistical services	-	-	-	-	-	-	9.6	11.0	13.6	16.8	21.4	37.4	32.9
Payments from Foreign Trade Organizations	-	-	-	-	-	-	.0	.0	.0	.0	.0	.0	.0
III. Net material product	4.204.5	5.867.0	6.463.9	7.011.4	7.240.6	7.424.1	7.513.7	7.922.1	8.279.9	8.912.5	9.549.8	9.997.2	15.140.9
Industry	1.513.6	2.673.4	2.832.2	3.001.3	2.624.6	2.393.4	2.446.9	2.780.0	3.059.2	3.073.3	3.480.8	3.406.7	9.030.9
Construction	431.7	676.0	689.2	750.0	790.3	911.2	1.025.6	1.014.5	1.173.4	1.224.6	1.250.5	1.338.3	1.011.2
Agriculture	1.613.6	1.126.1	1.404.2	1.650.5	2.150.8	2.383.9	2.322.3	2.421.8	2.379.2	2.809.9	3.028.7	3.330.3	2.718.8
Forestry	5.1	6.0	5.5	6.5	6.8	6.6	10.4	10.8	11.1	13.1	13.5	12.4	9.3
Transport and communication	164.9	279.4	294.5	328.5	343.[illegible]	342.1	367.2	403.1	384.0	434.5	460.6	585.9	710.6
Commerce and catering	181.1	352.6	370.2	361.6	370.[illegible]	388.9	[illegible]	418.7	412.4	471.4	530.4	598.6	887.[illegible]
Material-technical services	37.2	75.6	103.1	108.0	108.7	129.4	[illegible]	154.1	169.6	179.0	178.7	166.3	314.7
Purveyance	32.7	60.1	64.4	56.6	56.9	63.3	[illegible]	61.3	63.5	60.4	75.5	76.2	19.8
Other material production	51.7	54.5	54.7	53.9	55.9	52.9	57.9	55.3	56.5	107.7	94.7	145.9	143.5
Information-statistical services	-	-	-	-	-	-	23.4	20.2	23	25.9	35.7	37.6	29.1
Payments from Foreign Trade Organizations	172 9	563.3	645.9	694.5	730.2	752.4	631.4	582.3	548	512.7	400.7	302.4	244.5
Exports of goods & services													
Imports of goods & services													

Table A1. Lithuania: National Accounts (Own Methodology) (Concluded)
(in millions of roubles at current prices)

	1970	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
IV. Settlement of accounts with other republics	10.9	499.5	515.5	375.4	163.1	449.5	620.8	751.5	549.7	1.017.1	625.7		
V. Total source of net material product (III+IV)	4.215.4	6.366.5	6.979.4	7.386.8	7.403.7	7.873.6	8.134.5	8.673.6	8.829.6	9.929.6	10.175.5		
Use of material product for consumption and accumulation													
VI. Personal consumption (non-production consumption)	2.726.8	4.553.2	4.752.4	4.816.5	4.903.4	5.101.5	5.349.4	5.493.9	5.704.1	6.187.5	6.739.1		
VII. Social consumption	253.4	603.2	621.4	675.8	728.9	766.8	839.9	884.8	947.6	986.0	1.020.7		
Cultural-household services	210.2	493.7	512.8	546.2	593.4	618.4	664.5	705.3	763.2	781.7	814.5		
Educational and government services	43.2	109.5	108.6	129.6	135.5	148.4	175.4	179.3	184.4	204.3	206.1		
VIII. Growth of fixed capital funds	727.4	861.5	799.4	887.7	914.4	985.1	1.100.0	1.274.0	1.772.0	1.325.0	1.209.0		
Industry	476.4	548.5	747.4	466.7	501.4	490.1	552.0	640.0	1.137.0	652.0	633.0		
Nonindustrial funds	257.0	313.0	319.0	341.0	413.0	495.0	548.0	634.0	635.0	700.0	576.0		
IX. Changes in stocks (material turnover funds and reserves growth)	474.5	287.5	749.7	1.017.3	768.3	967.5	729.0	914.5	292.8	1.317.1	1.092.4		
X. Losses	33.3	51.1	62.5	69.5	88.7	52.7	116.2	106.4	113.1	114.0	114.3		
XI. Total use of net material product (VI-X)	4.215.4	6.366.5	6.979.4	7.386.6	7.403.7	7.873.6	8.134.5	8.673.6	8.829.6	9.929.6	10.175.5		

Table 1. Lithuanina: Exports and Imports of Goods 1/
(In millions of rubles)

	Exports of goods to:			Imports of goods from:			Trade balance:		
	Republics 2/	Foreign Cntrys 3/	Total	Republics 2/	Foreign Cntrys 3/	Total	Republics 2/	Foreign Cntrys 3/	Total
1958									
1959									
1970									
1971									
1972	2767	254	3020	2750	508	3258	17	-255	-238
1973									
1974									
1975									
1976									
1977	3537	222	3759	3725	683	4408	-187	-461	-649
1978									
1979									
1980									
1981									
1982	4238	574	4812	4734	1148	5882	-496	-574	-1070
1983									
1984									
1985									
1986									
1987	5387	483	5870	5860	1103	6963	-473	-625	-1098
1988	5431	527	5958	6209	1249	7483	-608	-722	-1530
1989	5850	475	6325	5703	1563	7352	61	--1087	--1026
1990	5386	386	5772	5210	809	6019	176	-424	-247
1991*	4307	219	4526	3411	357	3768	896	-137	758
1991**	8194	345	8538	4819	---	---	3375	---	---

* 1st half 1991.

** 1st nine months of 1991.

1/ Both foreign and domestic trade figures include the effects of domestic taxes and subsidies.

2/ Including Latvia and Estonia.

3/ Exchange rate used to covert foreign currency into rubles:

1987 64.90k/US$
1988 60.81k/US$
1989 63.04k/US$
1990 58.47k/US$
1991 57.45k/US$

APPENDIX E
Lithuanian Energy Price Reform Working Group

Chair:	Ada Macezinskiene	Ministry of Energy Director of Economics Department
Members:		
	Rimvydas Andrikis	Nature Protection Department Head of the Economics Board
	Jonas Balinskis	State Energy System Director for Economics
	Ovidijus Balsys	Vilnius University Assistant Professor
	Paulius Baltuska	Ministry of Energy Deputy Director of the Fuel Department
	Žaneta Drobnyte	State Owned Utility "Lietuvos dujos" Director of Economics
	Salomeja Girjotiene	Vilnius University Assistant Professor
	Kristinia Grigalevičiute	Ministry of Finance Deputy Chief
	Vytantas Guzys	Ministry of Energy Ecology Section
	Vidmantas Jankauskas	Energy Research Institute Lithuanian Academy of Science
	Antanas Juška	Ministry of Energy Director of Power Department
	Valentinas Klevas	Institute of Physical-Technical Energy Problems Scientist
	Mindaugas Krakauskas	Institute of Physical-Technical Energy Problems Research Assistant
	Pranas Liuga	Nature Protection Department Senior Specialist
	Rimantas Lukoševičius	Ministry of Energy Deputy Director, Department of Economics

Stasys Matusevičius	State Owned Enterprise "Lithuanian Fuel" Director of Economics
Aristidas Maurukas	Ministry of Economy Deputy Director of Pricing Department
Vaclovas Miškinis	Institute of Physical-Technical Energy Problems Scientist
Daiva Semeniene	Department of Environmental Protection Economic Advisor
Romas Stonys	State Energy System Chief of Thermofication Division
Rimantas Šukys	Ministry of Economy Deputy Chief
Aleksandras Vasiliauskas	Vilnius University Professor, Head of Analysis of Economics Systems Department
Gediminas Volskis	State Energy System Chief of Economics
Kazys Zilys	Ministry of Energy Department Director