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PREFACE

The Workshop on Energy Pricing, where these papers were presented, was carried out within the framework of the U.S. Emergency Energy Program for Eastern and Central Europe under an 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 Czechoslovakia and Romania.

This report is one of a series describing the Energy Pricing Reform Project in Czechoslovakia. The purpose of the Energy Pricing Reform Project is to provide the Government of Czechoslovakia an analytical basis for understanding energy flows in the Czechoslovakian 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.

INTRODUCTION

The U.S. Agency for International Development (USAID) is providing assistance activities to six Eastern European countries under its Eastern European Emergency Program. As part of these activities, technical assistance is being provided in the area of energy pricing reform. Resource Management Associates of Madison, Inc. (RMA) has responsibility for this function in the country of Czechoslovakia or, more formally, the Czech and Slovak Federal Republics (CSFR). This task is being carried out in collaboration with the Tellus Institute, an RMA subcontractor.

On May 21-22, 1991 a conference was conducted in Bratislava, Czechoslovakia. This conference, entitled "Workshop on Energy Pricing," was attended by over 50 individuals with varying responsibilities for energy pricing and policy in Czechoslovakia. Officials from national and republic governments were in attendance, as well as officials from individual energy resource providers, universities and other research groups.

The purpose of the workshop was to provide an opportunity for discussion of problems and potentials within individual fuel sectors and across fuel sectors. As foundation for the workshop several background papers were prepared and presented. Three papers were prepared by U.S. experts and eight papers (or notes) were prepared by individuals with expertise in the Czechoslovakian energy sector.

This document is a collection of the papers presented at the Bratislava workshop. The papers and authors are listed on the following page. All Czechoslovakian papers have been translated into English from their original version. In some cases minor editing has been done to these papers so that they might be more easily understood by U.S. readers.

The three U.S. papers are intended to provide a view "from outside" of the problems and issues facing the Czech and Slovak Federal Republics. The eight Czechoslovakian papers offer unique and insightful observations "from within" about many of these same issues. Together, this set of papers represents an important base of knowledge for those interested in the historical and emerging development of the Czechoslovakian energy sector.

PAPERS PRESENTED AT THE "WORKSHOP ON ENERGY PRICING"

Bratislava, Czechoslovakia

May 21-22, 1991

U.S. PERSPECTIVE

"The Experience in the United States Concerning Two Price and Planning Issues: Environmental Costs and The Utilization of Private Sector Energy Resources," Mr. Harvey Salgo, Tellus Institute

"Petroleum Prices in a Volatile International Market," Mr. Bronek Dutkiewicz, INTRATECH Inc.

"Practical Economic and Financial Issues of Energy Pricing Reform in Czechoslovakia," Dr. Jack Huddleston, Resource Management Associates

CZECHOSLOVAKIAN PERSPECTIVE

"The Price Development of Cokeable Coal and of Coke," Ing. Otto Tyrlik, OSTRAVA

"The Problems of Utility Coal Price Setting," Ing. Karel Dlask, SHD-North Bohemian Mines

"Prices of Liquid Fuels: Development and Present State," Ing. Durmis, Slovnaft Refinery

"The History, Development and Present Situation of the Prices of Gas Fuels," Ing. Vladimir Stepan, Czech Gas Production Company

"Some Comments on the Price Level of Electricity and Heat," Ing. Miroslav Vlcek, Czech Power Board, Headquarters Prague

"Electrical Energy Pricing," Ing. Erik Schmidt, CEZ

"The Problems of Power Engineering Management in the Economic Reform Process," Ing. Petr Kacvinsky, Ph.D., Institute of Economy, Czechoslovakian Academy of Sciences

"Energy Prices," Ing. V. Hauptvogel, Federal Ministry of Economy

The Experience in the United States Concerning Two Price and Planning Issues: Environmental Costs and The Utilization of Private Sector Energy Resources

Prepared by:
Harvey Salgo
Tellus Institute

The Experience in the United States Concerning Two Price and Planning Issues: Environmental Costs and The Utilization of Private Sector Energy Resources

Prepared by: Harvey Salgo of the Tellus Institute, May 10, 1991

I. Introduction

This paper addresses two developments in energy policy in the United States: (1) the growing involvement of the private sector in the provision of energy services, and (2) the movement toward the inclusion of environmental costs in the selection of resources and in the pricing of energy services. The focus of the paper is on the electric power sectors which, in the U.S., is substantially regulated.[1] While the paper concerns the experience in the United States, there are parallels and examples in other countries as well.

The growth in the utilization of private sector energy services -- both for power generation and conservation -- has resulted in a new understanding of what is, and what is not, a "natural monopoly", which will be an important topic at our May 21-22 workshop in Bratislava. The increasing consideration of non-internalized environmental costs (so-called "externalities") in the selection and use of resources reflects a recognition that energy use has consequences which are not adequately accounted for in traditional market or regulatory pricing. This is also an important topic for our workshop discussions.

[1] In the U.S. many aspects of the natural gas industry are also extensively regulated, although this paper does not address that industry directly. In the U.S., contrary to Czechoslovakia, relatively little heat or steam is provided from large central plants; and, in general, heat and steam transactions are not regulated.

In order to understand these two developments, it will be useful to begin with some background information concerning U.S. energy policy and the structure of the utility industry. After this discussion, the paper addresses the private sector involvement and environmental costs. In general, the paper is written from a practical rather than a theoretical perspective.

II. Background

The United States has hundreds of electric and gas utilities, most of which are investor owned; that is, the equity capital is from the private sector. These investor owned utilities (or IOUs as they are often referred to) -- as well as other types of utilities[2] -- are extensively regulated. Sales to all users -- residential, commercial, industrial -- are regulated by the state Public Utilities Commissions, of which there are 50. Sales between utilities, which are common in the U.S., are regulated by the Federal Energy Regulatory Commission.[3]

In general, all utility prices and tariffs (rate structures) are regulated, which means that they must be approved by the appropriate regulatory authority. However, the states differ somewhat concerning regulation of utility planning, with some exercising significantly more oversight that others.

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[2] The other types of utilities include so-called municipal systems, which are 100% debt financed, rural electric cooperatives, and federal power agencies (such as the Tennessee Valley Authority and the Bonneville Power Authority).

[3] FERC regulates transactions between utilities -- which are known in the U.S. as **wholesale** transactions -- while the PUCs regulate sales to all consumers (industry, commercial, residential) -- which are known as **retail** transactions. It is important to note that the terms **wholesale** and **retail** are used quite differently in the U.S. and Czechoslovakia.

The utilities differ significantly in size and scope. Some are as large as 20,000 MW or so, while others are only a few hundred MW or less. Until recently, the larger utilities either built and operated their power plants with their own staffs or commissioned engineering companies to build them and turn them over to the utilities for operation.

In the past 12 years or so, another option has emerged; power plants now are often built, owned and operated by non-utility companies.[4] In these instances, power is sold to the utility under a long-term contract (typically 20 years) which specifies the price to be paid for the electricity and other important terms and conditions.

The growth of the non-utility generating companies would not have been possible without the passage by the U.S. Congress of the federal Public Utilities Regulatory Policies Act (or PURPA) in 1978. PURPA changed regulation in important ways which encouraged non-utility generation. At this time, a large portion of new electric generation will be provided by these companies. One source estimates that, between 1990 and 1999, 12,255 MW of new non-utility generation will be added in the U.S. This represents 21% of the planned additions.[5] It is no longer assumed that electric generation, unlike transmission and distribution, is a natural monopoly.

PURPA led to a fundamental change in the ways in which utilities in the U.S. obtained electric generation. Because the change was so fundamental, it took several years

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[4] The term "non-utility generation" (or NUGs) is widely used in the U.S., but it is sometimes confusing or misleading. For example, some utilities have set up separate subsidiaries which own and operate power plants in the territories of other utilities. These projects function as NUGs even though they are fully or partially owned by a utility outside the territory. Even though the term non-utility generation is used, it also refers to situations such as the one just described.

[5] North American Electric Reliability Council, *Electricity Supply and Demand for 1990-1999*, Princeton, New Jersey.

from its passage in 1978 until there were significant numbers of non-utility power plants. It took time for lenders and equity investors to be comfortable with the new business; contract provisions had to be negotiated; utilities had to revise their ways of thinking about new power plants; fuel providers had to be willing to provide long-term contracts to these private companies; there had to be a demonstration that the power plants would be operated reliably; and so on.

At this time, non-utility private power projects of varying sizes (from less than 1 MW to many hundreds of MW) and fuel types (coal, gas, oil, hydro, other renewable fuels) are operating. Some are cogenerators (providing both electricity and steam or heat), while others are not. There are even some non-utility generating companies which own and operate nuclear plants, although this presents problems which are quite different from those concerning fossil plants, for example.[6]

In addition to the provision of power from non-utility sources, the private sector is also providing conservation services to the utilities and their customers. In recent years, there has been a very rapid growth in energy service companies which perform these services.

The growing interest in conservation in the U.S. has been prompted by a desire to reduce the dependence on foreign sources of fuels, such as oil and natural gas,[7] as well as

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[6] One of the issues which has arisen concerns nuclear plant decommissioning and what would happen if a private owner were unable to afford to decommission the plant safely, or safely dispose of spent nuclear fuel. In other words, the question is whether or not all nuclear unit functions can or should be privatized.

[7] Despite the wealth of U.S. domestic fuel resources, some portions of the country are resource poor. New England, for example, is relatively heavily dependent upon external fuel (oil and gas) as compared with other regions such as the Southwest.

an increasing concern with the environment. The environmental concerns have led to the consideration of a wide variety of policies, including selective taxes and more restrictive control of a number of pollutants. This paper discusses the development of two types of approaches in the utility field: (1) the federal Clean Air Act which allows a certain amount of SO2 emissions annually, and which encourages trading in the "allowances", and (2) the inclusion of so-called environmental externalities in the resource acquisition process.

III. Private Sector Energy Services

As noted above, PURPA is an Act which was passed by the U.S. Congress and signed into law by the President. PURPA requires that special consideration be given to certain types of private power projects[8] and that the state Public Utilities Commissions require the utilities which they regulate to purchase power from such projects. The approaches taken by the 50 PUCs to the implementation of PURPA have been quite different from one another. One approach, which is often used now, is to require that the utilities identify their needs for power (or conservation services) and solicit proposals competitively from energy services companies; thus, the energy services companies compete to provide the desired resources. This has become known as "competitive bidding" for resources.

Whatever the approach taken, increasing the utilities' reliance on private sector resources requires the development of a significant infrastructure. A substantial effort is

[8] Prior to PURPA it was virtually impossible to structure a transaction between a private power project and a utility. If one could be arranged, it would be regulated by the FERC. PURPA changed the law to allow such sales from cogenerators and renewable resource projects (hydro, solar, biomass, and others) to take place without regulation. Over time, other projects -- such as thermal plants which do not cogenerate -- are being built and operated privately as well.

necessary. The rest of this section discusses some selected issues concerning the development of a private power program.

In addition to the planning which utilities traditionally undertake to identify resource needs, there must be staff capable of creating acceptable requests for proposals, evaluating proposals from different companies, and assessing the capabilities of the companies to deliver the proposed services, whether it is power from a power plant or conservation.[9] In addition, it will be necessary to devote a significant amount of time to learning about and negotiating acceptable contractual arrangements. In the U.S. we have found that this is especially difficult and time consuming the first time that it is tried. However, as the market develops, and the buyers (utilities) and the sellers (private sector energy services companies) gain more experience with each other, the requirements for each of the tasks tends to decline. In other words, as the market 'matures', reduced staff and related requirements will result.

It is also important that the requirements for private power project financing be understood by all parties. These facilities are most often financed by so-called project financing (or non-recourse) mechanisms. To secure this sort of financing many conditions must be in place. These include acceptable power purchase contract terms, a belief that the contracts can be enforced, acceptable fuel agreements, a clear understanding that profits may be repatriated, some protection against the risks of currency devaluation, and so on.

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[9]There are a variety of types of resource solicitations in the U.S. electric industry. In some instances, the utility will be quite specific concerning the type of facility it wants built and operated privately. In other circumstances, a utility might identify the number of megawatts it needs (in power and/or conservation) plus some other criteria -- such as timing, dispatchability, reliability, and so on -- and ask for proposals without specifying the precise type of facilities or services it is seeking. What method or approach is preferable will depend upon the specific circumstances of the utility.

If there is interest in Czechoslovakia in developing a private power program with foreign investment, it will be necessary for the Government to consider numerous policy matters: for example, whether it is willing to provide any protection against currency devaluation. Interesting approaches to currency protection have developed elsewhere and will be important to consider.[10]

It will also be important for the Government to consider the macroeconomic impacts of a private power program: for example, the impact on the balance of payments, the national capital development budget and the debt situation. Similarly, it will be necessary to evaluate the financial impact on the utility and electricity consumers, as well as potential impacts on the utility operations.

Another matter which it is critical to address concerns the maximum amount to pay for private power or any energy services. In the U.S. (and many other countries) the price to be paid for power or conservation services is generally limited by a utility's avoided cost.[11] Avoided costs may be calculated in various ways, but, in practice, avoided costs often refer to the costs that the utilities expect to incur for their next one or more power resources. Avoided costs are significantly affected by a number of important assumptions, including the finance costs for any future "avoidable" resource. What will be the real costs of borrowing in the future? If there are equity investors in the country's power sector -- that

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[10] Problems will arise if the payments for power are in one currency (such as the Czech currency) and debt service must be paid in another (such as U.S. currency). It is possible to consider ways to disaggregate the payment stream so that, for example, the portion of the payment which must go to debt service is in one currency (dollars, for instance, or a basket of hard currencies), while the portions which are for fuel, labor, profits, and so on, are in one or more other currencies.

[11] As will be discussed and explained in the next section of this paper, in some instances the cost of the environmental externalities associated with the "avoidable" power plant have been added to avoided costs.

is, the utility is privatized (much like a U.S. IOU) -- what will be the cost of that equity? And what capital structure should be assumed in the calculation of avoided cost?[12] Naturally, other issues will also have to be addressed carefully as well.

To summarize, in order to develop a business environment which will effectively attract and utilize private sector energy services companies (power or conservation), several steps must be taken. In addition to comprehensive planning -- now often referred to as least cost planning -- it will be necessary to develop:

- an appropriate legal and regulatory structure;
- an understanding of the contract and other requirements so that such projects may be financed and undertaken;
- an understanding of what sort of contractual arrangements will best suit the country's needs, including whether or not joint ventures with private entrepreneurs will be considered in appropriate circumstances;[13]
- methods for soliciting projects (which need not be "competitive bidding"), evaluating proposals, and selecting the best projects;
- an appropriate approach to the calculation of avoided costs;

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[12] U.S. investor-owned utilities typically have capital structures which are in the range of approximately 45 - 50% equity with the balance in short and long-term debt. Private power projects often have 20% equity or less; that is, they are much more highly leveraged, which is what is meant by having a greater portion of debt in the capital structure. Obviously, the finance costs for any project will depend upon both the capital structure and the costs of the debt and equity components.

[13] An example of a contractual decision which it is necessary to make is as follows. Several countries have expressed a preference for private power projects which the developers Build, Own, Operate, and eventually Transfer to the host utility. These are known as BOOT arrangements. In the U.S., on the other hand, most private power projects are not contractually bound to transfer ownership to the utility. The two different approaches have very different implications for contracting and financing.

- rules and procedures for the integration of private resources into utility operations, including rules for monitoring operation and maintenance;
- an understanding of the macroeconomic impacts of such a program;
- appropriate policies concerning such matters as: repatriation of profits, whether or not to provide any special incentives or protection;
- and so on.

As mentioned earlier, it will take significant time and effort to successfully integrate private energy services companies into the country's power sector. Indeed, it took many years to integrate non-utility private companies into the U.S. system. Fortunately, it is possible to learn from the U.S. experience of recent years and avoid the mistakes which were made in the process.

IV. Environmental Costs

There has been a growing concern with environmental issues in all countries. In the U.S and elsewhere all power plants must meet the environmental requirements which are in place when they are constructed and operated. The costs of meeting these requirements become part of the plant costs and, in our terms, we would say that these costs have been "internalized". For example, the equipment which is necessary to reduce coal particulate emissions to required levels would be included in the cost of the power plant; that is, it would be an internalized cost which is paid for by the utility and is passed on to the consumers of electricity in the rates that they pay to the utility.

It is evident, however, that even after all environmental regulations have been met there are still air emissions and other environmental impacts. These impacts are, in economic terms, environmental "externalities".[14] Because the externalities associated with different plants (gas versus coal, for instance, or between the types of coal facilities) will not be the same, the question is whether to consider the different externalities impacts in the selection of resources.

An example will be useful; the one which follows is entirely hypothetical. Suppose that the cost of power from a new coal plant is expected to be $.06/kwh (6 cents/kwh)[15] on a levelized basis and that the expected cost from a natural gas plant is $.075/kwh (7.5 cents/kwh) on a levelized basis.[16] Both of the plants will be built to satisfy all existing environmental requirements, but the environmental externalities associated with the coal plant are greater than those for the gas plant. In other words, the remaining emissions and other impacts from coal exceed those from the gas plant. Which plant should the utility build? Or, if the plants are private power projects, which should it contract with for power?

If environmental externalities are not a factor in the decision making process, then the choice is the coal plant. It is less expensive and, as indicated above, it is assumed that all other aspects of the plants -- such as reliability -- are the same.

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[14] More generally, an externality is the impact on, or cost to, society which results from the production and consumption of goods and services. The externalities associated with electricity production and consumption include air and water emissions, used nuclear fuel, impacts on waterways from hydro construction and operation, and so on.

[15] The examples use U.S. dollars for costing. At an exchange rate of 28 kcs/$, $.06/kwh = 1.68 kcs/kwh.

[16] The assumption for this hypothetical example is that all other aspects of the plants are the same. That is, it is assumed that they are the same size, are equally reliable, have equivalent access to fuel and so on. These assumptions are made so that we may focus solely on the issue of cost and environmental externalities.

However, if the difference in the externalities associated with the two plants are to be a factor in the selection process, which one should be chosen? It is not possible to answer this question until we determine whether the difference in the costs which the environmental externalities impose on society is more or less than 1.5 cents/kwh, which is the difference between the cost per kilowatthour from gas (7.5 cents) and coal (6 cents) generation in our hypothetical example.

In the U.S. there is a growing consensus that the different environmental impacts should be considered; but there is not yet agreement as to how that should be done.[17] Whatever the approach taken, the fundamental question remains: how much more should consumers pay for cleaner power in this and other examples? It is precisely because there are so many possible real world examples and situations that a comprehensive analytical approach to the problem is required.

One approach is to estimate, in monetary terms, the cost to society of the different emissions and other impacts. For example, one would estimate a value for each emission on, for example, a $/ton basis. Thus, if the emission of a hypothetical pollutant were valued at $10/ton -- that is, its impact on society is estimated to be $10/ton -- one could compare the two power plants on that pollutant. One would estimate the amount of the pollutant expected from the coal and gas plant and (with appropriate assumptions concerning the amount of electricity to be generated from each plant) compare their impacts on a $/kwh basis. And, if all the emissions were valued with a similar methodology, the externalities

[17] At this time, relatively few state Public Utilities Commissions (PUCs) require utilities to include externalities in their selection and operation of resources. It is likely, in my view, that the number will increase substantially. In addition, as noted in this paper, the federal Clean Air Act will impose some changes on utility decisions.

associated with the plants could be compared directly. If the externalities costs per kwh exceed 1.5 cents/kwh one would choose the gas plant; if less than 1.5 cents/kwh, the coal facility would be selected.

Placing monetary values on environmental externalities is known as "monetizing" the externalities. Other approaches, such as a less formal ranking of the impacts of the different pollutants are also possible. Regardless of the method used, however, one should not lose sight of the central problem: how to decide between resources with different costs and different environmental impacts.

The tables and graph on the next three pages illustrate the use of monetized externalities. The first page is an example of air emissions costs for a gas combined cycle (CC) plant without selective catalytic reduction (SCR)[18] The table demonstrates how the calculation would be made for this hypothetical plant which uses gas for 40% of its generation and oil for the remaining 60%; the calculation (2.70 cents/kwh) is in 1989 dollars. The next page shows emissions coefficients for selected plants.[19] Emissions coefficients are the pounds (lbs)/MWH of emissions of the various pollutants. Finally, the graph shows the emissions costs for the resources identified on the previous page.[20] Unless one uses emissions costs which are significantly different from those used in these examples, it is evident that there are large differences among facilities.

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[18] Selective Catalytic Reduction or SCR is a catalytic method by which a significant amount of NO_x is removed from the exhaust gases. SCR is required for intermediate and baseload gas combined cycle plants in several states in the U.S.

[19] SCR has been defined in the previous footnote. NYPP refers to the New York Power Pool and NEPOOL to the New England Power Pool. The system margin in both instances is an estimate for each hour of the year of the emissions from the facilities which would be turned down were load to decline by a MW.

[20] Please note that the calculations for this graph are in 1990 dollars not 1989 dollars as in the first table.

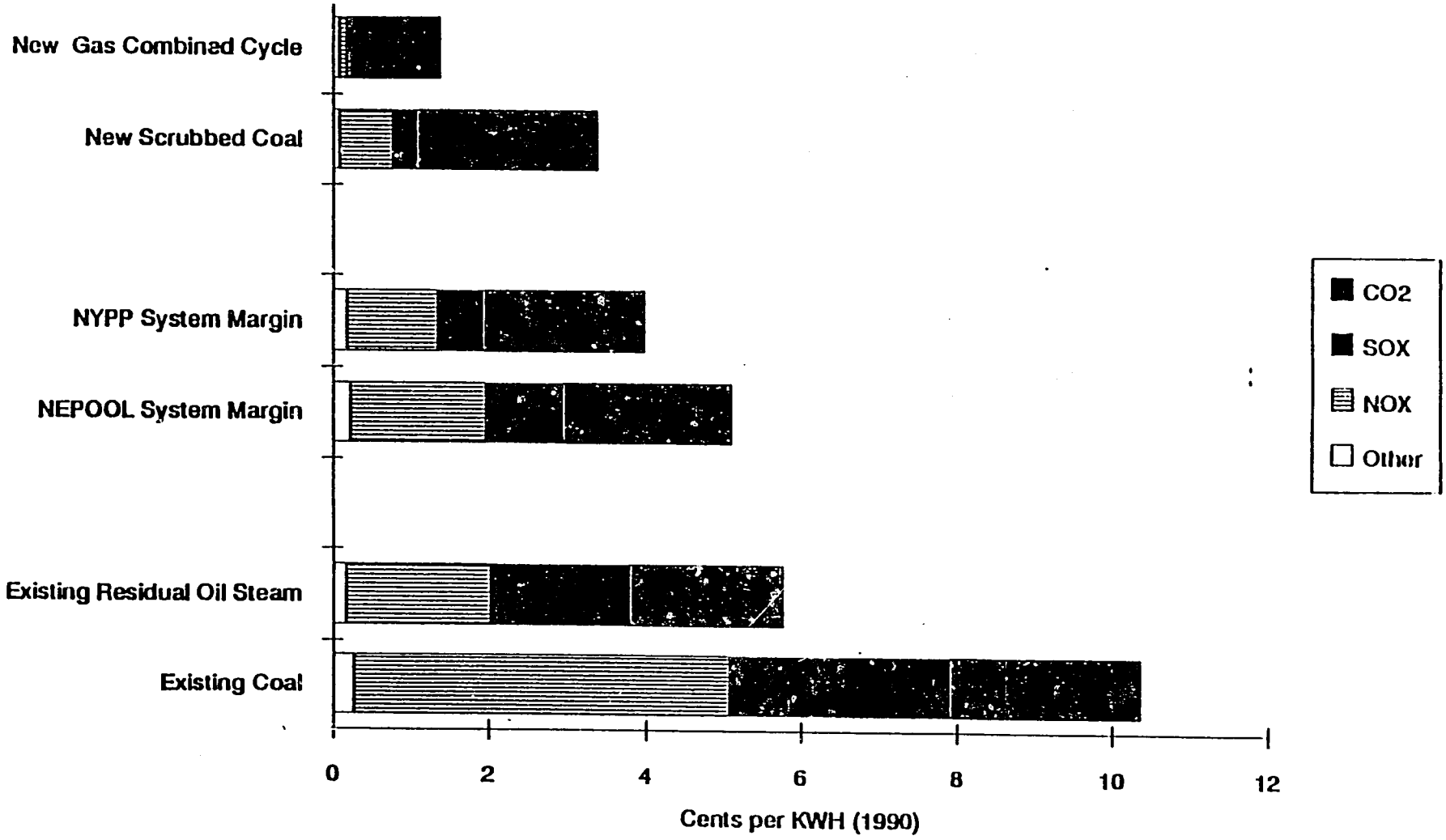
EXAMPLE CALCULATION OF LEVELIZED AIR EMISSIONS COST: CC WITHOUT SCR

Air Emissions	Value (1989$/lb)	Air Emissions (lbs/MWH)		Emission Cost (Cents/KWH)	
		Natural Gas	No. 2 Oil	Natural Gas	No. 2 Oil
Nitrogen Oxides	3.25	3.2	4.0	1.04	1.30
Sulfur Oxides	0.75	0.005	2.56	0.00	0.19
Total Particulates	2.00	0.01	0.01	0.00	0.00
Carbon Monoxide	0.43	0.017	0.15	0.01	0.01
Volatile Organic Compounds	2.65	0.27	0.13	0.07	0.03
Carbon Dioxide	0.011	952	1330	1.05	1.46
Methane	0.11	0.015	0.013	0.00	0.00
Nitrous Oxide	1.98	0.063	0.265	0.01	0.05
	Totals (1989 Constant Cents/KWH)			2.18	3.04
	Weighted Average Cost (40% Gas, 60% Oil)				2.70

EMISSIONS COEFFICIENTS FOR SELECTED RESOURCES
(Lbs. per MWH)

	NO_x	SO_x	TSP	CO	VOC	CO_2	CH_4
New Gas Combined Cycle with SCR	0.30	0.01	0.01	0.17	0.27	1013	0.02
New Scrubbed Coal	2.02	3.84	0.29	0.23	0.04	1922	0.01
NYPP System Margin (Baseload)	3.42	7.24	0.70	0.44	0.06	1716	0.02
NEPOOL System Margin (Baseload)	5.11	12.17	0.84	0.54	0.10	1815	0.02
Existing Residual Oil Steam	5.46	22.07	0.65	0.35	0.05	1670	0.02
Existing Coal	14.07	35.48	1.22	0.23	0.04	2061	0.02

EMISSIONS COSTS FOR SELECTED RESOURCES



At this point it is useful to recall the discussion of avoided cost. It should be clear that if a utility's avoided cost were the cost of a gas combined cycle plant or coal plant (or whatever), that could be calculated in an appropriate manner both with and without the addition of environmental externalities. The examples provided here demonstrate how such externalities values could be calculated and added to conventional avoided costs. Where utilities consider externalities in their selection of resources, avoided costs with externalities added defines the maximum price to be paid for any resource provided by the private sector or other company, such as another utility.

It is important to bear in mind that in any circumstance in which environmental externalities results in selecting the more expensive option, there will be cost consequences for electricity consumers. Obviously, this matter will weigh heavily in any decisions concerning the use of environmental externalities for resource selection purposes. The Tellus Institute has completed an analysis of the potential rate impacts in the state of Massachusetts and the New England region which showed, in those specific situations, that the electricity price impacts would not be great.[21]

A related matter which is under discussion in the U.S. -- but which is not yet in practice -- concerns environmental externalities and plant operations. Power plants are currently dispatched on the basis of their variable costs, which are principally fuel and other costs (such as some maintenance) which vary with plant operations. If one were to add the costs of externalities to the variable costs of plant operations (since emissions are proportional to kilowatthours generated), one would get a different dispatch order than if

[21] H. Salgo, B. Biewald, S. Bernow: *The Potential Impact of Environmental Externalities on New Resource Selection and Electric Rates*, for and with the Massachusetts Department of Energy Resources, January 3, 1991.

only variable costs are considered. The issue is whether or not to alter the dispatch order to reflect some or all of the environmental costs.[22]

The cost consequences of such a change will depend upon the power plants in the system under consideration. Thus, it is hard to generalize about them. Clearly, they could be substantial. In any event, as noted above, the matter is still being debated. No state (or the federal government) requires any utility to undertake environmental dispatching based on externalities.[23]

The U.S. federal government recently (November, 1990) enacted Clean Air Act Amendments which refer only to SO_2 (sulfur dioxide) and NO_x (nitrogen oxide) only. The requirements concerning SO_2 are much more detailed, however. The Act applies to all U.S. utilities and non-utility power plants. Utilities will be given a certain number of "allowances", each of which is an authorization to emit one ton of sulfur during a specified calendar year. If the emissions exceed the level permitted by the allowances, the penalties in the Act must be paid.

Because some utilities will reduce their need for allowances more than others[24], it is anticipated that those with a surplus will sell them. That is, the Act anticipates that a market in allowances to emit SO_2 will develop in the U.S. Part of a utility's planning

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[22] Obviously, there will be technical constraints to consider. Not all plants are able to cycle, for example. The discussion in the text does not address these important issues which would have to be considered in any detailed consideration of the matter.

[23] This is not the same matter as ordering a power plant to shut down on occasion because of local air quality problems. This is sometimes done. Rather, the issue concerns a fundamental change in the plant dispatch algorithm.

[24] The possible reasons for this are numerous. Fewer allowances will be needed if: load growth is reduced, through conservation, for example; cost-effective pollution control investments are made; cleaner power plants are constructed; and so on.

responsibility will be to optimize the utilization of its allowances. It is likely, in my opinion, that this will require a reconsideration of the decision making process for the dispatch of power plants.

Consider an example. Suppose a utility's least expensive (lowest variable cost) plants produced the most SO_2 and that its more expensive plants produced the least. This utility would now compare the savings it anticipates from the use of the least expensive plants with the amount it could receive from the sale of the allowances which it would no longer need if it were to use, instead, its more expensive, but less polluting, power plants.

There are other options for reducing SO_2 which would be considered in addition to, or instead of, changes in the dispatch order. In general, the lowest cost options should be undertaken first. Such options might include emissions reduction retrofits and fuel switching where that is possible. The best resource plans will consider the full range of available emissions reductions options.

V. Conclusion

In the past few years there have been several significant changes in the U.S. electric utility industry. The growth in the use of private sector energy services -- to provide both power and conservation -- has been rapid. The result has been a shift in the allocation of risk and reward; that is, the private sector is now absorbing some of the risks of project failure. In addition, there has also been a revision in thinking concerning what constitutes a natural monopoly in the utility industry. Electric generation, unlike transmission and distribution, is not considered a natural monopoly to be provided by a single firm under

strict regulation. Instead, many firms compete to provide electric generation under terms and conditions defined in long-term contracts.

To some extent the change in thinking about natural monopoly in electric generation reflects changes in technology and costs. It had been anticipated that the economies of scale which were evident in the industry until recently would continue as plant sizes grew.[25] It is apparent, however, that at some point diseconomies arise and that, in any event, there are some advantages to having relatively small plants on the system. In other words, the trend toward the addition of smaller size plants has made it easier for the private sector to raise capital and compete to provide electricity.

The issue of externalities is not new to economists. It has been widely recognized that the production and consumption of commodities imposes costs on society which are not recovered in the prices charged for the good. In the electric utility industry it is obvious to all observers that the externalities are substantial. However, it is only recently -- principally because of an increasing concern with environmental matters -- that serious consideration has been given to incorporating the cost of externalities into energy prices. There are serious questions and debates about how to measure the costs and, once measured, how to incorporate them into energy prices. However, despite the questions, there is a growing recognition that the differences in the environmental impacts of various energy resources cannot be ignored.

[25] Economies of scale in electric generation mean that as size (MW) increases unit costs ($/kwh) decline.

Petroleum Prices in a Volatile International Market

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PETROLEUM PRICES IN A VOLATILE INTERNATIONAL MARKET

1 Introduction

No country, whether they import or export crude oil, whether they are self sufficient in energy or not, can totally isolate themselves from the impact of the international oil market. Hence, international oil prices have a direct impact on the individual consumer, the petroleum sector companies, and especially the Government Agencies whose responsibility it is to oversee the efficient supply and consumption of energy.

In the immediate aftermath of the Gulf War and the associated violent swing in international crude oil prices it is easy to despair about the stability and security of oil price and supply. To put international oil prices in perspective, however, it is important to look at the longer term trends that are developing, rather than at the short-term disruptions that plague the global oil supply. This paper reviews what has happened to oil prices in the past, why these changes have taken place, and what can be expected in the future.

2 Historical Oil Price Experience

2.1 Long - Term Prices

Contrary to immediate impressions crude oil prices have remained relatively constant for a long period. Figure 1 shows the price of crude oil from the beginning of the twentieth century to the present date. This figure shows crude oil prices in both actual dollars and dollars adjusted for inflation. For the most part during this century oil prices have been remarkably stable. Four cases of supply disruption and resulting price escalation have occurred - in 1920 as a result of the Mexican oil embargo, in 1973 due to the OPEC Oil embargo, in 1979 due to the Iranian disruptions, and most recently as a result of the Gulf War and the UN oil embargo.

In fact, from the beginning of the century to the late sixties, crude oil prices increased only marginally in real terms. During this period oil prices were influenced to a large extent by the existence of an oil company cartel (the Seven Sisters), excess oil production world wide, and price/import controls by the major oil producer and consumer i.e. the U.S.

During the fifties and sixties, the domestic U.S. price of oil was controlled by volumetric oil production controls in Texas and Louisiana, and imports were restricted through the Mandatory Import Policy Program. This control of domestic and international oil prices by the U.S. came to an end when domestic oil consumption exceeded production at the end of the sixties and the U.S. could no longer act as the swing producer. The U.S. was replaced as the swing producer by OPEC in the early 1970's. Since then the international oil market has gone through some very significant changes, in essentially two distinct periods of development. The seventies were a time of rapid price escalations, supply disruptions and uncertainty of consumer reaction to the changes taking place. The next ten years were a period when many of the excesses of the seventies were reversed.

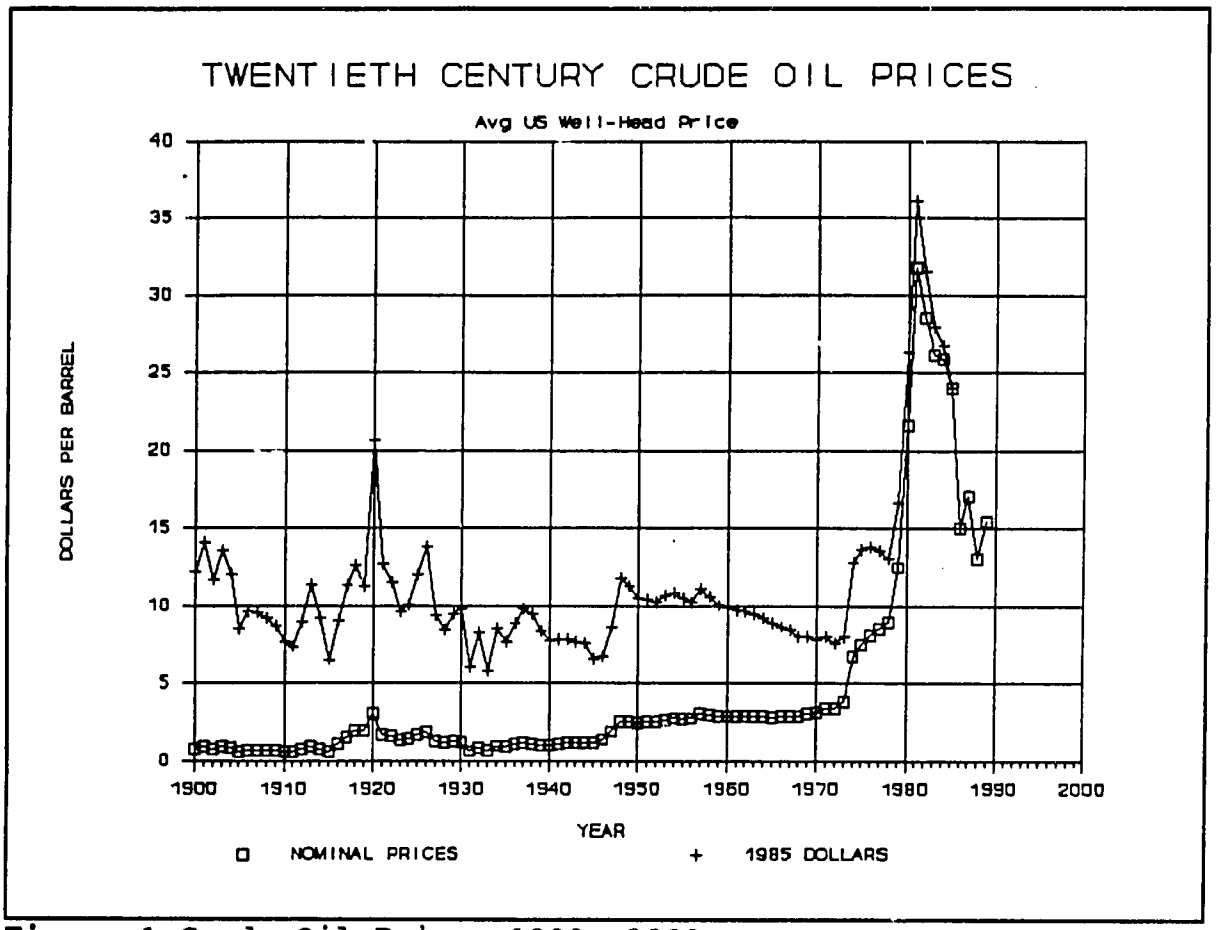

Figure 1 Crude Oil Prices 1900- 2000

2.2 The Seventies

The seventies saw a major change in world crude oil markets as manifested by two major disruptions during the decade. The first in 1973 was the OPEC oil embargo an the second in 1979 caused by the Iranian oil disruptions. As a result of the 1973 embargo prices jumped to a then astronomical level approaching $10 per barrel ($75/MT) and to above $30 per barrel in 1980.

During this period certain firm preconceptions prevailed within the OECD countries. In hind sight these were:

o That world crude oil production was peaking and that further production would be very expensive. Marginal new sources of energy would thus come from new sources of energy. Synthetic fuels from coal and shale, solar, wind, etc. would become the marginal source of energy and set oilprices.

o That the crude producers cartel would be effective for a sustained period, and that they would maintain prices at alternative energy source substitution levels.

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o The problem of higher oil energy prices could best be solved by the establishment of Energy Policy at the National level, and centrally micro-managed.

o That Governments could effectively control oil prices and isolate consumers from the volatility of oil prices.

o That oil supply and consumption patterns were hard to change and price inelastic.

The overall result during the seventies was for most oil consuming countries to move to more central government control of their energy sectors in general and of the petroleum sector specifically. For example, in the U.S. the response was to control oil and natural gas prices, mandate oil consumption patterns, invest heavily in alternative energy technologies and other enact preferential energy taxation measures.

On the supply side the oil producers believed that rising oil prices could go on indefinitely and prices of $100 per barrel ($700/MT) were expected by the turn of the century. This was predicated on the expectation that the synthetic fuels from coal, shale, and other sources would become the marginal source of fuels and hence set the price of oil.

On the demand side, attempts to stabilize prices through price controls lead to shortages and administrative nightmares, and reversal in production investment.

2.3 The Eighties

Supply/Demand and Prices

The decade of the eighties, saw the reversal of most of the popular held notions that had been developed during the seventies. A combination of the inability of OPEC to maintain a cohesive cartel, and a higher than anticipated price sensitivity of oil production and consumption, lead to a reversal in the oil price escalations achieved in the previous decade.

Four distinct periods of crude oil price change can be discerned during the decade as shown in Figure 2. During the period 1980 to 1983, prices declined by almost 50% from the highs associated with the Iranian Oil embargo. This period was marked by highly volatile and declining crude oil prices. Petroleum product prices, relative to crude oil, remained fairly constant. For the next three years crude oil prices remained fairly stable. Petroleum product prices on the other hand changed relative to crude prices.

In 1986 crude oil prices declined suddenly and precipitously. OPEC adopted netback pricing in an effort to regain control of oil prices and to provide some stability for crude oil importers. Numerous formulas were attempted linking crude oil prices to international product prices. These attempts failed to curb the volatility of oil prices and did not manage to return prices to previous levels.

In 1987 OPEC phased out netback pricing and adopted prices quotes with the intent of

stabilizing crude oil prices at an objective price of $18 per barrel ($130/MT). This did not happen and crude oil prices bounced around the $10-22 per barrel range for the next three years.

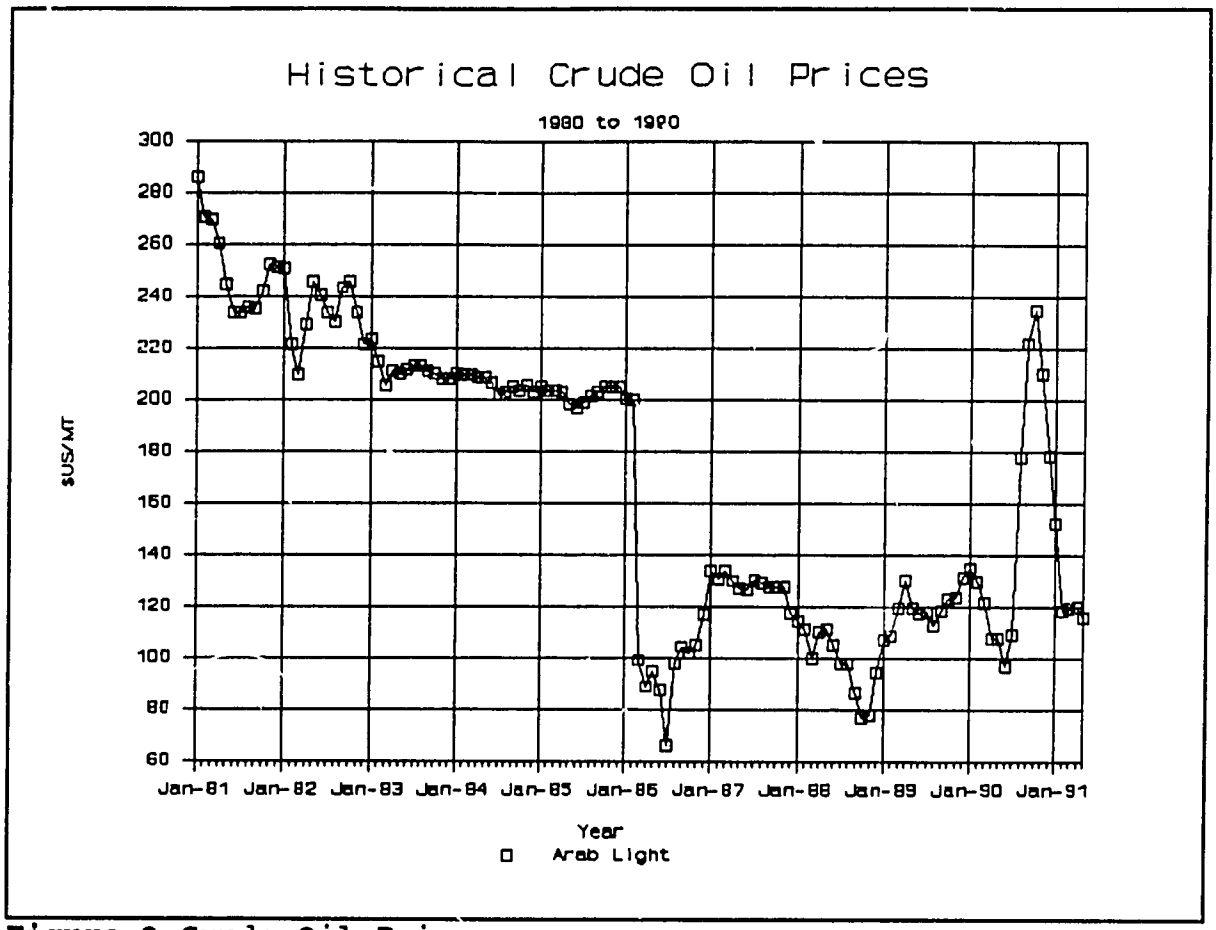

Figure 2 Crude Oil Prices

Many reasons have been postulated for the precipitous drop in crude oil prices in 1986. Most centered on the ability of OPEC to maintain cartel cohesion, and other political rationals. While the inability of OPEC to control the supply of oil was a factor, changes in consumption patterns were equally important in depressing crude oil prices.

During the late seventies and early eighties world oil consumption growth rates were almost flat due to higher prices and the resultant recession.

At the same time the supply of crude oil, both in OPEC and outside, increased as a response to the increase in oil prices. This imbalance was further accelerated by massive substitution of oil by coal and natural gas. Heavy fuel oil consumption in the OECD countries decreased by 44% between 1980 and 1987, dropping by 43% in the US, 49% in Europe and 47% in Japan. (Figure 3) The magnitude of this substitution was not recognized at the time with most forecasters still predicting continued growth of heavy fuel

oil demand.

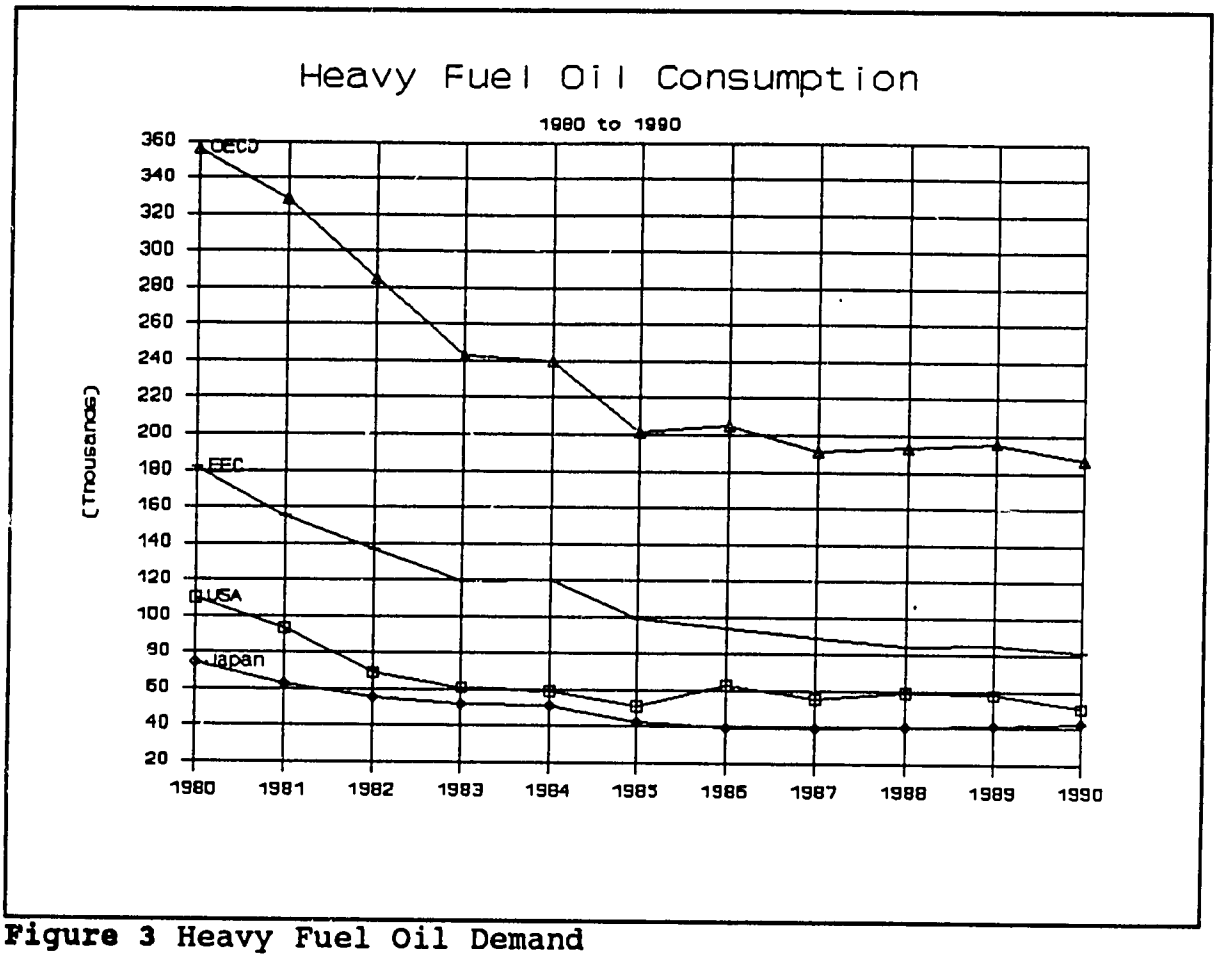

Figure 3 Heavy Fuel Oil Demand

At the same time the price of heavy fuel oil continued to rise, even though the price of coal and other alternatives were falling. The British Coal Miners strike in the mid-eighties may have contributed to the expectation of higher fuel oil prices. Another possible explanation was that oil refiners facing the erosion in distillate prices tried to make up for this loss by increasing the revenue on the bottom of the barrel.

The anomaly of rising fuel oil prices in the face of declining demand and declining coal prices could not be sustained and led to a sudden drop in fuel oil prices in 1985. This drop and continuous weakness in consumption was the most probable cause of the precipitated drop in crude oil prices a year later.

The relationship between crude oil, fuel oil and coal prices during this period is shown in Figure 4. The increasing gap between heavy oil prices and coal during this period is evident. This gap has now been closed and it appears that coal is now presenting a real floor for oil prices. In spite of the volatility of fuel oil prices the long term price trend appears to be testing the coal competition on the international market.

This interaction of energy prices and demand indicates the underlying supply demand pricing mechanism does work in the international market, and that deviations from the free market relationship cannot be sustained for any length in time.

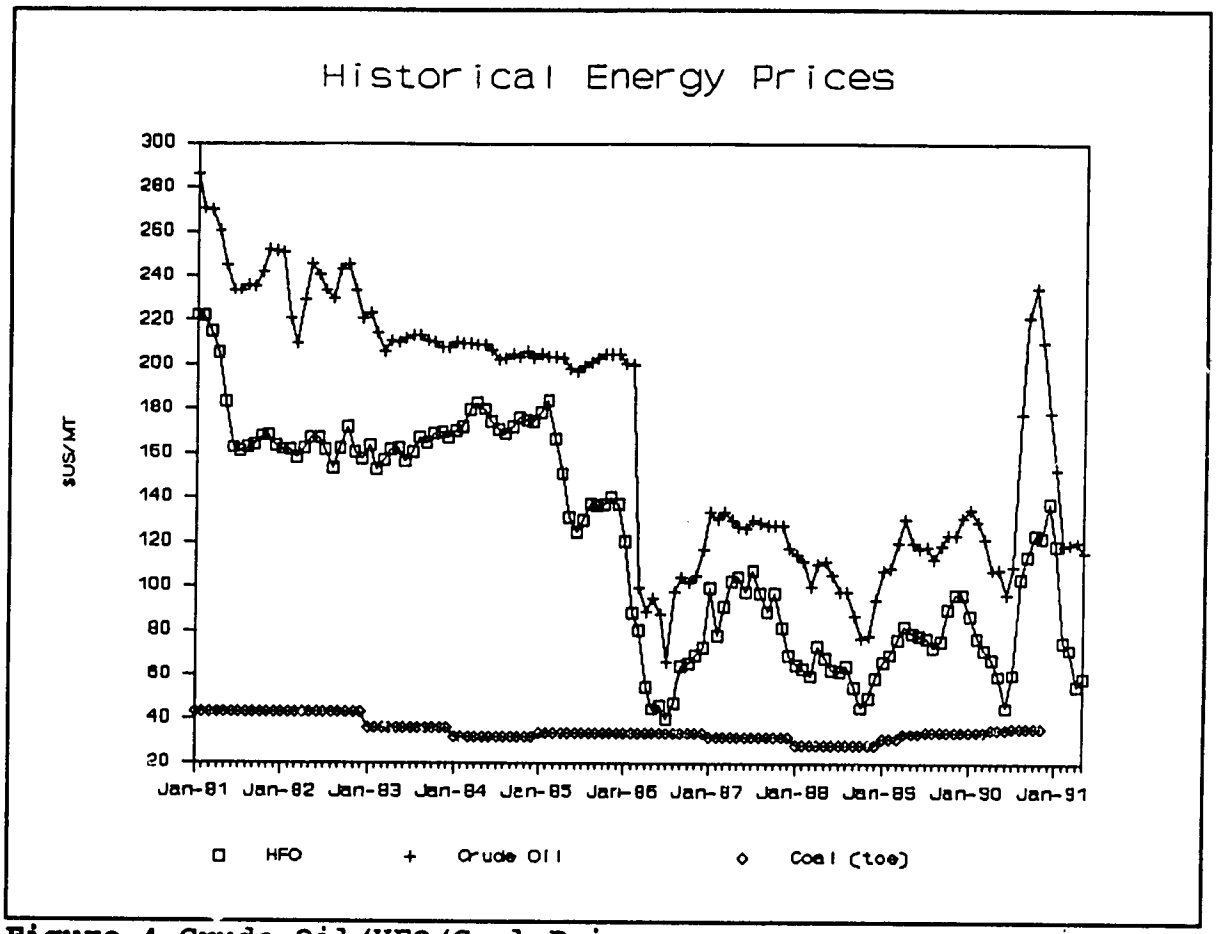

Figure 4 Crude Oil/HFO/Coal Prices

2.3 Oil Price Volatility and Risk

Another big changes in the international market resulting from the turmoils of the seventies was the development of Futures Markets. The experience of the seventies lead to the realization that wide swings in oil prices were to be expected in future. Individual countries responded by building up strategic reserves of oil and entering in coordinated consumer emergency agreements. At the same time, individual consumers, oil companies and the financial community responded by the creation of price hedging mechanisms. The New York Merchantile Exchange (NYMEX) in the US; the International Petroleum Exchange (IPE) in Europe; and the Singapore Monetary Exchange (SIMEX) in the Far East, expanded crude oil and product trading activities in response to the need for risk management in the energy area.

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This was a turning point in international oil trade, resulting in the globalization of oil markets and providing transparent pricing of crude oil and product prices.

There has been considerable discussion of whether the growth of these futures markets serves to stabilize or accentuate the volatility of international oil prices and whether the markets are an extension of the petroleum sector or purely a vehicle for speculation. Irrespective of the point of view, there is no doubt that the expansion of the futures markets in the eighties has radically changed the international oil market.

3 General Lessons Learned in the Seventies and Eighties

Looking back at the last two decades there are some very important lessons to be learned, and should be heeded lest we repeat them in the future. Some of the main lessons that should be noted are:

o National Energy Policies - Comprehensive national energy policies, no matter how seductive, are almost impossible to determine, are too cumbersome to implement and too slow to react to changes in the international oil situation. Invariably the attempt at intervention leads to problems larger than problems that they are trying to solve.

o Free Markets - There is no example of a truly free petroleum sector. There are only different degrees of intervention, at least for anything more than a short duration. Even the most ardent free market proponents will have their special reasons to intervene in special cases. Most frequently, differential taxation, and mandated volume controls (consumption and/or trade) are not recognized as price controls or limitations on the free market system.

o Alternative Fuel Technologies - The alternative sources and technologies to the use of petroleum have been researched and analyzed ad infinitum during the last two decades and no viable "major substitute" has been identified. While alternative technologies will be a factor, they will not replace oil in the foreseeable future.

o Competitive Energy Prices - The degree to which oil can be substituted by natural gas and/or coal was underestimated in the last two decades, and oil has been losing market share to natural gas and coal. This substitution is still continuing. Energy experts, forecasters, oil producers , and especially OPEC, have consistently, underestimated the price sensitivity of oil consumption; over-estimated the price sensitivity of oil production; and underestimated the degree that substitution can take place. The net result has been that the seventies and eighties were characterized by consistent attempts of the oil producers to prop up prices unsuccessfully. The price trend has been toward the competitive price of oil. Only major disruptions - Wars and Embargoes - have managed to raise oil prices for any length of time.

4 Oil Product Prices

Individual oil products respond to their own market forces which may differ substantially from that of crude oil prices. The dynamics of product prices are often overlooked in the focus of crude oil. Frequently it is impossible to distinguish the main driving forces, whether crude oil prices are setting product prices or whether product prices drive crude oil prices. Many forecasters and planners still retain the concept of a fixed relationship between crude oil and the major products. This leads to problems in the management of domestic energy prices, even during times of stable crude oil prices. The impact on investment decisions can be severe.

During the last two decades interfuel prices have fluctuated over a substantial range. Figure 5 shows the price of gasoline, diesel and residual fuel oil relative to crude oil for the period 1980 to date.

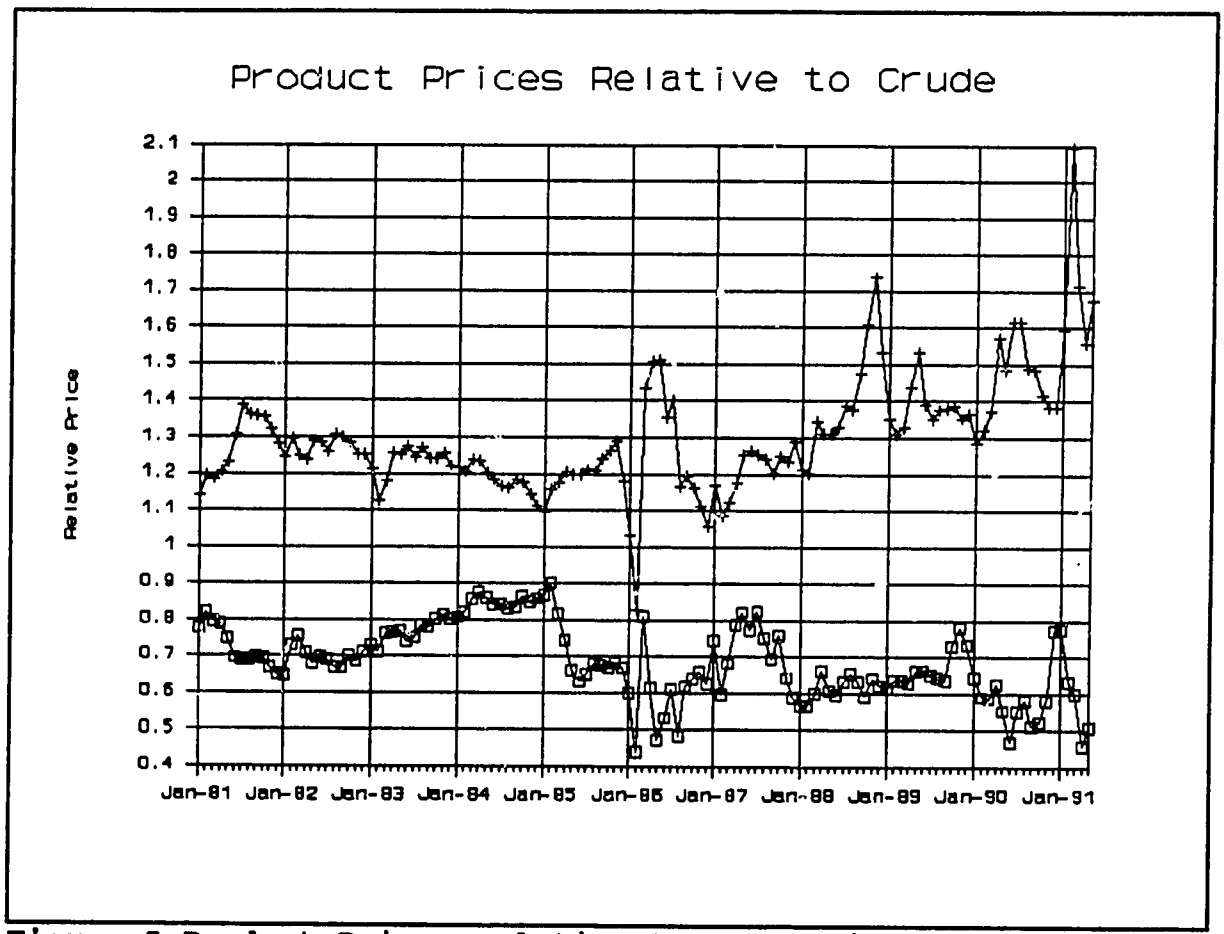

Figure 5 Product Prices relative to Crude Oil

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The distinct variations in prices both seasonally and with respect to time should be noted. The short term seasonal trends are well recognized and understood. The longer term trends are less readily apparent. During the first half of the eighties all three prices - gasoline, diesel and heavy fuel oil converged with crude oil. The second half saw a reversal of this trend, with the spread between distillate and heavy fuel oil increasing.

5 Product Market Structure and Prices

Up to the present it has been the tendency in many countries to maintain a protected domestic petroleum sector. Crude oil is preferentially imported and the domestic refining industry is protected from the importation of products. This is changing as product imports are being derestricted, and/or domestic prices are being linked to world product markets. While this generally improves petroleum supply economics, it can create problems for the domestic refining industry. A major determinant of refinery economics, and hence profitability, is the make up of the refinery product slate.

International petroleum product prices are determined by the market conditions in the major consumer countries i.e. the U.S., EEC and Japan. If these prices are imposed on a product slate that deviates significantly from the international average it can result in significantly different overall refinery economics. It is this difference in product slate valuation that differentiates refinery economics in different countries.

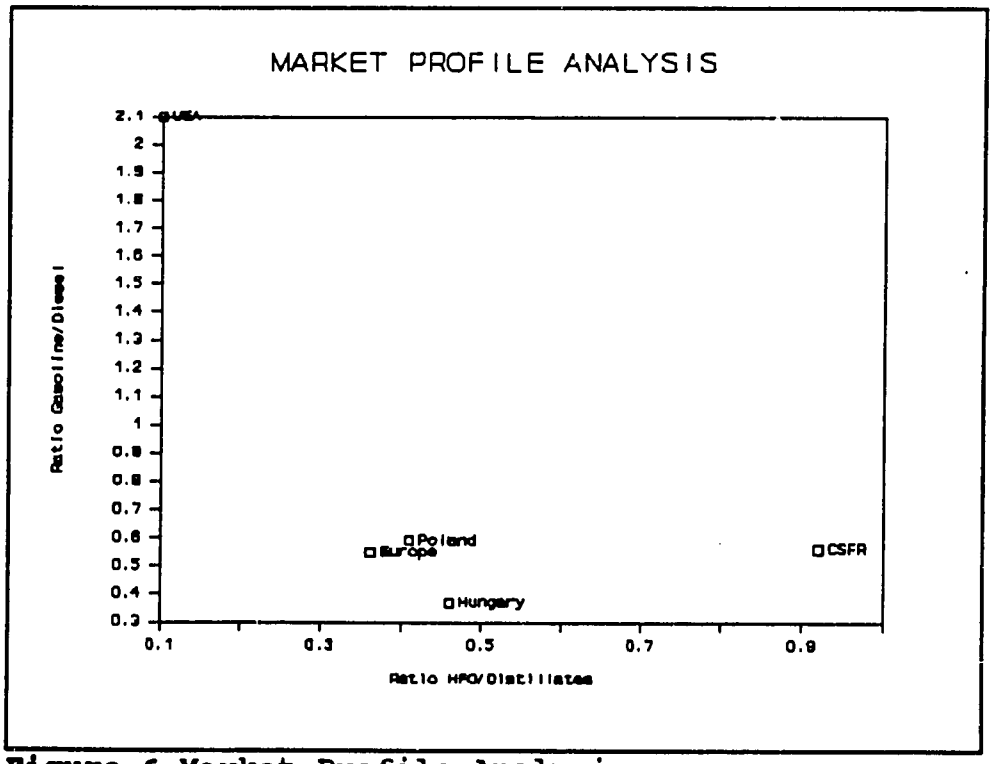

Figure 6 Market Profile Analysis

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This difference in market profile in the U.S., Europe, and the CSFR is illustrated in Figure 6. For comparative purposes, the ratio of gasoline to diesel fuel is plotted versus the ratio of heavy fuel oil to distillate (gasoline plus diesel) produced.

This figure illustrates the heavy orientation of the U.S. market to transportation fuels, especially gasoline, and the low heavy fuel oil demand. In Europe and the CSFR a much larger proportion of heavy fuel oil is produced. These differences in market configuration combined with the difference in product prices can have a significant impact on the valuation of a refinery's production.

This impact of market profile is often overlooked when considering the relative economic viability of refineries in different countries. It is also the reason that some refineries may need some protection from outside competition if they are to be viable.

6 Future Outlook

The track record of forecasting international crude oil and product prices during the last decade has not been particularly successful. In general, most predictions have called for a short term drop in oil prices; followed by an increase in longer term prices at approximately the rate of inflation in the OECD countries. This sliding forecast is still very much in vogue today. However, for the last five years, cyclical oil price fluctuations have overshadowed any longer term trend, and has lead to a concentration on shorter term price fluctuations and how to cope with them.

The uncertainties and instabilities in oil pricing are expected to continue for the foreseeable future. Unfortunately it appears that the times of long term stable prices are over, and the future energy industry manager will have to cope with continued uncertainty. Some general certain general trends are discernable.

5.1 Supply Side Considerations

The major preoccupation in forecasting oil prices has been the supply of crude oil. This generally translated into trying to second guessing what OPEC will do and whether it will be effective. The methodology of predicting small demand/supply changes effected by OPEC and the resulting impact on world crude oil prices has not proved to be very effective. This was amply demonstrated when the loss of the Iraqi and Kuwaiti oil did not result in the dire shortages predicted. The ability to forecast crude oil prices will continue to be an extremely difficult task in the future.

The outlook for the stability of oil supply and price look worse than it has since the 1973 oil embargo. In fact the situation is not too dissimilar, the only difference being that the OPEC oil embargo has now been replaced by a UN mandated oil embargo. The combination of a destabilized Middle East situation and the troubles in the USSR hold great uncertainties for unexpected and large crude oil price excursions. The possibility of more frequent oil price spikes in the $30 plus region have to be considered.

Even in the absence of major oil disruptions, international oil prices should remain volatile,

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but in a much narrower band. Most forecasts predict an ample supply of production capacity under normal situations. The tendency for OPEC to focus on a target price for crude above its economic parity value relative to coal and natural gas will continue to contribute to periodic price fluctuations.

5.2 Demand Side Considerations

The easily made conservation and substitution changes in the petroleum sector have already been made. Some further market share erosion to natural gas and coal is expected, though at a slower rate.

Environmentally driven changes in consumption patterns will be an increasing factor in the future. Forced substitution through mandated change to different fuels could be a characteristic of the nineties. Examples includes the use of oxygenates in transportation fuels, and lower sulfur emissions from heavy oils.

Most supply demand projections continue to show a significant imbalance between distillate and heavy fuel oil in the most markets, which would indicate a continuation of the depressed heavy oil markets and prices. The recent rationalization of the refining industry in Europe, and the build up of heavy oil upgrading capacity have helped dampen excess heavy oil production.

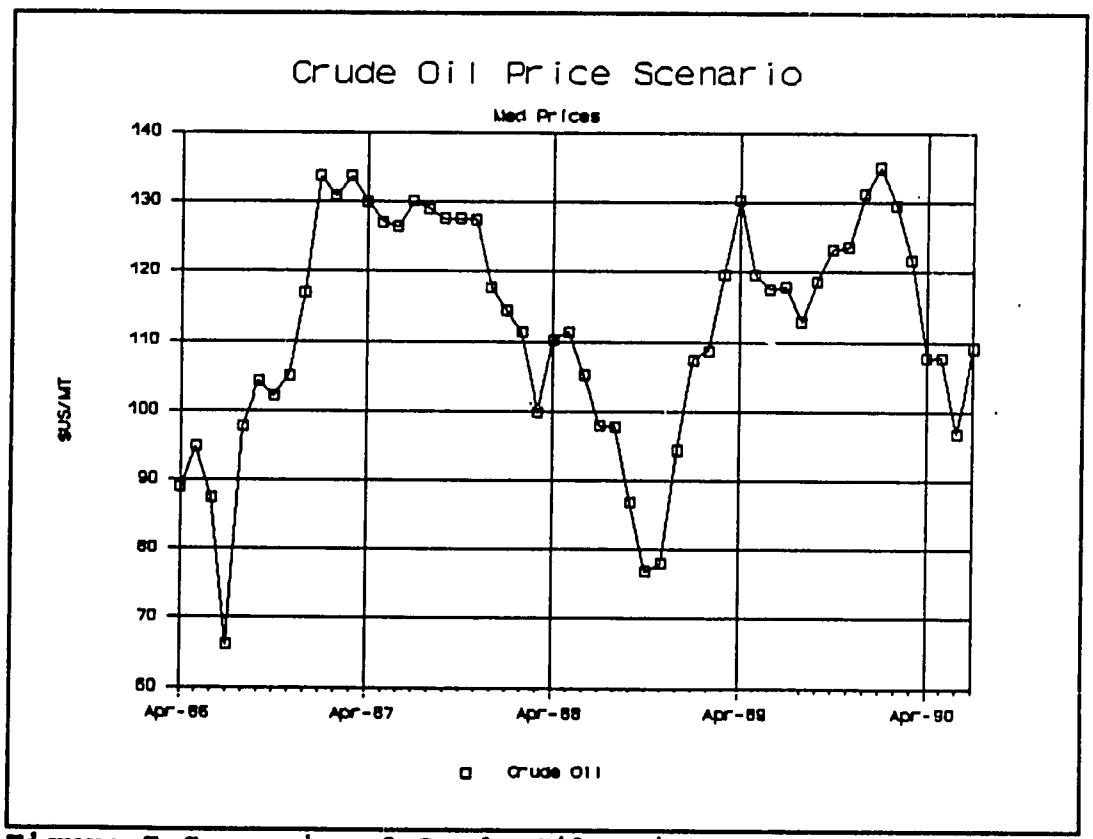

Figure 7 Scenario of Crude Oil Prices

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The above scenario will most probably result in oil price profile similar to the period between mid 1986 and mid 1990. Crude oil and product prices during this period are shown in Figure 7 and 8. The amplitude and frequency of the crude oil and product prices fluctuations in this figure highlights the problems facing anyone dealing the uncertainty of future oil prices.

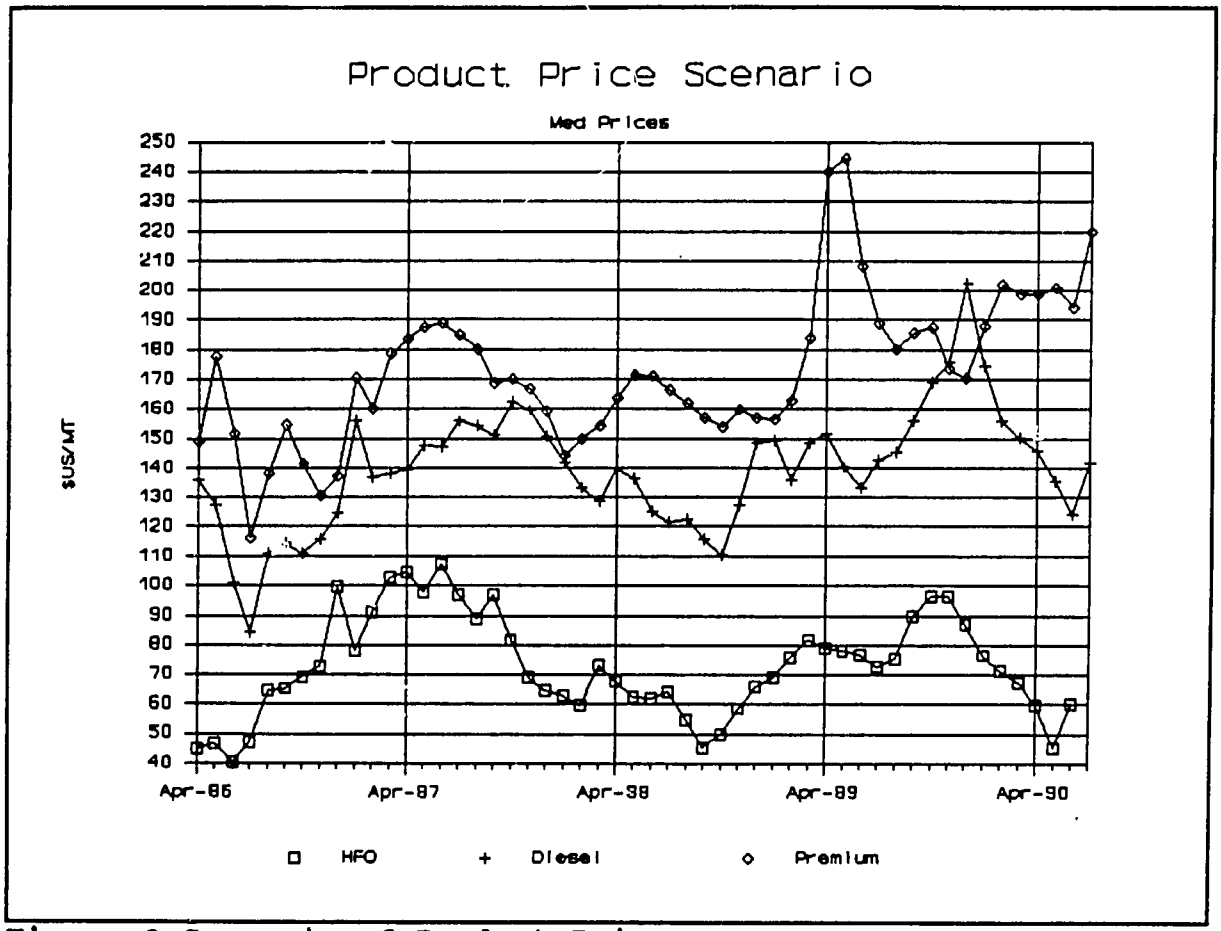

Figure 8 Scenario of Product Prices

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Practical Economic and Financial Issues of Energy Pricing Reform in Czechoslovakia

Prepared by:
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PRACTICAL ECONOMIC AND FINANCIAL ISSUES OF ENERGY PRICING REFORM IN CZECHOSLOVAKIA

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I. INTRODUCTION

Czechoslovakia, like other Eastern European countries, is undergoing rapid economic change. Ownership of productive capacity is changing from public to private enterprise; prices are increasingly being determined by market forces rather than government plans; and increased economic ties are being established with the broader world-wide market.

The energy sector in Czechoslovakia is a crucial segment of broader economic reforms occurring within the country. There is broad agreement that the historical price structure of Czechoslovakian energy resources has been low in comparison to other industrialized nations and that this structure has suffered from significant internal price distortions.

Major pricing reform is underway in each of the individual energy sectors of the country. In the long-run tradeable energy resources will be priced at comparable international levels and non-tradeable energy resources will be priced at (or approaching) long-run marginal cost. Determination of "correct" prices is a

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crucial aspect of the overall energy pricing reform that is taking place within Czechoslovakia.

While pricing reform within individual energy sectors is important, the purpose of this paper is to assert that an equally important set of questions needs to be asked about the impacts of changing energy prices on the overall economy of the country. For example:

* What are likely impacts on national (and republic) industrial output of changing energy prices?
* What are likely impacts on national (and republic) employment and income of changing energy prices?
* What are likely impacts on national (and republic) environmental conditions of changing energy prices?
* How will imports and exports be affected by changing energy prices?
* What financial capital will be required to adequately meet industrial and residential responses to changing energy prices?
* What are likely impacts on national (and republic) government expenditures and revenues of changing energy prices?

These (and other similar) questions are broader than those traditionally considered in developing energy price reform within an individual energy sector. Although the general movement within Czechoslovakia is towards decentralized, market-oriented decision-making, it is questions such as the above that will need to be considered and planned for within the emerging governmental structure of the country.

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This paper does not answer all of the above questions. It does, however, attempt to demonstrate the importance of the cumulative effect of individual pricing reform decisions on the overall economy.

To accomplish this, the paper overviews in Section II an economic simulation model that has been developed for the Czechoslovakian national economy. This (preliminary) model, called the CSFR Industry Energy Price Model (INDMOD), has been developed utilizing available national data and economic relationships existing in other comparable countries. [A second model, CSFR Transportation Price Model (TRANSMOD) has also been developed.] In Section III the model is applied to two different energy price scenarios for the country as a whole, illustrating the impacts of further energy pricing reforms. Section IV discusses the implications of the simulation analysis for energy policy and planning in Czechoslovakia, including a discussion of the role for strategic planning in emerging national and republic governmental structures.

II. CSFR INDUSTRY ENERGY PRICE MODEL

Rising energy prices will have numerous aggregate, or macroeconomic impacts on the national and republic-level economies. Analysis of these impacts will require use of comprehensive economic models that allow interactions among fuels and that capture the output response to changing relative prices for energy and other goods and services.

Two broad types of economic models have been developed and used for macroeconomic analysis of energy policy questions in the U.S. The first group is the statistically based (econometric) macroeconomic models. These models estimate relationships among national income, consumption, investment, savings, government spending and tax revenues, and imports and exports. Although relatively comprehensive in scope, these models require extensive economic data over long periods of relatively stable economic conditions. Radical economic change is not easily incorporated into these models.

The second group of macroeconomic analysis models is that of mathematical simulation models. These models take several forms and can consist of models with only a few economic relationships or models with hundreds of economic relationships. The current input-output (I-O) model used in Czechoslovakia is an example of the larger macroeconomic simulation model.

The CSFR Industry Energy Price Model (INDMOD), developed by Resource Management Associates of Madison, is a macroeconomic simulation model that has been developed specifically for use in energy policy analysis in Czechoslovakia. INDMOD simulates the consumption of seven energy resources (electricity, district heating, coal, coke, petroleum, natural gas and other gas) in nine industrial sectors (mining, chemical, ferrous metals, non-ferrous metals, mechanical engineering, construction, forest products, food and other) for the period 1988 to 2000.

INDMOD is designed to simulate the influence of several important economic relationships and is based on the economic framework shown in Figure 1. According to this framework, changing relative energy prices will have two immediate impacts on the input side of the industrial sector. As energy prices increase, firms will begin substituting capital and labor for energy (for example replacing old boilers with more energy efficient boilers) and will substitute one fuel for another fuel (for example shift from coal to natural gas).

After these shifts and substitutions have occurred, some portion of the higher energy costs will be passed through to consumers in the form of higher output prices. These higher prices will affect the level of imports, exports and overall domestic consumption. Changes in these variables will affect national output levels which, in turn, will affect overall national employment and income.

A more complete description of INDMOD is contained in the INDMOD User Manual.

III. ANALYSIS OF INDUSTRIAL IMPACTS OF FURTHER PRICE REFORMS

INDMOD has been used to analyze the impacts of further energy price increases in the future. Two scenarios are simulated and compared in this analysis.

Baseline Scenario. The first, called the baseline scenario, is INDMOD's estimate of industrial output and energy use if currently planned energy price increases are implemented by 1992,

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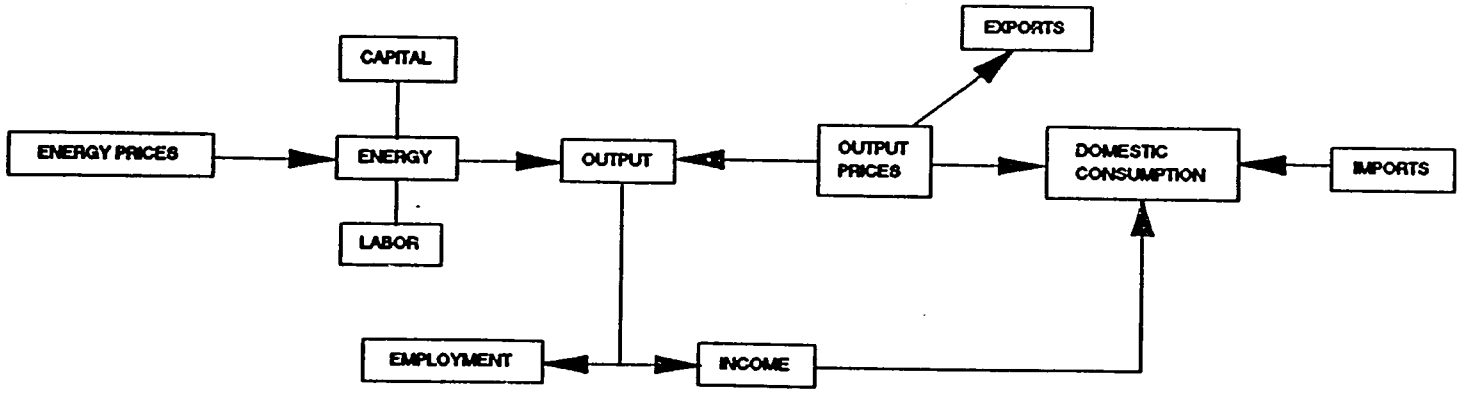


FIGURE 1: Influence of Energy in the Czechoslovak Economy

but not changed thereafter. This simulation is based on exogenous forecasts for energy prices and industrial growth rates through the year 2000. These rates of change, which were assembled from various government and research documents, are shown in Table 1.

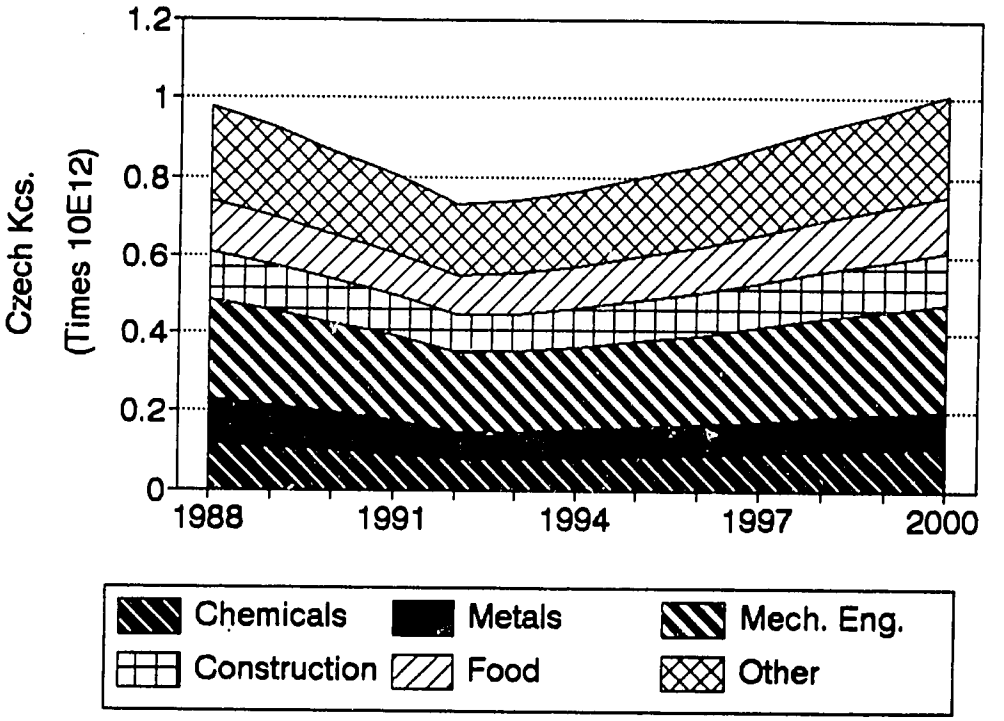
TABLE 1. Industrial Output and Energy Price Annual Growth Rates for Baseline Scenario

	88-91	91-92	92-94	94-96	96-00
Industrial Output					
Mining	-4.52%	-4.80%	2.34%	4.30%	5.00%
Chemical					
Ferr. Metals	[all industrial sectors are projected to				
Non-Ferr Metals	change at the same annual rate before energy				
Mech. Eng.	price changes are introduced]				
Construction					
Forest Products					
Food					
Other					
Energy Prices					
Electricity	7.7%	53.0%	0.0%	0.0%	0.0%
District Heat.	65.5%	0.0%	0.0%	0.0%	0.0%
Coal	9.9%	50.1%	0.0%	0.0%	0.0%
Coke	10.0%	47.0%	0.0%	0.0%	0.0%
Petroleum	136.6%	0.0%	0.0%	0.0%	0.0%
Natural Gas	0.6%	47.1%	0.0%	0.0%	0.0%
Other Gas	65.0%	47.1%	0.0%	0.0%	0.0%

Figure 2 shows the projected national industrial output by sector for the period 1988 to 2000. Given current forecasts of industrial output (without energy price changes) and future energy price increases, it appears that national output will

FIGURE 2. Industrial Output: 1988-2000

Baseline Scenario



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decline until about 1992 and then should begin a gradual return to previous levels of output through 2000. The construction and mechanical engineering sectors should experience slight increases in their share of overall national output, while metals and the chemical sector will decline in relative terms.

Figure 3 shows the corresponding energy use in the industrial sector over the 1988-2000 period. Energy use will decline as industrial output declines and will increase as output begins to increase in 1992. It is noticeable, however, that energy use in the industrial sector changes in fundamental ways due to rising energy prices. Although output levels should return to their 1988 levels by the year 2000, energy use in the industrial sector does not. Industries respond to higher energy prices by becoming less energy intensive.

Because each industrial sector has a different energy intensity in its production process, rising energy prices have different impacts on energy use among industrial sectors. Table 2 shows energy intensities for the nine industrial sectors for the beginning and ending years of the 1988-2000 period. It is clear that energy intensities in some sectors, such as ferrous metals, adjust more to energy price changes that do intensities in other sectors, such as food processing.

FIGURE 3. Industrial Energy Use

Baseline Scenario

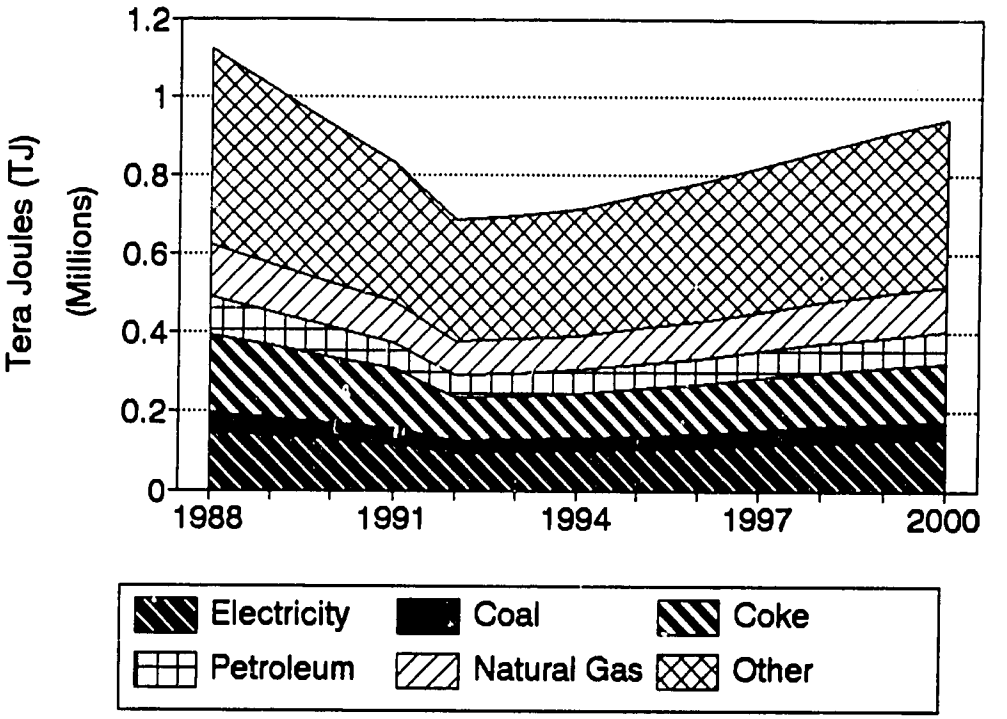

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TABLE 2. Industrial Energy Intensities: 1988 and 2000 (TJ/million Kcs output)

Sector	1988	2000
Mining	1.53	1.36
Chemicals	1.66	1.46
Ferrous Metals	3.95	3.53
Non-Ferrous Metals	1.31	1.18
Mechanical Engineering	0.42	0.37
Construction	0.89	0.77
Forest Products	1.40	1.29
Food	0.45	0.40
Other	0.44	0.40

Economic Price Scenario. There is some opinion that currently planned energy prices will remain below the true economic cost for several energy resources. To the extent that this is true, distortion will still exist in the country's energy price structure and over-consumption and investment will continue to occur.

The second scenario, the "economic price" scenario, replicates the earlier simulation with the exception that energy prices are assumed to reach World Bank estimates of their full economic cost by the year 2000. The same exogenous forecasts for national industrial output used in the baseline scenario are used in the economic price scenario. The anticipated rates of change in energy prices are shown in Table 3.

TABLE 3. Annual Rates of Change of Energy Prices Under the Economic Price Scenario

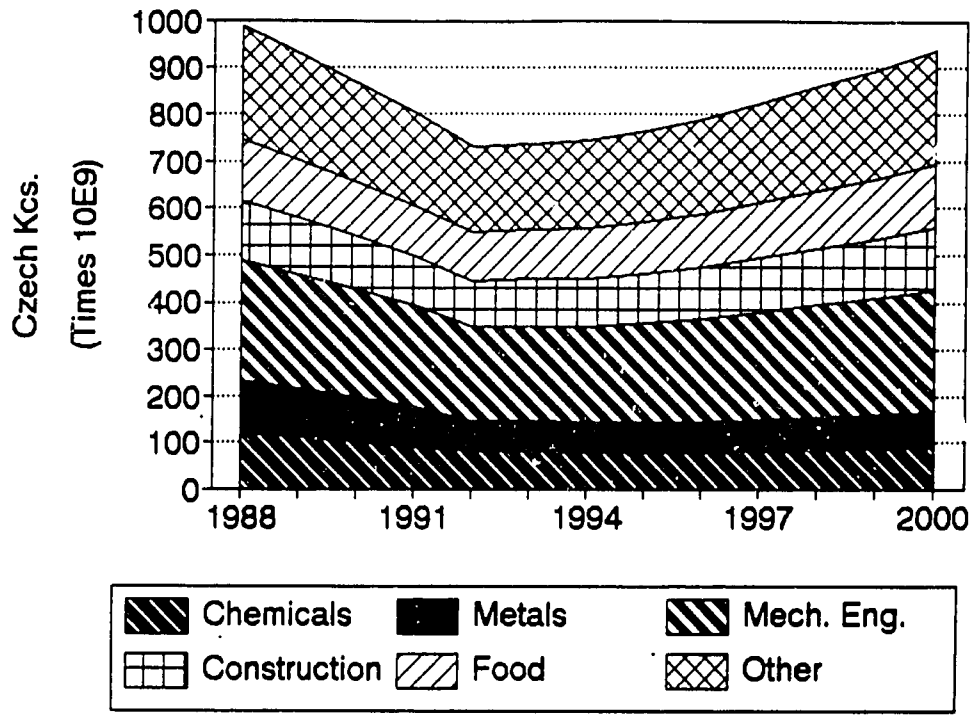
Energy Prices	88-91	91-92	92-94	94-96	96-00
Electricity	7.7%	53.0%	5.7%	5.7%	11.7%
District Heat.	65.5%	0.0%	31.6%	31.6%	73.2%
Coal	9.9%	50.1%	20.3%	20.3%	44.8%
Coke	10.0%	47.0%	9.9%	9.9%	20.9%
Petroleum	136.6%	0.0%	-6.6%	-6.6%	-12.8%
Natural Gas	0.6%	47.1%	2.2%	2.2%	4.4%
Other Gas	65.0%	47.1%	2.2%	2.2%	4.4%

As shown in Table 3, prices will need to increase significantly if economic costs are to be recovered. This is especially true of electricity, district heating, coal and coke. Although petroleum pricing is volatile, it appears that these prices could be reduced in comparison to their anticipated 1992 levels.

Figure 4 shows the simulated national output by industrial sector under the higher energy pricing (economic price) scenario. Output will likely fall again until 1992 and then begin a slow expansion through 2000. With higher energy prices, however, output is not expected to return to its 1988 level by the end of the simulation period (2000). Output under the higher energy price scenario could be as much as 77,352,000,000 Kcs. lower than under the scenario with no further price increases past the 1992 levels. This is due to the decreased demand for domestic consumption that results from energy price-induced price increases in domestically produced goods and services.

FIGURE 4. Industrial Output: 1988-2000

"Economic Price" Scenario



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The impact of rising energy prices on industrial output is more easily seen in Table 4. This table shows how much exogenously forecasted industrial output growth rates are changed because of energy price increases. For example, output in the mining sector is forecast to decrease by 4.42% a year between 1988 and 1991 in the baseline scenario. Output in this sector will decrease by an even larger 6.77% a year if energy prices are increased to the economic price scenario levels. Even larger negative impacts on output growth are experienced in chemicals and metals. In general, as shown in Table 4, rising energy prices will accelerate industrial output declines and will dampen industrial output expansions.

TABLE 4. Effects of Energy Price Changes on Industrial Output Growth Rates

	88-91	91-92	92-94	94-96	96-00
Baseline Scenario					
All sectors	-4.52%	-4.80%	2.34%	4.30%	5.00%
Economic Price Scenario					
Mining	-6.77%	-8.55%	1.68%	3.65%	4.68%
Chemicals	-9.40%	-11.39%	-1.52%	0.46%	3.10%
Ferrous Metals	-7.85%	-24.43%	-0.98%	0.95%	3.31%
Non-Ferrous Metals	-6.78%	-17.94%	0.15%	2.11%	3.91%
Mech. Engineering	-5.63%	-7.24%	1.38%	3.34%	4.52%
Construction	-6.20%	-7.0%	1.84%	3.82%	4.77%
Forest Products	-6.10%	-5.48%	1.01%	2.95%	4.33%
Food	-5.80%	-5.61%	1.26%	3.21%	4.46%
Other	-5.31%	-7.76%	1.61%	3.57%	4.64%

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FIGURE 5. Industrial Energy Use

"Economic Price" Scenario

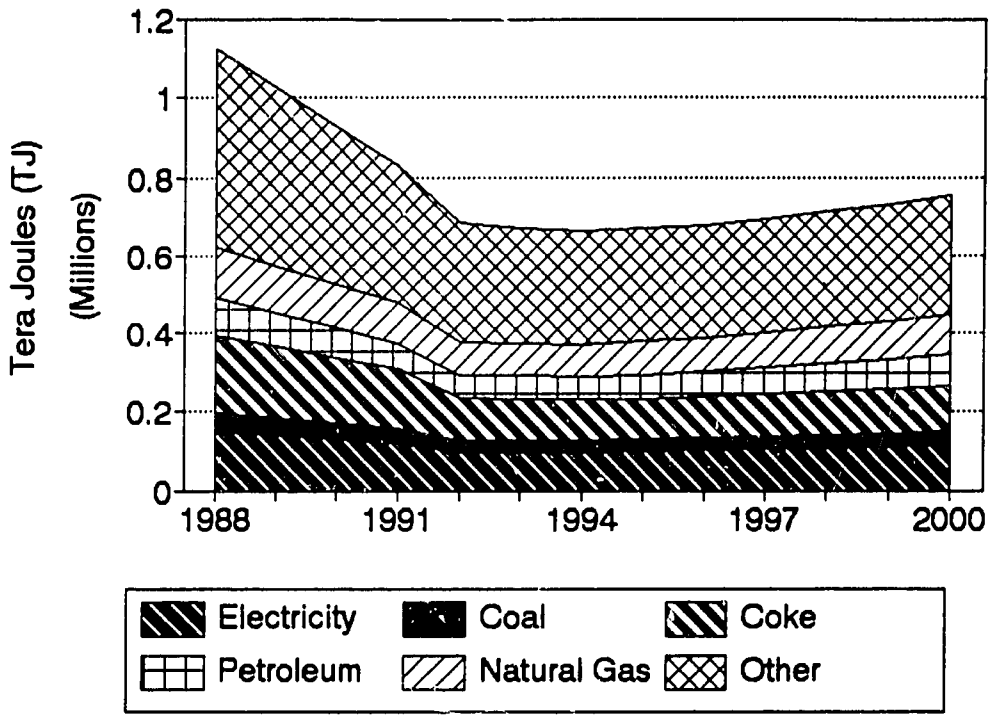

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Figure 5 shows the corresponding industrial energy use that would be required for the output levels shown in Figure 4. Under the economic price scenario, energy use in the industrial sector does not significantly expand after the 1992 decrease. The consumption of natural gas and petroleum products increases slightly in the industrial production process, while the use of coke, coal and electricity declines. In a general sense, economic cost pricing of energy resources will cause Czechoslovakian industry to make significant, long-run reductions in its overall energy intensity.

IV. IMPLICATIONS FOR ENERGY POLICY AND PLANNING IN CZECHOSLOVAKIA

Clearly, the analysis summarized in Section III is not complete. The current version of INDMOD is based on the best information available at this time, but this data has yet to be independently verified. INDMOD itself is not yet complete. Further development is needed (and underway) in the areas of: (1) cross elasticities of demand among fuels; (2) output links to imports and exports; (3) output and income links to government spending and revenues; (4) determinants (demand, supply and constraints) of national investment; (5) employment and income links; and (6) links between INDMOD and the environmental data base of the LEAP model.

This notwithstanding, the analysis presented in this paper does raise several important points for further consideration.

A. Energy price changes have multiple impacts. Energy pricing decisions should not only deal with the issues of marginal cost pricing or international tradeability of individual fuels. Prices determined for one energy resource affect the demand for not only that fuel, but also for other related energy resources. Higher energy prices ultimately also affect the demand for industrial output which, in turn, affects national (republic) employment, income and the governmental fiscal condition.

B. Aggregate impacts of individual decisions are significant and important. Energy price reform is an important element of the overall economic reform occurring in Czechoslovakia. Energy prices will play a key role in determining the pace and direction that economic restructuring takes within the country.

The overall impacts of energy pricing reform can be significant. Although these impacts will mostly be positive in the long-run, some short-run impacts may be significantly negative and may require some transitional assistance on the part of government. For example, if the current (1988) employment-output relationship continues in the future, national employment could be nearly 160,000 jobs lower if energy pricing reform conforms to the economic price scenario. Negative macroeconomic impacts of this proportion may require governmental intervention.

C. Role of strategic economic planning at the national and republic level. An underlying position of this paper is that strategic economic planning will be required at both the national and republic levels of government. In general terms, economic reform within Czechoslovakia is moving away from central planning and towards a market-oriented economy. While this movement is sound, it does not imply an absence of planning in a post-reform Czechoslovakia.

The nature of the planning function will, however, need to be different in a market-oriented economy. To a large extent the output and price setting functions of the central planning approach will no longer be necessary. There will be a need, however, for anticipatory (contingency) and strategic planning functions.

These planning functions arise from the need to coordinate and reconcile energy pricing reforms occurring in the individual energy sectors. For example, pricing decisions made in the coal sector have significant implications for pricing decisions being made in the electricity sector and should be made in this context. In addition, energy pricing reform will have significant impacts on other important sectors of the economy, such as the industrial sector and the financial capital sector. The strategic planning function would be a logical place for coordination with other affected sectors to occur.

In general, it is not sufficient for energy pricing reform to occur only within individual energy sectors. A coordinating, strategic planning function is required.

V. SUMMARY

This paper has attempted to illustrate that many important questions exist due to energy pricing reform that cannot adequately be addressed within individual energy sectors. There is a need at both the national and republic levels to implement a strategic planning function that coordinates and anticipates energy pricing reform. This planning function will require analytical techniques that are capable of capturing the macroeconomic and integrative aspects of energy in the economy.

The CSFR Industry Energy Price Model discussed here is currently still under development. Further data collection and model specification should enable economic models of this type to be used to answer many of the important energy pricing reform questions facing Czechoslovakia.

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The Price Development of Cokeable Coal and of Coke

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During the recent developments in the fuel and energy systems in Czechoslovakia, cokeable coal and coke have always been recognized as vital resources. Their utilization has historically been concentrated in the mining and foundry sectors, although their use is spread throughout the general economy. In spite of their high energy potential they were not valued as solid fuels but rather as charge stock reserved for specific technological utilization. The method of price making for cokeable coal and coke was based on this principle. Production costs and level of quality parameters were taken into account when deciding which level of cokeability was the most important for a specific purpose. Through this long-term development of the resource, the price level of the above mentioned fuels became, to a certain extent, independent of the energy content of its bearer. The heating value of a fuel played little note in determining the fuel's utility value.

This reality was reflected in distorted relative of prices between utility coal and cokeable coal, especially between domestic and world prices. In the author's opinion, this can be eliminated only by complete liberalization of solid fuels prices, provided that the market economy operates efficiently in the near future.

Let us examine the individual types of solid fuels:

Cokeable coal (Czech abbreviation: UVPK) is being produced exclusively in the Ostrqva-Karvina Mining District (OKR). Cokeable coal makes up over 71% of all coal-mining in the Czech Republic (OKR). Of 14 operating coal-mines, 12 mine cokeable coal exclusively. One mine, named Dukla, produces both cokeable and utility coal. The Fucik mine produces only utility coal, though its unused coal reserves contain a large amount of cokeable coal.

OKD State Enterprises long-time monopoly of cokeable coal production ended on November 1, 1990. The coal-mine CSM separated and became the Independent State Enterprise. This coal-mine produces more than 2 million tonnes of cokeable coal and has the highest output in the Ostrava-Karvina Coal-mining District. Beginning in 1991 Czechoslovakia began importing cokeable coal for its metallurgical industry from Poland. This was done on a larger scale for prices considerably under the European market average. In some cases coal is purchased for less than 50 US dollars per tonne, which seriously interferes with the terms of trade projected in CSFR price making. In spite of these circumstances, today's OKD, Inc. maintains its dominant position on the cokeable coal market.

From the viewpoint of price making for cokeable coal and its marketing possibilities, the long-term characteristics of the Ostrava-Karvina District are as follows:

1. Coal production in the Ostrava-Karvina deposit is moving deeper and into technically more difficult seams: seams prone to rock bumps; seams endangered by gas outbursts or coal inrush; narrow seams of 0.400.6 m with extremely low payback, or extremely wide seams of 5 to 6 meters with variable thickness, etc. which results in the continuous increase of total costs of production and subsequently in higher coal prices. If it is not possible to balance these higher costs by growing yields from coal sales, or in any other way - e.g. by redistribution of finances by means of rental levies and grants., an increasing number of mining organizations will totter into losses. Meanwhile the volume of nonprofitable output will continue growing. In this case, the necessary solution lies in maximum acceleration of damping program realization in mining industry. This means a considerable decrease of production with the subsequent results, primarily in the sphere of employment.

2. An important distinction of the Ostrava-Karvina mining district is the markedly different compositions and tectonic conditions of the Ostrava and Karvina deposits. The Karvina area typically has wide seams which facilitate mechanization, higher productivity and lower costs. The quality of the mined coal from the Karvina deposit is lower, however, and consequently so is its price.

In the Ostrava District the quality of the coal is higher, as is the price. The coal is found in narrow, deep seams which are difficult to mine. The variance of production and economic conditions on the deposit can be demonstrated with examples from 1989 figures from three mining organizations from various parts of the District:

Coal-mine	Total costs per tonne of marketable coal in Kcs/t	Overall sales per tonne of marketable coal in Kcs/t
Zapotocky	45,5 98	67,1 84
Paskov	86,9 32	1 02,3 98
Sverma	1 17,0 99	73,3 68

The above situation leads to the progressive differentiation of cokeable coal prices with regards to the quality of coal and the interests of commercial groups. Frequently this hits the sales barrier when the increased quality of a charge in the coking process cannot be adequately reflected in the value of coke.

3. In connection with the movement to more complex deposit conditions in the Karvina area, and the gradual decrease in the Ostrava deposits, there will be a decrease of overall production including the continuous deterioration of mined coal quality and the decrease of its useful value and price. In 1990 the realized sales to external customers (domestic consumption and exports) in the best commercial group V of cokeable coal were 1 247 600

tonnes less than in the previous year. The resulting loss of sales under the high rate of constant costs (70 -75%) can only be compensated by another price increase.

A survey of the most significant data on the development of sales and price relations of cokeable coal in OKR during the past five years is found in the appendix. Included for comparison is the data on sales and the economic situation in the first quarter of this year when the effects of moving towards a market economy could be observed.

In the administrative and directive system of management of the past years, a type of a production price was applied in the mining industry which was based on the overall mining costs and on the centrally determined rentability from production funds. Ever growing production costs in the mining industry under this method of price making, necessitated the change of price level from time to time. This change was realized in one big step, "price reconstruction", in order to secure the minimum profitability of operation connected with coal mining. The last of such reconstructions went into effect November 1, 1989 in the form of emergency increases of cokeable coal prices of 31% and of coke 34%. It should be noted that in similar cases the aim of the price fixing department was to avoid the levelled price adjustment with a unified rentability rate as the central regulation stipulated. On the contrary, price reconstruction was utilized for effective differentiation of solid fuels prices according to individual quality types, primarily with respect to real value relations and sales possibilities. Through such an approach, and to the date of November 1, 1989 when the universal rate of 4.5% profitability was determined, CSFR has achieved a more impressive increase in the price level of cokeable coal. The profitability rate raised above 7%, to the detriment of utility coal and coke.

Price modifications of solid fuels have always been successful in restoring the price balance in the domestic market in the short-term. In no instance can this be said about the foreign trade relations. On the contrary, each price modification widened the discrepancy between the domestic and world prices of coal and coke. This necessitated further directive intervention of the central government in company policy. If the State had an interest in solid fuels export, there was no way out but to cover the losses from the State Budget.

Since the last year, price regulation of coal and coke has been applied by maximum price determination. On the basis of a series of analyses which pointed at the low level of solid fuels prices in comparison to the world market and their negative impact on the income situation of mining organizations, the maximum price of cokeable coal was revalued for 1 December 1990 at the rate of existing prices for 1990 by an index of 1.44. After projecting further increases of input costs, the price index was also increased to 1.6 as of May 1, 1991. This means that the price of cokeable coal as of November 30, 1990 (according to quality and type) multiplied by the price index of 1.6 represents the maximum limit which should not be exceeded. Within this range it is possible to determine the actual price. From the comparisons made it can be seen that the determined maximum price of cokeable coal reaches in several cases (especially with high quality types) the level of average world market prices, not including transportation.

The applied method of price regulation, compared with the former static system of price

making, is undoubtedly more effective and flexible. Because of its "levelled" conception, however, it is still unable to eliminate all existing price distortions and discrepancies. This goal can be achieved only by price liberalization. This can introduce efficient dynamics into the internal structure of coal prices in relation to sale possibilities. Relative to the preceding consideration, it is necessary to emphasize the growing need for criteria for the coal price functions. The solution of this issue is very important in connection with the proposed decreases in coal production in which economic criteria play a decisive role. With view to limited and non-reproducible coal reserves, the problem of decreasing core production must be approached thoughtfully, with consideration of replacement coal imports. This must be done on the basis of world market prices in case CSFR production capacity would be decreased. There is some justification in the view that the crucial level of cokeable coal prices should be determined on the basis of average world market prices for the European market including foreign freight charges. Only in this way it is possible to acquire the proper criterion for appreciation of the effectiveness of cokeable coal production under different mining conditions.

The development of coke prices has always been in close relation with the accepted level of cokeable coal prices because the assortment and quality parameters are fully dependent on the quality of a charge, and thus on the quality of used cokeable coal.

The data survey on production and sale of coke in OKR including price relations during the past period is also given in the enclosed chart. It can be added that coke production in OKR is realized in three separate coking plants. These plants are organized under the name Ostrava-Karvina Coking Plants (OKK). The OKK production capacity represents only one third of the overall coking capacity in CSFR and is therefore not dominant from the viewpoint of price making.

Everything that has been noted regarding the price development of cokable coal can also applied with some modification for the price of coke. As of December 1990 the coke price level was scaled by an index of 1.47 as a maximum price. The coke price index was adjusted to the value of 1.7 in June 1991.

The basic problem in coke price determination is the actual relation to prices of cokeable coal. According to a number of economic analyses which are based on updated calculation costs, the ratio should move around an optimum of 1.7 - 1.8 (some documents give the current world relations as 2:1). Past price modifications owe much to this principle and to the detriment of price increases of other fuel types. This was reflected in distorted prices of coke which in spite of several price adjustments still lags behind those on the world market. This is especially striking for the price of fuel coke which was intentionally kept down for a long time in an effort to secure cheap ecological fuel. Unfortunately this trend survived until these days when the dual price level of fuel coke is still in use: Higher price for wholesale consumption and lower for consumers and heat production in boiler rooms up to 6 MW while the economic impact is borne by the supplier in the whole range.

Because the price of fuel coke in foreign markets is roughly at the same level as the price of quality foundry coke, the above mentioned directive price must affect the supplier with

an adverse motivation to fully develop his market behavior. As with cokeable coal, the solution to this problem lies in complete liberalization of coke prices and in the application of the average coke prices in the European market, including foreign freight transport, as a criterion for appraising the effectiveness
of the price for production and sale.

OKD Mines Ostrava

APPENDIX

Cokeable Coal

Year	Production Thousand Tonnes	Supply for Domestic Use Thousand Tonnes	EXPORT To COMECON Countries Thousand Tonnes	EXPORT for Hard Currency Thousand Tonnes	Average Domestic Price KCS/t	Average Export Price To COMECON Countries Thousand Tonnes	Average Export Price for Hard Currency Thousand Tonnes	Total Production Cost per Tonne KSC/t
1986	16 201,2	9 871,4	1 545,2	898,4	704,05	369,13	861,97	557,64
1987	16 200,6	10 185,8	1 161,4	799,9	706,16	660,04	674,28	569,44
1988	16 222,8	10 341,0	1 070,3	859,4	702,80	612,94	672,94	595,15
1989	15 965,7	10 346,8	993,3	1 212,4	916,18	599,65	725,28	678,31
1990	14 383,3	9 724,3	123,5	2 248,5	944,19	595,93	1 082,13	742,64
3 Months of 1991	2 865,6	1 970,4	-	288,7	1 318,50	-	1 675,02	978,46

Coke

Year	Production Thousand Tonnes	Supply for Domestic Use Thousand Tonnes	EXPORT To COMECON Countries Thousand Tonnes	EXPORT for Hard Currency Thousand Tonnes	Average Domestic Price KCS/t	Average Export Price To COMECON Countries Thousand Tonnes	Average Export Price for Hard Currency Thousand Tonnes	Total Production Cost per Tonne KSC/t
1986	2 903,0	1 900,9	638,5	363,1	962,10	1 126,70	1 753,95	991,10
1987	3 000,0	1 699,5	873,0	727,4	961,35	1 110,76	1 310,20	977,36
1988	2 930,0	1 574,5	878,7	471,5	965,32	1 026,96	1 256,11	1 013,34
1989	2 519,0	1 277,9	731,4	509,5	1 314,91	986,92	1 379,93	1 420,45
1990	2 421,9	1 430,9	481,9	510,0	1 349,81	889,80	1 931,39	1 422,60
3 Months of 1991	550,7	382,5	-	167,9	1 934,20	-	2 734,03	2 017,32

The Problems of Utility Coal Price Setting

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Three separate price schemes have long been used for setting the resale price of solid fuels in Czechoslovakia. Separate pricing mechanisms are used for cokeable coal, coke, and for utility coal, including briquettes. I will discuss the problems of price setting for utility coal.

Until last year, binding utility coal prices were determined by the State. The price lists had nation-wide validity both for customers purchasing without turnover tax,(i.e. for wholesale prices) and for customers purchasing for retail prices (i.e. including the turnover tax). Until May 1, 1991, the retail prices were lower than wholesale prices and the difference was refunded from the State budget. Since May 1, 1991 the government has discontinued the grants; the price of retail and wholesale coal are both at a zero turnover tax rate.

As a result of the new Price Act, effective January 1, 1991, the character of all solid fuel prices has changed. The prices are not fixed anymore, only their maximum limit is officially determined. Presently, the maximum level corresponds to the 1990 price list for wholesale utility coal, with a increase at parity A by coefficient 1.5, at parity B by 1.4. The prices at parity A do not include transportation costs while the prices at parity B include the costs for transport (which is about 29% of the price of parity A). Parity A prices are used for automatic coal deliveries, on conveyors and cable cars - essentially for consumers at the coal production locality. Parity B prices apply to all customers served by railway or water transport.

This method of price regulation according to the price list VC 1/2 1990 is binding only for producers of utility coal in the Czech Republic where the principle of permissible projection of costs into prices is applied.

In spite of the changes in pricing policy resulting from the new Price Act and provisions in the execution of the law, the long-term system of utility coal price setting has not changed significantly to this point. The overall level of utility coal prices is determined on the basis of average economic conditions of all producers. In other words, it is derived from total costs and average profit. This is cost pricing. As the individual total production costs differ substantially according to unequal natural and situational conditions for mining, the producers whose individual production costs are lower than the determined price, attain extraordinary profit and in the converse case, an extraordinary loss. Financial adjustment for different mining, geological and location conditions have been made by over distribution of financial means from mines with better conditions into the mines with worse conditions.

The existing system of utility coal price setting was based on the desire for a uniform

utilization of national natural resources. The policy, based on the principle that the natural coal deposit distribution can not be changed, was aimed at the elimination of the undeserved advantages or drawbacks of both coal suppliers (from the viewpoint of deposit conditions), and coal purchasers (from the viewpoint of distant coal deposits). Another factor was the desire to replace utility coal with other primary sources of fuel and energy through centrally directed planning and economic control (including the practical impossibility for individual consumers to import fuel).

The existing system of utility coal price setting suffers from a number of deficiencies. Since prices do not express the real economic value of the product, requirements for fuel and energy are very high, causing a disproportionate decrease in profitability of mining and processing plants. Drawn off are the extraordinary profits which were achieved not only because of more advantageous natural conditions, but also the application of scientific and technical development.

We suppose that under market economy conditions it will be necessary to transfer from the cost-type of utility coal prices to criterion prices. These prices will be based on the selected degree of liberalization, either as an upper limit of market prices or as an orientation scale for coal producers' use in determining market prices themselves.

The determination of criterion prices of utility coal is necessary to determine its' competitive ability in relation to other primary fuel and energy sources. The criterion price would also set a limit, which, if exceeded, would force a decision as to whether the output of a mining unit should be decreased or liquidated. This could happen in a case when the individual total costs are higher than the criterion prices. The market/resale prices of utility coal should fall in a range with criterion prices as the upper limit, and low individual production costs as the bottom limit.

The method of setting the criterion prices of utility coal has been discussed in expert circles and research institutes for a long time. For ecological reasons, gradual replacement of utility coal by natural gas and nuclear power is being considered. These are the two real substitutions which are being gradually enforced. The most frequent proposals determine the level of criterion prices of utility coal in relation to the import price of natural gas, using the principle of cost equality to acquire the comparable use value (e.g., heat).

Recently, discussions examining the need for a different approach for specifying the criterion prices of so called special purpose utility coal with a heating capacity of up to 11.1 MJ/kg, high content of ashes, and sulfur, and the criterion prices of quality utility coal with a low content of ashes, a heating capacity higher than 11.1 MJ/kg. Special-purpose coal criterion prices should be derived from the relative economic effectiveness of coal-burning power stations equipped with desulphurization equipment, comparable to the economic efficiency of nuclear power plants. The specific costs of electricity production in coal-burning power stations should not be higher than the specific costs of this production in nuclear power plants.

Criterion prices for quality utility coal, presently used primarily for industrial and district

heat production, and individual consumer production should be derived from the export prices of our inland coal, the prices of imported natural gas, or from the relative economic effectiveness of integrated steam-gas equipment based on utility gas produced from quality utility coal, evaluated against the economic demand of this equipment on the basis of natural gas. These recommendations for utility coal price setting are the result of research in the Research Institute for the Fuel and Energy Complex (Vupek).

In addition to determining utility coal criterion prices, the internal differentiation of individual types of coal according to heating capacity, granularity and other characteristics must be done to facilitate pricing and marketing. Presently, the basic method for market price differentiation of utility coal is the one used to evaluate utility fuels.

The use quality of utility fuel can be determined by the following method. The use value is given in grades of useful heating capacity, which are calculated according to the amount of heat produced by incineration of a unit of coal. These values are determined separately according to the furnace type used - grate boilers incinerating low-ash coal, power station dry bottom boilers incinerating special-purpose coal with ash content, and wet-bottom units for burning fuels with high ash content.

I think that market price differentiation of utility coal is the right approach, there is no reason to change this well-established practice.

The second characteristic for internal differentiation of utility coal prices is granularity. The price of coal which has passed through the preparation process should, at a minimum, reflect processing costs. The market prices of different grades of coal are determined by degree of preparation and resulting granularity. In addition, market price may include a purely commercial aspect, the supply and demand of individual grades of utility coal. No price differentiation of utility coal is made according to other criteria, e.g. according to sulphur content.

This discussion of utility coal price setting cannot be closed without mentioning some particular problems of mining production and use of coal in transfer policy. Utility coal is taxed for environmental protection and for utilization of natural resources. Now the question is, should these specific taxes, if applied, facilitate formation of a capital fund so profitable coal mines and preparation plants can finance their development.

Some Data about the Price of Steam Coal [Kčs/tonne]

1. Steam coal price development

Period	Price increase index
1971	1.000
1975	1.000
1980	1.201
1985	1.895
1990	2.281
1991	3.420

2. Coal prices in parity A. 1991

a) parity A - sorted coal (according to size)

Min. heat value [MJ/kg]	Mine's location				
	Kladno KD	Most SHD	Sokolov HDBS	Prievidza SUB	Hodonín JLD
25	690.30	-	-	-	-
20	514.20	557.30	-	-	-
18	443.90	487.50	-	494.00	-
16	373.40	417.80	441.60	423.00	-
14	-	348.00	368.70	351.90	384.50
12	-	278.30	295.80	281.00	309.60

b) parity B - other unsorted coal

Min. heat value [MJ/kg]	Mine's location				
	Kladno KD	Most SHD	Sokolov HDBS	Prievidza SUB	Hodonín JLD
20	450.80	458.10	-	-	-
18	403.10	410.10	-	410.70	-
16	355.20	362.00	364.40	362.60	-
14	307.40	314.00	316.10	314.40	-
12	212.40	254.00	255.50	254.10	257.40
10	173.30	178.40	179.40	178.40	180.90
8	130.60	139.50	141.00	139.40	142.80
6	-	98.70	-	-	-

Note:

The prices of the SUB coal, Slovenské uhelné baně - Slovak Coal Mines, are shown for illustration only. The coal prices in Slovakia are no more regulated.

3. Average prices in parity A

Mine's location	Heat value [MJ/kg]	Average price in parity A
Kladno	17.24	411.31
Svatoňov	12.01	215.04
Zbůch	17.06	416.02
All Kladno mines	15.95	364.03
SHD Most	12.37	258.28
Sokolov	12.53	250.81
SUB Prievidza	11.41	236.12
JLD Hodonín	8.52	148.91
Total average		256.10

4. Cost - benefit ratio

Mine's location	ratio
KD Kladno	2.207
SHD Most	0.959
HDB Sokolov	0.994
SUB Prievidza	2.548
JLD Hodonín	2.796

Prices of Liquid Fuels: Development and Present State

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The realization of measures in the field of prices is very important in creating market conditions. The price policy needs to strengthen the influence of the domestic and world markets on the creation of prices. The final result of the price policy should connect world and internal prices. Production and consumer prices should be connected within the framework of the national economy.

It is necessary to seek out the most rational procedures when attempting to attain the goal of the price policy. Some economists, especially in the Price Offices, were of the opinion that the starting-point should be the last reconstruction of wholesale prices, (as of 1.1.1989). In its preparation, as in all the preceding reconstructions after 1970, the production type of price was considered to be the most suitable, with the determination of the permissible percentage of rentability to production funds.

The plan calculations of 1987 were taken as the basis for the calculation of prices in the chemistry branch:

- the increase in wages deductions from 20 % to 50 %,
- the reduction in expenditure prescribed by the state plan up to 1989 (inclusive), according to the 8th 5-Year Plan,
- the reduction of costs by the exclusion of expenditure on enterprise culture, special-interest holiday, sports and physical-training activity and paid interest,
- the amendment of the payload and the re-evaluation of material consumption in terms of the new wholesale prices.

New wholesale prices in current production of all manufacturers were determined according to the average expenses of those organizations which to a decisive extent satisfy social demand and achieve the highest technical-economic parameters in production and with individual manufacturers.

When calculating profit in new wholesale prices a uniform measure of profit of 4.5% had to be implemented to the volume of production funds of the initial year (1977) in purchase prices. The volume of profit of the production department this calculated was transformed in calculating prices of products to rentability with regard to processing costs, and in permitted cases to overall costs.

Calculations for businesses had to be established in accordance with valid regulations and summarized:

1. Direct material
2. Direct wages
3. Other direct costs
4. Production overheads
   Items 1 - 4 - actual costs of production
5. Administration overheads
   Items 1 - 5 - actual costs of output
6. Sales costs
   Items 1 - 6 - complete actual costs of output
7. Profit
   Items 1 - 7 - wholesale price.

We will give at least a brief outline of the content of the individual items of this type of calculation:

1. Direct material

This would include all raw materials, material, bought semi-products and semi-products of which can be determined directly in a calculation unit (most frequently the quantity of the product in material units).

2. Direct wages

Wages included in costs, and other personal costs directly connected with the execution of output which can be determined directly in a calculation unit. Usually the wages of production (operation) workers for the time worked or for piece work completed, also included is the wages for other workers if their wage is connected with the production or other process and it is possible to independently determine.

3. Other direct costs

This item covers all time-linked primary and secondary costs connected with management which cannot be determined directly in a calculation unit, for instance:

- material
- fuel
- electricity
- costs of repairs and maintenance of basic means
- transport
- depreciation of basic means.

5. Administration overheads

This item would include all the time-determined primary and secondary costs connected with the management and administration of the organization, or with the internal organizational unit which cannot be determined directly in a calculation unit and does not come under production overheads (it is not possible to determine them per organizational unit).

6. Sales costs

This would include time-determined primary and secondary costs connected with sales activities, budgeted and invoiced as sales costs. This focuses in particular on the costs expended on storage, advertising, sales and expedition.

7. Profit

Under this item it was possible to calculate 4.5 % of the value of production funds in the complex reconstruction of wholesale prices as of 1.1.1989. (The amount of profit was set with each change in wholesale prices.)

This method was also used in the past for determination of the prices of liquid fuels (Diesel fuel, light heating oil, heavy heating oil). In the case of heavy heating oil the Price Offices tried to determine the wholesale price directly, but they always had to take into account the amount of complete actual costs of the main manufacturers.

With regard to what has already been said, wholesale prices of liquid fuels depended mainly on the determined wholesale price of crude oil. Crude oil was purchased from 1962, when the oil pipe-line DRUZHBA was completed, exclusively from the USSR. The price was also set by the Bodies of the Council of Mutual Economic Aid (known as 5-year sliding prices). The price was set on the basis of average world prices of crude oil over the preceding 5 years, which meant, with the application of the rate of the Ruble with regard to the dollar and that of the Ruble with regard to the Czechoslovak Krown (Kčs), that for a long time we purchased crude oil at very low prices. (1 USD = 0.6 Rbl, 1 Rbl = 10 Kčs, 1 USD = 6 Kčs.) It must be mentioned, however, that crude oil as a basic raw material was included in central price regulation, which meant that a foreign trade enterprise bought the crude oil from the USSR for an agreed purchase price and the difference between this price and the determined state wholesale price was balanced with the state budget. Production organizations purchased the crude oil for the wholesale price set by the state up to 1. 1. 1991. Over the past four years the wholesale price was set as follows:

	1987	1988	1989	up to 15. 11. 90	after 15. 11. 90
Wholesale price of crude oil (Kčs/t)	2250	2250	1550	1550	5280

The purchase prices of crude oil from the USSR which were paid by Chemapol as. were, however, far lower (800 - 1100 Kčs/t) and therefore considerable amounts flowed into the state budget from the difference between the wholesale price and the purchase price. With the purchase of around 16 million tons of oil annually this income represented around 20 million Kčs for 1987 and 1988, and around 18 million Kčs for the years 1989 and 1990.

The wholesale price of crude oil of 2250 Kčs was in force from 1984, when reconstruction of wholesale prices took place. This wholesale price was valid until the next reconstruction of wholesale prices on 1.1.1989, regardless of the changes in the price of crude oil on world markets. Even after the reconstruction as of 1.1.1984 the prices were

determined by the same method that I have described - on the basis of calculation by the cost method.

Not only were there low purchase price and wholesale prices for crude oil, but there was relatively low wholesale prices for liquid fuels due to the reconstruction of wholesale prices:

	Wholesale price	Turnover tax	Wholesale price with tax
Heavy heating oil	2050 Kčs/t	280 Kčs/t	2330 Kčs/t
Light heating oil	2550 Kčs/t	450 Kčs/t	3000 Kčs/t
Summer Diesel fuel	3170 Kčs/t	3080 Kčs/t	6250 Kčs/t

The wholesale price also determined the turnover tax. (W.P. + turnover tax = W.P. with tax.)

All organizations pay the wholesale price including tax with the exception of organizations which supply heat for citizens for communal consumption for households (district heating). These organizations purchased liquid fuels from the production or sales organizations and received retail prices which were considerably lower.

	Retail prices
Heavy heating oil	660 Kčs/t
Light heating oil	820 Kčs/t
Summer Diesel fuel	6571 Kčs/t

The difference between the wholesale and retail prices was paid from the state budget in the form of subsidies to fuel prices. The situation was similar in later years (actual prices of liquid fuels are given in the table).

By Czechoslovak Government Decree No.180 of 28.3.1991, subsidies from the state budget of the Federation were abolished for the prices of the final consumption of solid and liquid fuels and for the prices of thermal power supplied to the public from 1.5.1991. The state budget will provide a grant up to the end of 1991 only for covering the difference between the price of thermal power for the public. This is based on the cost of thermal sources for solid fuel and the actual costs to the supplier of the heat from these sources with a capacity of 6 MW that burn gaseous and liquid fuels in boiler houses.

The above decisions of the Czechoslovak Government cover state grants for power generation to a considerable extent. The liberalization of prices realized from 1.1.1991, in spite of the regulations set by them, brought the level of sales prices of liquid fuels produced in refineries in the CSFR close to the level of world prices.

As can be seen from the previous numbers, distortion in the relationships of internal price circles is of such an extent and the problems which arise from this fact are of such a basic nature that it is impossible to eliminate them even through the liberalization of

prices. I therefore feel that the creation of the correct market relationships among the prices of individual fuels is a long-term problem.

The History, Development and Present Situation of the Prices of Gas Fuels

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I. The history and development of Czechoslovak gas manufacture

The beginning of gas production goes back to the second half of the last century. The first gas plant began operation in Prague in the year 1847. By World War I some 85 gasworks were in existence. Gas production was at that time connected mainly with the production and distribution of gas and this period lasted approximately one hundred years. The situation changed when the gas line "Friendship" and later "Transit Gas Line" started to supply natural gas to Czechoslovakia and this moment represented the beginning of the building of the complex network of high pressure pipelines, local networks and underground reservoirs. In the year 1975 the amount of 2.6 thousand million m^3 was imported while in 1987 it was as much as 10.6 thousand million m^3 and the estimate for the year 1991 is 14 thousand million m^3 of gas to be imported. At present the delivery of natural gas is limited in the territory of Czech Republic and amounts to approximately 2 thousand million square meters annually.

II. How the prices of gas fuels were made and developed in the course of years 1980 - 1990

Gas fuels together with other energy resources have been considered to be the products for which the price levels have been fixed by the Federal Price Control Board for both wholesale and retail prices.

1. The purchase of gas

The main resource - the imported casing-head gas - was put into the group of products called " Group I of Central Price Control" and its purchase was for "centrally controlled price" (CCP) through the trading company PZO Metalimex. The level of CCP was defined by means of expected purchase price from the USSR and this level was liable to ensure the stability of actual costs for natural gas in the particular five-year plan.

The contracted price was calculated by the caloric value (33.41 giga Joule/thousand m^3) and its actual level was dependant on the actual heating value of delivered gas. Differences between the purchase price and "centrally controlled price"-(CCP) were settled in relation to the state budget by the foreign trading company PZO Metalimex. The development of contracted prices, purchase prices and centrally controlled prices and their impact on the state budget is shown in the following table:

Year	Actually achieved price for thousand m^3 contract price Ruble	Kcs	CCP Kcs	Relation to the state budget [mil. Kcs] Subsidies - Deliveries +
1980	58	870	565	+ 2 348.2
1981	75	907	907	- 2.7
1982	94	1131	907	+ 1856.0
1983	110	1236	907	+ 2826.2
1984	117	1314	1768	- 4298.5
1985	120	1350	1767	- 3913.0
1986	121	1361	1773	- 4323.2
1987	113	1268	1777	- 5370.7
1988	98	1036	1754	- 7682.0
1989	88	881	1197	- 3717.6
1990	75	719	1264	- 6703.4

2. Wholesale prices from distributing networks

Wholesale prices (WP) were derived from :
- the costs for purchase of heating gases;
- "actual costs," those including costs of gas distribution and underground storing;
- the profit at the level corresponding to the pre-defined scale of profit from production funds (4.5 percent in the wholesale prices since January 1, 1991).

Gas was purchased for WP by two categories of consumers :
- "big consumers" whose deliveries were larger than either 120 thousand m^3 municipal gas or 60 thousand m^3 natural gas;
- "small consumers" whose deliveries were less than either 120 thousand m^3 municipal gas or 6 thousand m^3 natural gas annually.

For these two categories of consumers there were prescribed wholesale prices:
-for the category of "big consumers" a basic rate (WP for 1 m^3 of delivered gas);
-for the category of "small consumers" a mixed rate (one that contained WP for 1 m^3 of delivered gas as well as a certain fixed payment paid monthly).

Quite exceptional WP was prescribed for deliveries of the natural gas (as a by-product of oil mining) which was consumed to ensure the production of municipal gas.
The tables No. 1 and No. 2 present the survey of actual WP for the years 1980 - 1990.

3. The sale prices of gas fuels for households

When the prices for households (meaning retail prices) were calculated, the principle of "cheap energy" was applied within the framework of the overall social policy of the state.

The last change in the retail prices (RP) was made on January 1,1979. The difference between the price prescribed by the state and the price paid by consumers was indemnified to the gas producing industry by negative turn-over tax or non-investment subsidies.

The retail price (RP) was charged for deliveries from distribution networks to households and was divided into two categories:
- up to 900 m^3 natural gas as a by-product of oil mining and 1500 m^3 municipal gas (basic rate);
- over 900 m^3 natural gas as a by-product of oil mining and over 1500 m^3 municipal gas (mixed rate).

Basic rate: - specifies the price for the volume 1 m^3 of delivered gas
Mixed rate: - specifies:
- fixed payment paid monthly for each specifically measured consumer place
- the rate for the volume 1 m^3 of delivered gas.

The producers of heating energy from resources whose performance was lower than 6 MW were charged according to the mixed rate that was prescribed in 1979 for the level of WP for 1 m^3, plus the same monthly payment as with the mixed rate for citizens. The table No.3 presents the survey of retail price (RP) in the years 1980 - 1990.

III. The price calculation of gas fuels in the year 1991

In 1991 several dramatic changes were made in the price policy :

1. The purchase of natural gas imports at world prices as quoted in USD was realized, and the system of centrally controlled prices was abolished on January 1, 1991.

2. The right to set prices for the production sphere (formerly the wholesale prices WP) was transferred to the gas producing organizations. The government decreed - within the framework of "material price regulation" (the ruling of Federal Ministry of Finance, Ministry of Finance of Czech Republic, Ministry of Finance of Slovak Republic No. 09/91) - that prices must be calculated based on economically justified costs resulting from the purchase, processing and circulation of goods, plus a reasonable profit.

3. As concerns prices for the sphere of final consumption (formerly the retail prices RP), the government claimed the right to set maximum prices for these deliveries (the ruling of Federal Ministry of Finance, Ministry of Finance of Czech Republic, Ministry of Finance of Slovak Republic No. 01/91).

Specific impacts on the calculation of prices in the course of this year can be expressed in the following way :

- as a consequence of the changes in hard currency and its rates the ČSFR will pay for imports of natural gas in 1991 approximately 35 thousand million Czech Krowns (in comparison, under the conditions of the year 1990 it would have paid 10 thousand million Czech Krowns).

- the prices for consumption in the industrial sphere are (after January 1, 1991):

• natural gas	3.35 Czech Krowns/m^3.....(basic rate) 3.35 Czech Krowns/m^3 + fixed payment of 46.00 Czech Krowns monthly.....(mixed rate)
• municipal gas	1.85 Czech Krowns/m^3.....(basic rate) 1.85 Czech Krowns/m^3 + fixed payment of 46.00 Czech Krowns monthly.....(mixed rate)

All these categories regarding the consumed amount of gas have been retained thus far. Prices for final consumption were changed on May 1, 1991 by the governmental in terms of "maximum prices". Table 4 shows particular prices and deliveries. Because the prices calculated in this way (initial prices x coef. 2.34 or 1.64) are below the level of import purchase prices, maximum deliveries of municipal gas were limited to 6 thousand cubic meters.

IV. Conclusions

The changes that were made in the control of price policy in the course of this year represent only the first step in the transition from centrally controlled policy to the conditions of market economy. From all the calculations made by the Czechoslovak Gas Production Board it can be seen that the present price of natural gas sales should be :

- deliveries from the local network...approximately 4.00 Czech Krowns/m^3 (citizens)

- deliveries from high-pressure system.... 3-3.60 Czech Krowns/m^3 (industrial deliveries dependent on the season of the year)

<u>The price development of natural gas for final consumption (averaged)</u>

The price on:	
April 3, 1991	0.85 Kcs/m^3
May 1, 1991	2.0 Kcs/m^3
present cost for final consumption	4.0 Kcs/m^3
December 31, 1991 price after the calculation of risk factors	5.0 Kcs/m^3
The world price	8·9 Czech Krowns/m^3

The increase in prices for industrial consumption :

November 30, 1990	1.53 Czech Krowns/m^3
December 1, 1990	2.52 Czech Krowns/m^3
January 1, 1991	3.35 Czech Krowns/m^3
The world price	4.00 Czech Krowns/m^3

From the figures given above it can be seen that during the transition to the conditions of a market economy, the main problem for the gas producing industry - reflecting the current rate of the Czech Krown - resides in the social sphere. A certain "shock" can be expected for the category "citizens".

I believe that in the present situation the main thing is to create the conditions for a "starting up mechanism" that would meet the requirements and interest of both the government and the gas production industry. This mechanism might include:

- The right to make prices for industrial and final consumption.

- Transition to tariff prices of gas.

- The change of prices for final consumption to an acceptable level for gas production, that is, purchase price plus minimum profit.

- Economic incentives for the gas production industry in terms of rational gas consumption.

- Investment by the gas production industry in research and development for new appliances.

- The complex care of consumers, relative reduction in prices for non-production consumption.

The principal and quantitative change in the structure of prices is the switch from the "basic rate" to a system of tariff prices. In the ČSFR, where 70 percent of consumers use gas only for meal preparation, the disadvantages of the basic rate (which disregards the influence of fixed costs) appear especially acute. The possibilities for the introduction of tariff prices are currently being studied.

Table 1. The Survey of Actually Quoted Prices WP of Natural and Municipal Gases in the Czech Gas Production Concern in the Years 1980- 1987

KCS/thousand meters cubed

The Sort of Delivery	1980	1981	1982	1983	1984	1985	1986	1987
Natural Gases								
Wholesale	846,48	1 243,64	1 259,41	1 275,18	2 039,03	2 120,38	2 120,60	2 116,12
Retail Sale	889,26	1 467,50	1 323,14	1 353,97	2 542,99	2 264,48	2 244,70	2 234,79
for Municipal Gas Production	632,41	928,76	944,34	938,20	1 870	1 870,-	1 870,-	1 870,-
Imported form USSR for Consumption in the Industry of Energy	565,08	907,-	907,-	907,-	1 800,-	1 800,-	1 800,-	1 795,94
Municipal Gas								
Wholesale	407,85	599,97	607,32	615,55	1 012,-	1 064,43	1 024,-	1 024,-
Retail Sale	438,17	747,69	650,75	656,72	1 321,41	1 093,14	1 118,67	1 079,21
The Purchase of Municipal Gas	435,74	575,27	585,22	585,89	743,11	748,69	741,27	753,81

Table 2. The Survey of Actually Quoted Prices WP of Natural and Municipal Gases in the Czech Gas Production Concern in the Years 1988-1990

KCS/thousand meters cubed

The Sort of Delivery	1988	1989	1990
Natural Gases			
Wholesale	2112,29	1525,35	1643,45
Retail Sale	2262,32	1428,19	1772,17
for Municipal Gas Production	1870,-	1270,00	1364,05
Imported form USSR for Consumption in the Industry of Energy	1800,-	1200,-	1200,- 1920,- since 1.12.90
Municipal Gas			
Wholesale	1023,76	741,13	785,80
Retail Sale	1099,22	616,54	819,46
The Purchase of Municipal Gas	766,50	646,53	692,77

Table 3. The Prices of Gas Fuels Quoted for Households and Producers of Heating Enrgy from Resources Lesser then 6 MW

Type of Gas	1979 - 1.5.1991	
	Price for final consumpt. in KCS	
Natural Gas from Oil Mining		
- basic rate	-	1,20
- mixed rate	37,50	0,70
Municipal Gas		
- basic rate	-	0,75
- mixed rate	37,50	0,45
Prices for Producers of Heating Energy Delivered to Households from Resources Lesser than 6 MW		
- natural gas from oil mining	37,50	0,80
- municipal gas	37,50	0,53

Table 4. The Sale Prices of Gas Fuels Quoted for Households and Producers of Heating Enrgy from Resources Lesser then 6 MW

A. The Sale Price for Households Deliveries

Type of Gas	Price for final consumpt. in KCS	
	Fixed Monthly Payment	Price for Volume Unit
Natural Gas from Oil Mining		
- basic rate	-	2 80
- mixed rate	88,-	1,65
Municipal Gas		
- basic rate	-	1,25
- mixed rate	61,50	0,90

B. The Sale Prices for Producers of Heating Enrgy Delivered to Households from Resources Less Than 6 MW

Type of Gas	Price for final consumpt. in KCS	
	Fixed Monthly Payment	Price for Volume Unit
Natural Gas from Oil Mining	88,-	1,90
Municipal Gas	61,50	0,90

C. Fixed Monthly Payments for Deliveries of Natural Gas From Oil Mining to Households when Gas Meter Disconnected

Type of Appliance	Type of Gas	Number of Family Members					
		1 Person	2 Person	3 Person	4 Person	5 Person	6 + Person
Gas Range	Natural Gas from Oil Mining	17,50	20,-	23,50	28,-	31,50	37,50
Combined Gas Range	Natural Gas from Oil Mining	14,-	16,-	18,-	20,-	24,-	28,-

Type of Appliance	Type of Gas	Constant Monthly Payment for one Appliance in KCS
Gas Range	Natural Gas from Oil Mining	14,-
Combined Gas Range	Natural Gas from Oil Mining	14,-

Some Comments on the Price Level of Electricity and Heat

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The policy of "cheap energy" which lasted several decades is currently being changed. In the beginning this policy could be justified by the need to accelerate industrial development and by certain societal requirements (in relation to the residents). For the last twenty years, however, it has merely served to contribute false information to the decision-making process. The outcome is a system which places disproportionately high demands on resources in producing the national product. At the same time this system is devastating the environment, and resulting in energy production facilities that certainly are not "a proper outfit" for our "return into Europe". The present situation cannot be entirely attributed to the price policy; indeed, this would be overestimating its role in the centrally controlled economy. In fact, price policy did contain some economic criteria for the evaluation of a successful economy, but the effects were short-term because in reality efforts to achieve immediate goals - the indices of year's plans - took precedence over all mid-term and long-term concepts.

In general, it can be said that prices did not function to the extent required: as a yardstick for value; as criteria for decision-making processes regarding the amount, allocation, structure and chronological introduction of resources and needs; nor did they stimulate the behavior of suppliers and consumers. Real management was focused mainly on direct tools (limits, etc.) and corresponding sanctions that some very artful consumers often managed to avoid. The years 1979 - 1986 could be called the "black" period of the electric energy industry, a time when the pilot criterion of the operation of electric power plant was, for example, the minimalization of the consumption of heat in fuel. It is a paradox that this occurred when the elements of economic control were not only strongly promoted but also pushed forward by the system of economic control.

To what extent did prices perform their function to create the national product? This question can only be answered when considering particular branches, their regional subsystems, and various time periods. The focus here is on the 1980's and the Czech Electricity Company, which to a limited extent produced and distributed electric power in the Czech Republic, and also produced and provided (predominantly) for the primary distribution of heat. This was all done according to the uniform prices (tariffs) of electricity and heat. In this ten year period, the Czech Electricity Company realized a profit of approximately 6 billion Czech Krowns (this figure includes non-profitable activities) and the maximum fluctuations of the average value in both directions were tantamount to almost 1 billion Czech Krowns. Changes in input prices (particularly with fuels) were to a great extent paralleled by - with some delay - changes in output prices, with the exception of the household sector (the sphere of heating was subsidized from the state budget).

In total figures - with the depreciations of production essentials - their own "pure" financial means that were tantamount to almost 100 billion Czech Krowns in the years 1980 - 1989 were created. The breakdown of this sum is as follows:

- 31 percent was transferred into the state budget
- 19 percent was redistributed "within" and "outside" the territory of the Federal Ministry of Fuels and Energy (this figure represents almost 19 billion Czech Krowns, of which almost 15 billion Czech Krowns were depreciations)
- 47 percent was allocated to the fund for investment development
- 3 percent was distributed among "operational" funds (incentives, funds covering social and cultural needs of workers, and other uses of profit) and the reserve fund.

The share of "pure" resources in overall investment needs (approximately 60 billion) was 77 percent, the contributions of other organizations amounted to 4 percent. Subsidies from the state budget totalled 13 percent (95 percent of subsidies was provided by the year 1985), and the balance of investment credits (new credits and installments) was 6 percent. If the financial resources corresponding to the consequent deliveries (related to the refunding "within" and "outside" the territory of the Federal Ministry Fuels and Energy) are kept then at the beginning of 1990 the Czech Electricity Company would have had, hypothetically:

- either zero debt and 6 billion Czech Krowns in the reserve fund, that is, approximately 5 percent of productive funds;
- or the reserve fund would have been almost 11 billion Czech Krowns, or 8 percent of productive funds (when "returning" the subsidies from the state budget for investments and at unchanged debt).

Many similar hypothetical "constructions" could be created in this way. Considering the financial situation of the Czech Electricity Company and on the basis of the above mentioned facts, it is possible to draw the conclusion that prices of energy were indeed creating, to a limited extent, the national product in the 80's (under the conditions of directive control of the economy and according to "that time approach" towards ecology and the environment). This statement is obviously not applicable in the case of:

- regional disruptions - mainly in the supply of heat, which for years has been subsidized internally according to the economic outcome from electricity (plus reorganizing processes between various heat distributing systems);
- the actual situation at the beginning of the 90's, as there are so many problems stemming from past neglect to be solved (especially ecological problems).

In the late 80's the call for a complex approach to the solution to energy prices was repeatedly and urgently sounded. Although in the course of the year 1989 some government officials appeared to be warming to the idea of an introduction of sweeping changes in prices (as evidenced by several public speeches), these new attitudes were not accompanied by any real devotion or commitment to convert the words into actions. Apprehensions that "the inflation spiral" would be triggered (which would be attributed to the fuel-energy complex) and the social certainty that citizens

would be jeopardized, justified the policy of postponements and delays, despite the fact that it was obvious that the decisive "cut" must be made.

At present we find ourselves with rather different conditions:

- the wholesale prices of electricity have been increased in two steps;
- heat is being listed under "goods" with materially controlled prices, which has created the conditions for individual quoting of the prices for the heat according to the locality;
- the prices of heat for citizens (households) have been increased, although subsidies in a number of localities remain in place;
- increases in prices for electricity for citizens are currently being prepared.

An observer from the outside might form the impression that lobbyists for energy issues have succeeded in driving forward their own "greenhouse conditions for present and future days", but this is not the case. Not only have the developing needs of both the Czech Electricity Company and the Slovak Electricity Company not guaranteed their financial resources, but now we find ourselves at the beginning of a period of "turbulences" that in many aspects is similar to the situation experienced by the countries with market economies after the "crude oil shock". The very significant increase in prices is a signal that consumers cannot miss. At present we are witnessing changes in the otherwise traditional behavior of our customers - consumers of either electricity or heat. For the time being these changes are of an operative character only, but they should become the grounds for economical and frugal management of energy and responsible decision making regarding requirements for output. The decline in production will be reflected within a few years by a drop in the requirements for the delivery of energy and needed output.

At present we find ourselves in a situation where the consumers are beginning to react quite logically to the signals, as manifested by the dramatically increasing prices. What will be the imminent impact on the energy industry? A very substantial part of the additional charge related to profit is included in the wholesale prices for electricity (in the tariffs for electricity). Because the relation between supplier and consumer is given by contracts that cover a very short period of time, the drop in consumption will be reflected by a drop in profit generation - a drop which, in fact, cannot be compensated by any system measure. A consumer is not in "the captivity" of a supplier in this country because of the complete lack of contractual relations usually found in a market economy. A very similar situation exists with heat. The drop in consumption of approximately 20 percent will lead in a number of localities to such a drop in takings that they will barely be able to cover production and distribution costs. In general it can be said that both the customer and the supplier will find themselves affected by "turbulencies," with one exception: the supplier still "drags" with him a system geared to provide a larger package of services than will be requested, both for the short-term and mid-term outlook.

From short-term and mid-term points of view it is impossible to predict future development. Its contours can be expressed only within the interval between marginal developing trajectories. Furthermore, the prognoses are surprisingly controversial. In the period of initial "turbulencies" we must be prepared to solve

various outer and inner conditions. In particular, we must strive to discover a sequence of invariant decisions that will be complemented by measures capable of responding to the gradual elimination of incomplete information about the further development of energy needs.

Price policy is an integral part of this transitional process (although in no sense is it the dominant one). It is hoped that within its framework a certain "refining" of relations between suppliers and consumers will occur in such a way that both sides will tend to find the conditions of market balance, meaning conditions maintaining both the volume and the quality of provided and demanded services for "reasonable" (balanced) prices. This is one of the preconditions for the introduction of a market economy environment into the energy industry. It is the rejection of the current paternalistic modes of thinking about the energy industry as having the responsibility "to ensure automatically the needs of society". In such an environment there can be held competent discussions about issues such as Integrated Resource Planning, whose one equal rights component is on the side of consumption, and its interaction with resources related to and directly influenced by economic relations - Demand Side Management. Its goal is to deliberately secure for the customers the required amount, course, reliability and quality of delivery at the lowest-possible costs - Least Cost Planning. This issue is closely connected to the solution of another problem, one which has been a burning issue in this country for a long time: how to "reward" a supplier for his efforts to reduce delivery when such efforts consequently reduce his takings and profit.

The electricity market began to be intensively taken into account in market economies on the verge of the 70's and the 80's and there are divergent opinions regarding its arrangement. In relation to prices it is obvious that with the current closed nature of the market, and due to the dominant position of manufacturing and especially distributing enterprises, conditions are lacking for the assessment of market prices for electricity. Electricity prices, in a large number of cases, involve controlled calculation of prices by a variety of controlling bodies with various levels of competence. Even in such a situation, three basic conditions are emphasized, each involving a very effective and long-term way of price making:

- entrepreneurial responsibility cannot be based on a riskless arrangement when a certain part of the profit is included in the price;
- flexibility resulting in the adaptability of particular subjects in order to respond to changing conditions of market economy, and
- transparency supporting rational decision-making by suppliers and consumers.

Of course, it is suggested that price should not provide any function that is not connected with the economy of a supplier - it means first of all that some social functions provided by internal redistribution (subsidies) and set to the debit of the other customers.

I suppose that all the above aspects need to be hammered out in the process of controlled making of prices in this country, although it is expected that a great deal of variability of decisive inputs within the process of reproduction (including the demand

of customers) will occur. The process of controlled calculation of prices between subjects operating in the sphere of production and distribution of electricity should be based on the same principles. Specifically, these subjects include production and distribution enterprises, production companies operating on the territory of both republics, producers and distributors of their own, and production enterprises. In no way does this involve problems that can easily be resolved - rather the opposite is true. Hence the field for accountants dealing with prices, assuming that their presence will make a significant impact, and taking also into account our lack of practice and experience, is virtually unlimited. It is evident that this is not only a problem for the accountants dealing with prices, but also a problem for the management in all electricity enterprises operating throughout the ČSFR.

Electrical Energy Pricing

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Electrical Energy Pricing

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1. Development of Electricity Consumption

In the past six months electricity prices (with the exception of those in the household sector) have increased twice. On December 1, 1990 electricity prices were raised 53%, and on April 1, 1991 they jumped an additional 80%. These changes have influenced the shape of the electricity load in this country. The peak attained in April 1991 was 600 MW less than the comparable figure for the previous year, while the non-peak generation also was continuously lower. This depression of generation was due to the general economic recession, as well as the change in the prices of electricity. If this trend continues, changes in the tariff policy will become necessary.

2. International Comparison

CEZ compared the situation in twenty member states of UNIPEDE, with the result that industrial electricity prices in the CSFR were at the low end of the continuum. On the other hand, electricity prices in the neighboring countries of Germany and Austria were at the upper end of the continuum. The typical mid-sized industrial electricity consumer in the CSFR pays an average of 95 DM/Mwh (at an exchange rate of 17.63 Kcs/DM). The end limits on the price continuum for member states of UNIPEDE are 70 and 200 DM/Mwh.

In the household sector the situation is completely different. Prices in this sector in the CSFR are substantially lower than those in neighboring countries. A typical Czech household pays 34 DM/Mwh, whereas the average price for household electricity in other West European countries is 100 DM/Mwh, and this price sometimes reaches as high as 350 DM/Mwh. In other words, prices are roughly 10 times higher in household sectors outside CSFR.

This international comparison, particularly at the household level, should only be seen as one illustration. Other measures of standard of living and household income must also be taken into account in order to understand the situation completely.

The Problems of Power Engineering Management in the Economic Reform Process

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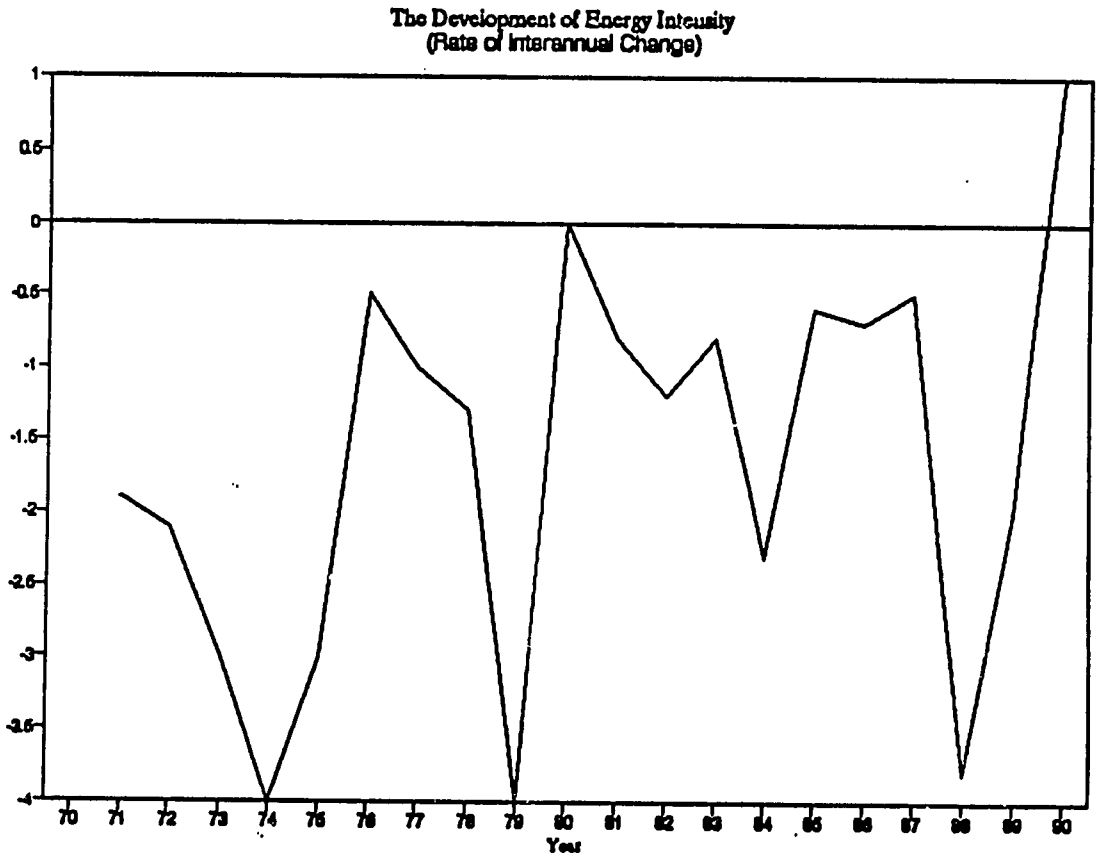
In 1990 latent problems in the energy resources economy were manifested by a reversal of the trend of energy demands development. Due to a slower primary decrease in energy resource consumption (approximately -2.3%) than that of the created national product (-3.1%) growth of energy demands by nearly 1% has occurred. Correspondingly, the demands of the created national product of electric energy had grown. The inland electric energy decrease was approximately 0.8%, so the electric energy demands had grown approximately by 2.3%. This development is in contrast to a twenty years trend in energy demands decrease and prima facie, under conditions of the energy bearers' prices increase.

Figure 1. The Development of Energy Intensity in CSFR.



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In spite of some positive facts, including the decrease in brown coal mining and corresponding decrease of combustion in the steam power plants (the electric power production in the steam power plants decreased by 3.5%), the tendencies of inertia in an inefficient "valuation" of energy inputs survive in a majority of industrial branches of production. Energy sources including electric energy consumption decrease more slowly than does industrial production. On the basis of further signals it can be assumed that this negative trend will continue in 1991.

The trend of energy resources procurement, change and utilization analysis proved that the main intermediate-run objective of energy policy is the decrease of national economic energy demands in the production sector, as well as in the household sector. To meet this objective, conditions necessary for the adequate functioning of the energy economy market must be met, while taking into consideration power engineering specificity. The State is committed to developing the energy economy for the following reasons: limitations of energy resources together with a high monopolization (connected with the natural technical monopoly of network bound energy forms), and objectively or politically created concentration of energy commodities (namely crude oil and natural gas) from unstable supplier countries.

The State should prevent the acquisition of rental revenues which result from the monopolistic position of the producer. The State should also prevent the initiation of external effects which result from ecologically inconsiderate utilization of exhaustible energy resources, and should encourage the application and exploration of regenerative energy sources. These responsibilities are transferred to the State namely because the energy base and the effective utilization of energy resources is a long-term process, while the market signals reflect the short-run changes of supply and demand. It is evident that the "invisible hand" of the market should be reflected in energy practice. These actions should result from the State's long-term energy policy, which has as it's goal ensuring a regulated supply of energy resources. The emergency distribution of resources, which may occur in a shortage situation, would have a strong influence on efficiency of all branches of the national economy.

The government has made a decision, as declared in its energy policy, not to alter energy sector preferences for expanding the energy sector through construction of new heat and energy producing plants. The priority in the interim is an analysis of the options for cutting final consumption. Such cuts would lower required investment, raise profitability, lower state subsidies, and reduce negative environmental consequences of energy consumption.

The analysis of energy specific consumption decreases and the influence on energy resource consumption of structural economic changes, is the correct basis for a draft economic development strategy. In addition to the possible cuts (which in the production sector are presumed to be at least 25%), it is necessary to evaluate the investment demands of the program to include possibilities for financing and state participation.

The real problem of energy resources allocation demand-side analysis is the influence of the development of prices in relation to energy resources consumption. Presently, a break in price development is occurring, and it is thus not possible to reliably determine price flexibility for individual energy bearers. It is not a matter of discussion that the increase in prices will positively influence energy resource consumption by burdening the budget of the production sector enterprises, and by providing the impulse for cuts in households. Nevertheless, in the field of energy prices, the differences in the rates for household and for production sector accounting still occur. In addition, incorrect relations between individual energy types and with some energy bearers creates considerable difference between the inland and world prices or prices in neighboring countries. There is no success in including external costs associated with ecological measures into prices. The problems outlined above are difficult to solve all at once. Their gradual liquidation brings about the negative reactions on the energy resources market.

The crucial time in energy economy price reform is a transition to the energy bearers prices which accurately reflect the real costs of their procurement. This is the only way to obtain information for decision making regarding energy utilization investment or construction of new production plants. It is evident that now, while the market is still in transformation, it is necessary for the State to retain control of regulation of the "unmarketable types of energy", such as electric energy and heat. It is already now necessary to:

1. "Draw" these energy resource prices nearer to price levels in the neighboring countries. This is without discussion easier in a situation with a relatively steady exchange rate;

2. Increase the individual energy sources price levels in such a way that steady relations are maintained which in principle correspond to the direct cost of energy to the consumer. At present the household electric energy price does not correspond to this requirement. Its level (500 CKR/Mwh) falls behind the gas and coal prices. This situation does not give the consumer the correct information, nor does it achieve "right" resource allocation. and

3. Connect the regulation of energy prices with energy policy objectives. The pricing policy in the field of energy resources should support the goals of the energy policy (e.g. the preference of certain resources from the point of view of ecology, commerce, or politics).

Nevertheless, the desirable requirement for the present transformation period should be the consumers' information on preference and relationships in the pricing policy of the energy resource economy.

The question of energy resources taxation is closely connected to pricing. If we want to decrease the external costs and push through the ecologically considerate utilization of energy resources, it would be necessary to introduce the differentiated taxation of individual resources by the consumer tax (ecological tax), for example. This tax should be placed on

the inland price of coal used for production of either electric power or heat, or on prices of goods produced by these energy sources. It is also necessary to consider introducing charges on waste heat, which should promote secondary energy utilization.

The problems of energy consumer taxes and ecological charges should be tied to the real objectives of energy and environmental policy. The connection of these objectives with the State fiscal interests will demand close consideration of departmental ministries preferential pushing through of energy resources and consumer behavior influencing need. In reality this means that the CSFR energy policy should contain a clear proposal of preferences in taxation on either the energy input changes or products. Alternatively, a proposal of ecological charges could be implemented, which would be incorporated into the tax system valid from 1993.

Price growth in energy resources should manifest itself in the investment concerns of enterprises which are aimed at fuels and energy consumption cuts. At present, while the competitiveness of a number of our products is relatively low, this factor is not apparent. Rather, the enterprises are interested in investment in production and technologies which ensure a higher market competitiveness. The investment directed towards energies substitution by funds and also investment in production programs of less power-demanding production methods, are on the periphery of interest of most enterprises. The enterprises prefer their short-term objectives which, under a soft budget restriction taking into account a price increase, does not provide an incentive for cuts.

The energy demands decreasing speed in the enterprises also strongly depend on the finance resource limitation, which limits the financing of necessary capital investment. The shortage of resources for energy-saving technologies may be bridged by agreements with the suppliers of these technologies regarding their participation in the contribution of energy savings. A natural monopoly exists at both the national level and in individual regions in electric power and gas. Only one supplier can satisfy the consumer' needs and that supplier may exert a hegemony against the competitive non-public supplies. This is a remarkable problem in the current transformation process.

While most power engineering enterprises will remain in the public sector even in the future, the existence of "natural monopolies" will require mediation of an independent state body (e.g. an energy agency) to ensure that these enterprises are efficiently carried out. In practice the public inspection should be include "public service licensing" which determines the rights and duties of power engineering enterprises with regards to production, transfer and distribution of energy. This might be achieved through inspection of the decisions of capital investment, and by introducing new production factors. With the decentralization of power, it is desirable to transfer a portion of public control powers in the municipal networks and regional bodies. For this, of course, a legislative framework should be created as quickly as possible.

Energy Prices

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I. Introduction

In the arena of price setting for fuel and energy, no substantial changes have taken place. The prices of these products, in the past as well as at present, presumes a uniform nationwide price level. The application of the so called "type of production" price is enforced based on average buying costs, in tenor reflecting the principles of the financial economy in the individual period. This fact regularly raises the existence of tools for redistribution of financial means between legal entities with lower and higher buying costs against average costs, which are reflected in prevailing prices.

Recently, with respect to changes in jurisdictional relations between the Federation and individual Republics, especially in the budgetary economy, the Republics have gradually insisted on cancellation of the principles of price uniformity for fuel and energy on a nationwide basis. The first result of this process is that for the year 1991, higher dynamics of price changes were admitted for coal mined in Slovakia, and the prices of the coal were exempted from central regulation and put into a category of prices with real regulation.

In connection with the expected adjustment of fuel and energy prices for the consumer population, the Slovak government has raised the demand to overvalue the existing uniform prices of natural gas and similarly, the same requirement can be expected when considering the prices of electrical energy (with respect to different conditions in buying costs).

II. The Characteristics of Fuel and Energy Price Development

One of the prime reasons for the high energy demand of the Czechoslovak National Economy was the policy of "cheap energy". Until 1976 the price policy supported extensive development of economic activities. The missing financial resources were funded by State Budget grants to fuel and energy suppliers from an appropriate ministry in accordance with the principles of a centrally planned financial system.

Since 1977 wholesale price setting has been based on production prices, however, the impacts of adjustments of fuel and energy wholesale prices were subject to price balancing. This was projected in most cases into the prices of corresponding products. In principle, these characteristics were also applied during the reconstruction of prices for fuel and energy to 1st January 1989. This was based on unrealistic economic development under the 8th Five-Year Plan, and in insufficient rentability of production funds to the average of 4.5 in coal industry.

The reconstruction of fuel and energy price setting brought no essential change of approach. The internal inconsistency between alternative types of fuels and energy remained together with distortions as to the level of foreign trade prices.

In 1990 only one adjustment of fuel and energy prices was realized, which increased the prices of energy-coal 10%. This adjustment was necessitated by the change in removing the heading overburden in lignite surface mining and by the increase of tariffs on goods traffic transported via the Czechoslovak State Railways (CSD). The price increase of energy-coal did not lead to an increase of available means in the field of solid fuels, and the problems connected with the financial economy of coal industry enterprises resulting from the complex price reconstruction in 1980 continued to stay. In view of this fact, the Federal Ministry of Finance (FMF) promised support in realizing price increases of energy-coal in several stages. The first stage was to start on July 1, 1990, the second one following on September 1, 1990, but eventually the intent was not realized. Due to the financial economy of the coal industry enterprises planned for 1991, the prices were increased with delay on December 1, 1990 on a level originally contemplated to come in force as of 1st January 1991.

The actual level of fuel and energy prices for the year 1991 was determined by price assessment providing that in contrast to original changes of December 1, 1990, a substantial price increase of gas fuels, heat and energy-coal would be realized for products of Slovak coal enterprises. The survey on price adjustments for the period 1989-91 is given in Supplement 1.

With view to the disconsolate situation in the financial economy of enterprises in the fuel and energy complex in 1991, discussions were held on March 12, 1991 on the ministerial level of the Federal and Republic central bodies. It was determined that it was necessary to further adjust fuel and energy prices within the half-year of 1991. New price assessment for an 80% increase of electrical energy prices is scheduled to come in force as of April 1, 1991 and a 20% price increase of solid fuels is scheduled for June 1, 1991, at the latest.

During discussions about the proposed development of fuel and energy prices, the Federal Ministry of Economy submitted their own suggestions which were put forward to individual central bodies for amendment procedure. In pursuit of unifying the views on the development of fuel and energy prices in 1991, the deputy ministers of the Federal Ministry of Economy and the Federal Ministry of Finance (FMF) on their joint session of October 24, 1990, elaborated a joint proposal for adjustment of wholesale prices to the date of December 1, 1990. The proposal was not accepted at FMF and FMF drafted another new proposal which eventually appeared in the shape of price assessments. The level of price increases resulting from these assessments is again based on average production costs with the provision that the input documents respected only input changes known to the date of processing, i.e. November 1990. This fact is one of the causes of imbalanced incomes of enterprises in the coal and power industry.

As for the retail prices of fuel and energy, the last adjustment was made in 1979, by a 50% increase of all prices. Even though in the mentioned period some proposals for the adjustment of these prices were submitted, none of them were realized. The updated

proposal for the adjustment of retail prices was the one by FMF of November 1990, which should come in force as of December 1, 1990 but the cause of its failure is everybody's news. The last known term for retail prices adjustment is 1st May 1991.

III. The Characteristics Development of the Revenue Situation of Companies in the Fuel and Energy Complex

Grants for the coal industry in 1989 amounted to 4,590 million Kcs. The source for these grants was so called "Mining Rent" formed by profitable state enterprises (SHD Most and HDB Sokolov) in the amount of 2,255 million Kcs. The redistribution of financial means within the fuel and energy complex, primarily from sources formed in the power and gas industry, was a total amount of 2,040 million Kcs. General reconstruction of fuel and energy wholesale prices to the date of 1st January 1989 brought to the coal industry an increase of available sources only in value of +38 million Kcs under the provision that the increase of outputs was essentially eliminated by an increase of wage transfer into the State Budget. The revenue situation in the power and gas industry was basically balanced. The serious problems appeared in 1990; when in contrast to expectations of price reconstruction, the handing over of share of profits was increased from 50 to 65% as compared to the growth of input products prices, services and works; decrease of coal production in Ostrava mining district owing to canceling of so called conscripted labor on 12 Saturdays; and the decrease of solid fuel consumption and deterioration of mining geological conditions both in coal mines and surface mining. Besides these influences, problems for the Coal State Enterprises were deepened by a Government amendatory act on the financial economy of state enterprises. This canceled the redistribution processes on the level of central bodies for 1990. Under redistribution there only remained the mining rents, which in their volume did not attain the level of 1989. For this reason, at the end of 1989 and in the course of 1990, a series of discussions took place at the level of central bodies. This discussion resulted in granting repayable financial aid from the State Budget to unprofitable coal enterprises in the amount of about 1.9 million Kcs. The volume of mining rent redistributed in this year represented the value of 1.6 billion Kcs.

The revenue situation of companies in the power industry shows an expressive tightness of financial means, especially for securing nuclear plants construction. The complex reconstruction to the date of January 1, 1989 counted on State Budget grants for the construction of nuclear power plants which were not granted. Power industry companies were forced to cover the gap by banking credits with 3-year maturity. This is one of the negative aspects for the starting point in 1991.

Because of the change of conditions resulting from price liberalization, as well as changes in banking conditions and in material balances of fuel and energy, the revenue situations of companies in the coal industry were discussed by representatives from the Federal Ministry of Finance and those of the Republics. The results were presented at the meeting held on the 15th March 1991, concluding that it would be necessary to carry out the adjustment of fuel and energy prices in a scope as defined under part B.

With prices presently used in the power industry, there is a shortage of 34 billion Kcs (of which 5 billion is a loss by Slovak power industry companies). In the coal industry this is 6.6 billion Kcs, of which 0.9 billion Kcs is in operational losses.

In connection with the drop of solid fuel production at the present time, there is the issue of how to finance the expenses for this deficiency, as well as financing health care costs, which for the year 1991 represents the sum of 1.4 billion Kcs. The sources for covering this deficit have not been sufficiently specified for now.

IV. The Financing of Enterprises in the Fuel and Energy Complex in 1991

The expected increase of 80% of electrical energy prices coming in force as of April 1, 1991 decreases the shortage of sources of power industry companies to the level of about 15 billion Kcs. Presently, intense discussions are under way with banking institutions on the conditions for granting new long-term credits for investment. Possibilities are being investigated as to how to acquire new financial sources under the joint ventures of foreign participants.

The basic problem in the coal industry is how to solve the revenue situation of companies (besides the expected price adjustment of solid fuels). Needed is the determination and acceptance of appropriate legislative measures facilitating the redistribution of the mining rent. Eventually needed are other similar ways to secure the allocation of financial means to balance the operation losses of Coal-Mining State Enterprises.

V. Fuel and Energy Retail Prices

Since 1970 no changes in retail prices were realized in direct connection to adjustments in wholesale prices. This has led to the gradual deepening of the difference between both levels, which reached 50% at the end of the 1990. The adjustment of retail prices to the 1st December 1990 is a certain approach to eliminate this disproportion, however, the basic drawback of the present proposal is the incomplete adjustment of retail prices. The proposal eliminates only the system of subsidies for retail prices. The products which were not subsidized (e.g. electrical energy) are not included in the new price adjustment. One positive result from the discussions held on March 15, 1991 is the fact that the retail price adjustment for electrical energy should come in force as of September 1, 1991.

VI. Conclusions

- The proposed price increase of solid fuels and electrical energy is a necessary condition for creating basic circumstances for the economic activity of the coal and power industry companies to prove their liquidity in relation to banking institutions of foreign partners.

- If the policy of determining prices on the basis of average production costs continues, it will be necessary to solve the mechanism of financial means redistribution among

individual state-owned companies for the coal industry branch. At present, this is the problem of the Czech Republic.

In accordance with the general requirement of another price adjustment for fuel and energy, attention should aim at:

- bringing prices of electrical energy to marginal costs;
- bringing coke, carbonized coal and natural gas to the level of foreign trade prices;
- bringing energy-coal to the level of foreign trade prices either directly or by using possible substitutes, e.g. natural gas;
- for other types of fuels and energy (e.g. town gas), setting the price subject to calculation of the so called "economical price" for their procurement;
- leaving the present system of discounted prices for deliveries of energy-coal.
- considering the expediency of introducing regional prices in electrical energy supplies according to individual systems, eventually according to individual distribution companies.

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