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ICF RESOURCES, INC.**

**ENERGY AND TELECOMMUNICATIONS SECTOR ASSISTANCE
FOR MINISTRY OF ECONOMIC POLICY AND DEVELOPMENT
OF THE CZECH REPUBLIC
PHASE 2**

**STRUCTURE AND REGULATORY FRAMEWORK FOR
NATURAL MONOPOLIES IN THE ENERGY SECTOR**

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Executive Summary

PURPOSE OF THE REGULATORY REPORT

- Centralized state control of the energy sector will be replaced with private, market-oriented companies regulated by an independent agency. Energy companies are included in the second wave of large enterprise privatization.
- This report has been prepared to organize available theoretical and empirical information about optimal energy industry structure and optimal approaches for regulating energy industries in the Czech Republic. The report has been prepared as a first step to provide information to support decisions and to stimulate discussion about regulatory issues.
- The recommendations in this report address the optimal long-term structure of the energy industries including electric power, gas, heat distribution, and captive lignite mining. Implementation of large changes in industry structure may not be feasible in the near-term privatization process. A transition period is likely to be required.

SCOPE OF THE REPORT

- Four aspects of regulation are reviewed in detail.
 - The report reviews the relationship between industry structure, the potential for competition in energy industries, and thus the need for regulation. The review of each energy industry identifies aspects (e.g., electric power distribution) that are natural monopolies (i.e., only one firm can efficiently serve the market) and aspects which can be competitive. Regulation is a poor substitute for competition except when natural monopoly conditions exist.
 - The report reviews possible methods for price regulation.
 - The report summarizes a detailed list of non-price regulatory responsibilities. These responsibilities include granting franchise rights, enforcing service to customers, ensuring the reliability of service, review or approval of least-cost expansion plans, certification of new facilities and related requirements for eminent domain, environmental protection, and protection of health and safety.
 - The report reviews the organization of the regulatory agency. Issues such as the legal charter of the agency, decision-making procedures, and staffing are discussed.

RECOMMENDATIONS FOR INDUSTRY STRUCTURE

- Several criteria are used to evaluate changes in industry structure. They are incentives for efficient operation of the energy companies, economies of scale, ease of coordination (e.g., between energy producers and distributors), effectiveness of regulation, simplicity of regulation, and ease of transition to the new structure.
- In the electric power industry, the report suggests that a competitive generation sector may be feasible and beneficial. Competitive generation provides the opportunity for competition without sacrificing economies of scale. The report recommends that nuclear facilities remain under state control at least in the near term.
- For the gas sector, the report concludes that the gas transmission and distribution functions should be in separate firms. Distribution companies could be organized as a single company with separate operating divisions or as independent companies. The best model for transmission may be a single transmission system (separate from Transgas) responsible for coordinating deliveries from a variety of supply regions, operating storage, and dispatching gas to distribution utilities within the Czech Republic. The report further suggests that the transmission company should be a gas merchant (i.e., buy and resell gas and perform gas planning functions) rather than act only as a transporter of gas.

RECOMMENDATIONS FOR INDUSTRY STRUCTURE (CONTINUED)

- In the heat distribution sector, continued integration of heat production, transmission, and distribution is recommended. Due to the distinct regional character of heat distribution (i.e., heat production and distribution are often dedicated to a single city), municipal ownership may be beneficial. Heat distribution may also be owned privately. Consolidation of multiple heat distribution networks in one company is recommended due to moderate economies of scale in management, operations, and fuel procurement, and the need for procurement of capital.
- For captive lignite mines (i.e., mines dedicated to a single utility), the report recommends that mining operations be owned by an independent company with the coal price set by regulation. Economies of scale are realized because the mines may be owned by a larger mining company. Regulation is difficult as the prices must be based on a detailed cost study of the mines. Transition is relatively easy as relationships are like those in place today.

RECOMMENDATIONS FOR PRICE REGULATION

- The report reviews two methods of price regulation. The first sets prices based on the cost of providing service plus a regulated profit and is called rate of return regulation. The second model is called price cap regulation. A price is fixed for a period of time (such as every one to five years) and then reset. Reductions in costs result in increased profit for the utility.
- The advantages of price cap regulation suggest that it is the appropriate form of price regulation for the Czech Republic.
 - Utilities have a strong incentive to cut costs and improve efficiency with resultant increases in profit.
 - Unlike rate of return regulation, price cap regulation does not provide an incentive to increase capital investment as prices are not directly tied to the amount of the utility's capital assets. The danger that the utility may be motivated to allow service quality to deteriorate to cut costs should be noted.
 - Price cap regulation is easy to administer. Price cap regulation can avoid burdensome and detailed, annual, reviews of the utility's cost structure.

RECOMMENDATIONS FOR PRICE REGULATION (CONTINUED)

- The report recommends additional principles for price setting in a market economy.
 - The current method of setting uniform energy prices must be replaced. The selected regulatory method for setting prices should reflect important regional or other differences in the cost of providing service. Unless energy prices reflect costs, consumers will be motivated to over- or under-consume energy.
 - The best price signal will be sent if prices are based on long-run marginal costs. The price that a consumer pays for energy should reflect the cost of supplying an additional unit of energy. Prices set at long-run marginal cost will cover the fixed costs of long-term, incremental investments as well as short-run variable costs such as the cost of fuel.
 - Long-run marginal costs are different for different types of consumers such as industrial and residential energy consumers. Consumers which contribute to peak energy usage should bear more of the costs of investment to serve peak demand. One role of regulation will be to distinguish between unfair discrimination against customers and justifiable differences.

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RECOMMENDATIONS FOR RESPONSIBILITIES AND ORGANIZATION OF THE REGULATORY AGENCY

- The report concludes that agencies or institutions will need to have responsibility for non-price aspects of regulation. Assignment of responsibility may be politically difficult. Interaction between different agencies will be necessary if responsibilities overlap. Although no one right answer can be advanced, preliminary conclusions are:
 - Municipal or local governments should play a role in regulation of district heat or certification of new facilities such as powerplants to be built within local limits.
 - It would be beneficial for the national government to play a role if issues have an international character. Enforcement of international nuclear safety standards is one possible example.
 - The Czech Republic should have primary responsibility for other activities. Mechanisms will be needed to coordinate energy activities with the Slovak Republic.

RECOMMENDATIONS FOR RESPONSIBILITIES AND ORGANIZATION OF THE REGULATORY AGENCY (CONTINUED)

- The report provides standards for development of an independent regulatory agency. The recommended standards include:
 - The regulatory agency must have a clear legal charter.
 - The charter must contain clear principles of economic regulation for the energy industries.
 - The regulatory agency must have sufficient authority. If its decisions can be easily overruled by the state, investors will be wary of providing investment capital.
 - The procedural rules of the agency must provide for dispute resolution and participation in regulation by energy consumers.
 - The agency must be staffed with knowledgeable regulators with a substantial term of service. The regulators will need a professional staff with the appropriate expertise.

NEXT STEPS

- Privatization and development of regulatory agencies are very closely linked. The process of developing regulatory principles and structures should continue at a fast pace.
- Next steps will include:
 - The Czech Ministry of Economic Policy and Development will need to initiate discussions internally, with CEZ, CPP, and others to understand the issues and problems presented in this report.
 - The Ministry will need to make preliminary decisions on the basic elements of the proposed regulatory methods, institutions, and industry structure.
 - Decisions will need to be made regarding what aspects of regulations are the responsibility of the CR government and which will be done by the CSFR government or local governments.
 - Detailed plans will be necessary as to how to implement new structures and regulation including development of a draft legal charter.
 - Law and policy documents will need to be debated, reviewed, and approved by the appropriate government bodies.

Overview Of Report

OVERVIEW OF THE REPORT

- I. Introduction
- II. Goals of Regulation
- III. Competition and Regulation in the Energy Industry
- IV. Potential Structures for the Electric Power Industry
- V. Potential Structures for the Gas Sector
- VI. Potential Structures for the Heat Distribution Sector
- VII. Potential Structures for Captive Lignite Mines
- VIII. Price Regulation
- IX. Non-Price Regulation
- X. Organization of the Regulatory Agency

Section I
Introduction

THE PRIVATIZATION PROCESS IS AN OPPORTUNITY FOR RESTRUCTURING THE ENERGY SECTOR

- Goals and status of the privatization process
 - Centralized state control of the energy sector will be replaced with private, market-oriented companies regulated by an independent agency.
 - Energy companies are included in the second wave of large-enterprise privatization. Privatization plans are due in March 1992.
- Reasons why regulation may be needed
 - Some important parts of the energy sector are natural monopolies.
 - Regulated natural monopolies can theoretically be more efficient than competing companies.
 - Regulation of monopoly firms is necessary to protect consumers.
 - Energy companies must also be regulated in the areas of service obligations and reliability, environment, safety, health, and conformity with energy policy goals.

SCOPE OF THIS STUDY

- This report has been prepared to organize available theoretical and empirical information about optimal energy industry structure and optimal approaches for regulating energy industries in the Czech Republic.
- This report addresses the optimal long-term structure and regulation of the natural monopolies, including electric power, gas, heat distribution, and captive lignite mining.
- Implementation of some of the ideas expressed here are feasible in the near-term privatization process; others will require a longer period for implementation.

Section II
Goals of Regulation

THERE ARE NUMEROUS GOALS FOR ENERGY SECTOR REGULATION

- Facilitate a reduction in the state's direct role in the energy enterprises.
- Protect consumers' interests.
- Provide a workable framework for raising capital for the energy sector.
- Promote reliability of the energy system.
- Promote efficiency of energy production and use.
- Carry out other social goals.

GOAL: REDUCTION OF THE STATE'S ROLE IN THE CZECH ENERGY ENTERPRISES

- Economic competition where it is feasible and regulation of the natural monopolies should be a substitute for direct State control, especially in setting prices.
- Regulation will be based primarily on clear economic and financial principles. These principles will be embodied in law.
- Political influence over the regulatory process and regulatory organization should be limited as specified in law.
- Regulation potentially can carry out State objectives sufficiently well that State ownership can be small.

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GOAL: PROMOTE EFFICIENCY OF ENERGY PRODUCTION AND USE

- Big improvements in efficiency of both energy production and use are possible in the Czech Republic.
- Regulations should promote efficiency in energy use by proper pricing of energy. If market prices properly reflect costs, consumers will not be motivated to over-consume or under-consume energy.
- Regulation should promote efficiency of energy production (also transportation and distribution). Profit rewards for efficiency are the best way.
- Regulation may deal with market failures such as external social costs (e.g., pollution) and lack of information (e.g., consumer knowledge of conservation methods).

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**GOAL: PROVIDE A FRAMEWORK THAT FACILITATES
THE RAISING OF CAPITAL FOR INVESTMENT**

- Regulation should set prices at levels sufficient to attract capital to the energy enterprises.
- Predictability of regulation is not enough for long-term attraction of capital. Regulation may be predictable, but also adverse to the financial interests of the regulated company.
- Clear and fair regulation means less risk for investors.
- Less regulatory risk means a lower cost of investment funds.
- Lower cost of funds means lower cost of energy for consumers.

GOAL: PROTECTION OF CONSUMERS' INTERESTS, INCLUDING RELIABLE SERVICE

- Consumers need protection from potentially excessive monopoly prices.
- Consumers also need protection from undue price discrimination.
- Where monopolies are allowed, consumers need service protection. Service protection includes the right to service and reliability of service.
 - Consumers may need some protection from unfair or unresponsive treatment by a monopoly. Consumers have no competitive alternative to the monopoly (by definition), and the monopoly may provide poor service.
 - Regulators can respond to customer complaints and encourage the company to be responsive.
- Reliability should be recognized as a goal. Regulators should set specific reliability standards.

GOAL: CARRY OUT SOCIAL GOALS

- Some social goals may be achieved most effectively through regulation of energy companies. Other goals are best addressed through taxation and standard-setting, such as appliance efficiency standards and other measures.
- Regulation of energy companies is necessary for control of the environmental, health, and safety effects of energy production, transportation and distribution.
- Allocating the costs associated with reduced employment in the energy sector could be part of regulation of the energy sector. Employment could also be dealt with separately.
- National security considerations affect energy decisions, such as strategic stockpiles and source diversity. Energy companies may be required by regulation to carry out some of these programs, or programs can be implemented directly by the State.

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Section III
Competition and Regulation in
the Energy Industry

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REGULATION SHOULD ONLY BE APPLIED TO INDUSTRIES WHERE MONOPOLY BEHAVIOR MIGHT LEAD TO POOR RESOURCE ALLOCATION OR INEQUITABLE PRICES

- A natural monopoly exists when one firm can serve a market at a lower average cost than can several competing firms.
 - Natural monopolies typically occur in industries which require considerable fixed investment, e.g., energy distribution or local phone service.
 - Several components of the Czech energy industry are classic natural monopolies: electric distribution, natural gas distribution, and thermal heat distribution.
 - For example, it would not make economic sense to have two gas distribution companies compete for customers in the same geographic areas.

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NATURAL MONOPOLY COMPANIES SHOULD BE PARED DOWN TO THE ESSENTIAL "CORE" FOR EFFECTIVE REGULATION

- The State energy companies, such as CEZ and CPP, are very large and carry out many functions. Some functions may be suitable for a company in an unregulated competitive marketplace, and some functions are not.
- Companies which mix regulated (monopoly) and unregulated (competitive) functions are very difficult to regulate properly. Unregulated activities can be subsidized with profits from regulated businesses, making it hard for regulators to monitor cost allocation within companies.
- If regulated monopolies are to be created, they should exclude all elements which are not integral parts of the natural monopoly.

PROBLEMS OF REGULATION

- Because profits are constrained under cost-of-service regulation, managerial incentives for economic efficiency are reduced. Superlative performance usually is not rewarded.
- Additionally, companies regulated on a "cost-of-service" basis are often motivated to over-invest in capital.
- Under "price cap" regulation, the firm may increase profits if costs are cut, but there is a sacrifice in equity since the firm may earn a return which is higher than would be considered acceptable under tighter regulation. Also, quality of service may decline under "price cap" regulation.
- Regulatory compliance activities divert productive resources away from the provision of service. Thus, regulation increases transaction costs (legal, managerial and planning resources). Consequently, whenever possible, equity concerns should be addressed through methods other than direct regulation, such as competition or taxation.

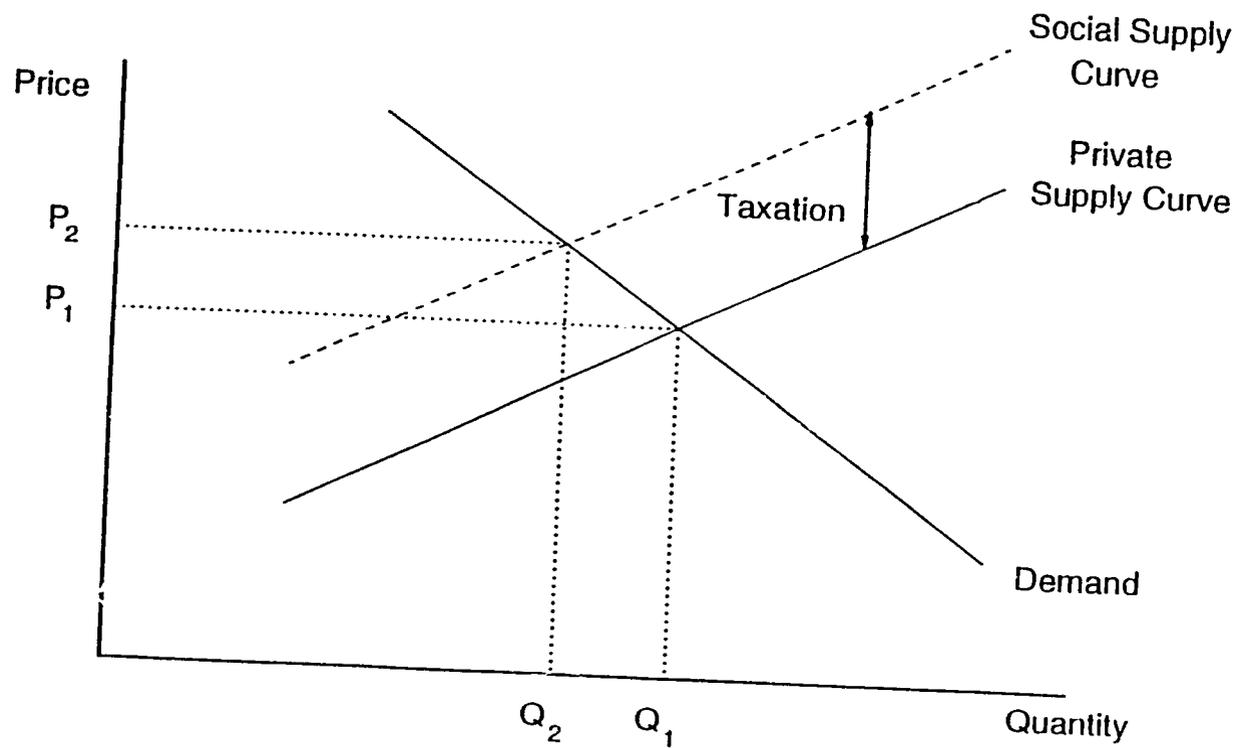
EVEN REGULATED UTILITIES OFTEN ARE NOT EFFECTIVE PROMOTERS OF CONSERVATION

- Providing correct price signals to consumers may not be enough to achieve energy conservation in a regulated utility. Market failures, especially in information, are a problem.
- Under regulation (as in an unregulated company) the utility's profit depends on sales. The natural behavior is for the company to try to sell more energy.
- Many types of unregulated firms can and do carry out conservation programs. For example, engineering firms advise industry on energy use. A regulated utility is not necessarily the most efficient enterprise to promote conservation.
- Regulatory schemes have been devised to make the utility neutral to changes in sales. Some regulatory programs even try to reward the utility for promoting or investing in conservation.
- The Czech Republic government could deal with this problem directly through support of conservation programs, such as appliance standards, information programs, or grants.

TAXATION CAN ADDRESS EXTERNALITIES MORE EFFECTIVELY THAN REGULATION

- Energy production, transmission, and use create costs and benefits that are "external" to company operations. Economic theory suggests that internalization of these "externalities" leads to proper resource allocation.
- Past energy production in the Czech Republic has ignored externalities such as environmental costs.
- Two key ways to internalize externalities are: "command and control" regulation and taxation.
 - "Command and control" regulation is typical of much of U.S. environmental legislation. This form does not produce allocative efficiency and may force uneconomic investments.
 - Internalization through taxation directly incorporates costs into decision-making and fosters efficient redistribution of resources, but it requires a more sophisticated approach.

TAXATION CAN BE USED TO INTERNALIZE SOCIAL COSTS



TAXES ARE PREFERABLE TO REGULATIONS TO PROMOTE OPTIMAL RESOURCE ALLOCATION

- We recommend that, where feasible, the Czech Republic address external social costs through taxation or other market mechanisms. This approach will lead to efficient allocation of resources.
- Use of market forces needs to be coordinated with the use of environmental standards and regulations. In particular, taxation needs to be developed within the context of the recent federal air pollution law.
- Examples of specific externality taxes that incorporate specific external costs include:
 - Employee health taxes (e.g., black lung)
 - Surface mine reclamation taxes
 - Taxes to fund nuclear plant decommissioning

THE ENERGY INDUSTRY SHOULD BE STRUCTURED SO AS TO MINIMIZE THE NEED FOR REGULATION

- Competing firms, such as coal producers or electricity generating plants, may not have to be regulated.
- Multiple non-competing firms, such as multiple electric distribution companies, expand the task of regulation.
- Firms which combine regulated and non-regulated activities are difficult to regulate.
- The organization of the energy industry to promote competition should be a high priority in privatization. Competitive markets almost always work better than regulation, if real competition is possible.

**REGULATION IS A POOR SUBSTITUTE FOR COMPETITION,
EXCEPT WHEN NATURAL MONOPOLIES EXIST**

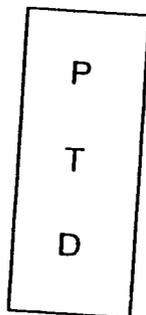
Goals	Competitive Market	Regulated Monopoly
Efficiency	Yes	Yes, but depends on regulation
Equity	Yes	Yes
Avoid Cost of Regulatory Process	Yes	No

CHOOSING AMONG STRUCTURAL MODELS DEPENDS ON EFFICIENCY AND COMPETITION FACTORS

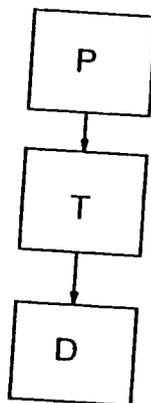
- The structure of the energy industry refers to the vertical and horizontal division of companies in each sector and the assignment of responsibility to those companies. "Vertical" refers to sequential activities such as generation, transmission and distribution of electricity. "Horizontal" refers to like activities, such as the distribution of electricity in several geographic areas.
- A variety of structural models exist for organizing the Czech energy sector.
 - Vertically integrated firms
 - Vertically disaggregated firms
 - Competition between vertically integrated or between disaggregated firms

POSSIBLE STRUCTURAL MODELS

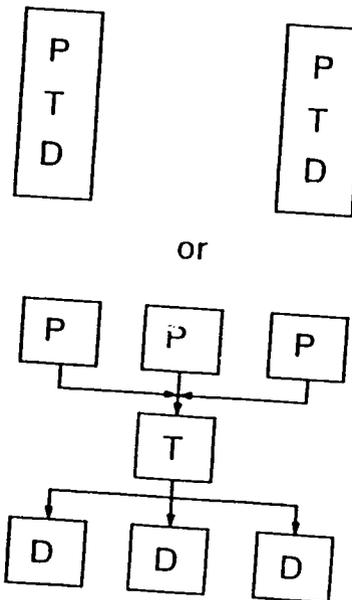
Vertically
Integrated



Vertically
Disaggregated



Competitive



P = Production
T = Transmission
D = Distribution

THE HISTORICAL STRUCTURE OF THE INTERNATIONAL ENERGY INDUSTRY HAS BEEN EITHER STATE-OWNED OR PRIVATELY OWNED REGIONAL MONOPOLIES

- State-owned, vertically-integrated monopolies were organized, or formed through nationalization in the market economies because of a state interest in promoting industry or subsidizing consumers, political or ideological reasons, or national security concerns about control of key energy supply activities.
- Recent trends in utility structuring emphasize increased competition in the production and generating sectors, particularly in electricity generation.
- Competition is the best way to encourage market-oriented management of enterprises.

VERTICAL COMBINATIONS OF MONOPOLY AND COMPETITIVE ELEMENTS ARE UNDESIRABLE

- The key advantage of vertical integration in regulated markets is the ability to incorporate economies of scope^{1/} and promote coordination within one firm. Where each stage of production is a natural monopoly, vertical integration is satisfactory.
- However, sometimes one stage, such as the generation of bulk electric power, could be competitive. If this stage is combined with monopoly elements, the whole organization must be a regulated monopoly.
- The coordination of the supply process is successfully achieved between independent firms in the United States (electric and gas), Germany (electric), Canada (gas), and the United Kingdom (electric).
- Regulating vertically integrated monopolies is less effective than regulating the components, because costs are joint and inefficiency is less detectable. However, regulation is made easier because there are fewer companies to regulate.

^{1/} "Scope" means the range of activities.

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HORIZONTAL INTEGRATION OF MONOPOLIES HAS CLOSELY BALANCED ADVANTAGES AND DISADVANTAGES

- A major structural and regulatory question is the choice of single (horizontally integrated) or multiple regulated monopolies. For example, the eight Czech electric distribution companies could be grouped into a single, regulated, private distribution company, or be left separate.
- The advantages of integration are some modest economies of scale, such as centralized engineering and procurement. U.S. research shows that such economies are difficult to detect. Also, the regulators have only one distribution company to review.
- The advantage of less integration is diversity. Regulated rates can be readily made to reflect regional differences. The level of efficiency, conservation programs, etc., of multiple companies can be compared by regulators, which permits an element of competition and may over time make the whole industry more efficient.

SEVERAL STRUCTURAL CONDITIONS ARE NECESSARY TO ENSURE COMPETITION

- Multiple sellers (usually at least 4) in the same market. Sometimes even two or three sellers may compete strongly.
- One or more buyers. If there is only one buyer, there is still competition among sellers. The one buyer (monopsonist) may be able to price-discriminate in purchasing and extract the "producers' surplus." However, if the one buyer must conduct an auction, the result may be the same as in a market with several buyers.
- The potential for competition in electric power, gas, heat distribution, and coal is examined in the following sections.

ALTERNATIVE INDUSTRY STRUCTURES AND REGULATORY SYSTEMS SHOULD BE EVALUATED USING THE FOLLOWING CRITERIA

- **Incentives for Efficiency:** Does the organizational structure promote engineering and allocation efficiency and innovative behavior?
- **Economies of Scale:** Does the size of the proposed companies lead to economies of scale or integration?
- **Ease of Coordination:** Will complex interpersonal or contractual relationships between components of the industry be necessary for efficient operation?
- **Effectiveness of Regulation:** Does the industry structure lead to effective regulation that balances efficiency with equity concerns?
- **Simplicity of Regulation:** How difficult will the industry be to regulate? Will information be difficult to obtain? Will there be large numbers of companies to simultaneously regulate?
- **Ease of transition:** How difficult is it to achieve the new organizational structure given the current Czech structure.

Section IV
Potential Structures for the Electric
Power Industry

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AFTER DECADES OF STABILITY, ALTERNATIVES TO THE TRADITIONAL VERTICALLY-INTEGRATED NATIONAL OR REGIONAL ELECTRIC UTILITY ARE NOW APPEARING

- Technological developments in communication and control systems now permit interconnected generating companies to pool their capacity and operate in a coordinated fashion over a much larger area. Larger transmission systems have significant economies of scale and increased reliability.
- At the generation level, most of the economies of scale are reached at a single large (1,000 megawatt [Mw]) power plant or at a single site with multiple generating units (except in the case of nuclear plants where greater complexity yields economies of scale for the management of multiple units at different sites).
- Economies of scale in distribution are significant up to about 1,000 Mw in customer billing and collection, planning and engineering, and other activities. Systems between 1,000 and 30,000 Mw seem to operate with reasonable efficiency.

NUMEROUS FEASIBLE STRUCTURAL OPTIONS ARE NOW AVAILABLE FOR ELECTRIC POWER SYSTEMS

- At the generation level, multiple competing companies can be created without creating reliability problems. Given the right regulatory structure, the competition associated with multiple companies can create strong incentives for efficiency. These companies can be free-standing power plants or steam and electricity cogeneration plants.
- At the distribution level, competition within a region is not economic. However, numerous options are feasible because companies of different sizes seem to be equally efficient.
- Accordingly, the key structural issues are:
 - Should generation companies be separate from transmission and distribution?
 - How many companies should be created?
 - How should multiple companies be regulated to ensure that the theoretically available efficiency is actually achieved?

THE RECENT TREND IN U.S. ELECTRIC UTILITY STRUCTURE IS TOWARD COMPETITIVE GENERATION

- Interconnection of the regional electricity monopolies has permitted the least cost dispatch of generation from numerous utilities, which obviates the need for full integration of generation (G), transmission (T), and distribution (D) functions.
- U.S. utilities now also have the additional choice of purchasing power from independent power producers or other utilities.
- The initial experience with purchases from small power plants was suboptimal due to problems with the regulatory structure. Very high rates were initially provided to independent producers. High prices caused many independent projects to be built, and utilities were forced (by regulation) to purchase the power at artificially high rates. These problems have now been solved. Electricity generation is now workably competitive in many parts of the country.^{1/}

^{1/} For more information see "Competition For Bulk Power Supply in the U.S." by ICF Resources.

THE TREND IN EUROPE IS ALSO IN THE DIRECTION OF MORE OPEN ACCESS AND COMPETITION FOR GENERATION

- The United Kingdom reorganized and privatized its electric utility system into a competitive generation sector and a national grid owned by regional distribution companies in 1990. In addition, the British model allows direct purchase of electricity from generators by certain end use customers. Early indications are that a healthy, independent power production industry is forming.
- The Netherlands, Germany and other European countries are experimenting with direct sales between generators and customers, and with third-party contract carriage.
- Spain is now structured around a nation-wide transmission system that dispatches all generation facilities on a least-cost basis. Companies bid for the right to expand generation capacity to supply the national system.

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GIVEN THE SIZE OF THE CZECH REPUBLIC'S ELECTRICITY SYSTEM, SEVERAL STRUCTURAL OPTIONS ARE FEASIBLE AND LIKELY TO BE COST-EFFECTIVE

- The Czech Republic currently has over 13,000 Mw of installed generating capacity. The majority of this capacity is owned and operated by the CEZ through its power generating enterprises. Several of these generating enterprises are single power plants. Significant amounts (over 10%) of industrial generation also exist. Given that most of the economies of scale in generation exist at the power plant level, the Czech generation sector could be privatized into multiple companies.
- The Czech transmission grid is a strong, well-designed republic (and federal) level system owned and operated by the CEZ. A primary purpose of this national grid is the transfer of power within the republic and for import and export. Given the relatively small size of the Czech Republic and the integrated nature of this system, scale economies suggest that transmission should remain a single monopoly.

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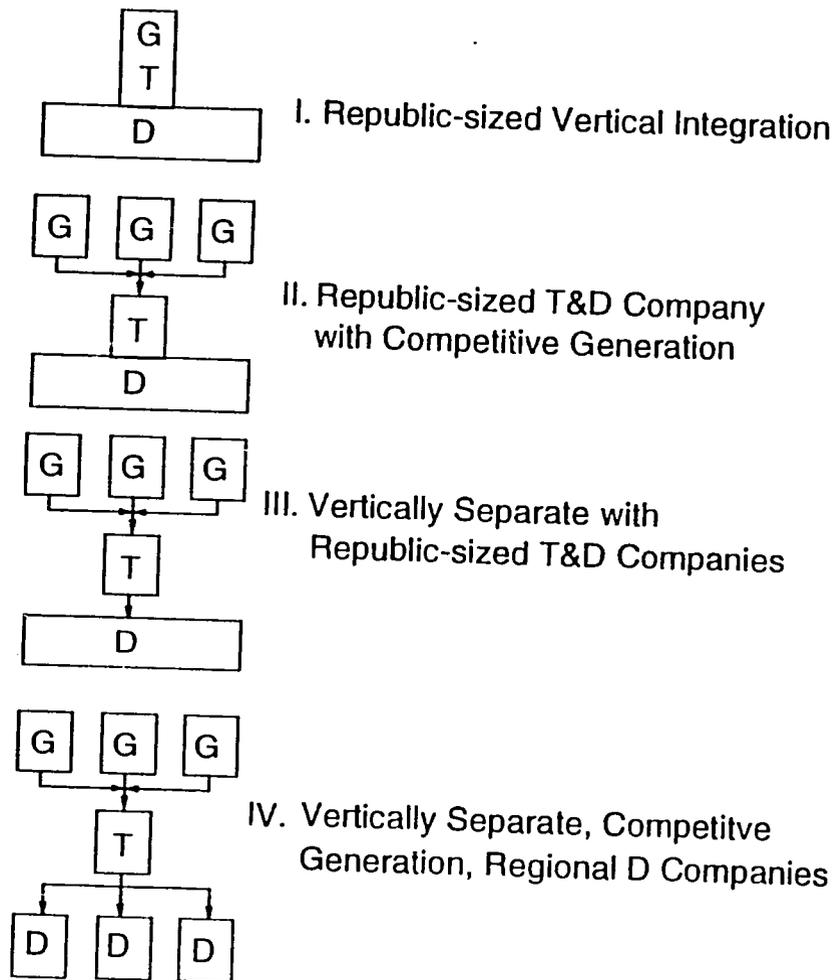
SEVERAL STRUCTURAL OPTIONS ALSO EXIST FOR THE DISTRIBUTION SYSTEM

- The Czech Republic distribution sector is comprised of eight regional energy distributing enterprises. Each of these enterprises is a regional monopoly and serves end-use customers within its service territory. Since these distributing enterprises are already organized along regional lines, this sector could be divided into separate enterprises.
- Alternatively, since the Czech Republic is not large, economies of scale may be achieved by organizing all distribution enterprises into one republic-sized monopoly. Given some regulatory advantage to having multiple distribution companies, the choice is not clear. Experience suggests that utilities as small as 1,000 Mw can be as efficient as utilities of 13,000 Mw.
- Either eight, fewer, or one distribution company would be workable.

DECISIONS ABOUT VERTICAL INTEGRATION ALSO ARE NEEDED

- Given the current organization of the power industry and the goals of the Czech Republic to use the free market, four key structural options are available. Due to the benefits of competition, three of the four options involve a competitive generation sector.
 - I. Full vertical integration
 - II. Competitive generation, integrated transmission and distribution
 - III. Competitive generation, non-integrated transmission and distribution
 - IV. Competitive generation, non-integrated transmission and distribution, separate distribution companies
- The evaluation criteria cited in the previous section permit a comparison of these four options.

EVALUATION OF ELECTRIC INDUSTRY STRUCTURAL OPTIONS



	Incentives for Efficiency	Economies of Scale	Ease of Coordination	Effectiveness of Regulation	Simplicity of Regulation	Ease of Transition
I.	L	H	H	L	H	H
II.	M	H	M	M	M	M
III.	M	H	M	M	M	M
IV.	H	M	L	M	L	L

EVALUATION OF OPTION I: FULL VERTICAL INTEGRATION

- The first structural alternative is to maintain the current, vertically-integrated structure of the CEZ, including the eight distribution companies.
 - This option is the easiest to implement, and will not require any restructuring.
 - Due to integration, full economies of scale are achieved in each sector, and coordination of operation and planning are conducted within the organization.
 - The size and integrated nature of a single company would make regulating the company difficult. Transactions will be difficult to monitor, and cross-subsidies could occur.
 - Further, without competition, the integrated monopoly will not experience the free market's powerful incentives for efficiency.

EVALUATION OF OPTION II: COMPETITIVE GENERATION, INTEGRATED TRANSMISSION AND DISTRIBUTION

- The second structural option is to introduce competition into generation by breaking up and separating the generation portion of CEZ from its transmission and distribution functions.
 - The generation sector is already organized into a form conducive for this option in that separate operating subsidiaries of CEZ have already been formed. However, this option will be relatively hard to implement. Significant time should be allowed for the transition to independent, competitive generation companies.
 - Nevertheless, competitive pressures from independent generating companies will promote efficient operation.
 - Full economies of scale will exist in the integrated transmission and distribution sectors. Economies of scale at the plant level will be available in the generation sector.

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**EVALUATION OF OPTION II:
COMPETITIVE GENERATION, INTEGRATED TRANSMISSION
AND DISTRIBUTION (CONTINUED)**

- Coordination between the transmission and distribution sectors will be within a single organization. Coordination between this company and the independent generating companies will be more difficult, but experience in the United States and United Kingdom indicates that this coordination can occur efficiently and reliably.
- Because the transactions between the generation and the combined transmission/distribution sectors will be external, regulation will be more effective.

EVALUATION OF OPTION III: COMPETITIVE GENERATION, NON-INTEGRATED TRANSMISSION AND DISTRIBUTION

- The third structural option is for the separation of the electric power sector into independent, competitive generation companies, one transmission company, and one distribution company.
- Under this model, generating companies would compete. There would be contracts between them and the transmission company and between the transmission company and the distribution company. There would be a single transmission and a single distribution company. Since each of these would be large, full economies of scale would be realized. There would be two points of coordination, governed by the two types of contracts mentioned above.
- Compared to Option II, this option has the advantage of great specialization of the organizations. This specialization would make it easier for regulators to judge their efficiency. This model has the disadvantage of more complex, external coordination between the transmission and distribution activities.

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**EVALUATION OF OPTION IV:
COMPETITIVE GENERATION, NON-INTEGRATED TRANSMISSION AND DISTRIBUTION,
MULTIPLE DISTRIBUTION COMPANIES**

- Under this model, the distribution sector would be divided into as many as eight independent companies. These would buy power from a single transmission company and power wholesaler. Each distributor would have a contract for power purchases. Generation would be competitive, as in Options II and III.
- Compared to the other options, this model sacrifices some economies of scale in distribution. As described earlier, however, the potential economies of scale in distribution in a system of 10,000 Mw (one company) compared to 1,000-1,500 Mw are not large. One advantage of multiple distributors is the possibility of comparing their performance, for regulatory purposes. A second advantage is the ease of making their prices (tariffs) conform to regional and other differences in distribution cost.

PRIVATIZATION OF NUCLEAR POWERPLANTS POSES SPECIAL PROBLEMS

- Privatization of nuclear powerplants may be quite difficult due to health and safety concerns. These concerns result in different operation procedures for plant and costs for nuclear facilities. For example, detailed procedures are required for plant maintenance and fuel handling and disposal.
- The role of the government in nuclear plant operations will need to be large even if facilities are private. The social goal of enforcing consumer safety requires very tight regulation of nuclear powerplants.
- Investors may be wary of providing investment capital for privatization of nuclear powerplants. Investor risks can be large due to the potential for accidents such as occurred at the Chernobyl facility. In addition, the costs to retire nuclear facilities may be extremely high. Similar problems resulted in a decision not to privatize the nuclear industry of the United Kingdom.
- State control of nuclear facilities may be necessary because of the above concerns. Almost certainly nuclear facilities can not be privatized as quickly as other companies in the electric sector.

ANOTHER POSSIBLE STRUCTURAL MODEL IS PARTIAL COMPETITION IN GENERATION

- An alternative model, in between options I and II, is to maintain a vertically-integrated company but to permit purchases of power competitively from some independent sellers.
 - This is like the emerging model in the United States. The presence of some competition at the generation level provides an indicator to regulators of the performance of the generation portion of the integrated company.
 - The integrated company will be aware of the danger posed by competition. It may, as U.S. companies have done, attempt to hinder these competitors by making their sales transactions difficult. Regulated utilities in the United States must provide back-up power to independents at non-discriminatory prices in order to facilitate such sources of power. Also the integrated company may try to bias the comparison of the cost of power from independents compared to its own generation activities.
 - Since the integrated company will control the transmission system, it may use its transmission monopoly to shield its generators from competition. Many independents in the United States have complained of such behavior.
 - Compared to fully competitive generation, this option is easier to implement but less effective in the long run.

ANOTHER CONCERN OF REGULATION IS THE PARTICIPATION OF INDUSTRIAL GENERATORS

- Industrial generators in the Czech Republic may have excess power (i.e., more than required for internal use) for sale to the transmission grid.
- If industrial companies are not given access to the grid, a potentially economic source of power may be ignored.
- One way to encourage participation in this market is through standard offer contracts. The terms for power sales are set in advance. The standard offer contract is based on the regulated utility's costs.
- Alternatively, the price paid to industrial generators can be set through an auction. Many companies bid for the right to supply power to the regulated utility company.

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RETAIL COMPETITION IS BEING PROPOSED AS AN OPTION IN EUROPE AND ELSEWHERE, BUT IT HAS BAD FEATURES

- Two models of the transmission company are possible. A transmission company can purchase power and resell it to the electric distribution company. Alternatively, the transmission company can act as a transmitter only. Distribution companies could contract directly with generators. The transmission company would not have ownership of the power.
- In Germany, and perhaps soon in the European Economic Community, large customers will be able to use the transmission system to seek bids from more than one generating utility. This is called "open access" or "retail wheeling." Similar proposals have been made by some industrial electricity consumers in the United States, but so far they are not allowed.
 - The effect of this form of partial competition in a regulated utility industry is likely to be damaging. The problem is that most electricity sales remain regulated. If a few customers are allowed to seek competitive bids, they may receive price offers which only cover variable costs. The utility seller can then only be assured of receiving contributions to the fixed costs from its captive, franchise customers.
 - The effect of a system of partial competition is really to shift costs away from selected large customers to the many small customers who have no supply alternative. Possibly, no real efficiency gain will result.

SUGGESTED ELECTRIC INDUSTRY STRUCTURE

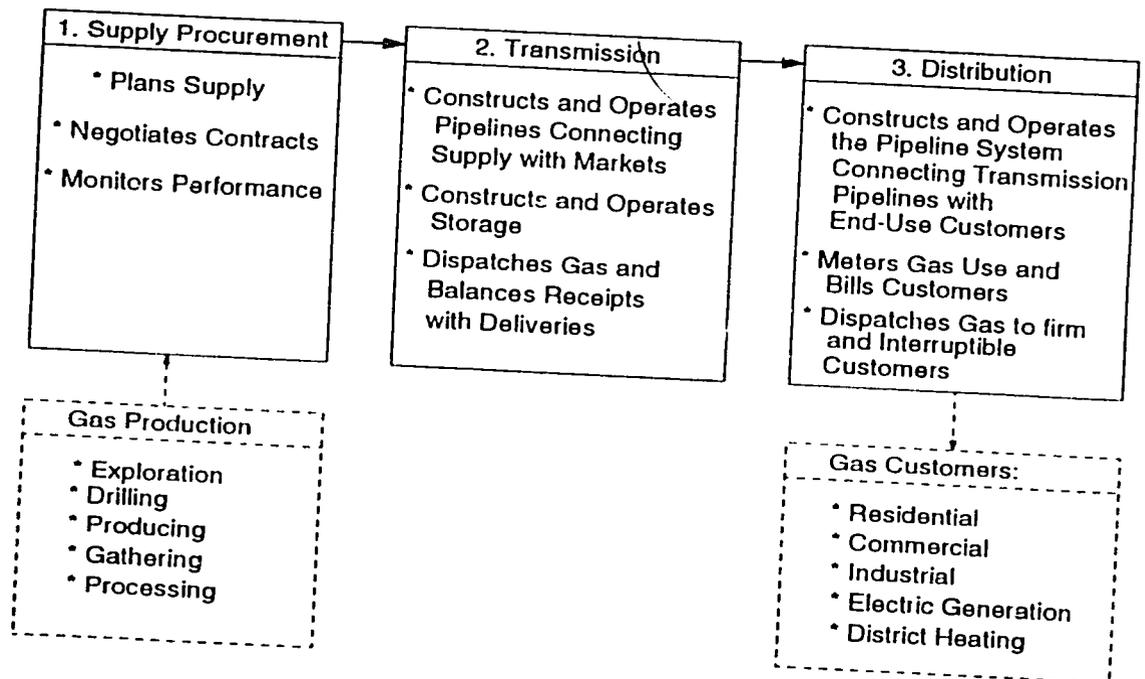
- The Czech Republic should adopt either Options II or IV. Both options include competitive generation. These options provide the most opportunity for competition without sacrificing economies of scale. Option III is not recommended because the extra burden of coordination between a single transmission company and a single distribution company is not offset by the minor regulatory advantages.
- Option I, the single integrated G, T, and D entity, is not recommended because it greatly reduces the opportunity for competition in the crucial generation component of the electric power sector.
- The advantage of Option II (Competitive G, Integrated T and D) is that the national scale of these sectors in a market the size of the Czech Republic allows economies of scale. The disadvantage of this option is that the large size of the resultant T and D company may not provide sufficient incentives for managerial efficiency.

SUGGESTED ELECTRIC INDUSTRY STRUCTURE (CONTINUED)

- A key near-term disadvantage of Options II, III, and IV is the potential for transitional problems. Breaking up CEZ into separate components will create major restructuring headaches. As a result, it should be conducted gradually. Nevertheless, the benefits from this restructuring eventually will outweigh the associated costs.
- A possible transition to competitive generation is:
 - (1) Structure the generation in several subsidiaries of CEZ.
 - (2) Establish initial cost-based contracts between these subsidiaries and the T and D portion.
 - (3) After a "break in period" during which the generation companies assess their costs and investment needs, hold an auction to set the bulk power price. Periodic auctions and annual or multi-year contracts then would be set in place.

Section V
Potential Structures for the Natural Gas
Industry

THE NATURAL GAS INDUSTRY HAS THREE FUNCTIONS



THE NATURAL GAS INDUSTRY HAS THREE FUNCTIONS

- These functions can be combined within firms or carried out in separate firms:
 - Supply procurement — can include production
 - Transmission — long distance, high pressure transportation
 - Distribution — low pressure delivery to end-user customers
- Organization options include both vertical and horizontal integration.
 - Vertically-integrated gas firms can combine supply procurement with transmission and distribution. Relationships between the functional components are a key issue in regulation of the firms.
 - Horizontally-integrated gas firms combine similar functions. For example, all distribution in the Czech Republic could be the responsibility of a single firm or of different firms. Multiple firms would operate in defined territories, as is common throughout the United States and Germany. Regulation of multiple firms can be more complicated, but it also offers opportunities to promote competition and compare performance.

GAS INDUSTRIES CONTAIN BOTH MONOPOLISTIC AND COMPETITIVE ELEMENTS

- Elements of gas markets that are competitive:
 - The supply markets (production, sale and purchasing of gas) can be competitive where there is a large integrated pipeline network that gives buyers and sellers access to alternative markets.
 - Gas competes with other fuels (oil, coal) in industrial and electric utility markets where fuels are substitutable.
 - Gas competes for market share with electricity, fuel oil, district heating and conservation in residential and small commercial markets.
- Gas transmission has aspects of competition and monopoly. Distribution markets can be served by multiple transmission pipelines that compete with one another. Transmission pipelines can also compete for new markets. However, within any one corridor, economies of scale dictate that a single pipeline is dominant.
- Gas distribution is considered to be a natural monopoly within any given geographic market. Competition between firms can occur if service territories overlap.

THE CURRENT SYSTEM IN THE CZECH REPUBLIC REFLECTS BASIC GAS INDUSTRY ORGANIZATION

Function	Current Organization
Gas Supply Procurement	Transgas purchases gas from the Soviet Union
Gas Transmission	Transgas transports gas from the Soviet Union to the Czech Republic. CPP's own transmission lines take gas from Transgas for re-delivery.
Gas Distribution	The CPP distributes gas throughout the Czech Republic through six distribution divisions.

FOUR POSSIBLE INDUSTRY STRUCTURES FOR THE CZECH REPUBLIC

Vertical Integration



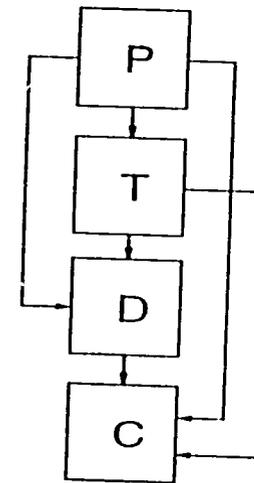
Integrated Transmission & Distribution



Merchant Pipeline



Open Access



P = gas procurement
T = gas transmission
D = gas distribution
C = customers

THERE ARE FOUR CONCEPTUAL MODELS FOR VERTICAL INTEGRATION

- I. **Vertical Integration** of all functions in one company. A single firm would produce, transport and distribute gas. British Gas is like this model.
- II. **Integrated Transmission and Distribution**, where a separate supply agency arranges gas supply for the integrated transmission/distribution function. Several U.S. firms are integrated T&D companies - National Fuel Gas, Columbia Gas, Consolidated Natural Gas.
- III. **Merchant pipeline**, where the transmission company is responsible for purchasing gas, storing gas, and reselling gas to a separate or several separate distribution companies. European systems (Ruhrigas) and most U.S. systems are like this.
- IV. **Open access** assumes separate and multiple gas agencies (marketers), transporters and distributors. In the U.S. where open access is most advanced, the transmission companies act as contract or common carriers and end-users and distributors can buy directly from producers or marketers.

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THERE ARE FOUR CONCEPTUAL MODELS FOR VERTICAL INTEGRATION (CONTINUED)

- In any of these models there can be more than one firm at the transmission, distribution, or supply/procurement levels. The extent of horizontal integration can promote competition and affects the need for regulation.

EVALUATION OF ALTERNATIVE VERTICAL ORGANIZATIONS

Evaluation Criteria	Vertical Integration	Integrated Transmission Distribution	Merchant Pipeline	Open Access
Incentive for Efficiency	Low	Low	Moderate	High
Economies of Scale	High	High	Moderate	Low
Ease of Coordination	High	Moderate	Moderate	Low
Simplicity of Regulation	High	High	Moderate	Moderate
Effectiveness of Regulation	Moderate	Moderate	Moderate	Moderate
Ease of Transition	High	High	Moderate	Low

**OPTION I: THE VERTICALLY-INTEGRATED SINGLE GAS MONOPOLY IS ONLY APPROPRIATE
WHERE THERE ARE NO ALTERNATIVES**

- For the Czech Republic, all industry functions would be placed within one firm. The firm would purchase, transport and distribute gas. Transgas could be a subsidiary or could be a separate organization, but it would still sell gas to the single gas monopoly.
- Principal advantages are:
 - Coordination of activities—gas purchasing, transmission system planning and operations, distribution and marketing—can be efficient, depending on management structures.
 - There can be economies of scale in operations.
 - Regulation could be simplified, because there is only one company.
- Principal disadvantages are:
 - Because it is one large company with no competitive elements, there will be few incentives to be efficient. Bureaucratic tendencies toward maximizing staffing and providing poor services to customers would persist.

**OPTION I: THE VERTICALLY-INTEGRATED SINGLE GAS MONOPOLY IS ONLY APPROPRIATE
WHERE THERE ARE NO ALTERNATIVES (CONTINUED)**

- All decision-making is in one organization. This can restrict the development of managerial talent.
- Effectiveness of regulation is made more difficult. Regulators may have difficulty controlling a powerful monopoly. Obtaining objective data can be difficult.

BRITISH GAS IS AN EXAMPLE OF A VERTICALLY-INTEGRATED GAS MONOPOLY

- British Gas (BG) was privatized as a single integrated monopoly in part to enable it to move aggressively into gas production and to expand gas services in Great Britain. This it has done well.
- Recently BG has received greater public criticism. BG has been widely accused of abusing its monopoly, earning excess profits and providing poor service.
- BG has had a stormy relationship with its regulator, Office of Gas Supply (Ofgas). Ofgas and other British government agencies recently have forced reforms in transmission operations to promote competition for gas supply in the industrial markets. It is difficult to introduce reforms when the company is as dominant as BG.

OPTION II: INTEGRATED TRANSMISSION AND DISTRIBUTION (T&D) MONOPOLY WITH INDEPENDENT GAS SUPPLIERS

- For the Czech Republic, this model envisions an independent supply agency responsible for acquiring gas on behalf of the Czech Republic. It would also negotiate with foreign transporters and would be responsible for developing alternative sources of supply. Transmission and distribution (T&D) would resemble the present structure of CPP. Transgas could be a separate company under this model, with the supply agency taking over purchases from Transgas and the T&D operating all interconnections with Transgas.
- Principal advantages are:
 - Economies of scale in operations can be exploited.
 - Coordination of T&D activities is internal to the company.
 - Regulation of a single company can be easier. Regulation could also focus on T&D costs and issues.
 - This model excludes the potentially competitive gas supply activity from the regulated monopoly.

OPTION II: INTEGRATED TRANSMISSION AND DISTRIBUTION (T&D) MONOPOLY WITH INDEPENDENT GAS SUPPLIERS (CONTINUED)

■ Principal disadvantages are:

- Incentives for efficiency improvements would be slight if the integrated T & D company has no competitors. It will be subject to the same bureaucratic tendencies as the present system.
- Decision-making is still concentrated. This can be mitigated by having autonomous operating divisions such as separate transmission and multiple distribution divisions.
- Effective regulation may be easier than for a vertically integrated company, but many of the same difficulties would exist.

MANY U.S. COMPANIES ARE INTEGRATED TRANSMISSION AND DISTRIBUTION (T&D) MONOPOLIES

- Some developed from distribution firms that entered the transmission business Pacific Gas and Electric, the largest utility in the United States is one example.
- Others came about where holding companies with several distribution firms interconnected these firms with each other and with upstream suppliers. Examples include the Consolidated Natural Gas System, Columbia Gas System and the National Fuel System. These firms are similar to CPP in because they receive most of their supply from other pipelines.
- Regulation of these firms in the U.S. is complicated because the distribution subsidiaries are regulated by state bodies and the transmission firms by the Federal Energy Regulatory Commission.

OPTION III: MERCHANT PIPELINE SUPPLYING A SINGLE OR MULTIPLE DISTRIBUTION COMPANIES

- Under this model, CPP would be organized into a separate distribution firm or firms and a separate transmission firm. The transmission firm would be responsible for purchasing gas supply and transporting gas to the distribution firm or firms. Multiple distributors would be preferable. These could be organized like the current six geographic organizations in the CPP or a recombination of these. Transgas could be a subsidiary of the merchant transmission firm, or it could be an independent source of gas from which the transmission firm would buy gas.
- Principle advantages are:
 - Diversify decision-making and make decision-makers more responsive to customers.
 - Allow regulators to compare the performance of multiple distribution companies, which may compete for new territories.
 - Coordination of the gas purchase/pipeline transmission functions.
 - Activities of separate distributors and transmission companies can be more transparent.
 - Greater responsibilities would fall on distribution management.

OPTION III: MERCHANT PIPELINE SUPPLYING A SINGLE OR MULTIPLE DISTRIBUTION COMPANIES (CONTINUED)

- Principal disadvantages are:
 - Transition from the present system may be more difficult.
 - There are still opportunities for market abuses by the merchant pipeline.
 - Economies of scale may diminish overall.
 - Authority for new market development may be diffused.

GERMANY AND THE UNITED STATES HAVE MERCHANT PIPELINES THAT SUPPLY DISTRIBUTION COMPANIES

- Merchant pipelining is the traditional system in the U.S. At the transmission level the major regulatory concerns are the purchasing practices of the pipelines and pipeline services to distributors.
- Competition between merchant pipelines can be encouraged, as is done in the U.S., by not granting exclusive franchises and by requiring the pipelines to provide transportation-only services to customers.
- The U.S. is moving away from this system, but the European countries seem likely to continue with it.

OPTION IV: OPEN ACCESS GAS TRANSMISSION IS ONLY FOUND IN THE UNITED STATES

- This model envisions separate distribution, transmission and supply organizations. These could be multiple firms at each level. The key element is that distributors and end-use customers could purchase gas directly from suppliers. The transmission company could transport gas on behalf of others.
- Principal advantages are:
 - It provides the greatest potential for competition in the supply and transmission of gas.
 - Gas buyers have direct access to alternative suppliers and can better match their supply with their markets, which works well if there are numerous suppliers.
 - Transmission companies must unbundle their services so users can purchase only the services (transportation, storage, peaking capacity) they need.
 - Regulatory oversight is reduced in some activities, gas supply mainly, because competition sets prices.

**OPTION IV: OPEN ACCESS GAS TRANSMISSION IS ONLY FOUND IN THE UNITED STATES
(CONTINUED)**

■ Principal disadvantages are:

- Option IV requires multiple suppliers, pipelines and distribution companies. Industries can purchase directly from suppliers.
- It has high transaction costs, a high degree of coordination of activities at all levels of the industry.
- Option IV is not suitable given the structure of the industry in the Czech Republic and in Europe.

OPEN ACCESS GAS TRANSMISSION IS A VERY COMPLEX SYSTEM

- In the United States, open access transportation has been advanced by the Federal Energy Regulatory Commission as a way of introducing greater competition in gas markets. The FERC has tried to move away from the Merchant Pipeline model because it believed that pipelines abused their market power by limiting buyers' access to competitively priced gas supply and by forcing their customers to buy pipeline services they did not need. Implementation of open access has taken several years and has been difficult.
- The Office of Gas Supply in Britain has implemented similar reforms but to a more limited extent. These are intended to allow industrial gas users to purchase gas from suppliers other than British Gas and allow them to transport their gas over the BG pipelines.

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THERE ARE FOUR MAJOR ORGANIZATIONAL ISSUES FOR A PRIVATIZED GAS INDUSTRY IN THE CZECH REPUBLIC

1. Should transmission be integrated with distribution in one firm?
 2. Should the Czech Republic have one or more distribution monopolies?
 3. Should there be one or more transmission pipelines in addition to Transgas?
 4. Should the transmission pipeline be a gas merchant or should it only transport gas?
- The answers to these questions depends on:
 - the physical and organizational infrastructures in the Czech Republic.
 - The European gas market environment.
 - The policy goals of the Czech Republic with respect to energy, natural gas, and privatization.

SHOULD TRANSMISSION BE INTEGRATED WITH DISTRIBUTION?

- Transmission and distribution functions should be in separate firms. This can accomplish several objectives.
 - Decentralize decisionmaking and make decision makers more aware of market signals.
 - Promote development of commercial and managerial skills in a market context.
 - Reduce the likelihood of a powerful monopoly that would dominate regulators and customer interests.
 - Create a basis for more competition as the industry matures.
- A first step in implementing this model would be to clearly define the transmission and distribution responsibilities and assets. This may be difficult depending on the extent of integration of the CPP system.
- Transgas could be a separate transmission company under this model.

SHOULD THE CZECH REPUBLIC HAVE ONE OR MORE DISTRIBUTION MONOPOLIES?

- Two options seem reasonable:
 - A single distribution company with separate operating subdivisions (similar to the current structure).
 - Separate, independent distribution companies operating in different geographical areas (and not necessarily the same areas as CPP's divisions).
- Independent distribution companies could make regulation more complicated but would accomplish several important goals:
 - Improve opportunities for developing commercial relations among companies.
 - Promote development of managerial skills.
 - Provide points of comparison for firm performance.
 - Decentralize decision-making.
- Independent distribution companies can be viable across a broad range of sizes in terms of customers and sales. In the United States, distributors serve as few as several hundred customers to over 2,000,000. Over half U.S. distribution companies have 50,000 or fewer customers.

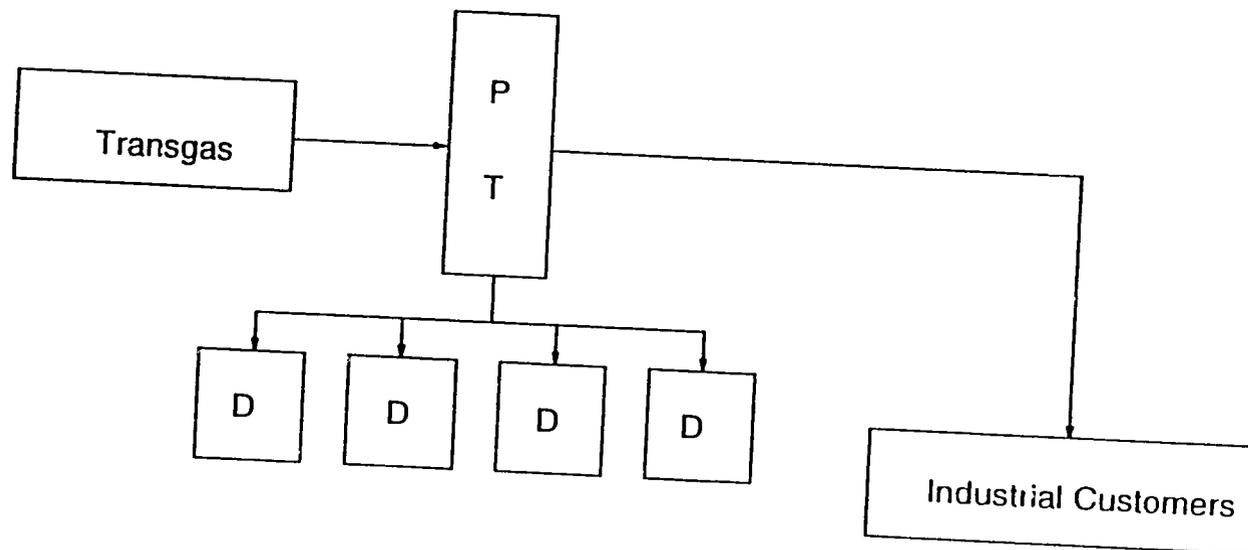
SHOULD THERE BE MORE THAN ONE TRANSMISSION COMPANY?

- It is likely that Transgas will become a separate entity with gas merchant responsibilities for Russian gas supply. This supply could be delivered to an internal Czech Republic transmission or transmission/distribution pipeline.
- Other transmission firms could be created to transport gas within the Czech Republic and deliver gas from Western Europe and from Algeria or other sources. These could compete with each other in distribution markets.
- The best model may be a single transmission system (separate from Transgas) responsible for coordinating deliveries from a variety of supply regions (Western Europe, North Africa, the USSR), operating storage, and dispatching gas to distribution utilities throughout the Republic.

SHOULD THE TRANSMISSION COMPANY BE A GAS MERCHANT OR SIMPLY A TRANSPORTER?

- Given the realities of European gas markets, dominated by large, national producing and transporting firms, the single merchant pipeline option is preferred.
- The merchant pipelines would be responsible for gas supply planning, negotiating contracts, transporting gas, and reselling gas to distributors.
- The merchant pipelines could be given the franchise for heavy industrial gas markets (including electric utilities) where high pressure gas is important.

PROPOSED MODEL CZECH GAS SYSTEM



- * A Single Merchant Pipeline
- * Multiple Distributors

A MERCHANT PIPELINE SERVING MULTIPLE DISTRIBUTORS PROMOTES COMMERCIAL RELATIONSHIPS AND PROVIDES REGULATORS WITH LEVERAGE

- This option has the following advantages:
 - Does not concentrate power in one entity, but locates decision making at the appropriate levels.
 - Creates opportunities to compare performance between companies.
 - Maximizes commercial relationships and promotes development of commercial skills.
 - Provides negotiating leverage with gas suppliers.
 - By breaking up the CPP organization, creates opportunities for self regulation.
- Allowing the transmission company to sell directly to industrial users can promote market sensitive pricing in this sector.

Section VI
Potential Structures for the Heat
Distribution Sector

THE HEAT DISTRIBUTION SECTOR CONSISTS OF MANY SEPARATE AND DIVERSE SYSTEMS

- The heat distribution sector includes the activities of steam and hot water production and distribution. Steam and hot water may be generated in single-purpose boilers, or as a co-product with electric utility generation, industrial facility electric power generation, or industrial facility steam generation.
- Each heat distribution network serves a single locality, usually a city or a portion of a city. Diverse customers, including industrial customers, may be served from the network.
- The district heat sector has been separated into multiple companies for the purpose of operation. Although 60 to 70 regions have district heat service, there has been some consolidation of systems, i.e., one company may operate systems in more than one area. This is the case for the OKE system which serves the larger Ostrava region. The largest five companies serve about 70 percent of the CR heat market.
- Each local network has a unique mix of supply sources and layout, and therefore a unique cost structure. One important characteristic of heat distribution networks is the number of heat sources connected to a single network. Prague, for example, has as many as 40 small networks which are supplied by small, single-purpose boilers. Some networks are supplied by a single heat source such as a powerplant that produces both heat and electricity. Some large systems have multiple suppliers.

THE FEASIBLE STRUCTURAL OPTIONS FOR THE HEAT DISTRIBUTION SECTOR ARE LIMITED

- Two organizational questions arise:
 - Should heat distribution networks in different localities be integrated into single companies?
 - Should heat generation be integrated with heat distribution?
- Another important question is whether there should be municipal rather than private ownership of heat distribution networks.

CONSOLIDATION OF HEAT SYSTEMS MAY BE VERY PRACTICAL

- District heat systems have a clear regional character in that networks are not interconnected except in instances where towns are located in close proximity.
- However, some economies may exist in grouping the regional networks in the same company. Economies may occur in management, administration, planning, and procurement of fuel.
- Organization at a reasonably large scale may provide access to investment capital. Capital will be needed particularly for environmental controls.
- The optimal number of firms is not clear. There should be enough companies so that regulators can compare performance. Regulators should undertake to make tariffs that reflect the cost differences of the firms.
- Coordination will be required to facilitate the electric power function of heating plants and the heat production function. If the electric generation sector becomes competitive, the combined heat and powerplant may be regulated when other electric generators are not.

OPPORTUNITIES FOR COMPETITION IN THE HEAT SECTOR MAY BE LIMITED

- From a conceptual standpoint, heat generation could be a competitive business selling to a regulated distribution company. Such a system would be analogous to separation of electric power generation and distribution.
- In practice, however, a single heat source may be dedicated to a single network. Thus, the distribution company would be captive to a monopoly supplier. Systems with multiple suppliers provide some limited competition in that more heat can be purchased from the least cost supplier to the network.
- Regulation of heat distribution companies ultimately may be less strong or eliminated entirely if the end-use heating market becomes highly competitive between alternative fuels (e.g., coal, gas, LPG, and electricity). Regulation will be required initially to prevent suboptimal short-run heat distribution company behavior before competitive fuel markets are successfully operating.
- Future competition of this sort would also depend on the financial viability of the heat distribution companies. If these companies must price heat very highly to cover their costs, some customers may switch to alternative fuels, further aggravating cost recovery problems. If existing heat distribution companies do not appear to be viable in some locations, then subsidies may be required until these systems can be phased out.

BOTH MUNICIPAL AND PRIVATE OWNERSHIP ARE POSSIBLE

- Municipal ownership of district heat systems is a common model in Western Europe.
- Some advantages could include:
 - Municipal governments would have close relationships with customers.
 - Control by municipal government can reduce the regulatory burden of other regulatory agencies.
- A primary disadvantage of municipal ownership is that governments have reduced incentives for efficiency. Efficiency is an important goal particularly as competition to serve the heating market increases.
- Another reason for municipal ownership is a public policy interest in subsidizing the provision of heat to certain customers. These interests (as well as the need to displace use of imported oil) motivated some subsidies of Western European district heating systems.
- Municipal governments can raise capital privately and tax laws can also provide funds for investment. Procurement of capital may be quite difficult for small municipalities. One option is for municipalities to form a cooperative association. This is common in the United States where cooperative utilities form an association to facilitate such activities as buying fuel.

SUMMARY OF OPTIONS FOR THE HEAT SECTOR

Evaluation Criteria	Option I: Organize many regional networks as one company with private ownership	Option II: Organize as single municipal-level systems with municipal ownership
Incentive For Efficiency	Moderate	Low
Economies of Scale	High	Low
Ease of Coordination	Moderate	High
Simplicity of Regulation	Moderate	High
Effectiveness of Regulation	Moderate	Low
Ease of Transition	Moderate	Moderate

WHILE THE OPTIMAL INDUSTRY STRUCTURE IS CLEAR, OWNERSHIP IS NOT

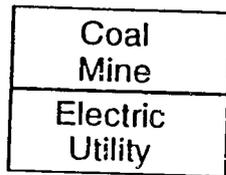
- Due to lack of competition, the most feasible structure for heat distribution is to maintain integration between heat production, transmission, and distribution.
- Heat distribution systems are purely local operations. However, the consolidation of multiple networks may offer economies of scale. Enough companies should be created so performance of companies can be compared for regulatory purposes.
- Because of the great diversity of systems, some aspects of the industry may be organized differently.
- Some networks might be owned at the municipal level.
- It is possible that enough competition will eventually exist to consider a competitive model for the heat distribution sector. Such conditions might occur for very large systems with multiple heat production facilities or if competition at the end-use level developed.
- The transition to either private ownership with regulation or municipal ownership will be facilitated by the current organization of district heat systems. Currently, the industry has a combination of operating companies and municipally operated systems.

Section VII
Potential Structures for Captive
Lignite Mines

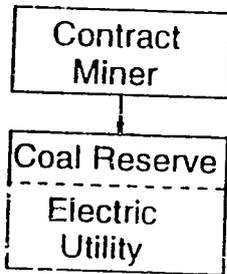
SOME LIGNITE MINES MAY BE NATURAL MONOPOLIES

- Several Czech electric power plants purchase fuel from lignite mines which are located near the power plants. To some extent the plant and mine are economically tied. The plant might have to pay much more for coal from any other source. The mine might receive less from any other possible buyer. In this case, the mine is a limited natural monopoly or "captive" lignite mine. A few mines and power plants in the Czech Republic may fit this description.
- Under the existing arrangements, the mines are independent of the electric company and sell at a price fixed by the State.
 - The mines are now part of a few large organizations, but they might be split up.
 - Coordination between the mine and power plant is one issue. The mine must supply the right quantity and quality of coal. If they are under separate ownership, a contract must govern this coordination.
 - Mining is a very different activity than power generation. There are some economies of scale in the management of several coal mines, even if they are not contiguous.

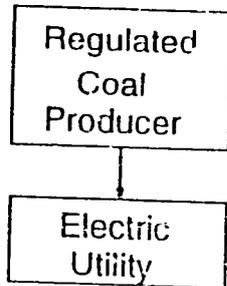
ORGANIZATIONAL ALTERNATIVES FOR "CAPTIVE" LIGNITE MINES



I. Utility-Owned Mine



II. Mining Company Bids for Contract to Operate Mine



III. Coal Mined by Independent Company, Price Set by Regulation

	Incentives for Efficiency	Economies of Scale	Ease of Coordination	Effectiveness of Regulation	Simplicity of Regulation	Ease of Transition
I.	M	L	H	L	H	L
II.	H	M	M	H	H	L
III.	M	H	M	M	M	H

EVALUATION OF OPTION I: UTILITY-OWNED MINE

- The coal mine might be owned by the power plant (Option I). This is the case for some mines in Germany and in the United States, Australia, Thailand, and elsewhere. Provided that the electric power producer had strong incentives to control costs, this system can work. However, the business of mining is very different from the power generation business. Pure mining companies are likely to be more effective.
 - Coordination is easy under this arrangement. However, incentives for efficiency may be weak. Effective regulation is difficult, because some cost allocation issues arise. The transition would require ownership changes but not major organizational changes.
 - Experience in the U.S. is that electric utility-owned mines are insulated from competitive pressure and are almost always less efficient than independent mines. Even the "style" of mining companies is different than utilities. Successful independent mining companies do things "rough and cheap"

EVALUATION OF OPTION II: COMPETITIVE CONTRACT WITH MINING COMPANY

- The second alternative (Option II) is a "contract miner" relationship. The coal deposit may be owned by the State or the electric utility. Then, the mining company may bid to operate the mine for a fixed term. In that case, the price is set by competition among mining companies seeking the operating contract. The mine equipment might even be owned by the electric utility.
 - Coordination between utility and mines will have to be achieved through a contract. This model assumes that multiple mining companies exist that will compete to serve as the contract miner. If so, the price is set competitively and regulation is easy. Transition would be difficult.
 - Contract mining relationships require very carefully thought out contracts. The coal producers seek to pass through cost to the buyer as much as possible and reduce risk. The buyer must be sure to negotiate a contract with strong efficiency incentives and some mechanism for sharing changes in cost between the buyer and seller.

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EVALUATION OF OPTION III: REGULATED PRICE OF COAL PRODUCED AND OWNED BY INDEPENDENT COMPANY

- The third alternative (Option III) is that the price of coal is regulated. Regulation in such cases is based either on historical average cost or, better, on long-run marginal cost. The price may be fixed or set by a formula for a specified period. Under a "price cap" regulatory approach, the producer has a strong efficiency incentive.

Coordination will require a contract between the mine and power plant. Incentives are good. Economies of scale are realized because the mine may be owned by a larger mining company. Regulation is somewhat difficult, requiring a detailed cost study. Transition is easy. The relationships are like those in place today.

- A fourth alternative is that the price of coal would be set by a "net-back value" from the price of a competitively priced fuel such as hard coal. In that case, excessive profits may accrue to the coal producer. These could be taxed away. This method is not used as far as we know.
 - The features are like those of Option III. The price setting is easier. The treatment of the excess profits would be quite difficult.

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A REGULATED PRICE FOR LIGNITE FROM A CAPTIVE, PRIVATELY-OWNED MINE IS THE PREFERRED OPTION

- The third option is simplest and still conveys both the right price signal and incentives.
- The main practical problem is in estimating the long run marginal cost. Under a "price-cap" type of regulation the coal producer can preserve independence and improve productivity. Only the few truly captive mines in the Czech Republic have to be regulated.

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Section VIII
Price Regulation

THE TRADITIONAL METHODS OF REGULATING ENERGY PRICES IN NATURAL MONOPOLIES HAVE DRAWBACKS

- Historically, in the international energy industry, utility energy prices have been based on historic average costs. Pricing at historic average cost recovers the revenue required for variable costs (fuel and operation & maintenance), fixed costs (depreciation), and a rate of return (if privately owned).
- Prices based on historic costs can diverge from marginal costs for two reasons: (1) inflation which causes historic ("book") costs to be low in relation to costs of new plant construction and (2) excess capacity, which causes historic costs to exceed marginal costs (at least for a time).
- Regulated prices which explicitly include a component of profit on invested capital create incentives for the regulated company to over-invest in capacity. This form of regulation, especially in the United States, has had two bad results. The first bad result is over building of capacity. The second is utility reluctance to promote conservation.
- The trend in utility pricing in other industrialized countries is to: (1) incorporate marginal cost pricing into rate structures, and (2) move towards incentive rates.

MARGINAL COST-BASED PRICES ARE THE CORRECT PRICE SIGNAL FROM AN EFFICIENCY STANDPOINT BUT MAY CREATE FINANCIAL PROBLEMS

- The most efficient signal to send to consumers is to set prices equal to long-run marginal costs (LRMC). The price that a consumer pays for a good should reflect the cost of supplying an additional unit of this good. Otherwise, inappropriately low or high levels of demand will result.
- Pricing at LRMC can cover the fixed cost of incremental investments plus short-run variable costs. LRMC is different for different classes of customers. Most importantly, in the optimum customer cost structure, the LRMC of capacity is charged only to customers who contribute to peak usage.
- If LRMC is lower than average cost, then total costs are not covered by rates, which can cause financial problems.
- Conversely, if LRMC is greater than average cost, then companies can earn excessive profits.

THE CZECH REPUBLIC IS WELL SITUATED FOR IMPLEMENTING MARGINAL COST PRICING

- In the creation of privatization projects, the Czech Republic is in the unique position to implement marginal cost pricing. As the utilities are privatized, assets and debt will be assigned to them, and interest rates will be set. These financial requirements could be sized to match the revenue collected based on prices set at LRMC.
- The Czech Republic already has experience with marginal cost pricing. A form of time-of-day rates is already in place. Off-peak usage is charged at lower rates than on-peak usage. Experience with this rate structure will make the transition to full marginal cost pricing easier.
- During the transition to a market economy, the estimation of LRMC in each industry will depend on the actual incremental investment that will be required. If an industry has surplus capacity, LRMC may be relatively low.

ONE GOOD EXAMPLE OF INCENTIVE RATES IS THE PRICE-CAP REGULATION IN THE UNITED KINGDOM

- The price-cap approach has been implemented in the United Kingdom's privatized utilities over the last 10 years. In this approach, prices are allowed to rise annually at the inflation rate minus a fixed percentage which is intended to reflect productivity gains. Some costs, such as fuel, may be made a separate item and passed through directly in the retail price.
- The advantages of this approach is that utilities have an incentive to cut costs and improve efficiency, with resultant increases in profit. Periodic reviews (e.g., every one to five years) ensure that profits are not exorbitant. Additional advantages include:
 - Price cap regulation does not promote "cost-plus" inefficiency and the over-capitalization associated with rate-of-return regulation.
 - Price cap regulation is easy to administer. It is more transparent and is focused on price (rather than costs), which is the greatest concern to customers.
- The primary disadvantage of this approach is that the periodic reviews may begin to resemble rate-of-return rate cases, with a heavy concentration on the level of utility profits. In each of the periodic reviews in the United Kingdom, the fixed percentage improvement in costs that must be achieved to maintain profits has been raised.
- Another potential disadvantage of price cap regulation is that the regulated company may be motivated to allow service quality to deteriorate in order to cut costs and increase profits.

SUGGESTED PRICE-SETTING METHOD

- The Czech Republic should implement marginal cost pricing coupled with price-cap regulation. Utilities should be instructed to use LRMC as the criteria for setting prices for retail customers. Price cap regulation would specify the future trend in prices.
- Marginal costs should form the basis for wholesale and bulk power transactions.
 - The bulk power price charged by producers should reflect marginal costs of energy production and additions to capacity.
 - The wholesale price charged to distributors should reflect the marginal costs of energy production and of additions to generation and transmission capacity.
- This form of price-setting will create powerful incentives for efficient operation and economically efficient retail prices. Regulation will be relatively simple, except for ensuring the equitable allocation of costs.
- One potential drawback should be noted. Price cap regulation can create significant short-term profits for energy utilities. These profits may produce political pressures for price reduction.

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THE REGULATED UTILITIES WILL NEED SOME FLEXIBILITY TO NEGOTIATE RATES WITH CUSTOMERS

- The existing energy monopolies and industries in the Czech Republic were created under a centralized planning framework. Some existing operations will not be financially viable in a competitive market.
- In the near-term transition period, utilities may have surplus capacity and will need the flexibility to provide energy to some customers at rates below LRMC. These lower rates will lead to greater use of otherwise surplus utility capacity. Therefore, they should be allowed by the regulatory agency.
- In the longer term, the utilities will need some flexibility to price energy competitively for large users who could otherwise switch to alternative fuels. However, utilities should not subsidize prices to such users on a long-run basis.

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THE PRICE REGULATION METHOD SELECTED WILL AFFECT THE OWNERSHIP OF ENERGY ENTERPRISES

- Regulation which gives a reasonable assurance of profit permits the establishment of purely private utilities. These utilities can often finance a large portion of investment with debt, since they are seen as safe. The required return on debt (i.e., the interest) is lower than the required return on equity capital.
- Regulation can provide for prices for energy which are adequate to cover costs, and reasonable assurance of continued fair treatment. If so, there is no financial reason for State ownership of the regulated energy company.
- Control of regulated utilities is really joint between the owners and the regulators. Even foreign ownership, if it is dispersed, may be acceptable given regulatory control.

NEED FOR FINANCIAL REGULATION

- Regulation of utilities often extends beyond prices. Financial arrangements and transactions of the utility are also important.
- Utilities are usually required to maintain certain capital structures (i.e., the balance between owners' equity and debt) to prevent financially risky actions by the utility owners. If the utility owners get into financial trouble, it is trouble for everybody.
- There is a long, sad history of financial manipulation of utilities, leading to excessive costs or to bankruptcy.
- Financial and price regulation interact. Greater financial safety requires a higher share of owners' equity, on which a reasonable return should be earned.

Section IX
Non-Price Regulation

MANY NON-PRICE ASPECTS OF PROVIDING ENERGY SERVICES SHOULD BE REGULATED

- Potential regulatory responsibilities include:
 - Granting franchise rights
 - Enforcing service obligations
 - Reliability of service
 - Review or approval of least-cost plans
 - Certification of new facilities
 - Eminent domain
 - Environmental protection
 - Health and safety

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GRANTING OF A FRANCHISE IS AN IMPORTANT RESPONSIBILITY WHICH CAN BE ASSIGNED TO THE REGULATORY AGENCY

- If natural monopoly conditions exist, the regulatory authority can grant an exclusive franchise to the energy utility.
- Competing companies can submit bids to obtain the right to a particular franchise. For example, companies could compete to provide pipeline or distribution service to a currently, unserved territory.
- Regulatory agencies can evaluate a variety of factors in awarding a franchise such as the experience, capitalization, or business plan of the entity.
- Franchises may be reevaluated after a fixed term of years. If granted in perpetuity, there should be a legal framework for transferring the franchise in cases where the obligations of the franchise are not fulfilled.

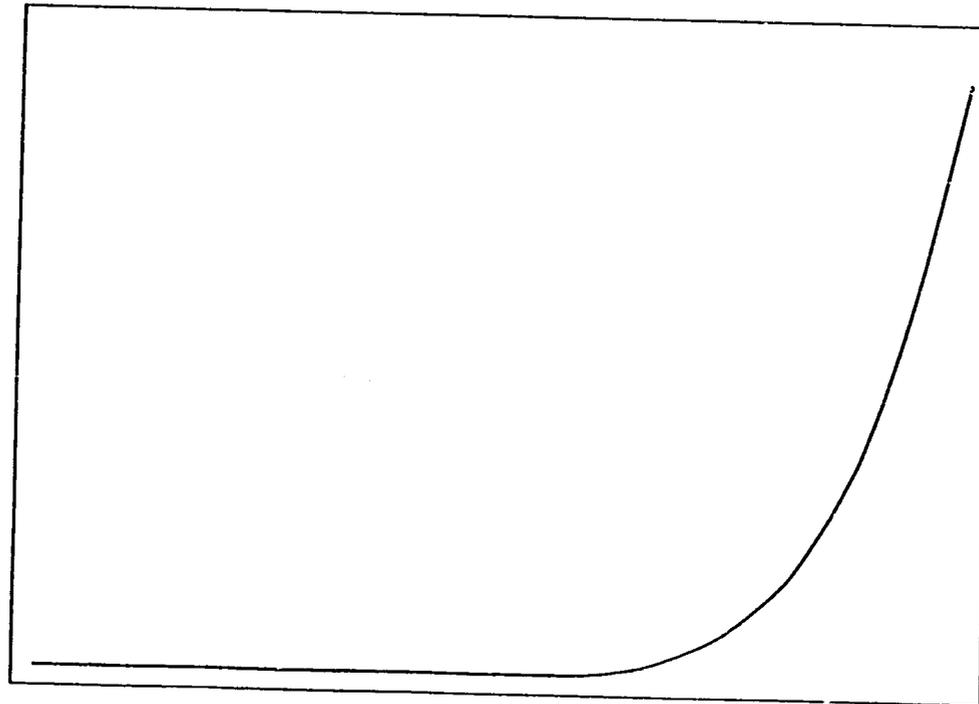
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THE GRANTING OF FRANCHISES IS GENERALLY TIED TO THE ACCEPTANCE OF A SERVICE OBLIGATION

- Without a service obligation, the monopoly utility can deny service to particular groups of consumers, or try to impose onerous requirements on undesirable customers.
- In some situations, it may be fair to deny service to particular groups of customers. For example, it may not be economically feasible to provide gas service in remote areas. The level of gas demand would be too low to justify investment in additional pipeline capacity.
- Rules should be developed to make service decisions fairly.
- Another key issue is the energy utility's contractual obligation to customers. For example, can the utility terminate service for non-payment? To send a good price signal, the utility may need the right to terminate service. Procedural protections would be necessary to prevent unfairness to consumers.

**RELIABILITY OF SERVICE REGULATION WILL AFFECT UTILITY
ECONOMICS SIGNIFICANTLY**

Cost



Reliability

RELIABILITY OF SERVICE REGULATION

- Reliability becomes increasingly costly as 100% reliability is approached.
- Reliability levels may be tied to the grant of the franchise or certification or may be left to negotiation with customers. Efficiency may be enhanced if customers choose the level they require. For example, a customer with stand-by power generation equipment would not pay much for 100% reliable service.
- Some reliability is tied to health and safety and may need to be directly regulated. Emergency power/heating and gas pipeline depressurization rules are good examples of this need.

PREPARATION OR APPROVAL OF LEAST-COST PLANS

- Regulated private utilities generally have the responsibility to prepare least cost system plans. These plans include planned investments and projected operation of the system (electric, gas, or heat distribution).
- Regulators may review and approve these plans. In the case of the United States, which is one extreme, the regulatory body does not approve or disapprove the plan. Although preliminary approval is provided before plants are built, U.S. regulators perform the final review after plant construction. At the other extreme, for example in Japan, utility plans are made in very close consultation with the Central Government and are not subject to later review.
- If the Czech Republic chooses to separate generation from transmission/distribution, the generation or transmission/distribution company would perform the least-cost planning function.
- Under loose, price-cap regulation, the utility is very much at risk for investment decisions. Under this system, regulatory review may be limited.

CERTIFICATION OF NEW FACILITIES IS AN IMPORTANT REGULATORY FUNCTION

- The regulatory body may approve the location and design of new facilities.
- Typically, the regulatory body will consider:
 - Environmental Impact. Is the new facility the least disruptive option for the environment? Are environmental controls adequate?
 - Siting. Siting of new facilities will depend on environmental constraints, access to natural resources, access to transportation, and other factors.
 - The need for the facilities. Under cost of service regulation, companies may have an incentive to over-invest in new facilities. Under price cap regulation, companies may have the opposite incentive.

ANOTHER IMPORTANT SITING/CERTIFICATION ISSUE IS THE NEED FOR EMINENT-DOMAIN AUTHORITY

- Eminent domain is the right of the government to take private property for public use. A purely private company that serves no social purpose would not have a right of eminent domain.
- Construction of pipelines and electric transmission lines are good examples of the need for eminent domain. That is, the energy company needs access to both private and public property of many landowners in order to complete the facility. Without eminent domain, private land-owners could charge unreasonable prices for access or force use of an inefficient route. Another important example is the need to use public waterways for hydroelectric generation.
- Eminent domain requires a process for transferring property rights and for determining compensation for the original owner.

EMINENT-DOMAIN AUTHORITY (CONTINUED)

- Property options include:
 - Transfer land ownership
 - Transfer subsurface or air rights ownership
 - Grant access for utility use (easements) without transferring ownership to the energy company.
- Compensation options include:
 - Private negotiations with a judicial process if agreement proves impossible.
 - Private negotiations with a specified settlement procedure such as an arbitration board if agreement proves impossible.
 - Government specified payments; the government can decide the appropriate amount of compensation to be paid.
- A standard of compensation should be established by law. "Fair market value" is the U.S. standard.

ENVIRONMENTAL ISSUES MAY AFFECT DECISIONS OF REGULATORY AUTHORITY

- Construction planning should reflect environmental concerns. More gas-fired or nuclear facilities could be planned to minimize air emissions.
- Construction processes may be changed. The utility must design construction plans to minimize environmental disruption (e.g., detailed plans for stream crossings during gas pipeline construction).
- Equipment choices such as the need for emission control and emission measurement equipment will need to be made.
- Fuel choice decisions may be adjusted given air, water, and solid waste pollution. For example, coal-fired powerplants with emission controls might be utilized more than uncontrolled sources.
- Training of personnel in environmental procedures will need to occur.

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ENVIRONMENTAL ISSUES MAY AFFECT DECISIONS OF REGULATORY AUTHORITY (CONTINUED)

- The Czech Republic may want to participate in or monitor international agreements on energy and environment. Areas of international focus are:
 - Acid Rain
 - Greenhouse Protocols
 - Stratospheric Ozone Protection
 - Endangered Species

ENVIRONMENTAL CONSIDERATIONS HAVE BECOME MAJOR OBSTACLES TO ENERGY PROJECTS

- Extended delays of new facility approvals and/or operating plans are a possible problem. For example, it may be politically difficult and time consuming to develop operating procedures for nuclear facilities due to the environmental and health risks.
- Authority over environmental regulation needs to be assigned. Several options are possible:
 - Give authority to an environmental regulatory agency similar to such as the U.S. Environmental Protection Agency (EPA)
 - Energy regulatory authority takes responsibility for environmental regulation (perhaps only in some aspects).
 - The energy regulatory authority enforces regulations developed by other agencies.

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ENVIRONMENTAL CONSIDERATIONS HAVE BECOME MAJOR OBSTACLES TO ENERGY PROJECTS (CONTINUED)

- Issues of authority will be important.
 - Potential coordination/decision roles need to be defined. For example, the energy regulatory authority could have authority to make decisions about project viability. It would review environmental data to make this decision. Or, the energy regulatory body could have limited authority, e.g., coordination of the activities (such as environmental permits) of other agencies.
 - Environmental issues are often contentious. Many interest groups (such as consumers, industry) may want to be involved. Quasi-judicial dispute resolution mechanisms that allow many appeals by many interest groups may prevent timely decision making. Alternative dispute resolution mechanisms should be evaluated and encouraged.

VARIOUS ASPECTS OF HEALTH AND SAFETY MUST BE REGULATED

- Several target populations (general public, utility customers, utility workers) may need protection.
- The responsibility of the regulatory authority may be defined in different ways.
 - Broad (e.g., including ambient carcinogens)
 - Industry operations (e.g., emissions, electromagnetic fields)
 - Focused problems (e.g., accident prevention and regulation of construction near utility rights-of-way).
- The extent of the agency's authority may vary.
 - Minimum standards for health and safety (e.g., prevention of electrocution from faulty equipment) may already exist. Regulatory authority should, at a minimum, have responsibility for enforcement.
 - Authority could include ability to stop activities and issue fines.

Section X
Organization of the
Regulatory Agency

REGULATORY BODIES ARE OFTEN ESTABLISHED AS INDEPENDENT AGENCIES

- Direct state control of energy companies is common in many countries. As in the Czech Republic, the government typically establishes an Energy Ministry to direct activities of the energy companies.
- The United States, United Kingdom, Canada, and other countries with private (or partially private) energy sectors have established independent regulatory agencies.
- One important goal of regulation is to set prices at levels sufficient to attract capital. Regulation should also be clear, fair and consistent. An independent agency that is removed from direct state control and political pressure is more suitable to carry out these goals.

CERTAIN FUNDAMENTAL ACTIONS WILL BE REQUIRED TO ENSURE INDEPENDENCE

- The regulatory agency must have a clear legal charter. The charter must contain clear principles of economic regulation for energy industries.
- The regulatory agency must have defined authority over a clear set of issues.
- The procedural rules of the agency must provide for participation in regulation by energy consumers.
- The agency must be staffed with knowledgeable regulators with a substantial term of service. The regulators will need a professional staff with appropriate expertise.

DEVELOPMENT OF A LEGAL CHARTER IS VERY IMPORTANT

- The regulatory authority is given the power to regulate by law.
- The legal charter should be designed so as to promote the goals of regulation and to prevent future disputes.
- The charter must state the principles under which regulation will be carried out.
- The authority of the regulatory agency should be clear. Some dispute resolution mechanism should be provided in the event the regulatory authority oversteps its authority. The goal should be to make interference with agency decisions as limited as possible.

THE REGULATORY AGENCY SHOULD HAVE CLEAR RESPONSIBILITIES AND AUTHORITY

- The regulatory authority can have very broad or very limited authority. It can:
 - Establish energy policy directly.
 - Draft regulations based on interpretation of laws made by other government bodies.
 - Enforce regulations made by legislative bodies.
 - Monitor behavior.
- Authority also varies according to the activities regulated. Typically, regulated activities include price regulation, licensing/certification, resource planning, environment, and health & safety. Not all responsibility for these issues may be vested in the same regulatory agency.
- Most regulatory bodies have some non-regulatory duties such as data gathering, data publication, industry analysis, market forecasting, and advising the government on energy policy.
- Collection of information is a useful public service and will assist the regulatory authority in monitoring the economic health and activities of the energy companies.

POSSIBLE REGULATORY AGENCIES COULD HAVE A BROAD RANGE OF JURISDICTIONAL AUTHORITY

- Regulatory agencies can be set-up at the national, republic or regional levels. In the United States, utilities are regulated at the state level. The regulatory authority has responsibility for all utilities (electric, gas, water) operating in the state. The U.S. Federal Energy Regulatory Commission (FERC), a national agency, is responsible for inter-state energy issues, i.e., those that affect more than one state.
- Separate agencies can be set up for each energy industry. In the United Kingdom, there is one regulatory authority for electric companies and another for gas.
- One national agency can regulate all energy companies.
- The regulatory agency can regulate only a few companies or many companies. The level of agency staffing and resources should match the regulatory workload.
- All phases of energy production, transportation, and delivery or only some phases can be regulated. The need for regulation will depend on the whether there is competition or natural monopoly in each phase. For example, the United Kingdom has only loose regulation for generating companies since the sector is considered to be fully competitive.

OUTSIDE CHECKS TO LIMIT REGULATORY AUTHORITY WILL BE NEEDED

- Outside checks to limit agency actions include:
 - Executive veto (e.g., some Canadian National Energy Board decisions require Cabinet approval).
 - Judicial review of decisions. The level of review (i.e., what court hears the case) and possibilities for appeals can vary.
 - Legislative. The scope of the regulatory authority should be clearly set out in the legal charter. In the U.S., conflicts occur between state and federal regulatory authority.

**DECISIONS WILL BE REQUIRED TO DETERMINE
NATIONAL, REPUBLIC AND LOCAL RESPONSIBILITY FOR REGULATION**

Activity Regulated	CSFR Government	Czech Republic	Local Government
Price	X	X	
Franchise, Service Reliability	X	X	
Certification Of New Facilities	X	X	X
Environment (Air pollution, Nuclear energy, Other)	X	X	
Health and Safety	X	X	
Energy Policy	X	X	

MUNICIPAL GOVERNMENTS SHOULD HAVE RESPONSIBILITY FOR DECISIONS WITH LOCAL IMPORTANCE

- Municipal governments may need to play a role if energy issues directly affect a particular city. For example, the city government may have the authority to award building permits to construct an electric generating facility within city limits. Another potential area of municipal involvement is district heat.
- Too much responsibility at the local level may result in serious disputes. In the United States, this phenomena is called "NIMBY" or Not In My Backyard. One important area of dispute would be the construction of long pipelines or long transmission lines. If local governments can interfere with such projects, inefficient routings may occur.
- Too little responsibility at the local level is also a problem. Standards of democratic participation suggest that local governments and by reference local populations should have a role in decisions that directly affect them.

THE ROLE OF THE CSFR GOVERNMENT COULD BE BROAD OR LIMITED

- One advantage of a national-level regulatory agency is that it is more isolated from political influences, i.e., it may be more independent.
- National responsibility will require the Czech and Slovak Republics to use similar principles of regulation.
- A national-level regulatory agency may be more appropriate for regulation of issues with a distinct international or national security character. Enforcement of international nuclear safety standards are one example. Development of energy policies such as for dependence on foreign sources of oil may also be appropriate for a CSFR-level agency.
- A national regulatory agency may be more effective in carrying out national energy policy.
- Finally, there may be some modest economies to having a single national-level agency.

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THE ROLE OF THE CZECH REPUBLIC IS LIKELY TO BE LARGE

- One advantage of regulation at the Czech Republic level is that it will be responsive to the objectives and issues important in the Czech Republic.
- There are already clear distinctions between energy assets in each republic. This may facilitate republic-level regulation.
- Some mechanism will be required to facilitate agreement on energy issues that affect both republics. Both republics could negotiate directly or alternatively a national-level agency could have responsibility for coordination.

THE REGULATORY AGENCY SHOULD PROVIDE FOR PUBLIC PARTICIPATION IN REGULATION

- The regulatory agency may invite public participation in its decisions and the formulation of new regulations. This requires a public hearing or comment process. The goal of public scrutiny is to help ensure professional, objective decision-making and to ensure consumer interests are protected.
- Typically, some limit on public participation (e.g., time limits) is necessary to conduct these sessions in a reasonable amount of time.
- The hearing process may be required by law (as in the United States) or may be informal at the discretion of the regulatory authority (United Kingdom).
- Formal transcripts of hearings are generally kept. Manuscripts provide a legal record and a means for those not present to learn what was discussed.
- In some hearings, testimony is under oath.
- Industry newsletters may cover major proceedings and developments.

THE REGULATORS SHOULD BE EXPERTS AND HAVE A SUBSTANTIAL TERM OF SERVICE

- The agency may have a decision-making board or a single (executive) decision-maker. The U.S. FERC has five Commissioners that jointly make decisions. The United Kingdom, by contrast, appoints a Director General who has final authority. The number of members on the decision-making board could relate to the extent of jurisdiction, volume of cases, and need to represent various interests.
- The optimal length of term of members depends on the importance of continuity of "policy philosophy" versus the desire to change policy, and the need for experience on the job. Terms can vary from about two to seven years or longer.
 - A medium term (five years) is common for U.S. regulators as well as the U.K.'s Director General.
- Selection method (elected versus appointed) will depend on the importance of responsiveness to citizenry versus professional objectivity. The United States handles this balance with executive branch appointments that are approved by the legislature.
- Factors considered in selecting members may include geographic representation, professional expertise, and representation of different industries or interest groups.

THE REGULATORS SHOULD BE SUPPORTED BY PROFESSIONAL STAFF

- Staffing Goals include the need to: (1) develop and maintain professional expertise, (2) maintain flexibility to hire and fire staff as needs change, and (3) avoid undue political influence.
- Staff needs expertise in economics, finance, engineering, law, and accounting.
- 30-50 staff members are probably a minimum "critical mass." State regulatory authorities in the United States have anywhere from 10 to 200 staff members. The United Kingdom's Office of Electricity has about 200, staff and the Office of Gas has about 35.

THERE ARE A VARIETY OF PROCEDURAL AND ADMINISTRATIVE LAW AND FUNDING ISSUES REQUIRING SPECIFICATION

- One decision is the extent to which meetings of Board members must be public. All formal hearings and meetings can be public, while "informal" meetings are private. "Sunshine provisions" (i.e., all meeting public) may hinder collegial decision-making.
- A second issue is use of administrative law judges and or hearing examiners. Their function is generally to decide routine cases, create formal records for cases, and make recommendations to the decision-making board. They can speed decision making by reducing the workload of the board.
- Agency funds may come from a variety of sources including user fees and general government funds. The regulatory agency should have a secure source of funds to promote investor and consumer confidence in the authority of the regulators.

PRELIMINARY RECOMMENDATIONS

- A regulatory agency will need to be developed to oversee the price and non-price activities of the energy companies.
- The regulatory agency must be independent. In order to be independent, there must be a clear legal charter that contains the principles of regulation. The legal charter should set goals and place limits on regulatory authority.
- There are no clear rules for determining whether regulatory responsibilities should be vested in national, republic, or local government. Our preliminary conclusions are:
 - Municipal or local governments should play a role in regulation of district heat or certification of new facilities such as powerplants to be built within local limits.
 - It would be beneficial for the national government to play a role if issues have an international character. Enforcement of international safety standards is one possible example.
 - The Czech Republic should have primary responsibilities for other activities. Mechanisms will be needed to coordinate energy activities with the Slovak Republic.
- Regulators should have a substantial term of service, at least five years, to encourage confidence in regulatory authority. Staffing should be flexible to facilitate changes as needs change.
- It would be beneficial to develop one regulatory agency in the Czech Republic with responsibility for all energy utilities. In a country the size of the Czech Republic, there are few advantages to having a separate regulatory agency for each energy industry. It is possible that expertise of staff may be shared if one agency is created.