Regulating District Heating and Cogeneration in Central and Eastern Europe

A Report of the World Energy Council

JULY 2004

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Published July 2004 by:
World Energy Council
5th Floor, Regency House
1-4 Warwick Street
London W1B 5LT
United Kingdom
www.worldenergy.org

ISBN 0 946121 13 3

ACKNOWLEDGMENTS

This report is a result of the many action-oriented and practical "hands-on" activities reporting to the WEC Programme Committee. As the Chair of this Committee, I have been monitoring the work on the report, which was produced by the Task Force, established within the WEC's Central & Eastern European Regional Programme. My task was made easy, owing to the high quality contributions prepared by the Task Force members. I believe the findings of the study to be particularly pertinent to the energy sector as a whole. This study once again reinforces the need for policy makers to secure an equal level playing field for all energies.

I would like to thank all Task Force members, in particular Mr. W. Cherubin, Task Force Chair and Mr. N. Bernot, Chair of the Central & Eastern European Group.

Last but not least, my special thanks go to Dr. K. Brendow, who over the years has been both the 'lighthouse' and the 'anchor' of the WEC's activities in Central and Eastern Europe. His expertise and dedication ensured that the Regional Programme in that part of the world has been most productive and efficient.

Norberto de Franco Medeiros

Norberto de Franco Medeiros, Chair
WEC Programme Committee
Rio de Janeiro, July 2004

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As Chair of the Task Force, I would like to thank the World Energy Council for deciding to address the important, but complex and rapidly evolving issue of regulating the district heating and cogeneration industries in Central and Eastern Europe. I thank all members for their input and cooperation, in particular the authors:

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I am indebted to Klaus Brendow, who stimulated our work and secured the logistic backing.

Witold Cherubin, Chair
Warsaw, July 2004

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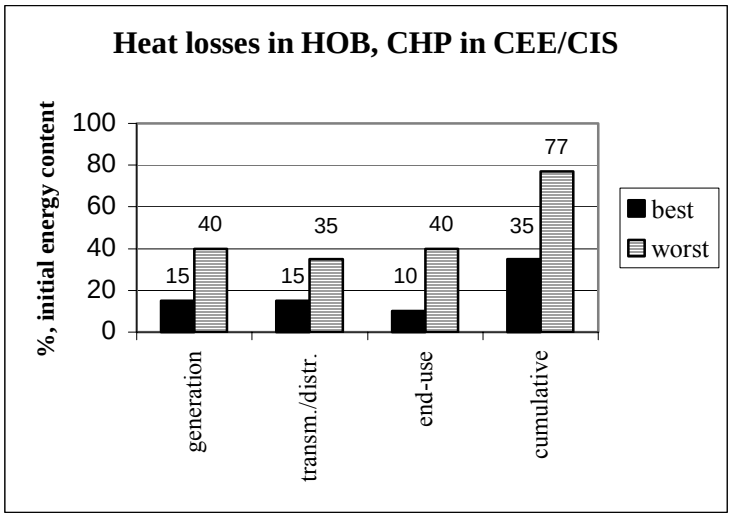
FOREWORD

The Background

A study published by the World Energy Council (WEC) in 2002 entitled "Towards Local Energy Systems: Revitalising District Heating and Cogeneration in Central and Eastern Europe" revealed the extraordinary importance of district heat supplies in this region. Notwithstanding progress, it had also revealed the difficulties of restructuring these industries suffering from:

- Enormous losses in generation, transmission, distribution and end use (see graph below);



- Lack of cost-effectiveness and profitability;
- Irregular service to the customers; and
- Regulatory weaknesses and lacunae.

The Mandate

In light of these findings, the WEC Group on Central and Eastern Europe, under the Chairmanship of Natan Bernot (Slovenia), decided in October 2002 to set up a Task Force to focus on regulatory issues and prepare an analysis and conclusions. It was decided that the Task Force would not deal with technological, managerial and operational issues.

The Membership

The Task Force was set up in December 2003. Eleven Central and Eastern European Member Committees nominated experts, who together are broadly representative of the region. Two additional experts from Denmark and Finland -- leaders in district heating – also joined the Task Force.

The Approach

On the basis of a concept paper, prepared by Dr. Klaus Brendow, twelve regulatory questions for the study were identified, and members replied to each individually. Using this method, the various national approaches to these twelve issues could be easily

compared and general tendencies and differences identified. In a second step, common or differing approaches were reviewed and analysed.

Task Force members worked mainly electronically but also met in Budapest in June 2003, to review the legislative and regulatory situation of the DH/CHP industries in Hungary. They also met in Moscow in March 2004 for a workshop on "Regulating District Heating and Cogeneration in Transition Economies: Policies and Regulations", during which the Task Force also presented its conclusions to its parent body, the WEC Group on Central and Eastern Europe.

The Structure

The present publication consists of:

- Part I, which includes the Executive Summary and the twelve "Issues", each describing the approaches followed in eleven Central and Eastern European countries, and in Denmark and Finland;
- Part II, which contains the reports presented at the WEC workshop on "Regulating District Heating and Cogeneration in Transition Economies: Policies and Regulations", along with a message for decision makers;
- The "Moscow Statement" (Annex B), which draws the attention of decision-makers to the most salient conditions for the cost-effective and sustainable development of DH/CHP.

The Message

a) The need for, and objectives of, DH/CHP regulation in transition economies

In the absence of fully functioning markets, the need for ex ante regulation of the DH/CHP industries throughout Central and Eastern Europe has been recognised. Energy policies and regulatory bodies have been set up at central, local and sometimes regional levels. Within the limits set by policy, the objectives of regulation are manifold:

- Facilitating competition by organising access to grids and markets;
- Securing supplies to captive customers at affordable tariffs;
- Stimulating greater efficiency in generation, transmission and distribution;
- Imposing quality, technical and environmental standards;
- Reviewing investment plans; and
- Encouraging CHP, decentralised DH/CHP and the use of renewables and waste.

In practice, these objectives are often conflicting and require arbitration. Regulation thus appears as a process, with the EU accession countries advancing faster than the others.

b) Obstacles and remedies

What are the obstacles to overcome on this road? This study identifies the continued need for policymakers to secure a level playing field for all grid-based energies. This implies the elimination of subsidies for particular fuels or customers, a common regulator for heat, gas and electricity (or a closer coordination among separate agencies) and the harmonisation of liberalisation policies for electricity and CHP.

On regulatory issues specifically, the study underlines the need for:

- Independence of the regulator from policy and industry;

- Improved coordination between central and local regulators and between environmental and energy authorities;
- Flexibility with regard to access to grids; and
- A "fair" sharing of CHP benefits among heat and electricity customers.

Other aspects (licensing, transparency of procedures, budgetary independence and accountability of the regulator, grid codes, consultative mechanisms, dispute settlement) did not raise general concerns.

c) Issues for a continued dialogue

We believe that a number of questions require further dialogue between the stakeholders:

- The internalisation of DH/CHP benefits;
- The future reduction of the density of regulation;
- Joint implementation;
- The compensation for public service obligations;
- The elimination of old debt and stranded investments;
- DH/CHP taxation;
- Privatisation; and
- The integration of DH/CHP in urban planning.

Witold Cherubin, Chair
Warsaw, April 2004

EXECUTIVE SUMMARY
COMMON TRENDS – DIFFERENCES – ISSUES

This Executive Summary gives an overview of the messages contained in the present study, which focuses on the institutional aspects of regulating district heating and co-generation (DH/CHP) in Central and Eastern Europe (CEE). The Executive Summary concentrates on the main findings from Central and Eastern Europe. Denmark and Finland have been used as examples of countries which have liberalised energy markets completely and which possess a remarkable share of the DH/CHP market.

I. The Policy Framework

1. Non-regulated versus regulated restructuring

No country case study advocates immediately introducing a self- or non-regulated, fully competition-driven organisation of the DH/CHP markets, with ex-post control by the anti-monopoly authorities. Given the inherited monopolistic structure of the DH/CHP industries in the transition economies and their strong social commitment, such an approach would not have been realistic.

2. DH/CHP regulation – a lengthy, painful and diversified process

All contributions assume appropriate general energy policy frameworks, within which the regulation of DH/CHP would take place. All view these frameworks as evolving in response to progress on the road to economic, budgetary and social development. Low incomes are a major obstacle to tariff reforms. This means that DH/CHP regulations are embedded in a lengthy and painful process, implying a degree of uncertainty for the operators. It also means that there are differences between Central and Eastern European countries in terms of market orientation and density of regulation, with accession countries closer to market economy regulation than the others (see table overleaf).

3. Feedback on general energy policies

Experience with DH/CHP regulation prompts a constant feedback from regulators, regulated industries and customers to general energy policymakers. It is therefore not surprising that the contributions in this study call for:

a) Strengthening market-oriented energy policies, implying liberalisation, full-cost tarification, competition, investment incentives and, to some extent, privatisation;
b) An equal, level playing field for all grid-based energies (heat, gas, electricity); this implies the elimination of subsidies granted to competing energy sources, the establishment of a common regulator or stronger coordination for all grid-based energies and the harmonisation of liberalisation policies, particularly for electricity and CHP markets;
c) Long-term policies to enhance predictability for investors;
d) Urban energy planning based on least-cost planning and life cycle analysis;
e) A stimulating attitude of governments towards DH/CHP, fully realising its environmental and resource-saving characteristics; contributions particularly advocate the internalisation of the environmental benefits of CHP through investment incentives, tax relief, protected heat supply city districts, obligatory purchase of electricity produced during heat production, cancellation of old debt or otherwise; and
f) Acceptance of DH/CHP regulation as a means to promote alternative energies and environmental policies by using renewables and urban waste, but at the same time, clear unwillingness to introduce free social protection policies.

Country	BG	CZ	H	HR	MAC	LT	LV	PL	RO	RU	SI	SK	YU	Other CIS
(1) Unbundling DH/CHP from electricity sector														
(2) Establishment of a regulator														
(3) Municipali-sation														
(4) Reducing cross-subsidies														
(5) Increased tariffs for captive customers														
(6) Cost + pricing for captive, market pricing for industrial customers														
(7) Budget allocation for the poor; elimination of producer subsidies														
(8) Competition among DH/CHP suppliers; regulated access to heat grids														
(9) Profitability														
(10) Investing into efficiency, metering, expansion, information technologies														
(11) Privatisation, private-public partnerships														
(12) Equal, level playing field; DH: gas; CH: electricity														
(13) Internalisation of external benefits														
(14) Urban planning														
(15) Reduced density of regulation														

II. Regulatory Issues

Regarding regulatory issues, there is a considerable consensus and focus on four goals:

1. Enhance regulatory regimes

Two issues are highlighted: the independence of the regulator and the balance between central and local regulation.

a) Independence: Securing the independence of the regulator from ad hoc interventions of policymakers (ministers, city councillors) is a major concern in all contributions. Independence does not, of course, mean that regulators are free from constraints: regulators have to operate within the framework defined by law and procedures. Nevertheless, the regulator should be protected against ad hoc interventions while still following the law. Protection is maintained by placing the regulator under the authority of the Cabinet of Ministers or Parliament, and (while difficult) by separating the ownership and regulatory functions at the municipal level. One contribution regretted a recent decision for the regulator to report to the Ministry rather than to the Prime Minister.

   Independence can also be impaired by budgetary constraints, which favour funding by regulated companies rather than by public budgets. In one case study, the full dependence on the state budget has been questioned, and another considered the financing of the municipal regulators as insufficient to safeguard competence and independence. Independence can also be impaired by a lack of expertise; a proper knowledge base by the regulators is therefore required.

b) Cohesion/subsidiarity of national, regional and local regulation: DH/CHP being local services, local regulation would appear to be the appropriate solution, were it not for the resulting lack of a common direction (in small countries) and the temptation for local policymakers to intervene. The need thus arises to find a balance between general, central and specific local regulation. The principle of subsidiarity (i.e., regulation at the lowest possible level) is advocated, requiring, however, a (centralised) definition of central, regional and local duties. Also, central regulation of CHP and local regulation of heat-only generation are advocated. Yet the issue of independence of local regulators from local policymakers remains and has prompted one country, Poland, to establish nine regional regulatory offices for heat, particularly gas, under the authority of the central regulator.

   Licensing, transparency of procedures, consultative mechanisms and dispute settlement have not caused concerns to the contributors.

2. Foster competition and facilitate access to district heating grids

Common to most contributions is the call for (unbiased) competition and access to grids:

a) Competition: There is a strong call in all contributions to eliminate cross subsidies granted to competing sources (gas, electricity) and the rescheduling or elimination of old debt and stranded investments resulting from public service obligation in the past. There is also a consensus to reduce licensing barriers in order to facilitate the market entry of new generators. Generally, heat supply should become demand-driven, rather than supply-driven.

b) Access to heat grids: In DH/CHP regulation, unlike the electricity and gas sectors, the unbundling of grids from generation in accounting or ownership terms is not practiced. Grids remain under the control of the owner-generator or distributor. Various

approaches to facilitate access of new generators to grids are advocated: regulated third party access via licence, preferential access for CHP or a single buyer solution, where the grid owner is obliged to buy and sell cheaper third party offers, according to their economic merit. These approaches reflect the basic difficulty in DH/CHP of enabling competition among few generators, of different market power.

c) Access to electricity grids: Supply of excess electricity from CHP into electricity grids is now favoured by policy everywhere but is hampered by the conflicting interests of grid operators and transmission/distribution companies (requiring high charges for connections and back-up and battling with overcapacities).

3. Secure cost-covering, market-oriented prices and tariffs

The modernisation/rehabilitation of DH and particularly CHP systems results in considerable energy savings and cost reductions, hence stabilising demand affected by demand-side management (DSM) and enabling new demand to arise. In this regard, the contributions focus on:

a) "Cost +" pricing: the emphasis in the contributions is (still) on "cost +" pricing, as regulated tariffs for captive customers do not cover the cost in every region. The regulators are therefore called upon to apply transparent pricing methodologies and to set tariffs for captive customers allowing provisions for investments, stranded costs, R & D, old debt or external benefits. The bottleneck on the road from "cost +" pricing to market-oriented prices is the perceived inability of many household customers to pay market-based prices. The preferred solution to this dilemma consists of supporting low-income customers from public budgets while eliminating price caps and other constraints on the pricing policies of the DH/CHP industries. It is argued that progressing along these lines would enable privatisation and foreign investments, whilst protecting the poor.

b) RAB systems (Regulatory Asset Base): These help address the inefficiencies and high costs of the "cost +" systems are being introduced to replace the "cost +" arrangements.

c) CHP overheads: As electricity markets were liberalised before CHP markets, competition in those markets induces CHP generators to charge overheads to heat customers rather than to electricity customers. This time lag between the two liberalisation processes disadvantages DH[1], as do subsidised gas prices with regard to DH.

4. Enhance the competence and interplay of stakeholders

As the rules of the game have changed, so have the roles of the various players. Contributors suggest that:

a) Environmental administrations and municipalities should acquire competence in the field of DH/CHP or refrain from regulatory responsibility and relations amongst different state bodies should be formalised.

b) Generators should behave as commercial entities: shedding capacities or investing as the case may be; entering or not in building or facility management; arbitrating investments into extensions; rehabilitation of networks and substations; information technology; engaging or not in joint implementation and emission trading; surveying

[1] For a discussion of cost allocation in distorted markets in the economies in transition, see Carolyn Gochenour, World Bank Regional Study on Regulation of Heat and Electricity Produced in Combined-Heat-and-Power Plants, Washington 2003, p. 37 ff

customer relations and new (DH cooling) markets; developing industry associations to deal with policy bodies, the public at large, or media; raising the competence of personnel.

c) Captive customers should not be granted special rights. Contributors prefer that supplier-customer relations be based on standard commercial contracts, with clear rules for disconnections and sanctions for a breach of contract either side. Conflicts should first be brought to the attention of the regulator if so authorised by law, or to civil courts. The possibility of customer representatives sitting on utility boards was mentioned.

d) Conflicts between the regulator and regulated industry require a special arbitration procedure.

III. Open questions

However extensive the case studies have been, a number of issues have not been raised or stressed, be it that they are perceived as premature or not applicable to transition economies. These include:

1. The future reduction of the density of regulation

Ideally, the density of regulation – growing in the first years – should decline in the longer term as the improved macro-economic context allows for more self-regulation. Thus, for example, heat tariffs could be approved for a period longer than a year. Licensing for new entrants could be discontinued. Tariff setting by the regulator could be abandoned in favour of a compulsory pricing methodology. Reporting and monitoring could be standardised and reduced. The regulatory regime could be reviewed after a number of years.

However, apart from complaints about "bureaucracy" and "cost", a reduction in the density of regulation has not been generally advocated in the contributions. Is this a reflection of a "culture" of central administration in CEE, an oversight or scepticism about the capability of transition markets and institutions to evolve towards markets?

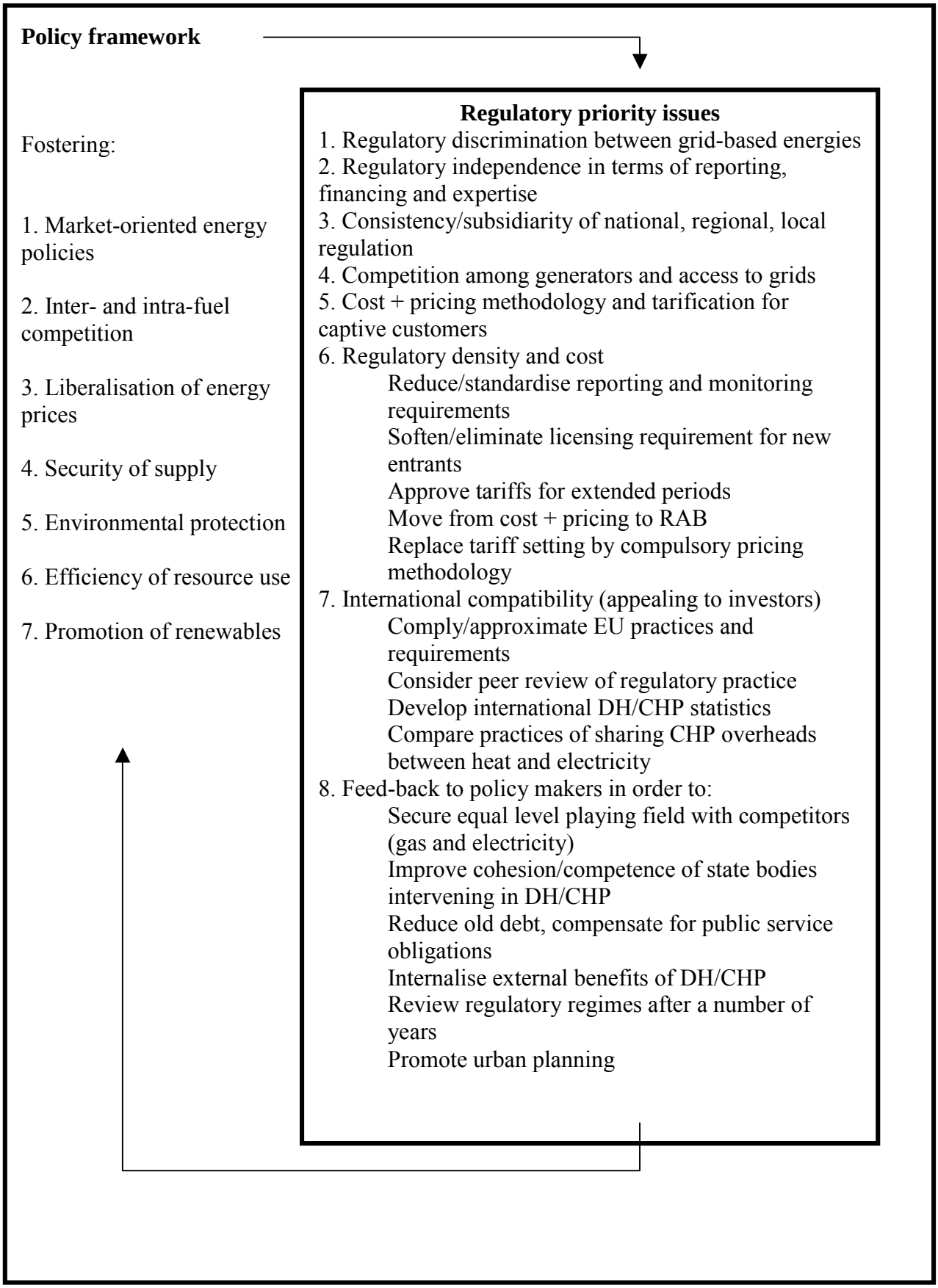
2. Auditing the regulator

The activity of the regulator is formally reviewed by policy bodies (the Ministry, city council, Parliament). Is there a need for an "independent" and competent auditing by "the like", i.e., by peer review (such as is carried out by the International Energy Agency with regard to energy policies of member countries)? Or by public hearings? Against a code of conduct or best international practices? Could the performance of regulators be benchmarked?

3. Compensation for public service obligations

The contributions only indirectly address the issue of compensation for public service obligations (protecting the poor, mitigating climate change, promoting renewables, supplying heat even if not paid). It is not controversial that the legislative bodies define such obligations. The issue is whether the DH/CHP industries are correctly compensated for such services and whether market-based mechanisms could not replace command-and-control mechanisms to achieve the same goals more cost-effectively.

Policy framework and regulatory priority issues



4. Asymmetric information

There is a striking "bias" in the contributions concerning the independence of the regulator. The risk is primarily seen to emanate from policy makers. The risk of depending on utilities – be it solely for data and competence – is not addressed. This risk is particularly evident during the elaboration of transmission and distribution codes. Is this "oversight" an indication of the growing mutual dependence/collusion of regulator and regulated industries inherent in any branch- or sector-specific regulation? to the detriment of customers?

5. A continued stakeholder dialogue

As a rule, regulators have informed generators and customers with their work via official journals, web sites and consultations. This dialogue needs to be continued on points such as:

- Complying with or approximating EU practices and standards so as to attract foreign investors;
- Merging or better coordinating separate regulators for electricity, gas and heat;
- Internalising external benefits of DH/CHP into tariffs, taxes, investment incentives;
- Eliminating cross-subsidies and subsidies for competing fuels;
- Eliminating old debt and stranded investments;
- Compensating for public service obligations;
- Applying the principle of subsidiarity of national, regional, local regulation;
- Enhancing the competence and coordination of the various state bodies intervening in DH and CHP;
- Defining methods of allocating overheads in CHP;
- Promoting expertise for local energy planning;
- Developing international indicators on DH/CHP capacities, supplies, grids, fuel use, efficiency, transmission/distribution losses; and
- Gradually reducing regulatory density and cost.

This dialogue would greatly benefit from experience gained in northern and western Europe.

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Regulating District Heating and Cogeneration in Central and Eastern Europe, and Finland:
Common goals – various national approaches

I. POLICY FRAMEWORKS

Common goal 1: Secure market-oriented energy policies

Varying approaches

Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
			-Develop national and local energy and environmental policies and strategies, which integrate DH/CHP; -Eliminate cross financing between different kinds of energy supply		-Foster liberalisation, unbundling, competition, customer choice; -Separate monopolistic from competitive activities apt for privatisation; -Harmonise liberalisation of CHP and electricity markets
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
-Use medium and long-term energy needs/ policies as a basis for DH/CHP incentives		- Establishing the electricity and heat prices according to market rules	-Enhance awareness of vital importance of CHP for the economy and sustainable development; -Strike a better balance between short-term social and long-term economic considerations; -Allow rising natural gas prices to be reflected fully and automatically in electricity and heat tariffs	-Exempt market participants from regulations if market conditions permit	-Apply a target-oriented energy policy including environmental considerations; -Enhance security of heat supply through obligatory fuel stocks and back-up capacities

The views reflect those of the contributors and not necessarily the views of the authorities of the country concerned.

Common goal 2: Develop long-term and local energy systems					
Varying approaches					
Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
			-Promote integrated least-cost planning; -Set targets and tools at national and local levels	-Develop least cost planning and life cycle analysis so as to reduce short-term focus	-Develop long-term and local energy strategies
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
	-Enhance local and regional energy planning; -Define means and obligations		-Consider associations (verticalisation) between generators and customers in order to save VAT		

Common goal 3: Promote district heating, cogeneration, use of renewables					
Varying approaches					
Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
	-Promote CHP through obligatory purchase of electricity produced during production of heat	-Do not promote DH/CHP as such, but apply investment incentives, tax relief or other means designed to enhance efficiency and use of renewables	-Designate protected areas for DH on environmental grounds, but develop CHP under market conditions; -Promote use of renewables and waste in (small) DH/CHP	-Promote renewables in small CHP	-Support DH/CHP systems and renewable technology
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
-Grant investment incentives	-Set purchase obligations for heat from urban waste, renewables and electricity from CHP	-Promote CHP on the basis of least-cost analysis; promote the rehabilitation of DH/CHP systems; redirect subsidies to investments	-Promote CHP		-Promote use of biomass

II. REGULATORY ISSUES

Common goal 4: Enhance regulatory regimes

Varying approaches					
Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
-Subsume regulator to Parliament and government; -Exclude by law that Minister instructs regulator; -Organise work of regulator by activity, not by form of energy (= horizontal responsibility of department heads)	-Place electricity, gas, heat under one regulator; -Have regulator reporting to Cabinet of Ministers and Parliament; -Reconsider full financial dependence on state budget and yearly approval process; -Strengthen competence on sanctions	-Place electricity, gas and heat under one regulator; enhance independence of regulator by handling appeals through a legal process which could not be overruled by the Ministry	-Have regulator reporting to Parliament; -Set the terms of office of regulators to exceed one cycle of government, i.e. six years; -Apply principle of subsidiarity, i.e. regulate DH at the lowest possible level; -Separate regulatory and ownership function at city level	-Prefer financing of regulator from regulated industry; -Clarify regulatory duties for CHP between central and regional regulators; -Regulate CHP centrally, coordinate heat supply regulation between regional and local levels; -Render local regulators independent from municipalities (avoid owner-regulator collusion)	-Have regulator reporting to president, Parliament and government; -Control monopolistic generators; -Undertake independent audits of regulated companies and regulator
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
-Merge gas, electricity and heat regulators; -Enhance independence of regulator by limiting his reporting duty to the Council of Ministers to organisational and financial issues; -Incorporate provisions against malfunctioning of regulator in law establishing the regulator	-Establish one common regulator for all grid-based energies; -Enhance independence of regulator by having the regulator reporting to the Cabinet of Ministers		-Extend the participation, responsibility and accountability of municipalities to all levels of planning, regulation and implementation	-Centralise DH/CHP regulation for the whole country; -Centralise regulation for gas, electricity and heat in one regulatory office; -Have regulator reporting to Parliament	

Common goal 5: Foster competition, access to grids					
Varying approaches					
Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
-Regulate the amount of stranded cost	-Organise access to markets via licence	-Eliminate subsidies, which distort competition; -Do not require authorisation for new plants; -Do not restrict supply of heat throughout the network and its extensions; use TPA for net access of CHP; -Possibly support network access of small CHP	-Support network access of small cogenerators; -Reduce cross financing between customers	-Reduce cross-subsidies between industry and households, large and small customers; -Regulate access to grids via licence; -Secure impartial treatment of market players in heat supply	-Set regulated prices, price caps, taking into account depreciation; -Reduce barriers to TPA so as to allow customer choice
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
-Eliminate sunk investments, old debts via prices or during privatisation; eliminate subsidies, tax distortions via pricing methodology; -Regulate access to grids on the basis of a law, proposed by the regulator and approved by the Cabinet and Parliament	-Give due account to the specifics of heat, gas, electricity grids when dealing with access to grids, transit, international trade		-Eliminate cross subsidies from industry to households; -Eliminate or reschedule old debt;		

Common goal 6: Secure cost-covering, market-oriented prices, tariffs					
Varying approaches					
Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
		-Allocate overheads to heat and electricity customers in CHP according to competitive situation	-Promote the financial rehabilitation of DH/CHP; -Apply tariffs which reflect full costs, including investments (depreciation), banking and fuel costs, profits (profits should be the main source of development and reconstruction); -Internalise benefits of CHP as a source of finance	-Include allowance for investments and depreciation into tariffs	-Reschedule or incorporate old company debt into tariffs or solicit government support
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
-Set prices only on the basis of a methodology or other legal provision acceptable to owners and operators	-Eliminate different pricing methodologies for heat supplies from different sources; -Base heat tariffs on average long-term temperature; Allow longer-term tariff planning to attract investors; -Incorporate growingly stranded costs of oversized systems and new investments in pricing methodology	-Internalise the environmental benefits of CHP -Reschedule old debt	-Strike a better balance between short-term social and long-term economic considerations, by including investment and R&D costs into tariffs; -Secure the allocation of overhead costs to electricity and heat tariffs in the interest of the national economy; -Apply separate fixed capacity and variable energy charges; -Support low-income customers via public budgets		

Common goal 7: Enhance the competence and interplay of administrations, utilities and customers					
Varying approaches					
Croatia	Czech Republic	Finland	Hungary	Latvia	Lithuania
-Use regulator to settle disputes; -Organise DH/CHP regulation centrally	-Use regulator to settle disputes among licence holders and between them and customers; -Solve appeals against decisions of the regulator via administrative proceedings; -Solve competition matters through Economic Competition Office; -Organise DH/CHP regulation centrally; -Formalise relations with other state bodies; -Improve information on activities of foreign regulators	-Base heat sales on commercial contracts; -Provide customer protection when prescribed by law; -Exclude overruling of appeals by the Ministry; -Use competition authority to arbitrate complaints	-Improve energy competence of environmental and municipal authorities; -Place local regulators under Ministry in charge of energy rather than under Ministry of Interior; -Apply customer protection only when prescribed by law	-Handle customer-supplier conflicts by civil courts; -Apply standard contracts, rules for disconnections	-Adjust capacities; -Encourage investments in new equipment; -Improve heat management in multi-flat buildings through professional administrators; -Improve building insulation; -Improve quality of service; -Develop customer relations; inform customers; survey client satisfaction; -Admit customer representatives in DH boards
Macedonia (Rep.)	Poland	Romania	Russian Federation	Slovakia	Slovenia
-Arbitrate disputes first at governmental level, next before courts; -Promote standard contracts; -Set rules for disconnections	-Delegate powers to regional offices of the national regulator	-Increase management skills through training, career planning and assessment of the abilities of managers; -Apply compulsory heat metering by end-users for all heat supplies by 2007; -Publish guidelines for DH/CHP project development; -raise end-user awareness of DH/CHP advantages and of their rights; -Win media support	-Encourage heat generators to work in base load rather than peak load; -Sanction violation of heat supply terms; -Support low-income customers via public budgets	-Exempt pricing ordinances of the regulator from review by courts	-Inform customers of consumption and advise on efficient use -Develop international energy statistics

PART 1

REGULATORY ISSUES IN INTERNATIONAL COMPARISON

1. What is the legal basis for DH/CHP regulation, if any, and since when?
2. Contact details for regulatory authority in each country
3. How is the regulatory authority structured (governance, competence, decision-making, appointment of regulators, reporting chain, independence, accountability)?
4. How is transparency ensured: are ordinances, rules, decisions, annual reports publicly available (e.g., via the Internet)?
5. What are the objectives of regulation? (licensing, tarification, metering, consumer protection, security of supply, encouragement of investments, efficiency, quality of service, enhanced competition, least cost planning, promotion of decentralised DH/CHP or of renewables, internalisation of external costs and benefits of DH/CHP?)
6. What are the powers of the regulator? (regulatory powers only or additionally, merger control, competition, market entry, and privatisation?)
7. Are powers shared between the central administration, the municipalities or regional groups of municipalities? If so, what are the respective powers?
8. What coordination, if any, takes place between the regulator for heat and the regulators for electricity and gas?
9. Are the means (budget, competence, urban heat balances and projections, sanctions) sufficient for the regulator to be efficient and independent?
10. What consultative mechanisms are established, if any, with the stakeholders (operators, customers)?
11. How are disputes settled?
12. Which other institutional aspects are relevant (e. g., better international statistics)?

1.1 What is the legal basis for DH/CHP regulation, if any, and since when?

Croatia

The legal framework for energy market development and energy sector regulation in Croatia is a set of five energy laws (Energy Law, Law on Electricity Market, Law on Regulation of Energy Activities, Law on Oil and Oil Derivatives Market and Law on Gas Market), which were adopted and published in July 2001. Those laws entered into effect eight days from their publication in the Official Gazette (Narodne Novine – NN), and implementation commenced on 1 January 2002. These five energy laws follow relevant EU directives and the Energy Charter and regulates:

- The gradual opening of the energy market and its integration into the EU;
- The establishment of an independent regulatory body – the Croatian Energy Regulatory Council;
- The definition of a framework for energy sector development, based on a long-term national strategy;
- The definition of public service obligation and non-discriminatory access to transport/transmission capacities;
- The restructuring of HEP (the electricity utility) and INA (the oil company); and
- The promotion of energy efficiency and use of renewable resources.

In March 2002, two new significant laws for energy sector reform were adopted: the Law on Privatisation of INA d.d. (oil company), and the Law on Privatisation of HEP (utility). A Law on Heat Market, a Law on Generation, Distribution and Supply of Thermal Energy and a series of bylaw acts (eligible generation, eligible customers, etc.) are presently under consideration.

Czech Republic

The legal basis for the DH/CHP, gas and electricity sectors consists of:

- Act no. 458/2000 Coll., on Business Conditions and Public Administration in the Energy Sectors and on Amendment to other Laws [the Energy Act] of 28 November 2000, which has introduced a regulatory framework and established the Energy Regulatory Office [further ERO], (in Czech: Energeticky regulacni urad, ERU);
- Act no. 2/1969 Coll., in accordance with Article 2, on establishment of Ministries and other central State Administration of the Czech Republic [Competency Act], in wording of later regulations. The ERO is another state body with an independent chapter in the state budget;
- Act no. 406/ Coll., of 25 October 2000, on Energy Efficiency;
- Act no. 526/1990 Coll., on Prices, in wording of later regulations. Article 6 is applied for pricing of DH/CHP;
- Act no. 265/1991 Coll., on the Czech Republic Administration Bodies Competence in the area of price setting, in wording of later regulations;
- Act no. 71/1967 Coll., on Administrative Control (Administration Code).

Secondary legislation includes:

- Decrees of Ministry of Trade and Industry to Energy Act [17 in all];
- Decrees of Ministry of Trade and Industry to Act no. 406/2000 Coll. [nine in all] and two Government Decrees;

- ERO Decrees to Energy Act [8 in all];
- Decree of Ministry for Regional Development;
- Pricing decisions of ERO [yearly];
- Decree no. 580/1990 Coll., to Act no. 526/1990 Coll., on Prices.

Denmark

Since 1976, specific law has regulated the energy sector in Denmark. The electricity and district-heating sectors are regulated by different acts. CHP is covered by the Electricity Supply Act and DH by the Heat Supply Act. These acts have been modified continually, especially regarding electricity supply; in view of the electricity reform introducing liberalisation and deregulation of the sector.

The following act and bills are relevant for the regulation of the sector:

- Act no. 772 of 24 July 2000, the Heat Supply Act;

Five bills on the Danish electricity reform, as adopted by Folketinget on 28 May 1999:

- Bill no. 234, the Electricity Supply Bill (act no. 375);
- Bill no. 235, Bill on CO_2 Quotas for Electricity Production (act no. 376);
- Bill no. 236, Bill to amend the Act on Subsidies for Electricity Production (act no. 377);
- Bill no. 237, Bill to amend the Act on the Utilisation of Renewable Energy Sources etc. (act no. 378);
- Bill no. 238, Bill to amend the Heat Supply Act (act no. 379).

The above act and bills are found in English on the web page of the Danish Energy Authority (see under Section 1.2 for website address).

Finland

The Electricity Market Act and the point-access tariff opened the Finnish electricity market to competition in July 1995. It introduced remarkable changes to the electricity market, such as competition for electricity production and sales, and a point access tariff for transmission service irrespective of the transmission distance. The power network is considered a market place serving buyers and sellers on equal and equitable terms. Later modification of the Electricity Market Act in autumn 1998 allowed all customers to choose a supplier freely and at no additional cost. Due to the use of consumption profiles, no specific electricity meters are needed for small customers.

The electricity market is governed not only by the Act, but also by numerous lower level statutes – presidential and ministerial decrees. The functioning of the electricity market is supervised by the Energy Market Authority. The introduction of the Electricity Market Act removed unnecessary government control and limitations on competition where possible, predominantly in the end-user market and foreign trade.

The Electricity Market Act simplifies the construction of new capacity for electricity generation. While permits are still required by environmental laws, nuclear energy legislation and other statutes, energy production as such is no longer subject to a permit. The construction of new generation capacity is permitted after adhering to the environmental criteria and building licence requirements.

Finland	Production	No licences	
	Transmission and distribution	Licence required, natural monopoly	Electricity Market Authority
	Supply	No licences	
	Trading services	No licences	
	Brokerage services	No licences	

There is no regulation concerning cost allocation methodology in CHP production in Finland, but energy producers are given the flexibility to select an appropriate methodology themselves.

Taxes are applied to fuels used in heat production. In HOB, the tax is paid according to the exact consumption of fuel. In CHP, the fuel use is calculated as if heat production has 110 % efficiency, i.e., from 1MWh of fuel, 1.1 MWh of heat is produced. This means that CHP is taxed less per produced MWh of heat than HOB production and thus, CHP is more tax efficient. Fuels used in electricity generation are not taxed.

The Finnish Competition Authority (FCA) can intervene in the event of a complaint about the price of heat. In this scenario the authority investigates whether the DH supplier has misused its dominant competitive position.

Hungary

1. District Heating

a) Law on Municipalities, 1990 / LXV. Law; which transferred district heating infrastructure (heat only plants, supply and distribution network, transformer stations up to the connection of distribution systems in buildings) into property of municipalities;
b) Law on District Heating, 1998 / XVIII. Law; general legislation on district heating, replacing previous incomplete legislation;
c) Law on Pricing, 1990 / LXXXVII. Law; general rules and authorisations for official pricing;
d) Law on Concession Right, 1991 / XVI. Law; valid also for district heating, restricts private property;
e) Law on Electricity, 2001 / CX. Law; with market rules of liberal electricity market, also with some special orders on district heating, it came into force entirely on 1 January 2003;
f) 1/1999 (I.1.) Korm; Government decree with enacting rules of b);
g) 61/2002 (XII. 29.) GKM; decree of the Minister of Economy and Traffics on special rules of pricing of heat from power plants above 50 MW, based on b), c) and e);
h) Special orders of the Minister – at present 64/2002 (XII. 30.) GKM decree of the Minister of Economy and Traffics – setting of heat prices from power plants above 50 MW based on b), c) and e), which are renewed temporarily;
i) Orders of individual local municipalities on heat consumer prices, based on b) and c), renewed temporarily;
j) Orders of individual local municipalities about setting heat prices from power plants below 50 MW based on b), c) and e), which have not yet been applied.

2. Cogeneration

a) Law on Electricity, 1998 / CX. Law; includes special rules and authorisations on supporting cogeneration;
b) Law on District Heating, 1998 / XVIII. Law; includes rules on pricing of cogenerated heat (which have not been enacted until now);
c) 56/2002 (XII. 29.) GKM; decree of the Minister of Economy and Traffics, about rules of mandatory purchasing of some kinds of electricity, including a wide range of cogenerated electricity and also setting of purchase prices with formula for long-term applying.

Latvia

The energy policy is implemented through legislation. The main energy policy documents are:

- Energy Act;
- Law on Regulators of Public Services;
- Latvian national energy programme, 1997-2002;
- State energy efficiency strategy, 2000;
- Bio fuel production and utilisation in Latvia, 2000;
- Government policy and action plan in energy sector, 2001;
- Natural gas market liberalisation conception in Latvia, 2001;
- Wood pulp utilisation in Latvian energy, 1995;
- Fuel and energy structure policy, (eu *phare* programme, 1999);
- Renewable resources utilisation programme, (eu *phare* programme, 2000).

Macedonia (Rep.)

The legal basis for DH/CHP regulation is the Energy Law ("Official Gazette of the Republic of Macedonia" no.47/97, 40/99 and 98/00), amended by the law for the Energy Regulatory Authority, which was adopted by the Assembly of the Republic of Macedonia on 6 December 2002.

Poland

The main legal basis of the Energy Regulatory Authority (ERA) activity is the Energy Law of 10 April 1997, and the secondary legislation, which includes (among others):

- Ordinance of the Prime Minister concerning the statute of ERA, of 15 October 1997;
- Ordinance of the Council of the Ministers about the obligatory yearly payments by licensed energy enterprises of 5 May 1998;
- Ordinance of the Minister of Economy about the schedule of TPA implementation (right of the customer to sign purchase agreement with a producer and a transmission contract with a distribution company) of 6 August 1998 (concerns heat, electricity and gas);
- Ordinance of the Council of the Ministers about the competence and territory of the ERA regional offices activity (9 branch offices) of 24 December 1998;
- Three ordinances of the Minister of Economy about conditions of connection to the grid (network), transmission services, dispatching and operation of the grid (network) as well as quality standards of the customer services for: heat (11 August 2000), gas (24 August 2000) and electricity (25 September 2000);

- Three ordinances of the Minister of Economy about principles of tariffs setting for: heat (12 October 2000), electricity (14 December 2000) and gas (20 December 2000);
- Ordinance of the Minister of Economy about obligatory purchase of electricity and heat from the non-conventional and renewable sources as well as obligatory purchase of electricity produced in cogeneration with heat (15 December 2000) and others.

Romania

The main legal frame for the electricity and heat sector in Romania consists of:

- Government Emergency Decision (GED) no. 63/1998 regarding electricity and heat;
- GED no. 29/1998 regarding the setting up and the operation of the Romanian Electricity and Heat Regulatory Authority (ANRE), approved by Law no. 99/2000;
- Government Decision (GD) no. 425/1994, modified and completed by GD no.168/2000 regarding the heat supply regulation;
- GED no. 162/1999 regarding the national reference heat price for domestic end users;
- GD no. 567/1999 regarding the regulation for licensees and authorisations in the electricity and heat sector;
- Law no. 199/2000 regarding energy efficiency;
- GD no. 122/2000 regarding the initial opening of the electricity market degree (10% open market); today the electricity market is 40% open (GD no. 1563/2003);
- Law no. 326/2001 regarding the public communal services;
- GD no. 373/2002 regarding the setting up and operation of the Romanian Communal Services Regulatory Authority (ANRSC);
- GED no. 124/2001 regarding the setting up and the operation of the Romanian Energy Efficiency Found, approved by Law no.287/2002;
- GD no. 73/2002, regarding the setting up and operation of district heating public services;
- Law no. 318/2003 regarding electricity; according to this law, the electricity and heat production within CHPP must be achieved in order to ensure the following main goals:
  - Sustainable development of the Romanian economy;
  - Diversification of the primary energy resources;
  - Establishing of the free electricity market;
  - Transparency of electricity and heat tariffs and taxes in order to ensure increased energy efficiency;
  - Promoting use of renewable energy sources;
  - Ensuring environmental protection at the local and global levels.
- GD no.443/2003 regarding the promotion of the electricity production using renewable energy sources.

Russian Federation

In the process of establishing and developing market relations in the power industry, a significant number of documents (43 official documents) have been produced and enacted by the administration of the President of the Russian Federation, the government, the

central and regional legislative authorities and the Federal and Regional Energy Regulation Commission (FRERC).

A full list of the documents is available, but access to them is limited. Some of the documents have become invalid, due to the adoption of new ones.

A list of the most important documents for the power industry, issued by operating authorities, is given below (with the exception of the documents approved by the regional administration and legislative assemblies and the Federal and Regional Power Commissions):

- The Amendments in the Composition of the Expenses Included in the Prime Costs of the Products (activity, services) of the Power and Electrification Joint-Stock Companies: Decision of the Government of the Russian Federation no. 513 of 29 June 1993;
- The Federal Law "On the State Regulation of Electricity and Heat Tariff in the Russian Federation" (14 April 1995);
- The Federal (Russian Federation-wide) Electricity Wholesale Market: Decision of the Government of the Russian Federation, no. 793 of 12 June 1996, with amendments as of 28 August 1998 under the Decision of the Government of the Russian Federation no. 1099;
- The Approval of the Provisions of the Federal Power Commission: Decision of the Government of the Russian Federation of 13 August 1996;
- The Additional Measures on Limiting the Growth of Tariffs for the Products (Servicing) of the Natural Monopolies and Providing Conditions for the Stable Functioning of Industry: The Decree of the President of the Russian Federation of 17 October 1996;
- Basic Electricity and Heat Pricing Provisions on the Territory of the Russian Federation. Approved by Decision of the Government of the Russian Federation no. 121 of 4 February 1997, with amendments as of 31 October 1999;
- The Procedure of the Approval and Application of the Tariffs for Electricity and Heat in the Russian Federation. Approved by Decision of the Government of the Russian Federation no. 121 of 4 February 1997;
- The Step-by-Step Termination of Cross-Financing in the Natural Monopolies: Decision of the Government of the Russian Federation no. 389 of 3 April 1997;
- The Basic Provisions of the Structural Reform in the Natural Monopolies: The Decree of the President of the Russian Federation no. 426 of 28 April 1997;
- The Measures for the Promotion of the Investment Processes in the Electric Power Complex in the Russian Federation: The Decree of the President of the Russian Federation no. 768 of 23 July 1997;
- The Procedure of Consideration of the Disputes in Addressing the Federal Energy Regulation Commission: Decision of the Government of the Russian Federation no. 1174 of 15 September 1997;
- The Step-by-Step Termination of Cross-Financing and Bringing the Electricity Tariffs for Population to the Actual Prime Costs of Electricity Production, Transmission and Distribution Decision of the Government of the Russian Federation no. 1221 of 29 June 1997;
- The State Supervision of the Efficient Use of Energy Resources in the Russian Federation: The Decree of the President of the Russian Federation no. 1010, September 1997;

- The Procedure of Termination or Limitation of Electricity, Heat and Gas Supply to the Consumers in Nonpayment of Fuel and Energy Supplied: Decision of the Government of the Russian Federation no. 1 of 5 January 1998;
- The Additional Measures on Increasing the Consumers' Responsibility for Payment of Fuel and Energy Supplied: Decision of the Government of the Russian Federation no. 601 of 17 June 1998;
- Basic Provisions of the Energy Strategy of Russian Federation up to 2020: 2000 Project;
- Restructuring the Power Industry of the Russian Federation: Decision of the Government of the Russian Federation no. 8 of 11 July 2001;
- Plan of Measures on the First Phase of Restructuring the Power Industry of the Russian Federation: Approved by Decision of the Government of the Russian Federation no. 1040-p of 3 August 2001.

Presently, proposals on further reforms and restructuring of the power industry of the Russian Federation are under development and review at the Legislative Assembly of the Russian Federation, in particular the Laws "On the Federal Power Systems", "On the Power Industry of the Russian Federation" and amendments to some effective laws.

Slovakia

The main legal basis for the regulation of DH/CHP in Slovakia is Law 276/2001 of 14 June 2001 on Regulation in Network Industries and Law 70/1998 of 11 February 1998 on Energetics. The Law on Energetics entered into force on 1 July 1998 and lays down conditions of business in the power industry, gas industry and heating:

- Rights and responsibilities of personal and legal entities, which are in business in the energy industry;
- Rights and responsibilities of electricity, gas and heat consumers;
- Restraining orders in emergency and emergency prevention in the energy industry;
- State regulation in the energy industry; and
- Ensuring abidance to the law.

The Law on Regulation in Network Industries entered into force on 1 August 2001, except for several parts (mainly on price regulation), which became valid as of 1 January 2003. The Law has substituted some parts of the Energy Law (mainly state regulation) and deals with:

- Establishment, status and activities of the Regulatory Office for Network Industries (RONI);
- Scope and conditions of state regulation in network industries; and
- Conditions of the exercise of regulated activities and rights and responsibilities of entities subject to regulation.

Secondary legislation includes:

- Ordinances of Ministry of Economy of Slovak Republic on:
  - Specialised skills for doing business in energy industry (9 November 1998);
  - Licences for doing business in energy industry (9 November 1998);
  - Required data for administration of state regulation in energy industry (9 November 1998);

- New ordinances of RONI on:
  - Price regulation on generation, distribution and purchase of heat (24 September 2002);
  - Maximum price and tariffs for Slovak gas industry (5 November 2002);
  - Price regulation on supplies of electricity for protected consumers and on distribution of electricity for authorised consumers (20.3.2002)

Slovenia
The functioning of the DH and CHP plants is regulated by the Act on Economic Companies and Public Services, which regulates the operation of state companies and of local communities providing public services.

The Energy Act endorsed in 1999 regulates the activities in DH and CHP companies. These must acquire a licence for the operation of each unit issued separately by the Minister of Energy.

For the production of thermal energy for DH and for electrical energy in DH and CH plants, the company must acquire a proper licence, issued by the Energy Agency of Republic of Slovenia.

1.2 Contact details for regulatory authority in each country

Croatia
Croatian Energy Regulatory Council (CERC)

Czech Republic
Energy Regulatory Office (ERO)
Energeticky regulacni urad
Masarykovo namesti 5,
CZ-58601 JIHLAVA
Tel: +420 567 580 111
Fax: +420 567 580 640
Email: eru@eru.cz

Denmark
Regarding general energy supply matters:
The Danish Energy Authority (DEA)
Address: 44 Amaliegade, DK 1256 Copenhagen K, Denmark
Tel: +45 33 92 67 00
Fax: +45 33 11 47 43
Email: ens@ens.dk
Website: www.ens.dk.

Regarding tariffs and other contractual issues:
The Danish Energy Regulatory Authority (DERA)
Address: 49 Nørregade, DK 1165 Copenhagen K, Denmark
Tel: +45 33 17 70 70
Fax: +45 33 32 61 44
Email: et@dera.dk
Website: www.energitilsynet.dk.

Finland
Energy Market Authority (EMA)
Lintulahdenkatu 10
FIN-00500 Helsinki
Tel: +358 9 622 0360
Fax: +358 9 622 1911
Email: virasto@energiamarkkinavirasto.fi

Finnish Competition Authority (FCA)
Address: Pitkänsillanranta 3, P.O.B. 332
FIN-00531 Helsinki
Tel: +358 9 731 41
Fax: +358 9 7314 3328
Email: kirjaamo@kilpailuvirasto.fi

Hungary
Magyar Energia Hivatal (Hungarian Energy Office) (MEH)
H-1081 BUDAPEST
Köztársaság tér 7.
President: Dr. Péter Kaderják
Vice President: J. Ferenc Horrváth

Latvia
Public Utilities Commission (PUC)
Brivibas street 55
LV-1010-RIGA
Tel: +371 709 7200
Fax +371 709 7277
Email: sprk@sprk.gov.lv
Website: www.sprk.gov.lv
Contact person: Inna Steinbuka

In the district-heating field, 16-17 independent municipal regulators have been created.

Lithuania
National Control Commission for Prices and Energy
Algirdo 31
LT– 2600, VILNIUS
Website: www.regula.is.lt

Macedonia (Rep.)
Independent Regulatory Commission

Poland
Urzad Regulacji Energetyki (Energy Regulatory Authority)
ul. Chlodna 64,
PL- 00-872 Warszawa
Contact person: Lukasz Godula, Department of European Integration and Comparative Studies
Tel: +48 22 6616 316

Fax: +48 22 6616 321
Email: ure@ure.gov.pl / godula lukasz.ure@ure.gov.pl

Romania
Romanian Electricity and Heat Regulatory Authority (ANRE)
No.3 Constantin Nacu Str.
Bucharest
President: Ioan Lungu
Tel: +4021 303 25 00
Website: www.anre.ro

Russian Federation
The Federal Population Commission, which is the Federal Executive Authority for the regulation of electricity and heat tariffs. Contact is via G.G. Olkhovsky, member of WEC and Executive Director of the All-Russian Thermal Engineering Institute.
Website: VTI@CNT.ru

Slovakia
Regulatory Office for Network Industries (RONI)
(Urad pre regulaciu sietovych odvetvi)
Bajkalská 27
P.O. Box 12
SK-821 07 Bratislava 27
Tel: +421 2 58100411
Fax: +421 2 58100479
Website: www.urso.gov.sk

Slovenia
Regulatory Authority of the Republic of Slovenia
Energy Agency of the Republic of Slovenia
Svetozarevska 6,
p.p.: 1579SI-2000 Maribor
Tel: +386 2 22 94 261
Fax: +386 2 22 94 270
Email: info@agen-rs.si

1.3 How is the regulatory authority structured (governance, competence, decision-making, appointment of regulators, reporting chain, independence, accountability)?

Croatia

The Croatian Energy Regulatory Council (CERC) consists of five commissioners appointed by the Croatian Parliament upon the proposal of the Croatian government. The Parliament designates, amongst the five commissioners, a chairman and a deputy chairman. The commissioners are appointed for a term of office of two years (first term), while future terms of office are five years, with the possibility of reappointment for one additional five-year term.

CERC was established pursuant to the Energy Activity Regulation Law as an independent legal entity, with powers prescribed by the Energy Law and other laws regulating energy activities performed on free market principles or as a public service. Since CERC is an independent legal entity, the minister is not legally entitled to instruct the regulator. However, the government appoints an institution and should assist CERC in the preparation of proposals of acts to be passed by CERC and carry out other expert assignments for them.

CERC acts independently in performing the activities defined by the law and at least once annually reports to the Croatian Parliament and the government.

Czech Republic

The structure of the Energy Regulatory Office (ERO) is as follows:

- The Chairman's Section, which includes the Cabinet of the Chairman, a PR official, the Department of Internal Audit, and the Chairman's Advisor;
- The ERO Bureau Division, which is responsible for the ERO's economic, financial and property management, operations, payroll and personnel management, IT and organisation;
- The Strategy Division has a Strategy Department and a Department for Legislative and Legal Affairs as well as a specialist for international cooperation;
- The Licensing and Regulatory Sector contains both the Licensing Division, which decides on the granting, change or revocation of licences and the Regulatory Division, which is responsible for regulation in gas, DH/CHP and the electricity industry.

The ERO employs 93 experts with legal, economic and technical training and backgrounds. It is an independent administrative body for the execution of regulation in the energy sector and is financed by an independent chapter of the budget. Four times a year, the ERO publishes the Energy Regulation Bulletin, which includes a full list of licence holders in the energy sectors, decisions of the ERO and pricing decisions. Each year before 31 May, the ERO submits its Annual Report to the Cabinet and Parliament; this contains the financial statement for the previous year. The Chairman of the ERO informs the government of serious problems in the energy sector and submits proposals and suggestions to the Minister of Trade and Industry. S/he respects initiatives of licence holders and customers.

Denmark

The Danish Energy Authority (DEA) is subordinated to the Danish Ministry of Economic and Business Affairs. (The energy sector was formerly under the authority of the Ministry of Energy and the Ministry of Environment, but the present government decided to close down the ministry and move responsibility to the Ministry of Economic and Business Affairs.) The DEA is responsible for the daily administration of the different acts and bills relating to the energy sector and for macro-economic matters, including the evaluation and approval of new projects.

The Danish Energy Regulatory Authority (DERA) is an independent authority of representatives covering jurisprudence, economy, technique, environment and business. The Minister of Economic and Business Affairs appoints its members. The secretariat of the authority is administered by the Danish Competition Authority, which is also under the Danish Ministry of Economic and Business Affairs. DERA administers the different acts and bills relating to contractual issues, with parties in dispute usually looking to DERA for settlement. DERA can also take up issues on its own initiative.

Settlements instructed by DERA may be appealed to the Energy Board of Appeal, another independent authority.

Finland

The Energy Market Authority (EMA) is an expert body subordinate to the Ministry of Trade and Industry and was established as the Electricity Market Authority on 1 June 1995. At the same time, the Electricity Market Act came into effect, opening the electricity market to competition by stages. The EMA was changed to the Energy Market Authority on 1 August 2000 as the Natural Gas Market Act came onto force.

The principle task of the Energy Market Authority is to supervise the pricing of transmission, distribution and other network services. The Energy Market Authority ensures that the pricing of network services produced by distribution, regional network operators and the national grid is reasonable and non-discriminatory. Supervision takes place on a case by case basis. Cases are presented as a result of complaints or on the initiative of the Energy Market Authority.

The Energy Market Authority also promotes efficient competition in the electricity and natural gas trade, by intervening in the terms and prices of the network services that are considered to restrict competition. The Energy Market Authority produces and publishes real-time information on the pricing of both electricity and its distribution. In the future, the Energy Market Authority will publish similar information on the pricing of natural gas. Efficient competition requires information on the prices and suppliers of electricity and natural gas to be easily available. Additionally, electricity and natural gas users must be informed about competitive tendering and the potential benefits to be gained from it.

Electric and natural gas network operation is subject to licence. The Energy Market Authority grants network licences to organisations and utilities engaged in network operations, and building permits for constructing power lines of 110 kV and higher voltages.

Decisions taken by the Ministry or the EMA, under this Act may be appealed to the Supreme Administrative Court as stipulated in the Act for appeals on administrative issues.

The supervision of the Finnish electricity market, pricing and terms of network services is based on a so-called "ex-post" regulation. This means that network companies set the tariffs and terms of network services autonomously – pre-acceptance from the Energy Market Authority is not required. The Energy Market Authority supervises the tariffs and terms afterwards on a case by case basis.

The head of the Energy Market Authority is appointed by the Council of State. Other staff are appointed by the Authority.

Hungary
The Authority was established by the Gas Act (1994) and re-established by the Electricity Act (See section 1.1. e). It regulates natural gas, electricity and DH- market and supply.

- Governance: "Authority with national competences governed by the government and controlled by the Minister"
  Remark: The competences mentioned in units below are not fully owned by MEH, but are shared between MEH and other authorities, with the responsible Minister (at present the Minister of Economy and Traffics) and with local authorities, by force of different laws. (See units 5 and 6);
- Decision-making: Sovereign within its competences;
- Appointment of regulators: The Prime Minister appoints the President and the Vice President of MEH;
- Reporting chain: Annual report to the Parliament (See also unit 4);
- Independence: The appointment of the president and vice president is valid for six years, in order to exceed one cycle of the government;
- Accountability: They may be removed only in very special circumstances by the premier (e.g., a negative decision of court against them).

Latvia
Until July 2001, several institutions regulated public utilities in Latvia. The Energy Regulation Council, an institution under the supervision of the Ministry of Economy, was responsible for the regulation of the energy sector. Practical experience showed that regulation was rather inefficient due to the fragmented institutions and limited resources available. Moreover, such a regulation system did not ensure an independent decision-making process. European Union reports on Latvia regularly emphasised the need to strengthen the regulatory process. To change the situation and improve the regulatory system, an institutional reform was implemented to change the public utilities regulatory model. After a four-year long legislative process, new public utilities regulatory institutions – Public Utilities Commission (PUC) and municipal regulators – started operating in July 2001, taking over the responsibilities from the Energy Regulation Council, the Telecommunication Tariffs Council, the Railway Administration and the Ministry of Transport. The PUC complies with the Law on Regulators of Public Utilities, PUC statutes, sectoral and other normative acts.

According to the Law on Regulators of Public Utilities, the PUC regulates the energy sector, except for heat supply, when heat is not produced in a cogeneration cycle.

Heat-only (tariffs, licensing, etc.) is regulated by independent municipal regulators (16 or more all over Latvia), whose activities are not coordinated between themselves and the PUC.

The PUC is an institution supervised by the Ministry of Economy, but it is independent in performing its tasks set in the legislation.

Municipalities nominally supervise municipal regulators. This can pose problems when utilities from different municipalities come under one regulator.

The decision-making institution of the PUC is the Board. The Board makes decisions on behalf of PUC and issues administrative acts, which are binding to specific public service providers and users. The Saeima, following a recommendation of the Cabinet of Ministers, appoints the Chairperson of the Commission, who is also the Chairperson of the Board, and four commissioners for a period of five years.

The Executive institution is subordinated to the Board; it performs the functions of its secretariat and supports experts in preparing documents for consideration by the Board. It also implements the decisions taken and fulfils the administrative acts issued. The Executive institution has a separate structural unit for each state-regulated sector as well as other necessary departments. The structure of the PUC was amended on 4 March 2002.

Political, financial and institutional independence is one of the basic principles and preconditions for successful operation of the regulator. It ensures an efficient, sound and professional process of utility regulation and the regulator should follow certain basic principles: independence, openness and a balanced distance from the government, the regulated companies and users.

The same principles should be applied to municipal regulators; however, taking into account their large numbers, dependence by the municipalities and lack of balanced supervision, implementation of these principles in municipal regulating are only partially applicable.

Implementation of the regulatory functions involves making decisions on politically sensitive issues. It is therefore necessary to keep the regulator free from any intervention by the government. The Law On Regulators of Public Utilities states that the regulator is not bound by decisions of government or its institutions regarding the implementation of its functions, decision-making or issuance of administrative acts. The adopted decisions and issued administrative acts may be recognised as illegal or repealed only by a court.

One feature of an independent regulator is the financing of the regulatory office. If regulatory institutions are funded from the state budget, it is possible to exercise financial influence on the work of the organisation. This risk is minimised in Latvia, as the regulator is financed from payments made by the regulated enterprises. Such a principle of financing already successfully operates in many countries. The annual rate of such payments in Latvia cannot exceed 0.2% of the net turnover of the public utilities in regulated services in the preceding financial year. The Cabinet of Ministers annually sets the rate of fees for regulation of public utilities for each type of public utility. In 2001 and 2002, the rate of fees for each type of regulated public utilities was 0.2% of net turnover of the regulated services in the previous year.

Lithuania

According to the Law on Energy for the Republic of Lithuania, a State Control Commission for Prices and Energy (hereafter referred to as the Commission) was established as follows:

- Article 17 defines the State Control Commission for Prices and Energy as follows:
  - The Commission is a state institution financed from the state budget of Lithuania. The government approves its regulations on the recommendation of the Ministry of Economy. The Commission is a legal entity;
  - The Commission is composed of five members. Its Chairman and four members are appointed by the President of the Republic on the recommendation of the Prime Minister for a term of five years;
  - Persons of high moral character who are nationals of the Republic of Lithuania and have a university degree or the equivalent are eligible to serve as members of the Commission;
  - The Chairman and members of the Commission may be dismissed from office:
    - Upon expiry of their term of office;
    - Upon their resignation;
    - When elected or appointed to another position;
    - When a conviction rendered against them becomes effective;
    - When it transpires that they have committed a grave breach of the requirements for the position held;
    - For violation of official ethics;
    - When for health reasons they are no longer able to hold the position;
    - Upon the loss of their Republic of Lithuania nationality.

  - The Commission performs the following functions:
    - Approves the methodology for setting state regulated prices;
    - Sets state regulated price caps;
    - Controls the application of state regulated prices and tariffs;
    - Approves charges for connection of energy facilities (networks, systems and equipment);
    - Has the right to unilaterally introduce state-regulated prices where energy enterprises are not in compliance with the requirements for setting of these prices;
    - When setting the state regulated prices, takes account of the return on investment and justification for operating expenditure;
    - Approves the purchase price for electricity generated from renewable energy resources;
    - Grants, suspends and revokes licences for transmission, distribution, storage and supply of energy and checks the licensed activities of energy enterprises;
    - Has the right to submit proposals to the government, the Ministry of Economy and municipalities in respect of the licensed activities of energy enterprises;
    - Has the right to obligate energy enterprises to conclude contracts for transmission, distribution or supply of energy where energy enterprises refuse a third party to provide services or to supply energy to customers;
    - Performs other functions provided for in legal acts.

The Commission is responsible for the decisions taken. The decisions of the Commission are adopted by a roll-call vote, and such decisions may be appealed following the procedure prescribed by law.

Within four months following the close of the calendar year, the Commission drafts its annual report, makes it public and submits it to the President of the Republic, the Seimas and the government.

The Commission Administration performs the functions of the Commission, and its employees are defined in the regulations of the Commission.

Unless this Law provides otherwise, the Law on Budgetary Institutions applies to the activities of the Commission.

Macedonia (Rep.)
The Regulatory Commission is independent in its work and decision-making in the framework of the authority provided in energy law.

The Regulatory Commission consists of five members, including the President. These are appointed and dismissed by the Assembly of the Republic of Macedonia, on proposal by the government.

The mandate of the first appointed members of the Regulatory Commission is:

- For one member – one year;
- For one member – two years;
- For one member – three years;
- For one member – four years;
- For the president – five years.

The mandate of every member of the Regulatory Commission is five years, and each member may be appointed to that position for no more than two mandates.

If the membership of a member of the Regulatory Commission ends before the termination of the mandate, the Assembly of the Republic of Macedonia, on a proposal of the government, appoints a new member for the rest of that mandate.

Appointed members of the Regulatory Commission should be citizens of the Republic of Macedonia and must fulfil the following conditions:

- Be in possession of a university degree and have expertise in the area of energy;
- Have at least ten years of experience in the area for which he/she is appointed; and
- Have references from at least three persons, qualified experts who hold a PhD and have at least five years' experience and/or general managers of energy companies, organisations or institutions, who have at least four years of managerial experience.

One of the members of the Regulatory Commission should be an expert in legal matters in the area of energy, and one must possess economic expertise.
A member of a political party may be appointed a member of the Regulatory Commission but must terminate his/her membership in the political party on the day of his/her appointment.

At most, two of the members of the Regulatory Commission may be members of the same political party.

If a member of the Regulatory Commission is dismissed from their position before the expiry of his/her mandate:

- At his/her request;
- In case of illness that prevents him/her from performing his/her duties;
- If he/she has committed a crime for which he/she has been sentenced to imprisonment of six months or more;
- When he/she does not perform according to this law.

The conditions for dismissal of a member of the Regulatory Commission before the expiry of the mandate are determined by the Regulatory Commission by a majority vote, after which a proposal for dismissal of the member and appointment of a new member is submitted to the Assembly of the Republic of Macedonia.

The president of the Regulatory Commission runs the sessions of the Regulatory Commission and organises and runs its administrative and expert services.

In the absence of the president of the Regulatory Commission, a member of the Commission appointed by the President fulfils the duties of the president.

Poland

The President of ERA (Mr Leszek Juchniewicz – his rank is similar to a minister) is nominated by the Prime Minister; his deputy (Mr. Wieslaw Wojcik) is nominated by the Minister of Economy. The President of ERA is the leading figure of the governmental administration for regulating the energy and fuels economy (management) in addition to the promotion of competition. The President of ERA reports to the Minister of Economy (previously to the Prime Minister). The activity of ERA is financed from the state budget, which is funded by annual payments by licensed energy enterprises, for licences granted by ERA (payments are higher than costs of regulation).

The personnel, employed in ERA headquarters and nine regional (branch) offices, fulfil the tasks of ERA. ERA headquarters includes the following departments:

- Department of Energy Enterprises (electricity, liquid and gaseous fuels);
- Department of Tariffs (electricity and gaseous fuels);
- Department of Promoting Competition (electricity, heat, gas and others);
- Department of European Integration and Comparative Studies (electricity, gas);
- Legal Department (electricity, heat, gas and others);
- Administrative Department, which includes a Coordinator of Tarification and Standardisation in District Heating (adviser to the ERA President) and a Spokesman of Fuel and Energy Consumers (electricity, heat, gas and others).

ERA regional office activities concern DH/CHP regulation (approx. 900 companies). The manager of the regional office has the right to sign documents on certain matters, on behalf of the President of ERA. The competence of the ERA regional office managers includes: making decisions concerning the acceptance or refusal of heat tariffs (DH/CHP), licensing of economic activity connected with heat supply, handling disputes concerning conditions of transmission services, refusal of connection to the grid

(network), refusal of signing heat, electricity or gas sale contracts, as well as unjustified interruption of heat, electricity or gas supply.

Romania

According to GED no. 29/1998, the Romanian Electricity and Heat Regulatory Authority (ANRE) has been set up as a public institution under the coordination of the Ministry of Industry and Resources. Beginning 2004, according to the GED no. 11/2004, ANRE was under the supervision of the Prime Minister of Romania. ANRE has the role to create and implement the appropriate regulatory system to ensure the proper functioning of the electricity and heat sector and market in terms of efficiency, competition, transparency and consumer protection.

ANRE has the following main competences:

- Establishes its own operational regulation and personnel responsibilities, according to the legislation in force;
- Provides, suspends or withdraws licences and authorisations for existing or new companies in electricity and heat field;
- Establishes methods for the calculation of electricity and heat tariffs;
- Establishes standard contracts for purchase, sale and supply the electricity and heat;
- Establishes eligibility criteria for electricity consumers;
- Establishes the technical and commercial rules for an efficient and transparent operation of the National Power Grid;
- Provides and emits rules for electricity and heat efficiency use;
- Approves the National Power Grid programming and dispatching regulation;
- Approve the technical code for transmission and distribution networks; and
- Executes other mandates established by the law.

The ANRE President is named by the Order of the Prime Minister and manages ANRE for a period of four years. The Consultative Council assists the ANRE President. The ANRE President appoints the Consultative Council members (nine members).
In order to achieve its functions, ANRE cooperates with the Competition Council, Consumers Protection Office, Ministries and other governmental or local organisations. ANRE also cooperates with professional associations in the electricity and heat industries.

ANRE establishes an annual income and expense budget according to Ministry of Finance regulations.

ANRE regulations are compulsory for the companies involved in electricity and heat production, cogeneration, transmission and distribution at a national level. The Romanian Communal Services Regulatory Authority (ANRSC) regulates the companies involved in local electricity production, heat production, transmission and distribution. ANRSC is a public institution under the coordination of the Ministry of Public Administration. ANRSC has the role to regulate and to control the public services working as a natural monopoly.

Russian Federation

The Federal Energy Regulation Commission has powers prescribed by the law, which are independent from the powers of the government of the Russian Federation, those of the

Regional Energy Regulation Commissions and the subjects of the Russian Federation . Within the framework of these powers, the Federal Energy Regulation Commission interacts with all federal ministries and agencies in solving the problems falling under their purview.

Pricing of the electricity and heat tariffs in the Russian Federation is conducted on a federal level, where the pricing policy is established via the adoption of the laws and normative and methodological support in state regulation. The terms of reference of the Regional Energy Regulation Commissions includes the setting of the electricity and heat tariffs for all consumers on the territory of the Russian Federation, with the exception of the consumers acting as subjects on the Federal Electricity and Power Wholesale Market. Thus, the structure of the state regulatory bodies, actually allows the independent power of the authorities to act within their terms of reference on a common legislative, normative and methodological basis. It is not the hierarchical subordination of the Regional Energy Regulation Commissions to the Federal Energy Regulation Commission of the Russian Federation, rather the coordination on the part of the latter.

Slovakia

The bodies of the Regulatory Office include an Office Chairman and Regulatory Council. The Office Chairman is the chairman of the Regulatory Council. The Regulatory Council determines the regulatory policy and tools to implement it.

The Regulatory Council comprises of six members. The quorum requires at least four members of the Council, in addition to the presence of the chairman or vice-chairmen of the Regulatory Council. The Regulatory Council makes the decisions by a single majority of all its members.

Members of the Regulatory Council are appointed and recalled by the President of the Slovak Republic. Membership in the Regulatory Council is considered a public office.

Requirements for being a member of the Regulatory Council are:

- Be in possession of a university education;
- Be legally qualified;
- Have at least ten years practical experience, with at least five years in a managerial position;
- Be of good character (has not had a conviction rendered against them being enforced).

The President of the Slovak Republic appoints three members of the Regulatory Council at the suggestion of the National Council of the Slovak Republic, and three additional members at the suggestion of the government of the Slovak Republic. There are at least two candidates suggested for every vacancy. The term of Regulatory Council members is six years. One third of Regulatory Council members are replaced every two years. Membership in the Regulatory Council is incompatible with membership in the National Council of the Slovak Republic, in a government office or employment in a central or local state administration office, in a local self-government body, conducting business or membership in administrative, supervisory and control bodies of business entities. There is substantial documentation, which outlines the conditions for termination of members of the Regulatory Council.

Slovenia
The Energy Agency is an independent body controlling the operation of the electricity and natural gas markets and implementing the goals of the energy policy of Slovenia. It has the following duties and authority:

- Setting the prices for the use of the electric grid, on the basis of data and criteria for the evaluation of cost justification;
- Decision making in case of disputes, originating from:
  - Denial of access to electric or gas transmission grids;
  - Charge for the use of electric or gas transmission grids;
  - Granting of licences for performing energy-related activities in accordance with the provisions of the Energy Act:
  - Cooperation with the competent authorities and inspectorates;
  - Publishing annual reports and information for the public;
  - Other tasks related to the control of the functioning of the electricity and natural gas markets.

1.4 How is transparency ensured: Are ordinances, rules, decisions, annual reports publicly available, for example, via the Internet?

Croatia
The Chief Commissioner of the CERC publishes information and news about the work of the CERC, along with an official newsletter.

CERC also ensures the publicity of its work through cooperation with the media, reports and annual overviews, press conferences and its Internet website. (The website is currently under construction: www.vred.hr

Czech Republic
All acts, decrees, regulations, decisions, licenses, annual reports and information about the activity of ERO are available to the public on the Internet address: www.eru.cz.
Decisions on pricing and more important notifications of the ERO are published in the Energy Regulation Bulletin. Acts and decrees are available in the Collection of Acts.

Denmark
All decisions and settlements taken by DERA, excluding the information that has been declared confidential, are immediately published on the Internet.
All the Danish authorities mentioned in this report have web pages, where information appears continuously. The authorities publish specific reports and annual reports in printed format, in addition to reports found on the Internet.

Finland
All decisions of the Energy Market Authority can be found on their Internet site: www.energiamarkkinavirasto.fi, excluding the information that has been declared confidential, this usually includes crucial commercial information.

Hungary

- Appointment of regulators: The prime minister appoints the president and the vice president of MEH.
- Reporting chain: Annual report to the Parliament

- Independence: The appointment of the president and vice president is valid for six years, in order to exceed one cycle of the government.
- Accountability: They may be removed only under very special circumstances by the premier (e.g. negative decision of court against them).

Latvia
Openness is a significant principle for ensuring transparency and stability of regulation. It helps to strengthen the responsibility of the regulator and is a certain guarantee against corruption. Decisions made by the regulator are open and are published. To ensure openness, the regulator cooperates with all subjects involved in the regulation process by inviting them to participate in the preparation of draft decisions.

For the implementation of this model it is necessary to minimise the risk factors connected with PUC operations. Understanding and support from society can be achieved through transparency of the decision preparation and decision-making process, openness of regulatory actions and procedures and explanation of the decisions adopted. PUC should avoid excessive regulation, an antagonistic style and conflicts with service providers, which would worsen the whole business environment in the country. Involving independent experts strengthens the intellectual potential and capacity of PUC, thus promoting adequate decision-making. In municipalities, the regulatory transparency depends on circumstance.

Lithuania
The decisions of the Commission are taken in open meetings with preceding public hearings. Decisions are published in an Official Letter and on the Internet. Annual reports are presented to the Parliament, President, Cabinet of Ministers, etc.

Macedonia (Rep.)
The sessions of the Regulatory Commission are open to the public, except in cases when confidential information and business secrets are discussed.

The Regulatory Commission adopts decisions by majority vote of its members.

The decisions of the Regulatory Commission are published in "the Official Gazette of the Republic of Macedonia".

The Regulatory Commission, after expiry of the first year of its activities, but not until after 1 October of the current year, submits to the Assembly of the Republic of Macedonia, a bill of budget of the Regulatory Commission that includes all the expenses of the Regulatory Commission, including the salaries of its members and employees.

Poland
The transparency of regulatory activity is fully ensured, since all decisions by the ERA President concerning licensing, tariffs etc. are published in the "ERA BULLETIN" which lists all decisions (licensing, tariffs approval, settlement of disputes) concerning electricity, gas and liquid fuels. Tariffs for electricity and gas are also published in "ERA BULLETIN". The same information concerning heat is published in proper voivodeship (regional) official journals (because of the local character of DH systems). All the above-mentioned information is also available on the Internet: www.ure.gov.pl.

The decisions of the President of ERA can be appealed against in the Court of Competition and Consumers Protection.

Romania
The transparency of ANRE activity is ensured through publishing all of the decisions or regulations, that have an impact at national level, such as licensing, tariffs, technical code, methodologies, etc. At the end of the year, ANRE publish an annual report. The report is available on the Internet: www.anre.ro and information can also be found on ANRE decisions and regulations.

Russian Federation
Periodically and whenever required, the methodological materials (orders, provisions, instructions, etc.) are published in the energy related journals and in the "Vestnik (Herald) of the Federal Energy Regulation Commission of the Russian Federation", Vestnik (Herald) of the State Energy Supervisory Agency, Issues of the «ORGRES Advanced Experience Service», in addition to official governmental publications. A website is also available.

Slovakia
General price regulation ordinances of RONI are published in the Collection of Laws of the Slovak Republic. Price ordinances for specific entities and other ordinances are published on the Internet: www.urso.gov.sk. The Internet is the main tool used for publishing documents and communication of entities with RONI.

Slovenia
The Energy law prescribes transparency of information about prices and energy consumptions.

The companies that provide several energy services (power and heat production, DH, gas distribution) are obliged to separate the financial reports for each business. The tariffs and prices for DH are publicly available, as well as the terms of conditions.

1.5 What are the objectives of regulation? (licensing, tarification, metering, consumer protection, security of supply, encouragement of investments, efficiency, quality of service, enhanced competition, least cost planning, promotion of decentralised DH/CHP or of renewables, internalisation of external costs and benefits of DH/CHP)

Croatia
According to the energy laws, CERC is responsible for:

Carrying out activities related to:
- Issuing licences for carrying out energy activities;
- Proposing the duration of licence dependant on type of energy activity and capacity;
- Cancelling (temporary or permanently) licences;
- Passing resolutions whereby it may order energy undertakings of licences which were cancelled or stopped performing an energy activity, to transfer its facilities to another

energy undertaking to operate them (including a related compensation to be paid by the beneficiary); and
- Issuing licences for eligible customers (electricity supply).

Carrying out activities related to regulation of energy prices:
- Approving the amount of stranded costs (Energy Act, art. 24/2);
- Issuing a preliminary opinion related to tariff systems;
- Monitoring application of tariff systems;
- Setting tariffs for the transmission of oil and oil derivatives via pipelines; and
- Setting electricity transmission fees and distribution fees proposed by the energy undertaking.

Carrying out activities related to the construction of new plants for power generation:
- Implementing public tenders for the construction of new plants for power generation;
- Issuing approval for construction of new plants for power generation;
- Informing in writing energy undertakings whose tender was not accepted on reasons of refusal; and
- Settling disputes and setting resolutions about complaints referring to access to network/system.

Monitoring the work of energy undertakings:
- Requesting energy undertakings to submit relevant data, reports and other documents;
- Monitoring the operation of the market operator;
- Reviewing gas supply contracts (Gas Act, art. 4/1);
- Issuing prior approval to supplier for new gas supply contracts containing take-or-pay or ship-or-pay provisions;
- Issuing approval for direct line construction; and
- Issuing approval for access and use of natural gas production facilities.

Other activities include:
- Issuing decisions related to the status of eligible producers according to conditions prescribed by the Minister;
- Verifying customer complaints about the activities of energy undertakings;
- Reporting to the Croatian parliament and the government on its work and making observations relevant for energy market and public service development;
- Promulgating the Charter of Council, subject to prior approval of the government;
- Preparing annual business plans of activities and budgets, in addition to financial statements;
- Passing individual acts within the scope of its power;
- Passing acts and publishing them in Official Gazette, if warranted by law;
- Publishing the CERC newsletter;
- Collaborating with relevant authorities and inspections; and
- Collaborating with international institutions related to supervision and regulation of energy markets.

Czech Republic
The objectives of regulation are:

- Protecting the interest of energy customers;
- Promoting competition in areas of the energy sector, where competition is impossible;
- Satisfaction of all reasonable demands for energy supply;
- Promoting generation efficiency, transmission, transport and energy distribution in the relation to quality; and
- Continuity and reliability of provided services.

Energy Regulatory Office (ERO):
- Decides on the granting, change or revocation of licences;
- Ensures the delivery of energy over the defined scope of the licence; and
- Ensures pricing regulation according to existing ordinances.

The ERO issues decrees, which determine the basic conditions for conducting business in energy sectors that stipulate:
- Particularities for access to energy market;
- Continuity and stable supplies;
- Trading with electricity and gas; and
- Regulation of prices and quality in electricity, gas and DH.

The ERO performs the following activities:
- It decides disputes among holders of licences, it mediates between holders and customers;
- It publishes information about holders of licences;
- It approves rules of electricity transmission system and distribution systems codes; and
- It advises the State Energy Inspection, to conduct inspections and assign the fines for breach of duties, according to the Energy Act.

In the area of DH/CHP, the ERO determines mandatory procedures for price-setting and the maximum possible increase of heat energy prices each year, which the supplier of heat must present at any further inspection. The issue of internalisation of external costs is not addressed. Distortion of competition is addressed by the Economic Competition Office. Questions of measuring are resolved according to the Energy Act, article 78 and Act no. 505/1990 Coll., on Metrology, as amended in later regulations. There is no support for DH/CHP, other than a priority for electricity generated by forced production of heat, article 80 of the Energy Act.

Denmark
The main objective of regulation is to secure the implementation of the energy policy decided by the parliament (Folketinget). This includes in general terms:
- High energy efficiency;
- High security of supply;
- High utilisation of renewable energy sources;
- Low environmental impact; and
- Economical implementation.

Finland
The Ministry of Trade and Industry's responsibilities include the efficiency and promotion of renewables; DH/CHP is not promoted as such. The promotion of

renewables is via taxation and promotion of energy efficiency and renewable energies. The Energy Conservation Programme, which was completed in 2000, is the framework for promoting efficient energy consumption and energy savings. One way of implementing the programme is to finance energy auditing and energy-saving investment projects related to new technology. Under certain conditions, the energy conservation agreement scheme also allows for financial support for ordinary saving investments. Implementation of the Energy Conservation Programme is part of the realisation of the National Climate Strategy completed in 2001.

The Ministry of Trade and Industry has issued recommendations on considering energy efficiency in public procurements. The recommendations are directed to the agencies and bodies of central and local government, to highlight the take-up of energy-efficient equipment and systems.

The energy information centre, Motiva Oy, which collaborates with the Ministry's budget funding, implements the Energy Conservation Programme and the action plan for renewable energy sources by producing, processing and distributing information, developing methodology and accelerating the take-up of energy-saving technology.

The promotion of renewable energy sources based on the action plan for renewable energy sources was completed in 1999. Its aim is to make energy produced by renewable energy sources competitive on the open market. Among the important measures are development and commercialisation of new technology and economic means, such as energy taxation and investment support.

Hungary

- *Licensing*
  MEH provides DH creation and production licences for CHP units exceeding 50 MW_e. It also provides DH supply licences for the operators of CHP units supplying heat directly to consumers.
  The town clerk provides DH creation and production licences for other types of production units exceeding 5 MW_t and for all other types of supply licences.
- *Tarification* is based on the 'pass through' principle: energy fee includes fuel costs; load fee includes all other costs (also win included).
  The Minister sets tariffs on heat supplied for DH directly or indirectly from CHP units exceeding 50 MW_e.
  The municipality council sets DH consumer prices and tariffs on heat supplied for DH directly or indirectly from all other types of CHP units. (It is a new decree, which has yet to be applied).
- *Metering* is obligatory at the connection point of the secondary system or at the point of heat entry. Account by metering is widely used and it is obligatory in all DH-systems by force of law from July 2003. Sharing of metered heat between dwellings has to be done by agreement of dwellers (e.g. in condominium statute). In cases, where there is a lack of agreement of dwellers, general rules of the municipality are applied.
- *Consumer protection* is regulated in general law. Certain aspects of consumer protection, in respect of district heating are included in the district heating law. They are delegated to MEH, municipality councils and municipality clerks.

- *Security of supply* is included in the supply licence and controlled by the issuer of the licence by force of DH law. The municipality council maintains the security of supply by providing for the existence of a proper licensee.
- *Encouragement of investments*
  The owner of a supply licence (DH supply company) is obliged to cover new demands and to carry out the necessary investments by force of law. The owner of a heat production licence is obliged to carry out necessary investments and to agree on sharing costs with the supplier.
- *Efficiency*
  Boiler efficiency is regulated in other rules. Joint efficiency of heat and power production of CHP units, acknowledged as cogeneration, has to be at least 65 %, as stipulated by force of electricity law and applying rules.
- *Quality of service*
  The DH law prescribes continuous, safe and guaranteed heat supply, based on the general heat supply contract. A certified quality assurance system is a compulsory part of the supply licence application.
- *Enhanced competition*
  One heat source by one DH-system is typical, which creates a monopoly for the heat producers. Official heat price setting has so far failed to provide satisfactory control on heat prices from power plants. Separation of the utilities from the power plants through the creation of independent CHP units is difficult, due to the lack of capital of DH companies and also for political reasons.
  The ownership of DH and gas supply companies is separated, the municipalities own DH companies; while gas companies are privatised. Natural gas supply is a strong competitor of DH on the consumer side, but it is not competitive, since both parties apply cross-financed official prices.
- *Least cost planning*
  Heat supply at least cost is prescribed in the DH law; however, special rules about application or monitoring have yet to be established.
- *Promotion of decentralised DH/CHP or of renewables*
  There are no special tools used for the promotion of decentralised energy supply. The electricity law prescribes the Minister to issue rules on mandatory purchase of cogenerated electricity and electricity from waste and renewables. It has been specified in the enacting rules, setting different upper promotion limits for different kinds of electricity production. There is no upper limit for mandatory purchase of DH related CHP, but the guaranteed price is limited at 50 MW.
  The electricity law also prescribes a price subsidy for electricity created from waste and renewables, until a green labelling system is introduced.
- *Internalisation of external costs and benefits of DH/CHP*
  Surplus costs of guaranteed prices are financed from the system operator fees, which are paid to the operator for its different services; it is a type of cross-financing but not a true internalisation of external costs. Green labelling is a true internalisation and is prescribed in the electricity law only for waste and renewables. Internalisation tools for DH/CHP have yet to be established.

Latvia

The Public Utilities Commission (PUC) is a state institution that supervises and regulates the provision of public services in the energy, telecommunications, postal and railway sectors. The PUC is a central multi-sector regulator, and is independent in carrying out its functions; government or other state institutions cannot overrule its decisions. PUC

operation is based on the Law On Regulators of Public Services, statutes, as well as strategy and basic principles of operation approved by the PUC Board.

PUC functions include: regulating the specified sectors and enterprises, setting tariff calculation methodologies, approving tariffs, issuing licences, carrying out preliminary extra-judicial examination of disputes, supervising the compliance of the provided services with the licence conditions, and specific quality and environmental protection requirements.

Strategic goals of utilities regulation are:
- To provide users with high quality, continuous and safe public utilities for economically reasonable prices (tariffs);
- To stimulate efficiency and sustainable development of public utilities ensuring, profitability levels are consistent with the prevailing economic conditions; and
- To promote economically justified competition in the regulated sectors.

To reach these goals, the regulator carries out the following functions:
- Sets the tariff calculation methodology (only PUC, not municipal regulators);
- Approves tariffs for utilities;
- Issues licences and supervises implementation of the set conditions;
- Supervises compliance of utilities with requirements for quality and environmental protection, technical regulations and standards; and
- Performs/disputes out-of-court settlements, etc.

PUC elaborates and implements non-discriminatory procedures for the review of consumer complaints, and together with the Consumer Rights' Protection Centre develops a uniform approach and common activities. Service providers' licences contain stipulations for the provision of consumer rights and choices, including services of different quality and volume, several service tariff system options, several payment systems' options. One of the core functions of PUC is, ensuring and constantly improving the public utilities service quality. In order to implement this, PUC supervises the development of national standards and the adaptation of international standards in public utilities sectors, it monitors standard observance, develops and utilises uniform criteria for monitoring and assessment of service quality. PUC prevents service providers from compromising system safety and service quality, in order to achieve higher profits. Consumer compensation procedures are determined for those who fail to receive a service or receive substandard services.

Lithuania

The Commission is obliged to create and approve pricing methodologies and to control the implementation of them. It regulates companies that provide energy supply services, which are monopolistic or dominant in those markets. The goal of the Commission is to avoid misuse of market power in monopolistic or dominant markets.
Usually the pricing methodology is based on reasonable cost recovery.

The Commission has no special obligation to promote DH/CHP or renewables, but the Commission must follow existing legislation. The government supports CHP and renewable technologies, according to the Electricity Law and National Energy Strategy. In practice, Kaunas CHP, Vilnius CHP and Mazeikiai Refinery CHP are certified as public service obligations, because at present they cannot compete with Ignalina Nuclear

power plant. However after the proposed closure of Ignalina NPP (Unit 1 in 2004 and Unit 2 in 2009), the importance of these power plants will be significant. The mentioned CHP plants have annual electricity quotas, which suppliers must purchase. New CHPs, if they supply heat to the district heating network under public service obligation, receive quotas at a price approved by the Commission (e.g. the new Panevezys CHP). More information can be found under the Lithuanian Government Resolution on "Public service obligation in electric power sector".

Macedonia (Rep.)

Regulation in Macedonia is designed to:

- Provide safe, continuous and quality energy supplies;
- Promote a competitive energy market;
- Determine the requirements of supply of certain types of energy;
- Determine the methodology for forming the prices for certain types of energy;
- Determine the tariff systems for certain types of energy;
- Make decisions about the prices of certain forms of energy, according to the methodology of price formation, the tariff systems and other legal regulations;
- Issue, amend, revoke and follow the implementation of licences for certain energy activities;
- Determine rules for access to the energy networks;
- Promote the protection of energy users' rights;
- Initiate the adoption of laws and other regulations in the energy field:
- Participate in the solution of conflicts and propose measures to resolve them;
- Submit proposals to the authorities with a view to undertaking measures on issues, which impede the implementation of the law, and which fall under its competence;
- Adopt statute and other regulations of the Regulatory Commission; and
- Conduct other duties according to the law.

Poland

The Energy Law defines the scope of competence and obligations of the ERA President. The responsibilities of the regulation are:

- Licensing – the Energy Law defines the scope of economic activity connected with the supply of electricity, heat and gas which requires a licence from the ERA President. Separate licences are issued for electricity, heat and gas production, transmission and distribution, including trade. Licences for activity connected with liquid fuels supply are also separate;
- Tarification – the Energy Law defines the scope of regulation concerning this field of activity of ERA. Tariff regulation comprises the approval and supervision of tariffs in accordance with the provisions of the Energy Law and secondary legislation. Supervision includes the analysis and verification of costs and the definition of the coefficient of the planned improvement of the performance of the energy enterprise. It takes into account expected changes in conditions (circumstances) of economic activity. The basic principle of tariffs setting is the minimisation of supplier and consumer costs. According to the Energy Law, tariffs for heat, electricity and gas should ensure that justified costs of the supplier are covered, whilst simultaneously protecting consumers against unjustified high prices;
- Approval of development plans prepared by electricity or gas transmission and distribution companies;

- Supervision of the quality parameters, in the supply of electricity and gas services to customers;
- Settlement of disputes defined in Energy Law;
- Issuing penalties on persons and companies according to principles defined in the Energy Law,
- Cooperation with other organisations to counteract monopolistic practices of energy companies;
- Publishing information concerning, improving the efficiency of fuels and energy use;
- Collecting and processing information concerning energy management;
- Supervising the qualification of staff operating the grid (network) and exploiting equipment and installations defined in the Energy Law and secondary legislation.

Romania

The main mandates of the Romanian Electricity and Heat Regulatory Authority (ANRE) are:

- To issue, grant, suspend or withdraw the licences and authorisations for new or existing companies in the electricity and heat field;
- To establish methods for calculating electricity and heat tariffs;
- To establish standard contracts for the purchase, sale and supply of electricity and heat;
- To establish eligibility criteria for electricity consumers;
- To establish the technical and commercial rules for the efficient and transparent operation of the National Power Grid;
- To provide and emit rules for electricity and heat efficiency use,
- To approve the National Power Grid programming and dispatching regulation;
- To approve the technical code for transmission and distribution networks;
- To establish that quality and performance standards are applied;
- To supervise the application of environmental protection measures;
- To supervise the electricity and heat production structure;
- To promote hydro power, co-generation and renewables;
- To propose measures to the government, which ensure the storage primary energy (e.g., coal, fuel oil, water for hydro); and
- To cooperate with the Ministry of Industry and Resources and the Romanian Agency for Energy Conservation, in order to propose policies and strategies in the energy field.

Russian Federation

The main tasks of state regulation are:

- Harmonisation of the energy needs and the interests of the national economy;
- Overcoming the crisis of nonpayment for the energy resource;
- Provision of sustainable power supply to consumers to create favorable conditions for industry growth and promotion of entrepreneurial activity in all sectors of the economy;
- Gradual termination of the cross financing of consumers;
- Implementation of the mechanisms of competitive market relations; and
- Elaboration of the rules for the dispatching of the power grid of the Russian Federation (Central Dispatch and Regional Dispatch) on the basis of market relations.

Slovakia
State regulation in network industries includes:
- Granting of permits to perform regulated activities;
- Regulating prices according to the Law on Regulation in Network Industries and Price Law 18/1996;
- Decision making on business conditions upon performing regulated activities;
- Granting of approvals for the construction, reconstruction or cancellation of structures and facilities serving to perform regulated activities, if provided by the legislation (Energy Law 70/1998);
- Decision making on access to networks, pursuant to legislation (Energy Law 70/1998); and
- Exercising state surveillance of businesses, subject to regulation.

Slovenia
In the DH and CHP sector, the Energy Agency of the Republic of Slovenia does not have any particular role in considering competition, market entry or privatisation.

DH is under local jurisdiction. The ownership structure of DH companies varies, there are companies, which are wholly owned by the municipalities or partly owned by the municipalities. Privatisation of DH companies is rare, but possible by the decision of local authorities. The processes of privatisation are defined by the Energy Law and by the Act on economical civil services.

Tariffs and prices of district heating are regulated by governmental decree, although the Energy Law transfers regulation to the local authorities. District heating companies thus have to seek approval from local authorities as well as the government. The decree prescribes the model of changing prices according to the change in the cost of fuel, which is used to produce the heat. The fixed price of heat changes once a year by an amount lower than the rate of the price index (RPI –x), the variable part of price changes with the change of costs of fuels index, which are used for production. The decree also prescribes the price cap (0,5 €cent/kWh), which limits the price hikes in the DH systems. The aim of the decree is to enhance the efficiency of DH systems through the price model.

Security of supply is quite high and depends on various factors: diversity of fuels, peak boiler capacities etc. There are no common rules adopted at state level for DH systems.

Efficiency of heat production and supply:
- Over 70% of all heat in DH systems in Slovenia is produced in combined heat and power production (65% from coal fired CHP and around 6% in smaller gas fired CHP plants). Average heat losses on the distribution part are 14%. Average overall energy efficiency of DH systems in Slovenia is 0.75%.

Competitive position:
- The average price of DH in Slovenia is competitive compared to the price of heating oil and natural gas. The price of heating in the DH system in Ljubljana, which comprises 56% of the Slovenian heat market, is 3.2 €cent/kWh and is around 15% lower than the price of heating oil and natural gas.

The legislative framework in Slovenia is based on the Energy Act. Objectives pursued include the promotion of renewables, security of supply and quality of service.

Combined heat and power production entities can apply for the status of a qualified producer of electrical energy, in compliance with government regulation.

The tariff system for the sale of electrical energy produced in plants with the status of a qualified producer is governed by regulations.

The tariff system for the purchase of electric energy generated by qualified producers is defined by a government decree on electric energy pricing policy.

The pricing policy for thermal energy for tariff users takes into consideration internal and external costs and is regulated by government decree.

Measuring delivered energy is regulated. Thermal energy is measured at the point of entry (e.g., apartment block, individual house, etc.). Relationships among users in apartment blocks will be regulated by recommendations, to be issued by the Ministry of Energy in the near future.

The protection of consumers is regulated by the Act on Protection of Consumers. Market inspectors resolve any disputes.

Reliability of supply is ensured by the implementation of the Energy Act, relating to obligatory fuel reserves and backup production capacities.

The government, through price stimulations and beneficiary policy, encourages integration of investments in CHP units into DH systems.

Efficient energy use is promoted by the Agency for Efficient Use of Energy, which was established in 1995. It allocates grants for target projects for efficient and rational use of energy on the basis of tenders.

Quality of service of heat and other forms of energy supply is regulated by the Energy Act, which defines the relationships between suppliers and consumers.

Renewables are promoted by a programme aimed at enhancing the use of wood biomass in DH systems.

1.6 What are the powers of the regulator? (regulatory powers only or additionally merger control, competition, market entry, and privatisation?)

Croatia

The powers of the regulator are mostly regulatory, yet they can partially define market entrance as stated in the Law on Electricity Market, Art. 9.:

(1) An energy undertaking may determine the construction of plants for power generation for eligible customers at its own discretion, provided it has a licence for carrying out power generation activities.

(2) An energy undertaking may construct power plants for tariff customers upon public tendering and approval issued by the Energy Council.

(3) The terms of reference for the tenders, include the following:
- The location where the plant is to be constructed;
- The type of primary energy source to be used for power generation;
- The manner and conditions of power generation;
- Conditions to be met after cessation of operation;
- Conditions related to environmental protection and health and safety of citizens;
- The required energy efficiency level; and
- Conditions for the use of common and public goods.

(4) CERC approves the construction of a power generation plant that will supply electricity to tariff customers, only if the power generator meets the requirements prescribed in the tender and offers the lowest price of produced electricity.

(5) CERC informs in writing the undertakings and the reasons of refusal to those, whose tender was not accepted and provides them with a copy of the licence issued to the most successful bidder.

Czech Republic
The ERO is empowered by the Energy Act as previously mentioned. The ERO is given power from decisions of ordinary and extraordinary appeals, in compliance with rules of the Administration Code. Questions of privatisation and merger are addressed by the Economic Competition Office. Accession to the market is regulated by the ERO, issuing licences on generation and distribution of the heat.

Denmark
All energy projects with a capacity of more than 20 MW need to be approved by the energy plan authorities before implementation.

All commercial contracts are subject to the supervision of Danish Energy Regulatory Authority (DERA), which can intervene if necessary.

The DERA continually benchmarks monopoly companies in the electricity sector, and sets figures for income limits, in order to force the companies to improve the efficiency of their operation and administration. The same regulatory possibilities have been identified for the DH sector, but have not been implemented as yet.

Production of electricity and the electricity trade is privatised by law, and separated from the monopoly companies operating the network.

All tariffs must be submitted annually to DERA.

The largest producers of electricity (>20 MW) have to obtain a licence by the Danish Energy Authority (DEA).

Finland
Please refer to answers to questions 1, 3 and 5.

The energy sector is subject to the general competition laws of Finland, i.e. the Act on Competition Restrictions (480/1992), amended by (447/1994), (448/1994), (600/1995), (908/1995) and (303/1998); the Act on the Finnish Competition Authority (711/1988), amended by (482/1992).

The ownership of electricity distribution is limited to 25% for any company.

Market entry and privatisation do not have any special provisions.

Hungary
Licensing, issuing of operation and business rules and merger control are delegated to and decentralised between MEH and municipalities by the DH law. Market entry of CHP units (and all types of power plants) below 50 MW requires only a set-up licence, by force of the Building Act, permitted by the municipality clerk. Market entry of DH production units (heat only plants or heat exhausting component of power plants) above 5 MW requires both the set-up and operation licence, also permitted by the municipality clerk.

Latvia
In order to achieve its goals, one of the main tasks of the PUC is to promote the currently restricted competition, in accordance to the long-term sectoral policies adopted by the government. Competition will stimulate the service providers, to operate with a maximum efficiency and ensure alternative choices for consumers, lower prices and higher quality of services. PUC directly intervenes in the service provision process only where competition is limited. PUC cooperates with the Competition Council on a regular basis.

Lithuania
The regulator has the power to establish pricing methodologies and price caps. Competition in Lithuania is under the control of the Competition Council, this can be found at: www.konkuren.lt and the main legal basis for that is the Competition Law of the Republic of Lithuania.

Privatisation procedures are under the jurisdiction of State Property Fund, they can be found at: www.vtf.lt

Macedonia (Rep.)
Regulatory powers only.

Poland
Regarding DH/CHP, the power of the ERA President has only one tool of regulation, since the Energy Law also contains provisions concerning local energy planning. According to the Energy Law, all local authorities (communes) are obliged to develop assumptions concerning heat, electricity and gas supply for the municipality as a whole or its parts. In some cases, the local government can prepare a plan of heat, electricity and gas supply and in defined situations this plan (or parts of it) can be decided by the city council as a local law (where everyone is obliged to work in accordance with that plan).

Romania

ANRE has only regulatory powers and acquires those through decisions and regulations. ANRE ensures market competition by supervising the application of regulations. Regarding CHP promotion, ANRE has determined that the national electricity distribution company purchases the electricity produced by CHP at any price, so long as the price is established according to ANRE methodology and the Regulation of the Dispatching and Programming of the National Power Grid is observed. This regulation establishes a "restricted priority order list" for accessing the electricity market as follows:

- First position: electricity supplied by run-off hydropower plants;
- Second position: electricity supplied by the nuclear power plant;
- Third position: electricity supplied by CHP, but only the electricity produced in cogeneration for urban consumers, not the electricity produced in cogeneration for industrial consumers or produced in the condensing tail;
- Fourth position: electricity supplied by thermal power plants using a limited (pre-established) quantity of coal, in accordance to the government's strategy regarding the use of energy resources;
- Fifth position: electricity supplied in accordance with power purchase agreements;
- Sixth position: electricity supplied in accordance with bilateral agreements between producers and eligible customers;
- Seventh position: imports and exports of electricity.

Producers, who compete on the sport market, will handle remaining uncovered demand. In this market, even CHP can compete with electricity produced in the condensing tail.

Russian Federation

The Federal Electricity and Power Wholesale Market was organised by the joint stock company "United Electrical System of Russia (EES of Russia)" which performs the following functions:

- Coordinates the activity of all subjects of the Federal Electricity and Power Wholesale Market in the fields of production, transmission, distribution and consumption of electricity;
- Ensures reliable operation and the development of the technical base of the Federal Electricity and Power Wholesale Market: the system-forming electric transmission lines and the process control of the united electrical system of the Russian Federation;
- Coordinates the activity to produce adequate output by power stations, in view of the required reserve of capacities, as well as the activity of the subjects of the Federal Electricity and Power Wholesale Market in conducting the repair and re-powering/retrofitting;
- Conducts the analysis, development and systematic review of the normative characteristics of the generating equipment of all power stations, irrespective of their institutional and legal basis (form) for the purpose of minimising the fuel and operational parts of electricity and heat generation costs;
- Coordinates the investment activity of all subjects of the Federal Electricity and Power Wholesale Market;
- Organises the export/import of electricity (power);
- Ensures on-line control and optimisation of the duties of operation of all subjects of the Federal Electricity and Power Wholesale Market;
- Performs calculation of planned balances of electricity production and power;

- Annually evaluates the ability of the organisations to work within the Federal Electricity and Power Wholesale Market;
- Ensures the validity and availability of information on the activity of the Federal Electricity and Power Wholesale Market for all its participants;
- Analyses the functioning of the Federal Electricity and Power Wholesale Market and makes the results available to all its subjects.

Slovakia
RONI also has the following powers:
- Keeps and publishes a list of holders of licences for the performance of regulated activities;
- Imposes measures to remedy faults and shortcomings identified, through the compliance with the Law on Regulation in Network Industries and legislation (18/1996, 70/1998);
- Imposes sanctions for violation of liabilities under the Law on Regulation in Network Industries and other legislation;
- Issues based on the law, such as binding legal regulations are to be promulgated, by being published in the Collection of Laws of the Slovak Republic;
- Participates in the drafting of laws and regulations by the government of the Slovak Republic that concern regulation in network industries.

Slovenia
Any economic company established in the Republic of Slovenia can enter the Slovenian energy market by obtaining a licence, and to operate energy units it has to obtain an energy permit.

The Competition Protection Office controls the concentration of capital and competitiveness.

Privatisation of economic companies in state property is carried out in accordance with a government programme.

1.7 Are powers shared between the central administration, the municipalities or regional groups of municipalities? If so, what are the respective powers?

Croatia
The central administration has all powers.

Czech Republic
Powers of regulation in the Czech Republic are not shared. The only competence of municipalities is in their development of a regional energy concept, which can influence heating operations in their limited area.

Denmark
The evaluation and approval of heating projects is conducted by the local municipality, but the DEA has to be informed and can intervene if necessary.

A project applying for a grant according to a specific act has to be approved directly by the DEA.

All new power plants have to be approved by the DEA.

Finland
Powers are not shared in energy market regulation.

Hungary
Please refer to answers to questions 5 and 6.

Latvia
The powers between the PUC and municipal regulators are shared, to the extent that the PUC deals with gas and electricity regulation; the PUC regulates heat supply only in the case of cogeneration – when heat is produced in a cogeneration cycle.

Municipal regulators regulate heat-only supply, waste management, water supply and municipal transport tariffs.

Central administration and municipalities cannot influence the regulators' decisions.

Lithuania
The municipalities, as owners of DH companies, set prices etc.

Macedonia (Rep.)
The powers are not generally shared.

Poland
Formulating legislation and energy policy is the main role of the central administration. The role of ERA and its personnel is the regulation of enterprises active in heat, electricity and gas supply as well as liquid fuel trade. The role of local authorities is to cooperate with ERA and energy enterprises on local energy planning.

Romania
Once the Romanian Communal Services Regulatory Authority (ANRSC) has been set up, the companies involved in local heat production, transport and distribution, will be regulated by ANRSC. The competences of ANRSC are similar to the ones of ANRE, but are limited to local level and concern all public services (except cogeneration which falls under the mandate of ANRE).

Russian Federation
The Federal Energy Regulation Commission, in accordance with legislation, is responsible for economic substantiation of tariffs (payments for servicing), their introduction and the non-disclosure of information that is of commercial confidentiality.

The Regional Energy Regulation Commission has the following powers:

- Maintains the registry of the energy-supplying organisations relating to the subjects of the Russian Federation;

- Monitors compliance of the federal laws in the making and execution of contracts on power supply to consumers, in regard to setting up and the application of electricity and heat tariffs;
- Examines proposals on the adoption of the electricity and heat tariffs submitted by the energy-supplying organisation, energy producers or the organisations rendering the services on the consumers market;
- Determines the scope of the products (electricity, heat, etc.) supplied to consumers;
- Calculates the average electricity and heat tariffs by the energy-supplying organisations and consumer groups.

Slovakia
Regulating powers are fully entrusted to RONI.

Slovenia
Powers are shared between state and local communities in the field of district heating:
- The government defines conditions covering licences, energy permits, pricing policy, concentration of capital, competition, security of supply, technical standards etc.;
- Municipalities define the manner of implementing public service obligations, approving energy prices for district heating, and ways of energy supply in specific areas of local communities.

1.8 What coordination, if any, takes place between the regulator for heat and the regulators for electricity and gas?

Croatia
The CERC is structured according to activities, not according to the type of energy; therefore one Commissioner is responsible for a particular issue in the heat, electricity, gas and oil field (see graph 1 overleaf).

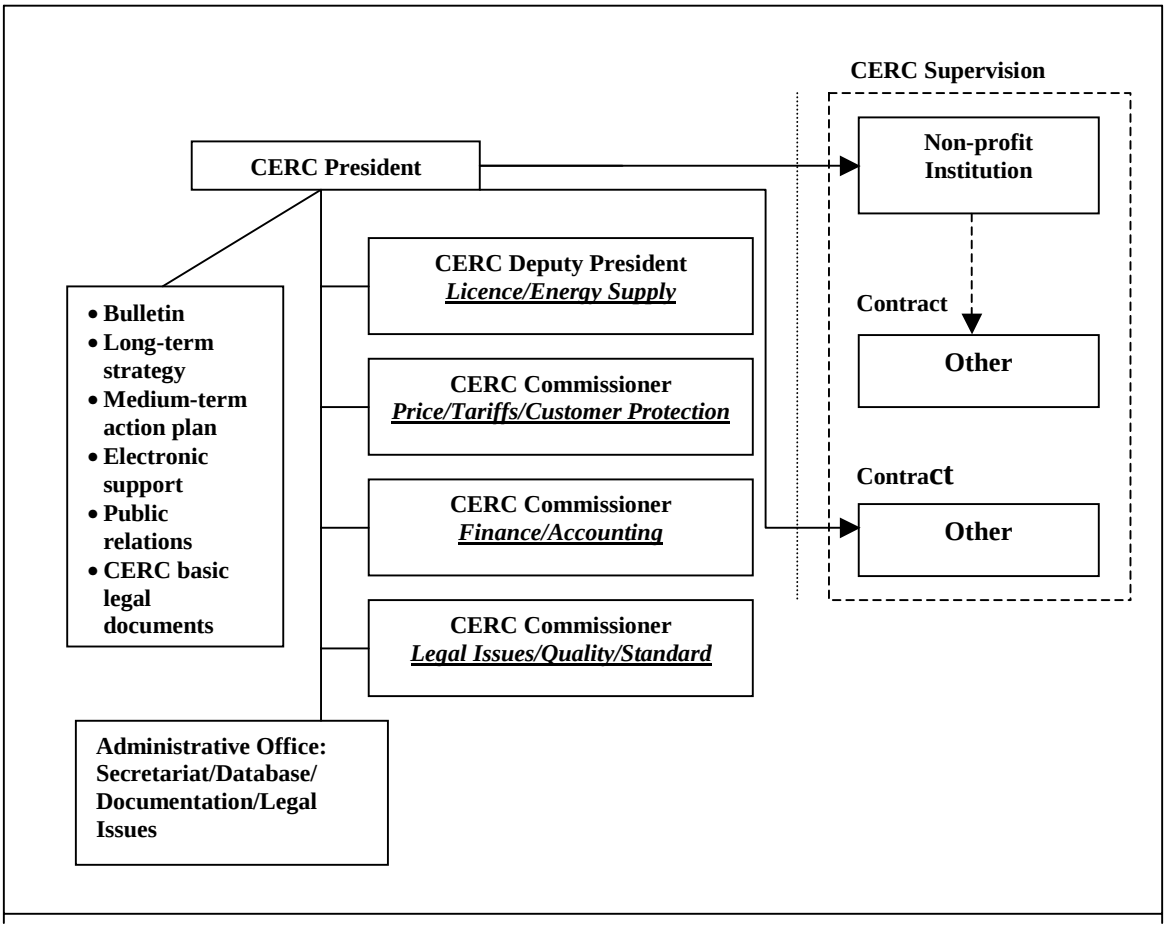
Czech Republic
At present, the Licensing and Regulatory Sector of ERO controls electricity, gas and heat tasks. Institutionally, there is coordination of regulation between the director of the Licensing and Regulatory Sector and the Strategy Division.

Denmark
The same regulator covers all sectors.

Finland
The same regulator regulates electricity and gas. No specific regulation for heat.

Hungary
MEH is the regulator of electricity and gas, and also of DH. It coordinates closely with the ministry.

Graph 1: Framework for Energy Regulation in Croatia



The independent system operator is a new authority, which has been established in the structure of the new electricity law. It has competences in the safety and balance of the electricity system and market coordination, among others. (It also controls and prices the compensation of mandatory purchasing). Its obligation is also to coordinate with MEH. Local municipalities and municipality clerks have only occasional contact with other energy authorities.

Latvia
No coordination, but PUC coordinates the preparation and changing of the methodology for tariff calculation.

Lithuania
The same institution regulates the heat, electricity and gas sectors. The regulator has separate departments for gas, electricity, DH problems. Coordination is regulated according to Commission rules.

Macedonia (Rep.)
Coordination is not an issue as the regulatory commission covers all energy sectors.

Poland
The ERA President coordinates the regulatory activity for heat, electricity and gas and the activities of the ERA headquarters' personnel. There is a special post of Coordinator for District Heating.

Romania
ANRE, ANRSC and the Romanian Natural Gas Regulatory Authority – ANRGN – are all independent. However, ANRE and ANRSC cooperate in order to harmonise their methodology for tarification, licensing, etc. for electricity and heat. ANRE and ANRGN are also under the authority of the Ministry of Industry and Resources.

Russian Federation
The common approaches to regulation of electricity and heat were outlined in question 1.7. Competition in the regulation of the gas supply in the Russian Federation is weak as a result of strong state influence (it will be a long-term trend since it is the national budget-forming sector), as well as a practical monopolisation of gas production and transport. This can temporarily complicate the implementation of full-scale market transformations. Gas price regulation is the responsibility of the Federal Energy Regulation Commission. Changes (rises) in gas prices caused respective increases in electricity and heat tariffs, but with a significant time delay (months).

Slovakia
RONI is the regulator for heat, electricity and gas.

Slovenia
There is no regulatory body monitoring heat production, as heat production and distribution in district heating systems is defined as an optional public service. Any energy activities and/or operation of energy units can be implemented on the basis of acquiring the related licence and energy permit.

1.9 Are the means (budget, competence, urban heat balances and projections, sanctions) sufficient for the regulator to be efficient and independent?

Croatia
The reform (and regulation) of the energy sector in Croatia is in its early stages, but statutory means available to the regulator are sufficient for efficiency and independence.

Czech Republic
At present, the size of ERO´s budget is sufficient, but there is concern about the suitability of full dependence on the state budget and its yearly approval. Sanctions are currently not invoked by the ERO, but there is an effort by the ERO to enforce sanctions by amending the Energy Act and updating the Act on Sector Regulators. This will include an amendment to certain competencies of the ERO and its statute would lead to more independence, as requested by EU legislation.

Denmark
The Competition Authority, which handles the secretariat for DERA, appears to be insufficiently staffed, causing capacity problems for DERA.

Finland
The Energy Market Authority appears to have adequate resources. However, additional personnel are probably required.

Hungary
Theoretically, MEH is satisfactorily independent, competent and has a good budget. In practice, the ministry is superior to MEH (the law empowers the Minister to control the MEH) and the MEH works for the ministry in an advisory capacity.
The different authority roles of municipalities (regulator, owner, licenser, responsibility for public supply) can never be separated from one another.

Latvia
Since the Ministry of Economy supervises the PUC, the PUC's budget is included in the Ministry's budget. In accordance with the amendments to the Law On State Budget for 2001 (with effect from 7 July 2001), a new section called the Public Utilities Commission was created in the budget of the Ministry of Economy.

PUC operations are financed by a state duty, which is paid by the regulated enterprises. From 2002, the PUC and municipal regulators were financed from regulating enterprises:
- 0.2% from its annual turnover for financing PUC;
- 0.4% - for financing municipal regulators.

For PUC, the means are quite sufficient (including budget, competence, etc.).
With regard to the number of municipal regulators, income must be divided between all regulators, therefore the budgets with few exceptions are insufficient and as a result, staffing and competence are also lacking.

Lithuania
The budget of the Commission is included in the state budget, as a separate issue. This significantly restricts the independence of the Commission.

Decisions of the Commission are obligatory for companies, which are under state control. In case of a breach, the Commission has the right to suspend the licence and/or impose a fine.

Regulation of district heating in Lithuania is not particularly effective, as debts of DH companies are usually very high. Solvency of consumers is low and technical equipment is old and inefficient. Half of all DH companies have no long-term development plans.

Macedonia (Rep.)
Yes, the means are sufficient.

Poland
The budget of ERA and nine regional offices has reduced over the last two years (reduction of expenses for central administration) and has resulted in reduced employment (by approximately 10%) in 2002.
The competence of the ERA President is, in principle, sufficient, but sometimes there are misunderstandings between ERA and the Department of Energy in the Ministry of Economy (now: Ministry of Economy, Labour and Social Affairs). Urban heat balances and projections show that there is tendency towards a permanent reduction in heat

demands, mainly owing to demand side management (DSM) and thus the main goal of DH/CHP companies is to gain new heat consumers.

Sanctions are sufficient for regulatory activity. The independence of the President of ERA has reduced in the past year, he now reports to the Minister of Economy, Labour and Social Affairs, who also supervises the entire energy sector. Previously the ERA President reported to the Prime Minister.

Romania
To date - yes, the means are sufficient.

Russian Federation
The models being developed on the function, evolution and regulation of market relations in the power industry in the Russian Federation are designed to reflect historic elements of the industry: a united system network, centralised operative (on-line) dispatching, and the existence of a state regulation system. On the other hand, the models assume the formation of radically new economical mechanisms, market structures and market relations between the market subjects, ensuring the development of a competitive market environment. The latter forms an important basis for the efficient and high technological evolution of the power industry, as well as being a necessary condition for best satisfying the demands, with minimum selling prices for energy products.

The foremost objective of regulation is the protection of the economic interests of consumers (purchasers) of electricity and heat, specifying the directions of production activity and control of financial activity. Interference from the state into the electricity and heat market will only be required to create and maintain the conditions of free competition and to ensure market conditions.

Slovakia
RONI is an independent organisation, in terms of budget, but depends upon decisions made by the National Council of the Slovak Republic (state budget). Available information suggests the present budget is sufficient. On an annual basis, and by the 31 May of the subsequent year, RONI submits reports on its activities to the National Council of the Slovak Republic.

The impact of RONI on urban heat balances and projections is only through the price policy. Competences are suitable and sanctions are sufficient.

Slovenia
At the present stage of development of energy markets – yes, the means are sufficient.

1.10 What consultative mechanisms are established, if any, with the stakeholders (operators, customers)?

Croatia
CERC ensures the publicity of its work through cooperation with the media, publishing its reports and annual overviews, organising press conferences and through its Internet website, which is under construction.

Czech Republic
Advisory and consultative mechanisms are currently being established. Until now, they have been used without any official procedure, but through, in many cases, the advisory members of the Commission of Appeal of the Chairman of the Office. ERO efforts are aimed towards creating Expert Working Groups, consisting of an official from the ERO and stakeholders representing the market players within the formation procedure of ERO decrees and pricing decisions.

Denmark
The DEA publishes informative material, and the different branch organisations organise hearings and meetings.

Finland
In Finland, consultative measures are ensured through meetings, negotiation days, web pages and the journal of the regulator.

Hungary
MEH, municipalities and DH utilities are obliged to cooperate with customer representatives (associations, etc.) by force of law. Where a construction licence requires environmental analysis, it also requires a public hearing. The independent operator is obliged to coordinate with MEH.

Latvia
The PUC ensures the publicity of its work through cooperation with the media, publishing its reports and annual overviews, organising press conferences and through its Internet website. The PUC also holds public hearings alongside an established consulting council.

Lithuania
Public hearings and meetings are held to communicate with stakeholders.

Macedonia (Rep.)
At present there is no established consultative mechanism.

Poland
There are several consultative organisations in Poland (i.e. associations) such as the Economic Chamber of District Heating, the Polish Society of CHP, and similar associations of the housing cooperatives (main heat consumers). If any amendments to the Energy Law and secondary legislation are prepared, consultation usually occurs with these organisations and takes place at the Ministry, which is responsible for the preparation of new or changing provisions. Consultations are also possible during the process of approving heat tariffs for registered “associations of consumer protection”, which intend to take part in this process, although this type of consultation is rather rare. It is worth mentioning that, according to the Energy Law, the ERA President is obliged to protect consumers against an unjustified high level of heat prices. To this effect, the ERA headquarters has appointed a spokesman for fuel and energy consumers, who is responsible for settling disputes and conducting consultations with consumers. A “consumers handbook” which answers consumer questions has also been published.

Romania
In order to achieve its goals, ANRE cooperates with the Competition Council, Consumers Protection Office, Ministries and other governmental or local organisations. ANRE also cooperates with professional associations within the electricity and heat field. All national regulations issued by ANRE are published in the Official Journal.

Russian Federation
An Interdepartmental Board of Experts was set up under the Federal Energy Regulation Commission and produced recommendations for the Commission Board.

Since regional Energy Regulation Commissions are not directly subordinated to the Federal Energy Regulation Commission of the Russian Federation and depend on the administration of the subjects of the Russian Federation, a consultative board of the subjects of the Russian Federation was established by the Federal Energy Regulation Commission to enable closer cooperation and render normative and methodological assistance.

In the time between the annual meetings of the subjects of the Federal Electricity and Power Wholesale Market, the activity of the latter is considered by the Oversight Council as selected by it subjects (suppliers, purchasers, organisers and operators).

Slovakia
There are several organisations assisting heat and energy producers (e.g. Slovak Association of Heat Producers, Slovak Heating Society) and several organisations for heat and energy consumers (e.g. Slovak Association of Consumers). These organisations take part in the legislative preparation of a new law or amendments of existing laws. There are many conferences, seminars, courses and other activities, which permit stakeholders to consult with the Regulatory Office on Network Industries.

Slovenia
Suppliers of any energy from the networks must inform their consumers at least once a year on their energy consumption and advise on the best practice of achieving efficient and rational use of energy.

1.11 How are disputes settled?

Croatia
Specific decisions passed by the CERC, while exercising its prerogatives as stipulated by the Energy Law and the laws regulating energy activities are final, unless stipulated otherwise by these laws. The decisions of the CERC are published in the Energy Regulatory Council's newsletter. If any party is dissatisfied with a specific decision it may initiate administrative procedures.

Czech Republic
Arbitration disputes are solved in the form of administrative proceedings in line with Energy Act, Article 17 [8] point [a, d].

Denmark
DERA settles all disputes.

Finland
Please refer to question 1.3.

Hungary
MEH regularly organises meetings on issues of public interest and invites all interested parties (representatives of suppliers, consumers, etc.). Meetings focus particularly on legislation (new laws or rules) and other disputes are occasionally addressed.

Latvia
There is no official procedure; disputes are usually settled between interested organisations and inhabitants.

Lithuania
Disputes can be settled by negotiation or by taking the case to court. The Commission holds a preliminary extra-judicial hearing of complaints concerning acts or omissions of energy enterprises in supply, distribution, transmission, storing of energy, failure to grant the organisation the right to use networks and systems, connection, balancing of energy supply flows, application of prices and tariffs (Law on Energy, Article 26).

Macedonia (Rep.)
Specific decisions of the Regulatory Commission may be appealed against at the Appeals Commission on Energy Matters. This Commission consists of three members. The members and the president (who is one of the members), are appointed by the Assembly of the Republic of Macedonia upon proposal of the government of the Republic of Macedonia. A member of the Commission is a person with at least a university degree and at least ten-years experience in the field of energy. The mandate of the members of the Commission of Appeal is four years.

Poland
Seminars and conferences are organised each year and give the opportunity for exchanges of views on critical issues between ERA specialists and representatives of heat suppliers and consumers. Occasionally, ERA specialists are invited by organisations representing heat suppliers and consumers to discuss specific (more complicated) situations and to seek effective solutions.

Romania
Specific decisions of the ANRE President may be appealed against at the Bucharest Appeals Court, no later than 30 days after notification. General decisions can be appealed against until 30 days after publication in the Official Journal.

Russian Federation
Disputes are settled in accordance with the rules established by the participants-subjects of the Federal Electricity and Power Wholesale Market.

Slovakia
Proceedings are initiated by the RONI or at the suggestion of a participant. Oral proceedings are public, with the exception of cases where facts to be reviewed or submitted, are to the nature of business, service or state confidential. Data and information protected under separate pieces of legislation are not made public.

The general regulation on administrative proceedings does not apply to price regulation ordinances. Such ordinances are not subject to review by courts.

First-level rulings may be appealed. The Regulatory Council decides upon appeals. Meetings of the Regulatory Council in matters of appeal are not public. Minutes of Regulatory Council meetings are drafted, indicating the position of Regulatory Council members different from the decision adopted. No remedial action is allowed against Regulatory Council decisions on appeals. Courts may review Regulatory Council decisions on appeals.

Slovenia
Disputes related to issues of access to energy transmission lines are initially settled by the Energy Agency, but a final settlement is within the competence of the Minister in charge of energy.

Disputes among suppliers and consumers, relating to the quality of energy services are resolved by market inspection.

1.12 Which other institutional aspects are relevant (e. g. better international statistics)?

Croatia
Additional laws related to heat-supply:

- ***Communal Law (Off.Gazette no.36/95, 70/97, 57/00, 129/00, 59/01)*** – because it defines possible organisational forms of performing municipal services, i.e., legal forms of organising the enterprises as municipal service suppliers;
- ***Law on Concessions (Off. Gaz. no. 89/92)*** – because the concession agreement, according to *Communal Law*, is one of the basic legal frameworks for performing municipal services;
- ***Law on Environmental Protection (Off. Gaz. no. 82/94)*** – because existing/new heat sources are real/potential sources of environmental pollution through emissions into air and water, and generation of waste, as products of burning fossil fuels;
- ***Law on Physical Planning (Off. Gaz. no. 30/94, 68/98, 61/00, 32/02)*** – because heat supply generation and infrastructure facilities (such as hot-water and steam pipelines, heat transfer sub-stations, etc.), by their very existence and position in the area, can have a potentially significant impact on existing and planned land use by other subjects and/or on land use patterns;
- ***Law on Construction (Off. Gaz. no. 52/99, 75/99, 117/01)*** – because construction and/or reconstruction of the mentioned facilities, are often of significant size, they are generally subject to special laws referring to construction activities.

The *Communal Law* defines heat supply as a municipal service, meaning generation and supply of steam and hot water to physical and legal persons, and thus supplying this type of municipal service to the users of the service. As a municipal service, heat supply also involves the construction, financing and maintenance of the plants and facilities of the municipal infrastructure as an integral system in the area of a local self-government unit.
The laws under bullet points 3, 4 and 5 are fundamental laws defining the legal framework of the licensing process for construction of new and reconstruction of existing

plants and facilities, as well as the general conditions for their construction and operation (defined further in sub-laws and other regulations).

Some of those acts explicitly mention heat supply sources for district heating systems:

- ***Decree on Environmental Impact Assessment (EIA) (Off. Gaz no34/97, 37/97, 59/00),*** sets out the conditions and lists the facilities requiring the process of environmental impact assessment to be conducted. Among them are the thermal power plants and other power plants (incl. combined heat and power plants – CHPPs, as well as heat sources for district heating system) having total thermal output installed at one location of 50 MW and higher. Infrastructure connections of such plants and facilities, i.e. heat supplying pipelines are subject to mandatory EIA if longer than 1000 m.

- ***Decree on Environmental Emission Inventory (Off.Gaz. no. 36/96),*** defines generation facilities – heat supply sources (i.e., TPPs-CHPPs, DH, industrial boiler-houses and boiler-houses over 100 kW) as individual point sources of environmental emissions; these are subject to the provisions of this by-law, such as providing mandatory information on air emissions (e.g., form PI-Z-3 for emissions into the air from district heating and sanitary hot-water generation plants), water effluents and also waste generation.

In respect to the construction and operation of plants and facilities, including heat supply sources firing fossil fuels, that can be considered environmental pollution sources, other laws and regulations in the field of environmental protection are also important. These laws and regulations apply to heat supply sources in the same way (and to a certain extent) as to other capital investment plants and facilities. The areas covered are: nature conservation and cultural heritage protection, air and noise protection, waste and hazardous substances, water use and protection, agricultural land and woodland protection, and fire prevention and protection.

Czech Republic

Better information about the activity of foreign regulatory institutions would be welcome. The main regulatory body, the ERO seeks to establish formal relations with other bodies of state administration, with important players in the energy market and customer representatives.

Hungary

Legislation:

- Laws 1.1. a), b) and d) restrict privatisation of DH public utilities. It is only possible to privatise 49%, of the operation of DH, in order to keep the property in public ownership.
- Law 1.1. b) allows the designation of city areas for district heating. (Several municipalities have applied it, but it has been strongly disputed by counter parties.)
- Law 1.1. a) and the Law 1995 / LIII. on Environment Protection do not contain special rules about DH or CHP, but they do give the municipalities power to make independent decisions on and select individual tools for environmental protection measures.

Representations:

- MaTáSzSz (Association of Hungarian District Heating Enterprises) is the recognised national representative of DH utilities. It is also a member of Euroheat&Power.

- Cogen Hungary is an association that includes corporate members interested in cogeneration. It represents CHP in public administration. It is a member of Cogen Europe.

These international organisations also provide statistics for their members.

Latvia
Appropriately, the official central government body – the PUC – must regulate gas, electricity and cogeneration.

The enormous number of municipal regulators must be reduced to ensure a common approach to all utilities, to strengthen their capacity and to lower the regulatory expenditures for enterprises to a common standard – 0.2% of annual turnover.

Internal and international energy statistics must be improved and accessible.

Lithuania
The lack of statistical data is a problem, not only with regard to consumption, but also for research and development goals. The Commission receives all data it requires for decision-making, but only an aggregated report is publicly available. Annual financial results can be viewed, but it does not easily impact on the policy and decision making of DH companies. In theory, all applications for price revisions, presented to the Commission, are public and open to analysis, but in practice the Commission is unwilling to provide concise information.

It is necessary to view DH/CHP development and associated problems in Lithuania and other CEE countries from a theoretical point of view. Perfect competition and perfect regulation give the same good results for existing systems and for consumers. In reality, perfect regulation and perfect competition are impossible, so we have imperfect competition and regulation. What is better – imperfect competition or imperfect regulation? State regulation was only one possibility identified to manage the so-called natural monopolies, but a regulated monopoly is problematic. Thus, there was an attempt to replace regulation by competition, as found in the case of the Scandinavian electricity system Nordpool, which yielded good results. Prices for consumers went down. At present, the EU Directive is introducing competition into the electricity sector in all member countries. If successful this approach could be transferred to the district heating sector, as the district system of a city is linked to the power system of a country or region: both systems have producers, grids and large numbers of consumers. Electricity consumers in Lithuania have the opportunity to choose a supplier on a contractual basis. Why should this principle fail to work when applied to district heating?

The most developed district heating systems are located in the Nordic countries (Finland, Denmark, Sweden). District heating companies in these countries work under strong regulation and give good results. Unfortunately, experience in Lithuania and another CEE countries in this sector have not been so positive. In many cases, the sectors of the economy under state regulation develop more slowly than sectors in which state regulation is minimal and where the principle of competition prevails. Moreover, economy sectors under state regulation usually attract very high debt. This is a problem at state level, because it appears that the existing system is not able to correct its financial situation without further support from the government. In Lithuania, the health,

pharmaceutical and DH sectors all experience this problem of debt. Perhaps, the differing experience in the Nordic and CEE countries is related to the long soviet regime in Eastern Europe. The soviet regime differed due to its total state ownership and control of all activities. People in CEE are now sceptical of state property and are inclined and able to avoid bureaucratic regulation, which makes regulation inefficient and expensive.

In conclusion, there is a need to introduce competition into the district heating sector, between heat producers, operators and maintenance providers.

Poland
There is a need for statistics on DH activities to elaborate internationally accepted definitions and principles of classification for different heat sources, etc. There are serious difficulties in finding information on the DH sector in Poland; only data concerning CHP is available and reliable. Since 2002, statistics concerning heat tariffs have been available from ERA headquarters and published in the ERA BULLETIN.

Romania
The Romanian authorities can attempt to revitalise the DH sector by setting the following objectives:

- To continue the process of adapting the legal frame to the EU directives in the electricity and heat field;
- To continue the development of specific mechanisms for creating a free market; and
- To create incentives for joint ventures, IPPs, third party finance schemes, etc. for CHP projects.

Russian Federation
Information is needed on the analysis of tariff promotion, in particular, tariff crediting.

At present, it is very important to learn from successful projects in DH/CHP in Europe. In particular, it would be beneficial to have access to an international database that includes the success stories in the DH/CHP field. It is also important to recognise that efficiency is important in decreasing heat and electricity costs.

Slovenia
The most powerful tool in assuring high quality energy services and efficient, smart energy use is a clear and goal-oriented energy policy, which takes into consideration environmental requirements. In Slovenia, the National Energy Programme should produce further suggestions and revisions to the existing programme.

Good international energy statistics are of great relevance.

PART 2

REGULATORY EXPERIENCE IN VARIOUS TRANSITION ECONOMIES

REGULATORY EXPERIENCE IN VARIOUS TRANSITION ECONOMIES [2]

2.1 Transformation from Subsidies to Market Oriented Heat Tariffs: The Role of the Energy Regulatory Authority in Poland [34]

Summary

This paper describes the transformation of the DH sector and the evolution of heat tariffs in Poland resulting from changes of the economic system, ownership, pricing etc. It describes the legislative base, energy policy and pricing problems.

A. Introduction

Fundamental changes in the entire national economy (including DH systems) commenced in 1990, when the Parliament issued important acts, which created a legal base for ownership changes in the DH sector, and shifted the responsibility for heat supply to local authorities. Those acts defined, amongst others, the principles of taking over, by the municipalities; the state owned DH companies' assets. According to those acts, heat supply became one of the city's own tasks and local authorities had to choose the organisational and legal form of an economic activity in that field. Simultaneously, Parliament issued the act on the privatisation of state-owned companies, and determined principles of commercialisation and privatisation of the industrial heat sources (including the power sector).

According to the general principles of economic transformation, company restructuring aimed first at market activity (commercialisation), then at its privatisation and the creation of competition conditions, wherever possible and economically justified. At the beginning, restructuring of the DH sector was hindered, because the compulsory provisions were not adjusted to economic changes occurring in Poland. More specifically, they were not adapted to the transformation of the market economy and to the transfer of heat supply obligations to the municipalities.

The process of ownership and organisational transformations in the DH sector is slow and remains unfinished. The majority of municipalities have already taken over DH system assets and created its own organisational units in the form of limited companies, joint-stock companies or budgetary entities. In some cases, DH companies were privatised (with participation of national or foreign capital), and shares of a few companies are listed on the stock exchange. However, there are also communes, where companies have not been transformed as yet, and they continue operations on the basis of acting for state-owned companies. In some cases, communes did not take over the DH assets (these assets are owned by the state treasury) instead DH companies acting independently from the communes were established.

[2] Papers presented at the WEC Workshop on District Heating and Cogeneration in Transition Economies, Moscow, 23 March 2004

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In the power sector, the first step was establishing joint-stock companies owned by the state treasury (including CHP plants). Recently, progressive privatisation of CHP plants has been implemented as the next step in transformation.
The process of industrial heat source transformation is similar to the power sector. The industrial heat sources are privatised together with the whole factory (as a part of it), but in several cases, an industrial heat source is separated from the "mother factory" and privatised as a self-dependent entity.

The ownership and organisational changes constitute only the beginning of the restructuring process of the DH sector, which includes economic transformation and related technical activities. These aim at improving energy use effectiveness (energy savings), a decrease in environmental pollution, an increase of heat supply reliability, improvement of the customer services' quality, etc.

B. Legal and policy framework

Energy sector transformation has been introduced in response to national and international conditions. The most important national "drivers" include three main documents: "Strategy for Poland", "Industrial policy" and "policy of Housing Development" adopted by Parliament. Two basic documents, determining the framework for energy sector restructuring "Assumptions to the energy policy till 2010" and "Assumptions to the state policy in the rationalisation of energy use in housing and communal sector", were adopted by Parliament in 1995. There were also a number of international obligations. The most important ones include the European Energy Charter and European Energy Charter Treaty, as well as bilateral agreements with different countries regarding the purchase and transmission of energy carriers, joint energy investments, etc. Additionally Poland is required to achieve conformity of the Polish national legislation with European Union standards before the date of accession to the EU.

Unfortunately, until 1997, the energy sector remained regulated by "old" legislation, issued in the former economic system and inadequate in the new social and economic situation. This was a serious obstacle for energy sector transformation. The most difficult situation was in the DH sector, which is not as consolidated as the power and gas sectors. It is necessary to stress that particular elements of the Polish DH systems (heat sources, DH networks and substations) are owned by different entities. In some DH systems, heat sources owned by several different companies, are supplying DH networks owned by another DH company. Thus development and modernisation, as well as restructuring of the DH sector, are very complicated processes and proper realisation was required for a change in old legislation in favour of a market oriented economic framework.

A change of the legal base was initiated by the Energy Law of 1997 (EL), which deals with the security of national energy supplies, efficient and rational use of energy and fuels, utilisation of renewable energy, promotion of competition, protection of customer's interests and minimisation of costs. It must be emphasised, however, that the implementation of the EL was possible only after several ordinances had been issued and changed in the years 1998-2003 – according to the actual (mainly economic) situation.

Since 1997, the EL has been amended several times; either to improve a specific provision or to adjust a provision to some modified economic or organisational condition

(and occasionally political reasons). The amendment of the EL in 2000, made it necessary to replace several ordinances and to issue an ordinance regulating principles of obligatory electricity and heat purchase from renewable sources, and electricity produced in cogeneration with heat. However, the amendment of 2002 was connected with achieving conformity of the EL with EU legislation.

The most important ordinances concerning the DH sector, issued by the Minister of Economy, Labour and Social Policy (MELSP) are listed below:

- Ordinance of 1998 (replaced by Ordinance of 2000) on detailed conditions of subjects' connection to DH network, trade of heat, transmission services, network dispatching and operation, and quality standards of customers' service;
- Ordinance of 1998 (replaced by Ordinance of 2000) on detailed principles of heat tariffs forming and calculation, as well as principles of accountability with customers;
- Ordinance of 2000 (replaced by Ordinance of 2003) on detailed scope of obligation to purchase electricity from renewable energy sources and produced in cogeneration with heat, as well as heat from renewable energy sources;
- Ordinance of 2000 on carrying of supervision by energy enterprises;
- Ordinance of 2001 on the requirements of the energy efficiency.

The EL with its secondary legislation, determines a new quality of operational rules for DH companies acting under market economy conditions. The EL defines, amongst others, limits for production, transformation, storage, transmission and distribution as well as energy and fuels trade (turnover), for which a licence is required.

The network has, however, the character of a natural monopoly and requires the adaptation of monopolistic structures of heat production and distribution to the requirements of customers, as well as price and cost regulation determined by the market. It means that if energy (including heat) is supplied from a network, market forces are not functioning and should be replaced by an independent authority (the "regulator"), balancing interests of suppliers and customers.

According to the EL provisions, the President of Energy Regulatory Authority (PERA) has been established as the central organ of the governmental administration for regulating the energy and fuels economy as well as for the promotion of competition in the energy sector. The activity of PERA is financed from the state budget, which is funded by licensed energy enterprises paying annual charges for licences granted by PERA (payments are higher than costs of regulation). The tasks of PERA concerning the DH sector include:

1) Licensing: according to the EL provisions, a separate licence is obligatory for heat production in heat sources with total capacity over 1 MW; heat transmission and distribution in DH network if heat demands of connected customers exceed 1 MW and heat trade (without limitation of a turnover);
2) Approval and supervision of heat, electricity and gaseous fuels tariffs, which should be calculated according to the specific provisions of the EL and secondary legislation, including:
   - analysing and verifying of costs assumed by the DH company as justified costs creating a base for calculation of prices and charges covered by a heat tariff;

- defining correcting indexes determining a designed improvement of the DH company activity and expected changes in conditions of its economic activity, as well as the time when the correcting indexes must be enforced.

3) Arbitration of quarrels between suppliers and consumers, concerning matters specified in the EL;
4) Sentencing of companies and managers according to the principles defined in the EL;
5) Cooperation with legitimate organisations to counteract monopolistic practices in DH companies;
6) Supervision of qualified persons operating specified energy equipment.

Special consideration should be given to the fact, that the EL defines some principal rules of electricity, gas and heat supply planning by companies dealing with its transmission and distribution, as well as local energy planning by local authorities (municipalities).

Investments in the energy sector require a large amount of capital and are long-term. Thus, planning of energy investments has to be based not only on actual energy use by existing customers, but also on expected changes of demand, resulting from the balance of new customers needs (demand increase) and the rationalisation of energy use in existing buildings (demand decrease). The companies operating energy networks (DH or gas networks and power grids) are obliged to work out a development plan for heat (also gas and electricity) supply on their territory of activity, according to actual and future customer demands. The plan should be based on the expected development of particular towns and villages, defined in documents prepared by local authorities in frames of obligatory physical planning.

According to the EL, a DH network development plan should define planned scope of heat supply and planned scope of DH networks development and modernisation, in addition to necessary new heat sources (including renewable energy sources – RES).

The plan should also define expected customer intentions, resulting in rationalisation (decrease) of heat demands as well as planned investments costs and a financing scheme (including income, which is necessary to assure realisation of the planned investments) and timetable of the planned investments realisation. It should assure reliable heat supply and high quality of services as well as minimisation of investment and operational costs – to protect customers against any unreasonable increase in prices and charges (heat bills). The DH companies are obliged to cooperate with local authorities and customers with the aim of rationalisation and coordination of investments and energy supply costs optimisation.

According to the EL, supervision of the power grid and gas networks development planning is performed by PERA, while planning of DH systems development is co-ordinated by regional authorities (regional councils and “voivodes”), since heat supply planning is the task of the municipalities.

The EL imposes an obligation on local authorities to determine assumptions to the Local Energy Plan (LEP) – the local plan of heat, electricity and gas supply. The assumptions should define: actual energy demand (heat, electricity and gas) and its future changes; actions resulting in a rationalisation of heat, electricity and gas use; possible scope of the local energy resources and existing surplus of energy utilisation. Special attention should be given to the scope of combined heat and power production, as well as waste heat

utilisation from industrial installations. The assumptions should also define a level of co-operation with other local authorities (communes – municipalities).

There are also provisions concerning obligatory purchase of electricity and heat generated in RES, and electricity co-generated with heat in plants with a total energy efficiency of no less than 70%. Although RES has a little influence on the state energy security, it must be emphasised that according to the assumptions governing energy policy till 2020, RES can play a more important role in local energy balances (including power and heat generation).

LEP concerns, in principle a territory of one commune (municipality) or its part, but sometimes the assumptions can be prepared for several communes (e.g. in the case of large DH system) supplying agglomeration assembling different towns (municipalities).

All energy companies are obliged to offer to the local authorities (without payment) the necessary information and proposals concerning LEP; also the companies that own plans of development have to be available 'open' for the local authorities. Apart from that obligation, a "public discussion" on assumptions allows any person or entity interested in the matter, to submit any proposals or remarks. The city council should consider and arbitrate all submitted proposals and remarks and decide on the acceptance of the assumptions, in the form of a resolution.

The regional authorities are coordinating LEP in their region "voivodeship". The "voivodes" supervise compliance of the assumptions of the LEP with the ASEP 2020 and provisions that are in force. The regional councils cooperate between local authorities (communes) in the region ("voivodeship").

The local authorities prepare an energy supply plan (ESP), in case energy company plans do not secure the realisation of the assumptions of the LEP. The ESP should be based on the accepted assumptions and submitted to the voivode controlling its compliance with the approved assumptions. The city council accepts the ESP in the form of a resolution.

It is necessary to stress, that heat can be delivered to customers from various heat sources using different fuels and technologies. This means that DH systems are not the sole solution to supplying heat and they do have existing and potential competitors.

The DH systems have a specific character, in that heat carrier distribution systems and, in addition, particular elements of the systems are usually owned by different entities (companies or customers). Thus, many different factors influence investments and operational costs of heat supply to the customers, and local authorities have to consider all those factors, comparing costs of different "network" systems operation and the profitability of its development in present and future economic conditions. The decision-making process is based on the assumptions of the LEP, a so called "Master Plan" of the DH system development and modernisation and, in further steps, on more detailed economic analysis in the form of a feasibility study, business plan, financial model or financial plan, etc.

One of the most important factors in Poland, which influences the choice of the heating system, is the possibility of a decrease in heat demand owing to energy conservation on the demand side (Demand Side Management – DSM). Many studies and several realised

projects show that in housing and commercial buildings, heat demand could be reduced to 50% and sometimes even more. There also exists the possibility to reduce heat demands in industry, and the scale of reduction could be even higher than in the housing/commercial sectors, if industrial waste heat resources were utilised.

> "In housing and commercial buildings, heat demand could be reduced to 50% and sometimes even more."

All these factors and their economic compensation in total costs of energy supply, illustrate that there is no simple answer to the planning of energy supply or free competition on the heat and energy market. Thus, the main aim of the LEP is optimisation of the total cost of energy supply to the end users, including costs of investment and modernisation, costs of environment protection and running costs both on the supply and demand side "least cost planning".

LEP is useful for optimisation of the total cost of energy supply, because economic analysis will show a profitable scope of energy network development, depending on heat density. The areas with lower heat density can be supplied with electricity and gas (development of DH networks is unprofitable), however the areas with high heat density can be supplied from DH network and power grid (gas consumption is too low and development of gas networks is unprofitable). In areas with extremely low heat density only electricity would cover all energy consumer's demands, including heating and warm water purposes.

In 2000, the Council of Ministers adopted new "Foundations of the Energy Policy in Poland till 2020" (ASEP 2020), in which the main social and political objectives of energy policy are defined as:

"Creating conditions for sustainable development of the country, ensuring energy security, economical and rational utilisation of fuels and energy, development of competition, mitigating negative effects of natural monopolies, considering environmental protection requirements and obligations under the international agreements, protection of customer interests and minimisation of costs."

The assumptions of energy policy within the scope of heat supply are as follows:

- Higher standards of thermal insulation for new buildings and modernisation of existing ones will lead to a moderate decrease in heat demand; however, a substantial increase in heat and power cogeneration is foreseen, especially based on small scale installations, which will bring a substantial improvement in efficiency of fuel use and a decrease in emissions;
- Decentralisation of energy systems will follow, as well as assistance to local governments in determining local energy plans (heat, electricity and gas supply), aimed at:
  - Development of cogeneration in dispersed sources producing electricity and heat in small-scale CHP plants;
  - Accelerated utilisation of local RES (e.g. biomass, geothermal energy, waste etc.), as well as gas from small non-system deposits;
  - Development of local energy markets (creation of multi-utility energy companies) and services in these markets (financial and consulting institutions, performance of works etc.);

- Cooperation of self-governments with energy companies and division of competencies and responsibilities of self-governments and energy companies in the process of realisation of company plans and energy planning by the communes;
- Determination of principles of state policy implementation for the rational utilisation of energy, co-generation, RES including obligatory purchase of electricity from CHP and RES and heat from RES;
- Unification of criteria and rules of conducting tariff policy, taking into consideration the necessity of conducting the current activities and development planning by the energy companies according to the least costs principle.

The ASEP 2020 stated that the European Energy Charter Treaty will be ratified, and participation in the EU programme will be continued, and that the Polish energy policy will be in compliance with the EU energy policy, before accession to the EU.

At present, there is no dedicated programme or action plan referring to energy efficiency, but the mechanisms of rational energy conversion and utilisation are included in the ASEP 2020, as an important issue of the energy policy. The promotion of energy efficient technologies and equipment is listed as an important instrument for implementing this strategy. The document also defines the integrated strategy of energy and environment management.

The integrated strategy will be executed on the base of cooperation between the MELSP and the Ministry of Environment (ME). The state's environmental goals are formulated in the ecological policy of Poland. The ME, responsible for environment protection, co-operates with the MELSP in matters referring to the energy sector. There is a policy of supporting RES and other investments connected with environment protection (including reduction of emissions from heat sources).

The potentially large reduction in heat demand in buildings is supported by the Act on Support for Thermo-Modernisation Investment of 1998, which creates a base for energy saving projects in housing (all forms of ownership) and public buildings owned by municipalities. These investments concern heating plants up to 11.6 MW, DH networks and buildings connected to those networks. The project has to be positively evaluated by an expert institution. The basis of investment financing is commercial credit with payback during a maximum of seven years (owing to savings resulting from the realisation of the project). Energy audit, completion of the project on time and repayment of 75% of the credit, allows the remaining 25% of the credit to be used as an incentive premium (grant).

The promotion of modern, highly effective equipment and technologies forms an important element of the energy efficiency improvement strategy. According to the EL, energy labelling of selected groups of household appliances is regulated by the MELSP (labels comply with EU regulations).

Apart from this legislation, other acts do exist, which influence the activity of DH companies. These include the Civil Code, the Commercial Code, the Act on Physical Planning, the Act on Protection and Forming of the Natural Environment, etc. There is also the Act on Rental Allowances, which addresses social support for poor households who are not able to cover expenses connected with flat use (including heat bills).

C. Transformation from subsidies to market-oriented heat tariffs

Heat supply is a significant sector of the Polish energy economy, approximately 50% of primary energy is used for heating purposes in all heat consuming sectors, and approximately 80% of energy consumption in buildings is consumed by space heating and domestic warm water. The dominance of solid fuels in the energy balance is of basic importance for DH development in Poland. It has also created conditions for the development of cogeneration of heat and power in CHP plants. Heat demands of cities are mainly met by the DH systems with a thermal capacity of 46000 MW, and DH networks' length are estimated at over 17 000 km.

The scope of DH systems is local, but they play an important role in the national economy. They suffer from a number of failures as a result of the centrally planned economy, leading to inefficiencies and waste of energy. The past investment and energy policy resulted in relatively low efficiency of heat production and distribution, much higher heat losses in buildings than in western countries, and a lack of proper correlation between prices and costs.

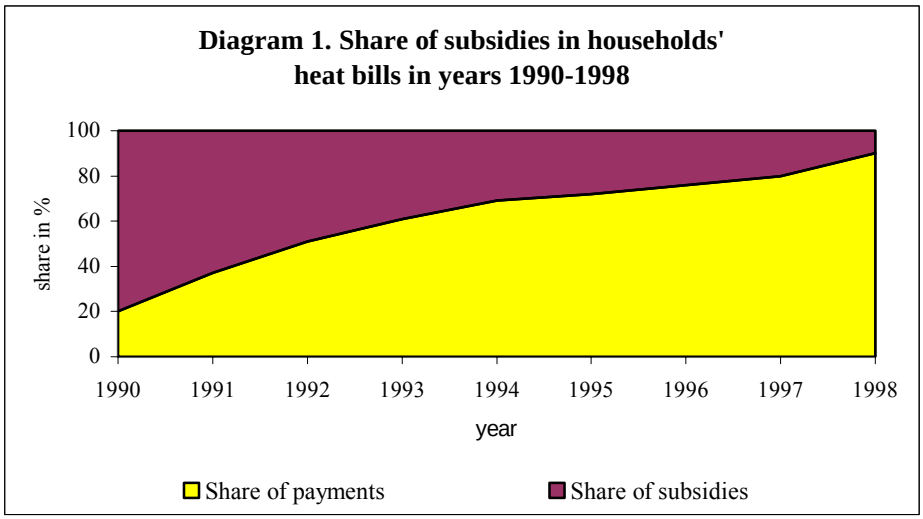
The process of restructuring the DH sector includes ownership and organisational changes and economic transformation supported by technical modernisation, leading to a decrease in heat supply costs owing to energy savings, as well as to a decrease in environmental pollution, increase in heat supply reliability, improvement of the customer service quality, etc. A crucial parameter for the economic transformation of the DH companies is their financial situation. Viability of the DH companies is strongly dependent on heat price level and heat sale, as well as heat supply costs.

In the past, heat prices in Poland were determined with customers on a contractual basis or as official standard prices for households (including one person houses).

The standard heat prices were extremely low for political reasons and in 1989 households covered only a small portion of heat production and transportation costs. The difference between standard heat prices paid by flat users and contractual prices paid by building administrators was covered by subsidies. The state budget subsidised housing co-operatives, while communal budgets subsidised other customers.

At that time, financing of development and modernisation of DH systems was allowed exclusively from net income and depreciation allowances. These were of course insufficient financial sources to cover necessary investment costs, due to the low level of heat prices (resulting in low income and even financial losses) as well as the very low level of assets. As a result, investments in the DH sector have been financed mainly from the state and local (municipal) budgets, in the form of subsidies to the DH companies.

The change of the economic system caused a rapid increase of heat prices and a slight "economic shock" to heat consumers, especially for households (in 1990, the standard heat price increased from 970 to 9 700 PLZ/GJ – ten times!). Since 1990, a systematic increase of standard (maximum) heat prices for households took place, together with a reduction in subsidies for residential customers. Diagram 1 illustrates the changes of the shares of subsidies and payment by flat users in years 1990-1998.



Until the end of 1997, the Minister of Finance fixed official (maximum) heat prices for households as standard heat prices for a whole country. The household payments for heat supplies were calculated mainly as a "lump sum" (per m^2, per person etc.), but not on the basis of measured heat use.

The increase in standard (maximum) heat prices for households in years 1989-1998 is shown in table 1 and illustrated in diagram 2.

Table 1. Increase of standard heat prices for households in Poland (VAT included)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Heat price in zloty/GJ *)	970	9 700	31 000	61 000	113 840	184 000	20.24	23.66	27.33	47.23

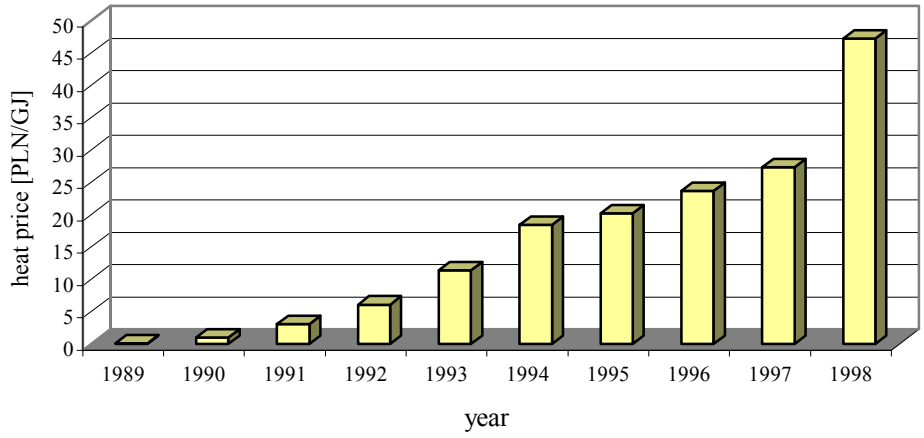
*) Since 1995 the New Polish Zloty (PLN) is in use. The exchange rate was 1 PLN= 10 000 PLZ.

In 1995, 7% VAT has been included into the heat price, in 1996 = 12%, in 1997 = 17% and since 1998 = 22%.

At the same time, and until the end of 1998, the increase in heat prices defined in contracts signed by DH companies with customers was also limited. The freedom of setting heat prices was limited by the Minister of Finance (or Council of Ministries), usually by means of a "maximum index of heat price growth", which was also determined for the whole country.

This means that in the former economic system, there was no proper correlation between the heat price level and heat production and transportation costs (which strongly depended on local conditions of heat supply). The DH companies calculated average heat price for all customers on the company's territory (usually whole or part of the voivodeship; sometimes single towns) independently of real costs of heat supply to the particular customers (buildings).

Diagram 2. Maximum heat price for households fixed by the Minister of Finance



A similar situation prevailed in other energy sectors, because the state fixed low prices of coal, electricity, and subsidised energy enterprises; even whole branches (e.g. coal industry). From 1990, prices of other energy carriers have also been systematically increasing.

The systematic growth in heat prices caused an increase of customer interest in reducing heat bills through DSM, mainly through the improvement of thermal insulation, which resulted in a decrease in heat losses in buildings, as well as implementation of automatic control and measurements of heat supply. Modernisation of buildings owned by housing co-operatives were subsidised from the state budget. However modernisation of other buildings was rather exceptional, because building owners (including municipalities) were not able to finance necessary investments.

Unfortunately the results of the DSM actions have been rather invisible in the DH sector, due to insufficient coordination between building modernisation customers and heat sources and DH networks modernisation by DH companies.

Due to a lack of coordination, energy savings achieved in particular buildings were not taken into account as a reduction of fuel consumption. The main reason for that was the uncoordinated implementation of measurements and automatic control of heat supply in the DH system.

Usually a reduction of heat use by a particular customer, without change (decrease) of water flow rate in DH system, caused an increase in heat supply and overheating of buildings; which were not equipped with an automatic control of heat supply. It led to irrational increases of heat losses through walls and open windows in overheated buildings. The lesson learned, was that real economic effects (reduction of fuels consumption resulting in decrease of environment pollution and heat supply costs) can be achieved only in the case of well coordinated actions, realised by all entities dealing with the process of heat supply and use.

Continuous decrease of heat demand in the housing sector (mainly due to DSM actions) and reduction of heat sales to industry (liquidation or decrease of industrial production) limited the level of heat prices. This caused a systematic worsening of the economic situation of the DH companies, because increasing heat supply costs were not followed by adequate growth of income. To improve that situation, the government decided to reassess the value of assets in the years 1995-1997, but this did not lead to cost-covering prices and some DH companies were forced to reduce the scope of maintenance (resulting in worsening of heat supply reliability and quality of services).

"Continuous decrease of heat demands in the housing sector … and reduction of heat sales to industry … caused a systematic worsening of the economic situation of the DH companies."

The main reason for this situation is the relatively low level of wages in Poland and the slow increase of the purchasing power of the population. Thus, fuel and energy prices increases were adjusted to the actual social, political and economic situation, to avoid social tension (e.g. strikes) and too rapid a growth of prices in Polish products and services. It is necessary to stress, that the share of energy costs in Polish household budgets is much higher than in EU countries: in Poland, the average share amounts to about 11% (in poor families even 40%) against approximately 4% average share in EU countries. It is necessary to take into consideration that rapid growth of energy prices, resulting in an increase of the share of energy costs in family budgets, would lead to dissatisfaction within society and an increase in the rate of unpaid bills. This mainly concerns heat prices, as heat used for space heating, ventilation and domestic warm water purposes amounts to approximately 80% of the total energy use in the housing sector.

The systematic reduction in the share of subsidies in household heat bills (see diagram 1) resulted in the flat user paying almost all the charge for heat used in 1998. At that time, the secondary legislation to the EL was issued to create a basis for a completely new price regulation system, adjusted to market economy conditions. As electricity, gas and heat delivery through the national (or international) power grid and gas network, as well as local DH networks, represents a natural monopoly where market forces are limited, the PERA has to regulate activity of the "networks" companies to protect consumers' interests.

The EL defines the main principles of tariff setting, which are the same for electricity, gas and heat. According to the EL, every energy company is obliged to keep specific accounts (within the scope of a plan of accounts), which allow calculating fixed and variable costs as well as revenues. The fixed and variable costs and revenues should be accounted separately with respect to generation, transmission and distribution, for each of the types of energy (or heat carrier) or fuel, as well as with respect to the individual tariff groups (customer groups).

The EL introduced the general principle that tariffs for gas fuels, electricity and heat should ensure:

- that reasonably justified costs of the economic activity of the energy companies in generation, transformation, transmission and distribution as well as trade of electricity, gas fuels and heat, including costs of modernisation, development and environment protection are covered;
- the protection of customer interests against unreasonable level of prices.

The EL also states, that differentiation of prices and charges in tariffs for gas fuels, electricity and heat for different customer groups is allowed only on the basis of reasonably justified costs of performed services. According to the EL, all licensed energy companies should set tariffs for gas fuels, electricity and heat, subject to the approval of the PERA.

PERA can approve a tariff or refuse it, in case of non-compliance with the principles and provisions of the EL and secondary legislation. The approved tariff is published (at the expense of energy company) within 14 days from the date of approval. The tariffs for gas fuels and electricity are published in the PERA Bulletin, while tariffs for heat are published in an adequate voivodeship official journal.

The secondary legislation contains differentiated provisions for the three various "network" sectors, which are adjusted to the specific individual characteristics of the power, gas and DH sectors. The ordinances regulating detailed rules of tariffs setting for electricity and heat were issued in 1998, and in 1999, for gas tariff setting. PERA has regulated the price of electricity and heat since 1999 and gas prices since 2000.

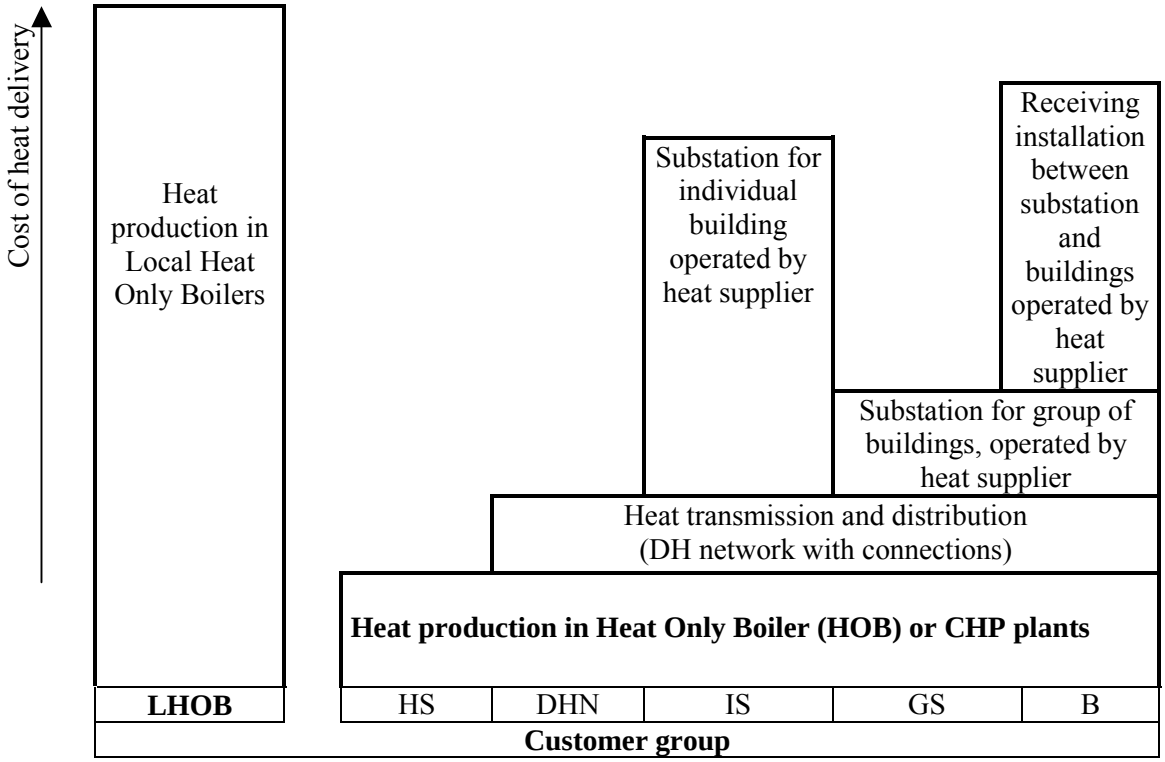
At the beginning, heat price regulation was based on the provisions of the EL and secondary legislation concerning the DH sector issued in 1998. Those provisions defined a completely new tariff system for heat production, transmission and distribution, as well as heat trade. The principles of heat price calculation were completely new and changed the previous philosophy of pricing. Instead of an "average" heat price for all customers, the DH company would calculate an individual price for various customer groups, according to the real costs of heat supply to those customers. The basis for heat price calculation should justify the costs of heat production, transmission and distribution, which include the running (operational) costs, but also costs connected with the financing of modernisation and development of DH systems, as well as environmental protection.

According to the new regulations, the heat tariff should contain the following prices and rates, depending on the type of economic activity:

Economic activity	price or rate (fee)
Heat production	→ price for ordered heat output [PLN/MW]
	→ heat price [PLN/GJ]
	→ heat carrier price [PLN/m^3 of water or PLN/t of steam]
Heat transmission And distribution	→ rate for transmission services [PLN/MW]
	→ lump sum for customer service [PLN/connection]
	→ connection fee [PLN/m of connector]
Heat trade only	→ rate for customer services [PLN/MW]
	conditions of heat producer prices and heat distributor charges application in heat bill

According to the new regulations, a calculation of the particular prices and charges should be based on justified fixed and variable costs of heat production in different heat sources, as well as fixed and variable costs of heat transmission and distribution. The prices and charges (rates, fees) should be differentiated for separate heat sources according to heat production costs and for separate DH networks according to transmission services (place of heat delivery) resulting in different costs of heat supply – see the following diagram.

The new provisions allowed including 10 % profit into the calculation of prices and charges determined in heat tariffs. The price for ordered heat output should be calculated on the basis of a maximum 30 % of the total costs of heat generation, and the heat price on the basis of at least 70 % of the heat generation total costs. Customers have been motivated to rationalisation of heat use and energy savings.



As heat transmission and distribution costs are mostly fixed costs, the new provisions stated that the rates for transmission services should be calculated as a fixed charge (PLN/MW), on the basis of the total costs of heat transportation to the particular customer groups (according to place of heat delivery).

The new provisions also defined the date when heat bill calculation on a "lump sum" basis is forbidden. DH companies were obliged to install heat supply measurements in substations not equipped with heat meters. Between 1998-2000, a great effort (financial and organisational) was made to equip thousands of substations with heat meters in all Polish DH systems.

The implementation of the new tariff system by DH companies, which usually operate different heat sources and DH networks, could have caused a strong differentiation in heat prices for particular customer groups. Thus, the increase of the heat price for any customer group was limited to 15% (excluding companies with apparent losses in heat sale). This was necessary as earlier an "average heat price" was calculated by DH companies for all customers, as total calculated costs of heat supply divided by total heat sale and cross-subsidies existed, both between different kinds of economic activity (heat production, transmission and distribution) and between different customer groups. To avoid such large differentiation in heat prices for particular customer groups, the new regulations allowed a gradual (during three years) liquidation of cross subsidies in the DH

sector. Rapid elimination of cross-subsidies between different customer groups (implementation of heat supply cost covering heat prices) could have caused a significant growth in heat prices for some customers (e.g. supplied from local HOB), which sometimes could be accompanied by a decrease of heat prices for other customers (e.g. supplied from large CHP plant).

It should be emphasised that, according to the secondary legislation to the EL, the first tariffs for gas and electricity also protected customers against excessively high prices. Charges for gas were not permitted to increase by more than 12.5%, and similarly, the increase in electricity prices was limited to 13% for households.

The introduction of the new tariff system was supported by the Act on housing economy and rental allowances (since 2001 the Act on rental allowances). The Act regulates matters connected with a social support for poor households to cover costs of the apartment. The Act (together with secondary legislation) defines principles and procedures of calculating and granting rental allowances, as well as the responsibility and right of the authorities on local, provincial (voivodeship) and central levels (decision making, grants dividing, etc.).

The Act states that the social support for poor households is the task of the local authorities (communes), which are subsidised from the state budget, defined each year by Parliament. The President of the State Office for Housing and Towns Development divides the fund between voivodeships (provinces). The voivodes transfer subsidies to the local authorities (communes) proportionally to the commune's application for subsidy on rental allowances.

Poor households can be granted a rental allowance, providing they meet the conditions specified by the law. The average income per person, living in a common household, is a basic condition to obtain a grant from the commune for covering household expenses (rent, electricity, gas, heat, cold and warm water etc.). The grant applies to both flat tenants in multifamily blocks, and family homeowners. The rental allowance is granted for a six-month period and is paid to either the multifamily block administrator or to the homeowner. (All formalities connected with rental allowances are handled by the social support centres as specialised units of the local authority).

Some important amendments to the EL were introduced in 2000. They resulted from the necessity to replace existing secondary legislation, and concern in the rules of pricing and calculating heat bills. The changes were aimed at increasing the impact of tariffs on rational energy use. Earlier, in several cases, fixed charges determined up to 70% of the total customer charges. Thus, consumers had no economic incentive for rational heat use and energy savings. According to the EL, the fixed charges for heat transmission services may constitute only 30% of the total charges (despite the fact that fixed costs amount to almost 100%), while for gas and electricity transmission services they amount to 40% of the total charges for transmission services. This means that in the DH sector, former fixed rates for heat transmission services have been divided into fixed and variable ones. The similar proportion of heat price calculation is also maintained for heat production (maximum of 30% of heat production costs can be used as a base for fixed

"Earlier, in several cases, fixed charges determined up to 70 % of the total customer charges."

price calculation). As customer payments depend mainly on the amount of heat delivered to the substation (building), a reduction of heat demand prompts a decrease of heat bills.

In 2000, the definition of "justified costs" was included in the provisions of the changed EL to avoid misunderstandings occurring during the process of heat price regulation. The "justified costs" are defined as the costs necessary to execute obligations raised in connection with heat supply (production, transmission, distribution and trade), that are into account by the DH company in calculating prices and rates defined in a heat tariff. Cost estimation and calculation of prices and rates should be performed according to economic reasonable methods and accuracy, leading to the protection of customer interest. Justified costs are not costs of income acquirement in the understanding of tax regulations.

According to the "heat tariffs ordinance of 2000" (HTO 2000) a heat tariff should define:

- Tariff groups (groups of customers);
- Sort, value and conditions of prices and rates usage;
- Rebates, reductions of prices and method of charges calculation in case of quality standards of consumers service breach (breach of heat supply contract); and
- Charges for illegal heat usage.

The HTO 2000 introduced major changes in the calculation of "unit costs" besides prices and rates for the first year of tariff implementation. Earlier calculations were based on "historical" operational costs and planned costs of modernisation, development and environment protection. At present, the calculation is based on justified costs, which are defined on the basis of planned yearly operational costs and planned yearly costs of modernisation, development and environment protection, including financial costs but without penalty costs.

The evaluation of planned costs is based on a comparison with costs covered in the previous year, as defined in the annual financial report; in accordance with bookkeeping regulations.

The HTO 2000 defines the following formulas for heat production "unit cost" calculation:

$$\mathbf{k_{jm} = A \times (a \times K_{st} + K_{zm}) : N \quad and \quad k_{jc} = (1 - A) \times (a \times K_{st} + K_{zm}) : Q}$$

Explanations:

k_{jm} – "fixed unit cost" – a base for calculation of ordered heat output price [PLN/MW];
k_{jc} – "variable unit cost" – a base for calculation of heat price [PLN/GJ];
K_{st} – planned fixed costs of heat production [PLN];
K_{zm} – planned variable costs of heat production [PLN];
A – share of charges for ordered output in total charges for ordered output and heat ($A \leq 0.3$);
a – index of fixed costs reduction, which is dependent on the relation between installed and utilised heat output ($N_{zain} : N_w$);

$N_{zain}: N_w$	a
up to 1.25	1.00
over 1.25 to 1.40	0.95
over 1.40	0.90

N – heat output calculated as a sum of heat output ordered for DH network and heat output ordered by customers receiving heat directly from heat source (numbers at the end of a previous year) [MW];
N_{zain} – installed heat output at the end of a previous year [MW];
N_w – utilised heat output at the end of a previous year [MW];
Q – amount of heat sold in a previous year [GJ], defined as a sum of:
1) heat sold to the customers by heat producer, or
2) heat sold to the customers and heat losses in DH network operated by heat producer and distributor (one company).

There is a specific problem connected with the setting of clear pricing principles for plants, which are producing heat and electricity in the same equipment. The cost allocation in CHP plants and in condensing power plants producing heat is differentiated. It was assumed that heat is the main product of a CHP plant, while electricity is the main product of a condensing power plant. Thus various principles of heat and electricity price calculation are in use for CHP plants and other plants producing heat and electricity. The heat production costs are defined according to the following principles, which are illustrated below:

Picture 1. The principle of heat cost production defining in CHP plants.

CALCULATED HEAT PRODUCTION COSTS	INCOME FROM ELECTRICITY SALE
TOTAL COSTS OF HEAT AND ELECTRICITY PRODUCTION IN CHP PLANT	

Picture 2. The principle of heat cost production defining in condensing power plants.

OPERATIONAL AND MAINTENANCE COSTS OF EQUIPMENT INSTALLED IN POWER PLANT FOR HEAT PRODUCTION PURPOSES	VALUE OF REDUCED SALE OF ELECTRICITY, BECAUSE OF HEAT PRODUCTION
TOTAL COSTS OF HEAT PRODUCTION IN CONDENSING POWER PLANT	

The heat transmission "unit costs" are calculated, according the following formulas:

$$k_{sp} = B \times \{K_{ps} : \Sigma N_s\} \qquad k_{zp} = (1 - B) \times \{K_{ps} \times N_{gp} : \Sigma N_s\} : Q_{gp}$$

Explanations:
k_{sp} – "fixed unit costs" – a base for calculation of fixed rate for transmission services [PLN/MW];
k_{zp} – "variable unit costs" – a base for calculation of variable rate for transmission services [PLNGJ];
K_{ps} – planned total costs of heat transmission through DH network [PLN];
B – share of fixed charges for transmission services in total charges for transmission services ($B \leq 0,3$ – according to the Energy Law regulations);
N_{gp} – heat output ordered by customers consuming heat directly from DH network at the end of a previous year [MW];
ΣN_s – sum of heat output ordered by all customers connected to the DH network at the end of a previous year [MW];

Q – amount of heat sold in a previous year to the customers consuming heat directly from DH network [GJ];

REMARK: If transmission services include not only DH network operation, but also substation operation as well as operation of group substations together with (or without) receiving installations between buildings and group substation, the formulas for "unit cost" calculation are much more complicated. The reason for these complications is the requirement of the EL concerning fixed charges ($B \leq 0.3$) and different proportions between heat sale and ordered heat output for particular customer groups.

The "unit costs" constitute the basis for calculating prices and rates. These can include profit, necessary to cover costs of planned investments and they should simultaneously ensure customer protection from unjustified high price levels.

According to the EL, the regulation of heat tariffs requires analysing and verifying the justified costs defined by the DH company and appraising the correctness of price and charge calculation. Once this has been done the correcting indexes are fixed, which determine the designed improvement of the DH company's activity and expected changes in the company's economic activity conditions.

The prices and rates defined in a heat tariff are not comparable because of different references (MW, GJ, m^3 etc.) and because their level depends on many different factors. Thus, according to the HTO 2000, the average index price or rate is calculated for the first twelve months of tariff implementation and a previous calendar year, separately for every economic activity:

heat production	average index heat price
heat transmission	average index rate for transmission services
heat trade	average index rate for service of customers

The average index heat price is calculated, according to the following formula:

$$\mathbf{P_{ai} = (C_p + C_h + C_c) : Q}$$

Explanations:
P_{ai} – average index heat price in a first year of tariff implementation [PLN/GJ];
C_p – planned customers' payments for ordered heat output in a first year of tariff implementation [PLN];
C_h – planned customers' payments for delivered heat in a first year of tariff implementation [PLN];
C_c – planned customers' payments for consumed heat carrier in a first year of tariff implementation [PLN];
Q – amount of heat delivered in a previous year to the DH network and sold to the customers consuming heat directly from heat source [GJ].

Using the same formula, average index rates for transmission services are calculated. Calculation of the average index heat prices gives the possibility to compare those prices between different companies and evaluate consequences for customers' planned changes of the prices and rates.

The basic principle of heat tariffs regulation is that the average index prices or rates cannot exceed value resulting from the following formulas:

$$\mathbf{C_{swt} = C_{swp}\,[1 + (RPI - X_w) : 100]} \qquad \mathbf{C_{swt} = C_{swp}\,[1 + (RPI - X_w) : 100]}$$

Explanations:
C_{swt} – new average index price or rate [PLN/GJ];
C_{swp} – hitherto existing average index price or rate (before change) [PLN/GJ];
RPI – average yearly inflation rate for a previous calendar year, defined by the President of the Main Statistics Office in official statement published in Law Gazette [%];
X_w – correcting index, fixed by PERA for a certain economic activity of the DH company (production, transmission, heat trade), defining planned improvement of the company's effectiveness and planned change of conditions for that economic activity in the first year of tariff implementation;
X_r – correcting index, fixed by PERA for a certain economic activity of the DH Company, defining planned improvement of the company's effectiveness and planned change of conditions for that economic activity in the next year of tariff use, in comparison with a previous year.

If the tariff has to be accepted for one year only, the correcting index X_w is fixed by PERA for one year. For tariffs accepted for two years and more the correcting index X_r is fixed for a certain period of tariff validity. The DH company can after every twelve months, adapt prices and rates fixed for the first year of tariff implementation to the changed conditions of the economic activity, without necessity to apply for PERA approval.

D. PERA's regulatory activity

PERA was created in 1997 and the organisation of the regulatory activity in the energy sector started in 1998. Simultaneously, it was necessary to issue licences to many energy companies already established in the power, gas and DH sectors. During one year, PERA prepared completely new procedures and issued thousands of licences, in addition, conducted intensive training of PERA staff in the new activity of licensing and price regulation.

The licensing activity allowed the collection of basic data describing energy companies and was the first step, in the regulation of electricity and heat prices with gas prices to follow. Based on the collected data, PERA started with the regulation of heat and electricity prices in 1999 and with gas prices in 2000. Simultaneously, the Minister of Finance stopped his "regulation" of prices in those energy sectors.

A significant number of the DH companies (over 3000 entities. whereby over 900 licensed), as well as their geographical dispersion in all regions of the country caused many problems, due to the poor organisation of regulatory activity. It was obvious that many entities, being subject to regulation needed an adaptation of PERA to the structure of the DH sector. Thus, it was decided that apart from PERA headquarters nine regional PERA offices would be set up. During five years of PERA regulatory activity, the organisational structure passed through several changes and the number of licensed DH companies was

"Apart from PERA headquarters, nine regional PERA offices (were) set up."

reduced to approximately 850. At the same time, the number of licensed companies in the liquid fuels and gas sectors increased.

The tasks of PERA are fulfilled by highly qualified personnel, employed in PERA headquarters and nine regional (branch) offices. The actual organisation of the PERA headquarters is as follows:

- Department of Energy Enterprises (electricity, liquid, gaseous fuels and RES);
- Department of Tariffs (electricity and partly gaseous fuels);
- Department of Competition Promotion (electricity, heat, gas and others);
- Department of European Integration and Comparative Studies (electricity, gas);
- Legal Department (electricity, heat, gas and others); and the
- Administrative Department.

There are also the offices of the Coordinator of the District Heating Sector Tarification and Standardisation and the Spokesman for Fuel and Energy Consumers (electricity, heat, gas and others) as well as several PERA advisers.

The activities of PERA regional offices focus on the regulation of the DH sector (including CHP plants) and partly the gas sector. The manager of the regional office has the right to sign documents, on behalf of PERA in certain matters. The competence of the regional office managers includes decision making on the acceptance or refusal of tariffs for gas distributing companies and DH companies and licensing of economic activity connected with heat supply. Apart from that, they are involved in the arbitration of disputes concerning conditions of transmission services, refusal of connection to the grid (network), refusal of signing heat, electricity or gas sale contracts, as well as unjustified interruption of heat, electricity or gas supply.

In the initial stages of heat price regulation by PERA, hundreds of the DH companies had no experience in preparing draft heat tariffs or justifying the proposed prices and rates defined in the tariffs, together with the formal application for the tariff's approval by PERA. The regional office and headquarters' staff also had no experience in regulatory activity; thus, intensive training for PERA staff was organised in 1998 and the beginning of 1999.

Guidelines for heat tariff regulation were prepared in the headquarters and approved by PERA as a working material supporting PERA staff and harmonising the regulatory activities across the country. Simultaneously, PERA issued a letter to the managers of the licensed DH companies, which was mailed and also published in the press with the aim to support DH companies in drafting heat tariffs and to obtain similar application for heat tariffs approval. The letter was accompanied by several templates (tables etc.) with detailed explanations and guidance on proper preparation of a heat tariff draft and necessary technical, economic and financial data or other information required for justification of the proposed prices and rates.

New legal regulations required DH companies to develop a new business strategy. The new strategy had to be adjusted to each company's economic, organisational and legal situation, in addition to local conditions. An essential role was played in this strategy by fuel costs, including costs related to meeting the requirements of environmental protection, as defined in regulations on environmental protection and environment management.

A new strategy was also needed for the customers, especially in case of increased heat prices resulting from a decrease in heat demand, due to the refurbishment of buildings; which led to lower heat output ordered by the customers and to a decrease of heat sales.

As previously mentioned, the licensed DH companies are obliged to send their applications for heat tariffs approval to PERA (in practice to the PERA regional offices). The first step in the procedure of heat tariff approval includes analyses of its accordance with regulations in force (including costs accounting, unit cost as well as prices and rates calculation etc.). The second step of the heat tariff approval procedure is connected with verification of the planned fixed and variable costs (including costs of modernisation, development and environment protection) as well as the level of the average index prices and rates. It usually takes time because some additional information or answers to PERA questions have to be prepared by the DH company.

The final steps of the tariff approval process are investigations of the financial effect of the new tariff on particular customer groups (the heat bill's increase or decrease) as well as defining the correcting indexes (X_w or X_r), which are the main tool of the heat price regulation. These correcting indexes and the yearly inflation rate in the previous year determine the permissible increase of the average index heat prices or rates.

Initially, the heat tariffs were approved by PERA for twelve months or so (less than 24 months). At that time, practically all DH companies had not implemented proper cost accounting for different kinds of economic activity and customer groups and cross subsidising was common. This made it necessary to review hundreds of heat tariffs and decide about their approval or refusal. It can be stated, that every year hundreds of applications for heat tariffs approval are mailed to the PERA regional offices (recently over 500 – 600 applications during a year).

At the beginning, a few applications were turned down because of non-compliance with the provisions regulating principles of tariff setting; however a large part of the applications, after analysis were approved. Recently only a small percentage of applications are turned down.

Apart from that, for different reasons, many DH companies applied for extension of the heat tariffs approved earlier by PERA. This means that every year PERA has to analyse and decide the approval or refusal of about 600-750 applications concerning heat tariffs or prolongation of their validity. After two years of "regulatory practice", when DH companies improved their costs accounting procedures and cross-subsidies were eliminated in some of the companies, PERA started to approve heat tariffs for periods longer than 24 months. In 2001, those tariffs amounted to less than 10%, but in 2002 the share of "longer term" tariffs increased to about 20%. DH companies' can after every twelve months adapt prices and rates fixed for a first year of tariff implementation to the changed conditions of heat supply without the necessity to apply for PERA approval. At the same time, PERA does not approve heat tariffs for those DH companies annually.

"PERA started to approve heat tariffs for periods longer than 24 months."

When describing PERA regulatory activity, it is necessary to stress that the organisation of heat supply in different towns (municipalities) is different, because of the different nature of the DH company's economic activity. The greater part (approximately 64%) of

the licensed DH companies have a licence for heat production and a licence for heat transmission and distribution. This means that those companies operate their own heat sources and DH networks. About 12% of the licensed DH companies also have a licence for heat trade. Those companies are transmitting and distributing heat produced with their own heat sources and heat purchased from other DH companies. DH companies having a licence for only heat production constitute approximately 14% of the total amount of the licensed DH companies. The remaining DH companies have a licence for heat transmission and a licence for heat trade (they transmit and distribute heat purchased from other DH companies).

It is worth mentioning, that the territory of DH companies varies. DH companies are usually operating in one commune (town), but there are also DH companies operating in more than one commune on the territory of one voivodeship (province). Several DH companies operate in many communes located on different voivodeship (province) territory.

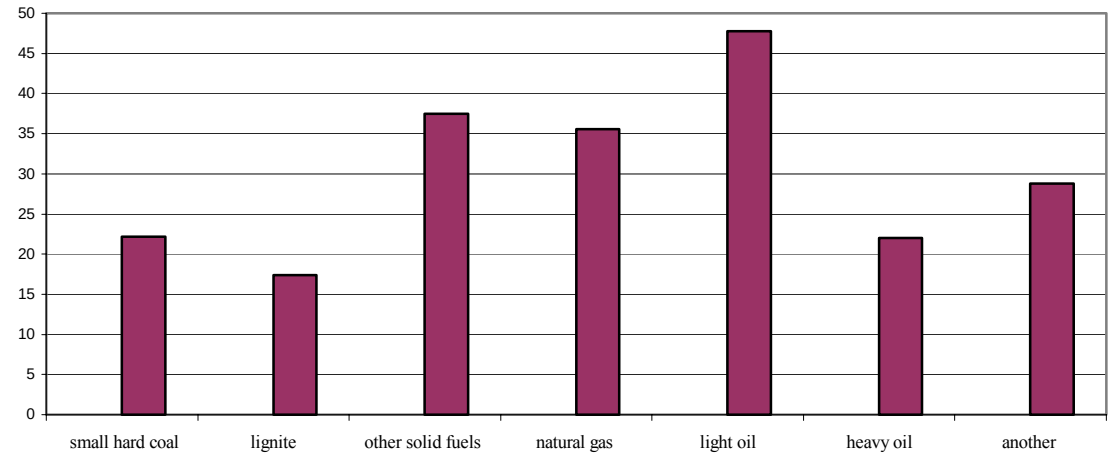
The size of DH companies also varies. In Poland, small and middle size DH companies constitute the largest part (about 90%) of the licensed DH companies, but yearly sale of heat by those companies amounts to only approximately 30% of the total heat sale by all licensed DH companies. The smallest DH companies (with yearly heat sale up to 100 TJ) constitute about 50% of all licensed DH companies, but their yearly heat sale amounts approximately 4% of the total heat sale by licensed DH companies. By contrast, the share of the biggest Warsaw DH company in total yearly heat sale by licensed DH companies amounts to approximately 15%.

The size of the DH company has usually a substantial influence on the level of the heat price (because of economy of scale) and heat supply costs are higher in smaller DH companies. But the level of the heat price depends mainly on type of fuel used for heat production. The differences around the average weighted heat prices, depending on the kind of fuel used, calculated for a first year of application of the tariffs accepted in 2002, is shown below in table 2 and illustrated on diagram 3.

Table 2. The average weighted heat price differentiation depending on type of fuel

Type of fuel	Small hard coal	Lignite	Other solid fuels	Natural gas	Light oil	Heavy oil	Other fuels	All fuels (average)
Price [PLN/GJ]	22.19	17.37	37.51	35.53	47.76	22.01	28.81	22.68

Diagram 3. Average weighted heat price [PLN/GJ]



The average weighted price of heat produced in heat sources using small hard coal (22.19 PLN/GJ) covers both, heat produced in CHP plants and heat produced in other heat sources (HOB plants, condensing power plants etc.). The average weighted price of heat produced in CHP plants amounts to 21.65 PLN/GJ and is 11% lower than price of heat produced in other heat sources (24.35 PLN/GJ). The DH companies producing heat in CHP plants sold about 62% of heat sold by all 450 DH companies operating heat sources, for which heat tariffs were accepted in 2002.

The relatively small differences between the average weighted prices of heat produced in all heat sources (22.68 PLN/GJ) and in heat sources using small hard coal (22.19 PLN/GJ) result from the structure of fuel use for heat production.

Small hard coal is a dominating fuel, which is used in Poland for heat production. The structure of heat sale by DH companies depending on the type of fuel used for heat production is shown in table 3.

Table 3. The structure of heat sale depending on sort of basic fuel used for heat production

Type of fuel	Small hard coal	Lignite	Other solid fuels	Natural gas	Light oil	Heavy oil	Other fuels
Share [%]	92.28	1.26	0.51	2.74	0.33	2.41	0.47

It is worth stressing, that the value of the maximum standard heat price for households, fixed for 1998, by the Minister of Finance, was 47.23 PLN/GJ. Comparing that price with the highest average weighted heat price calculated in 2002 of 47.76 PLN/GJ (for heat sources using light oil), it can be stated, that the level of those prices is almost the same. However, the average weighted heat price of 22.68 PLN/GJ calculated for 450 DH companies, whose heat tariffs were approved in 2002, is much lower than the maximum standard heat price for households, fixed by the Minister of Finance before PERA started

regulatory activity in the DH sector. This means that the results of PERA regulatory activity are beneficial for customers.

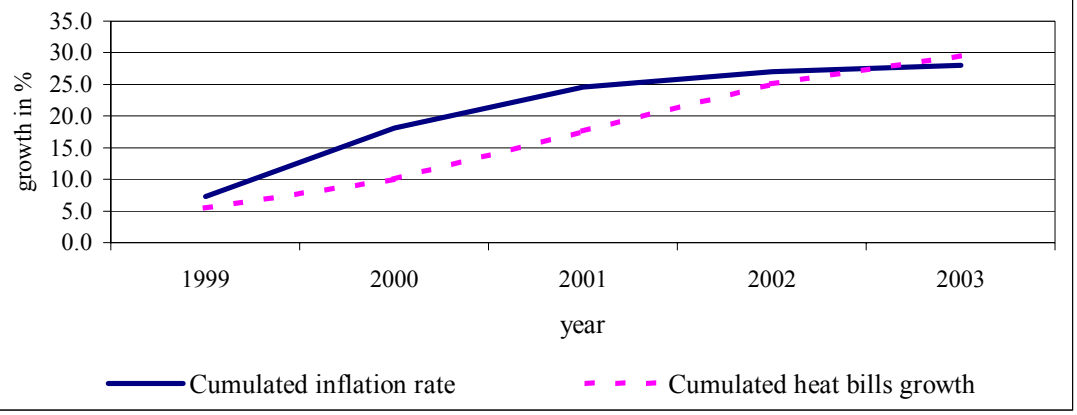
The increase of household payments for heat, in comparison with inflation ratio in 1999 – 2003 is shown in table 4 and illustrated in diagram 4.

Table 4. Increase of payments for heat in comparison with inflation ratio since 1999 to 2003

Year	Average yearly inflation ratio [%]	Increase of payments for heating and warm water [%]
1999	7.3	5.5
2000	10.1	4.3
2001	5.5	6.9
2002	1.9	6.4
2003 *	0.8	3.5

* Estimated data

Diagram 4. Growth of inflation and household's heat bills during five years of PERA activity



The above data shows the limited growth of heat prices, during the first two years of heat price regulation (1999-2000), when the ordinance of 1998 was in force. Since 2000, heat price regulation is based on balancing DH company and customer interests. Simultaneously, DH companies are restructuring DH systems with the aim of reducing heat supply costs through a reduction of heat losses, increase of heat production efficiency etc. Recently the growth of heat prices is caused mainly by factors, which are not dependent on the management of the DH company, such as taxes, increase of fuel and energy prices, etc.

2.2 New Trends in the DH and CHP Sectors in Lithuania [4]

A. Introduction

The economic changes during the last decade have significantly impacted on the well-developed infrastructure of district heating (DH) in Lithuania, as a result of which DH had to be restructured according to the new market conditions. Large heat losses in the network (about 20%) resulted in relatively high heat prices, and DH could hardly compete with individual gas burning heating, which penetrated the market. Yet, the national energy strategy supports the dominant use of DH in residential houses so as to take advantage of the benefits of centralised heating systems: the possibility to burn different types of fuel, the related safety of supply, the benefit to the environment and the possibilities to operate in cogeneration (CHP) mode. Nevertheless, mistakes in the management of DH prompted financial difficulties, while mostly political interests determined the rise of heat tariffs.

Competition still remains an urgent problem. Heat supplies and supply costs from local heat production facilities are different in different towns (and also in the outskirts of bigger towns). It is obvious that there are cost margins in heat production and distribution that can be explained by the technical possibilities of the various generation modes. Due to fuel (natural gas) price distortions among consumer categories, competition has arisen between centralised and decentralised heat suppliers, stimulating consumer disconnection from the DH network. Related customer investments in autonomic heat supply systems damage the overall economy of DH companies.

One of the most important current activities in DH is to prepare properly for the future changes, owing to the accession of Lithuania to the European Union (EU). This involves the creation of new relations in the market as well as searching for financing sources for modernising DH. New market requirements, EU standards and directives and a sharp competitive environment are compelling reasons to initiate fundamental measures to rationalise DH activities. Circumstances improving, the DH sector can stand up to competition according to the new EU directives. Thus, economic stability and ensuing economic growth would encourage the privatisation of fuel supply, electricity distribution and energy production companies, promote the liberalisation of the electricity market and the creation of a new "non-energetic experience" business (e.g. retail trade), and also enable market penetration and capital investments of major international companies. Russia's state and non-state capital and other factors inevitably will induce changes in the heat economy sector. There is no clear policy to charge or relieve DH from public service obligations, such as care of public health, education, trade, and industrial production activities. Although, some examples can be given: the purchase of heat energy and the equipment, which maintains services from the professional energy companies; the construction of boiler-houses and CHP by manufacturing industries and the invitation of private companies to construct CHP on their own means; but there are also examples of the opposite.

"Circumstances improving, the DH sector can stand up to competition."

[4] Dr. Rimantas Bakas, SC Kauno energija (Lithuania)

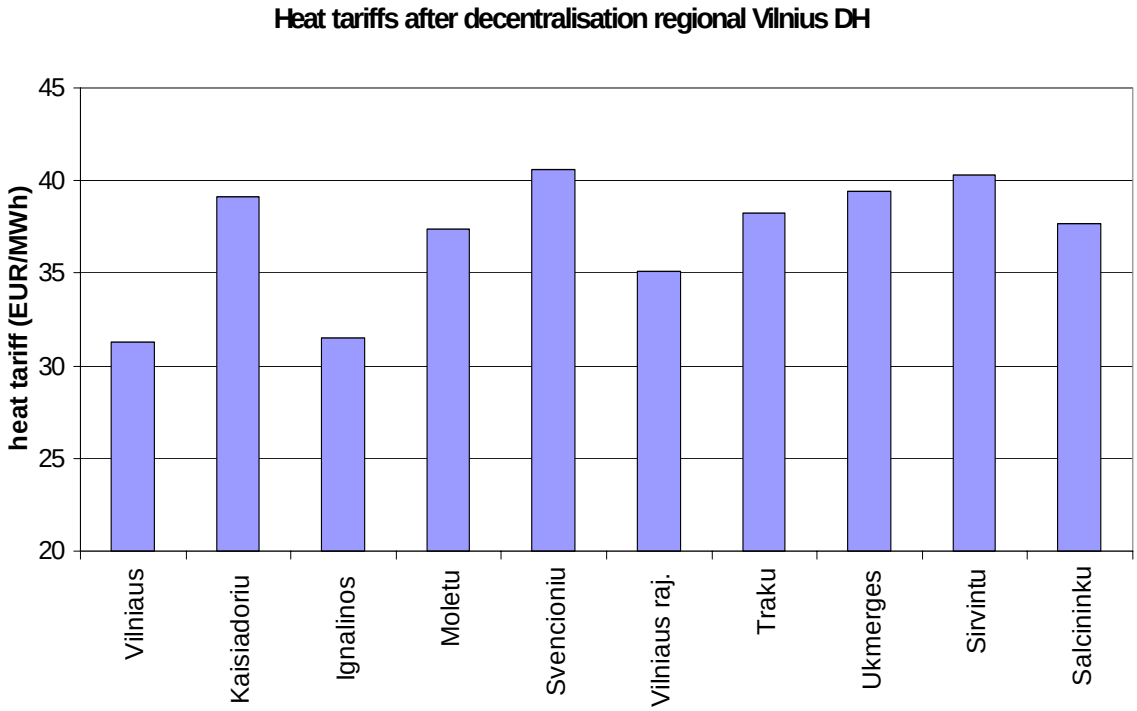
B. A survey of the development of the heat economy

In 1997, 15 independent municipal DH companies were established by unbundling district heating activities from the state company SC Lietuvos energija. There were six regional companies, merging with several heat supply companies in various municipalities.

In 2000, the remaining regional district heating companies in Vilnius and Altus were separated. Only two regional companies: Panevezys district heating company and Kaunas energy company were left. The separation was mainly politically motivated, to accommodate the interests of the larger cities. In 2001, a major regional split of companies took place resulting in more than 40 independent DH companies.

The evolution of heat price after the separation of the Vilnius regional DH company is shown in figure 1.

Figure 1: Vilnius region centralised heat prices after the reorganisation in 2001.

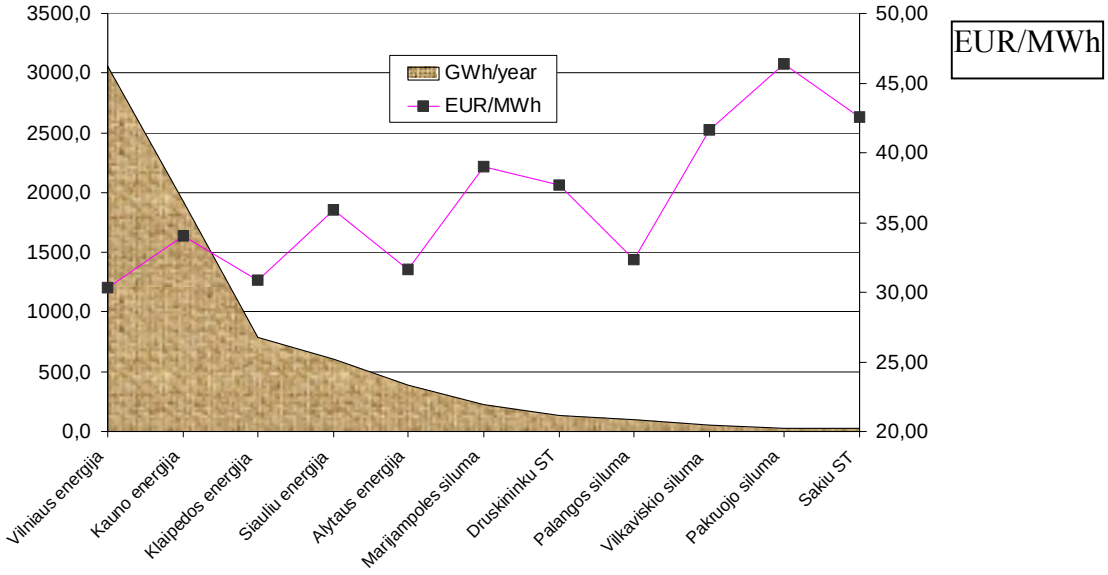


Leasing tends to favour regrouping.

C. The evolution of the heat price

Statistical data shows that heat prices changed widely in independent heat supply companies. In the largest towns the price was lower, while in small regional towns, the price was higher. Heat prices of different independent district heating networks are given below. The difference in prices is evident.

Figure 2: Heat price for the centralised supply in towns and regions for 2002.



Heat production and the structure of heat supply price in 2001 and 2002 in cities and regions are shown in table 1. The data illustrates the increase of efficiency in DH.

Table 1. The heat cost/price structure in DH in cities and regions.

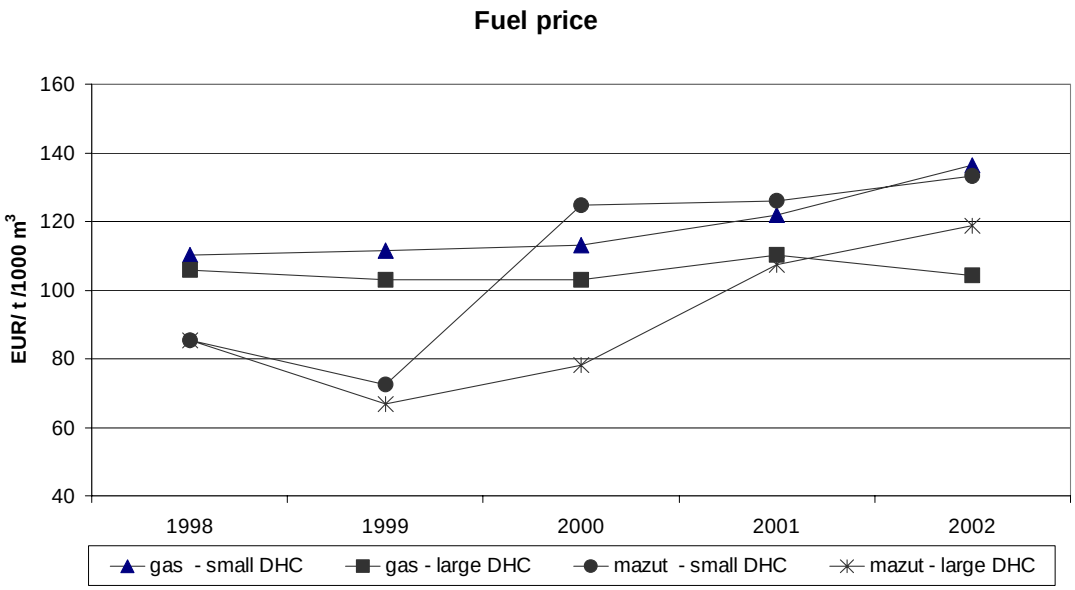
Name	Units	2001			2002		
		Average	Large DHC	Small DHC	Average	Large DHC	Small DHC
Supply to network	TWh	9.8	7.81	1.99	9.83	7.71	2.12
Sale to end consumers (calculated energy)	TWh	7.44	6.05	1.396	7.59	6.04	1.54
Percent "sale/supply"	%	76.0	77.5	70.2	77.2	78.4	72.9
Total cost (production+ supply+ distribution)	10^6 EUR	242	184.3	57.4	245	185	60
Average price	EUR/MWh	32.46	32.03	41.22	32.26	30.61	38.78
Variable price part	EUR/MWh	19.13	18.09	23.54	18.2	17.3	21.77
Constant price part	EUR/MWh	13.33	18.05	17.68	14.06	13.31	17.01

D. The change of the fuel price

Due to the price increase for heavy fuel oil and its poor quality, its relative weight in the fuel structure in 2002, in comparison with 2001, declined from 22.6% to 18.4%, while natural gas consumption increased from 73.3 to 75.7%.

Heat supply so far shows, that the cost difference between heat supply companies with large consumers (big towns) and small (regional) consumers is increasing. This is due to industry consolidation and among other reasons, owing to the average price for heavy fuel oil for small companies was about 133 EUR in 2002, while the price for large companies was only 118 EUR (figure 3). Nor was gas pricing favourable to small companies. The price difference in large companies reached 17.4 EUR/MWh, but exceeded 21.7 EUR/MWh in small companies. This influenced the relative input quantity. On the other hand, small companies have real possibilities, to introduce alternative fuels such as wood waste, whose price is significantly lower and whose availability on the market at this time is sufficient.

Figure 3: The dynamics of the price for average fuel consumption by DH.



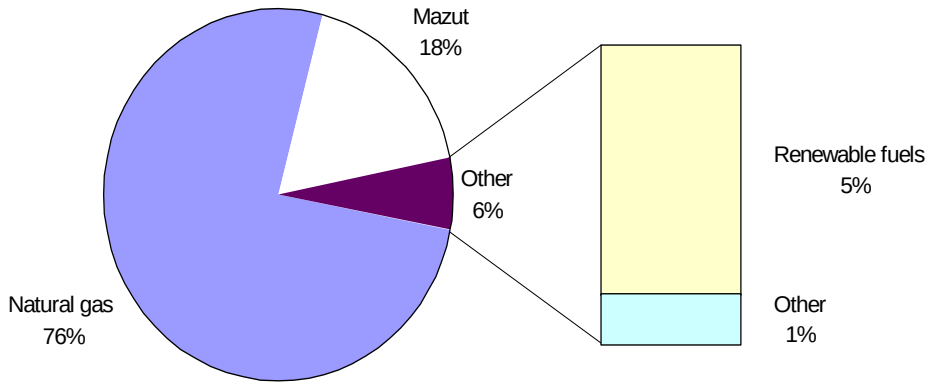
E. Trends in fuel use

In 1998 and 1999, most centralised heat companies operated on heavy fuel oil, because it was very cheap. However in summer 1999, when its price was higher than 116 EUR/t, natural gas became cheaper. Beyond price, it is necessary to take into account the transportation and storage costs of heavy fuel oil and the higher efficiency of gas burning in boilers. Most DH companies reacted flexibly to the mentioned price changes and correspondingly adjusted their fuel balance. This can be seen in figure 3.

The share of the various fuels used in the Lithuanian DH sector is shown in figure 4. Companies operating on two or even three fuels are more flexible to adapt to fuel market conditions. They also deal more successfully with fuel suppliers.

Some of the heat suppliers are increasing the numbers of wood burning boilers realising the benefit of this alternative biofuel. It should be noted that in a few small companies the share of biofuel in figure 4 for 2002 made up almost 19%, while in 2001 it stood at only 8%.

Figure 4: Fuel used in the Lithuanian DH sector (2002).



This is a great achievement, taking into consideration the oil price rise and the possible rise in price for the natural gas supply in the future. The use of biofuel will help to implement new restrictions on the sulphur content of fuel oil, applicable as of May 2004. This is especially significant for the non-gas-using companies, where problems will arise due to the burning of cheaper fuel oil with high sulphur content. The increasing share of biofuel consumption in the fuel balance will help to implement the requirements of the EU and of the government to raise the share of renewable fuels in the Lithuanian energy balance sheet to 12% by the year 2010.

Up to 2003, over 340 MW of total heat capacity has been fuelled by wood in Lithuania. The most powerful bio fuelled plant (heat capacity 60 MW) planned is to be constructed in Vilnius. The operation of a steam turbine producing electricity is also planned.

F. The regulation of centralised heat supply

The principal legislative documents regulating the heat sector activity in Lithuania, consist of the following:

- Civil Code (2000);
- The Energy Law (2002);
- The Competition Law (1999);
- The Lithuanian National Energy Strategy (2002);
- National Sustainable Development Strategy (2003);
- Enhanced National Energy Efficiency Programme and Principal Implementing

Guidelines for the years 2001-2005 (2001);
- The Heat Law (2003).

The Heat Law stipulates:

The promotion of reasonable competition in the heat sector:
- Production – heat purchase to the interconnected DH network from independent companies;
- Hot water systems: free consumer choice for selecting the source of hot water supply;
- Supervision of building heating and hot water systems: free consumers choice to select the supervisor of heating and hot water systems;
- Heat supply systems: state regulates competition through price regulation and special planning between the heat suppliers and alternative energy types – natural gas and electricity energy suppliers.

Consumer rights:
- To opt for the supply of heat and/or hot water division method and related technical means;
- To choose a supervisor or to assign the supervision to a heat supplier;
- To disconnect, in compliance with municipality regulation, from the district heating network, without jeopardising other consumers;
- To choose when to commence and to quit the building space heating season.

Heat pricing:
- Basic top marginal prices are fixed for no less than three years;
- Basic prices are fixed by the State Price Commission separately for production, supply and distribution;
- New consumers are permitted to apply for reduced prices. This must facilitate the development of the heat market and CHP sector.

The Heat Law comprises several other significant provisions:
- The order of the purchase of the heat produced by independent producers into DH grids;
- Licensing for heat supply;
- Methods to prepare a municipality heating development plan;
- No less than 30% of heat production capacity (asset of facilities) must be owned by the municipalities (or the government).

The Heat Law stipulates the preparation, by all municipalities, of a special compulsory heat supply plan. It is impossible to coordinate the investment plans for DH and the prices for the supplied heat without such a special plan.

G. Participation of the private capital in the DH sector

In 2000, a new trend appeared: private capital investments in DH. The Lithuanian/French/EBRD joint venture company “Litesko” leased for a 15-year period several regional heat companies. Another Lithuanian company, «Energijos taupymo centras» has chosen a similar approach. At the same time, the Finnish Company Suomijos Energija (“Finnish Energy”) registered in Lithuania, established a joint venture company together with a small municipal DH company by acquiring 51% of the company shares

and taking over the management and responsibility for modernisation. Joint venture companies and concessions are more long-term oriented than leases. In the past, the Lithuanian Concession Law was applicable only to municipality- or state-owned companies. However, a new concession law came into effect in 2003, so that we can also expect new approaches of private capital participation in the DH sector.

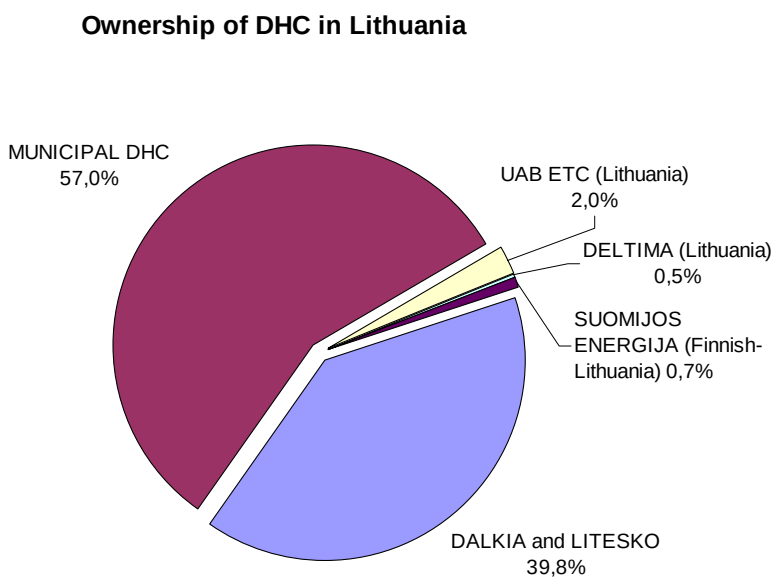
The main DH activity indicators stabilised due to common measures taken by the municipalities and DH companies, despite decentralisation. The number of profitable companies has increased: in 2002, 24 companies, which together sold 6960 GWh, made a profit. However, 14 companies, which sold 625.9 GWh of heat, had made financial losses.

In 2002, the French company "Dalkia", according to the signed lease agreement with the City of Vilnius, leased the largest heat company of the country, SPSC "Vilnius district heating company" and registered a new "Vilnius energija" company. By the end of 2003, almost 40% of the Lithuanian heat supply market was owned by "Dalkia" and JSC "Litesco" (9 companies were leased). "Dalkia" is a shareholder of the JSC "Litesko". The company supplying DH in 31 municipalities covers 57% of the market (figure 5).

> "24 companies worked profitably, …14 … had financial losses."

It must be noted that the pricing principles are not always clearly formulated according to the valid legal acts in the agreements signed between the municipality and the heat company lessee, which later sometimes causes different legal disputes.

Figure 5. DH market structure as of 1 January 2003



The shares of one big district heating company SC "Klaipeda energija" was sold to foreign companies. The municipality of Klaipeda retained 75.2% of shares and is the main shareholder of the SC "Klaipeda energija". The other shareholders are Stadtwerke Leipzig GmbH –14.7%, VNG-Erdgascommerz GmbH – 4.9%, Klaipeda region municipality – 4.44%, small shareholders – 0.76%.

At the end of 2003, Mazeikiai CHP was privatised. The winner of the tender was the Russian company YUKOS. The capacity of Mazeikiai CHP is 99 MW electricity and 1400 MW heat.

Sale of Kaunas CHP. In 2002, SC "Kauno energija" arranged and completed an international tender for the sale of its production facility Kauno elektrine (Kaunas CHP). Kauno elektrine has an electric capacity of 170 MW and a heat generating capacity of almost 1500 M. It is one of the main heat supply sources for the integrated DH network in Kaunas city. The sale and heat purchase-sale agreements were signed in March 2003. The new asset owner is "Gazprom". According to the agreement, the new owner of Kauno elektrine is obliged to invest no less than 110 million euros in 15 years.

SC "Kauno energija" purchased 80% heat from JSC "Kauno termofikacine elektrine", the integrated network of the City of Kaunas, for a heat price of 18 EUR/MWh.

The main heat price stipulated in the agreement is fixed for five years after the agreement entered into force, except (1) if during the indicated period inflation exceeds 3% per year or (2), if in case of recalculations according the formula the new heat price is lower than 18 EUR/MWh.
If during the term of the agreement a new gas supplier appears on the Lithuanian market, supplying gas other than Russian gas, the principal heat price is recalculated according to a new formula.

Over 80% of the monthly and annual purchased heat price of Kaunas city is sold at 17.1 EUR/MWh. The heat price to new consumers is 12.28 EUR/MWh. The mentioned prices are "at the power plant border". The price for the final heat consumers is fixed according to State Price Commission regulations. The heat price for main consumers in Kaunas is 34.72 EUR/MWh.

In January 2004, 720 MW electricity generating capacity facilities have been leased (long-term 15 year contracts) or do not belong to the state or municipality sectors. The total installed electricity generating capacity is 6040 MW (including 2600 MW from Ignalina Nuclear PP).

H. Heat consumption

In Lithuania, about 75% of space heating needs of residential houses is supplied from DH. Due to this reason, currently, the heat supply problem is the most significant and complicated issue for the energy sector of the country.

Heat sources. Lithuanian houses are well provided with gas, water and heat: 82% of all flats are supplied with gas, about 90% city flats with water and sewerage, 72% flats with hot water and 87.7% city flats by central heating. Due to the lack of data for rural infrastructure, the heat supply was approximately evaluated, according to residential fund census data and new constructions (see table 2).

Table 2. Lithuanian housing resources heat sources

	Total	City	Village
Residential fund, million m^2	73.3	45.0	28.3
Residential fund, supplies with central heating, million m^2	56.6	39.5	17.0
Central heating supplied residential fund part %	77.1	87.7	60.0
Heating space, when heat supplied from: CHP, million m^2	...	 24.5	...
Regional boiler houses, million m^2	...	6.6	...
Local boiler houses, million m^2	...	8.4	...

Table 3, demonstrates the existing capacities of the DH, disposed and consumers' installed capacity.

Table 3. DH companies: heat production and consumption capacities (MW.)

Heat production capacity	DH pipe network capacity	Consumption (connected) capacity		Maximum used capacity	Capacity of disconnected consumers from DH systems	
		2002	2003		2002	2003
MW	MW	MW	MW	MW	MW	MW
14945	20936	9159	9094	5412	658	529

It is noted, that the number of newly connected heat consumers and the relative heat capacity is increasing. For example, in Kaunas in 2003, the disconnected installed heat demand capacity was about 3 MW, while the newly connected heat capacity was about 8 MW. The same tendencies are recognised in almost all larger towns in Lithuania.

I. Perspectives of CHP production

The greatest part of the world's generated electricity originates from burning organic fuel. In comparison, Lithuania is a unique country, where the main share of electricity is produced in the Ignalina Nuclear Power Plant. In big cities like Vilnius, Kaunas and

Klaipeda, CHP capacities are large and significant for DH. Electricity can be generated in Elektrenai and in a number of industrial CHP. Lithuania has too many electricity generating capacities, which significantly exceeds reduced domestic demand. This influenced the incomplete utilisation of already existing cogeneration capacities (e.g., Vilnius and Kaunas).

This situation – unfavourable for new constructions – is virtually changing after the approval of the National Energy Strategy and of the obligations linked to the accession of Lithuania to the EU; that is decommissioning of unit 1 of Ignalina NPP by 2005 and unit 2 by 2009. During this period, small CHP must take a reasonable position in the energy sector.

State institutions started the implementation of preventive measures by fixing electricity production quotas and special electricity purchase prices. Such decisions distort the electricity energy market, although at the same time they maintain the vitality of CHP.
Special prices are applied to generating electricity from renewable fuels. There are several such type thermal power plants. The biggest of them operates one MW: the owner is JSC"Pajurio mediena" Ltd. There are several small bio-fuelled power plants.

The number of CHP is rapidly increasing, where the capacity unit is an internal combustion engine burning natural gas. At present, the largest such type operating plant is in Klaipeda shipping company. There are installed two 1 MW units.

At the moment, project documentation is being prepared for CHP facilities in Klaipeda (planned 80 MW_{el} electricity energy generation capacity) and in Panevezys (50 MW_{el}).

The largest chemical industry companies have become electricity producers: "Achema" operates 22 MW_{el}, and "Lifosa" 31 MW_{el} capacity CHP. The heat is utilised mainly for their own needs, but part is supplied to the local DH networks. Electricity is used for own needs only and is also distributed to the national electricity grid.

It must be mentioned that the electricity market model valid in Lithuania permits the sale of electricity from the generation sources and independent electricity purchase contracts. The liberalisation of the electricity energy market takes place by stages in order to proceed gradually to market relations.

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- National Energy Strategy.

2.3 District Heating and Cogeneration in Romania: Facts and Prospects[5]

A. The role of energy

Human beings have always been concerned with having normal living conditions as well as the best comfort both at home and at work, depending on the society's development in general, and on the technical progress in particular. Providing microclimate conditions in the living or working rooms has been achieved over time by individual heating, central heating, air conditioning and modern systems with completely automatic processes.

This does not deny that problems arising between man and the energy source had to be solved, so has producing heat with as little labour as possible; ensuring comfortable conditions and parameters; reasonable and highly efficient utilisation of generated heat; low costs in the power consumption, and the least possible environmental impact.

Energy is a product with high economic, social, strategic and political value. It is indispensable for industry and, consequently, for the whole economy and society. The lack of access to energy has big consequences, and the strategic and political role of energy has been clearly emphasised in the last 30 years by different oil crises, regional conflicts, large energy blackouts, social tensions or errors in the energy policy of a country.

Certain personal points of view are given on the two topics of particular significance for the Romanian power sector and social life, namely- district heating and cogeneration.

B. District heating in transition economies

A workshop on "*Restructuring and privatising the urban heating sector in Central and Eastern Europe- towards local power systems*" took place at the initiative and under the auspices of the World Energy Council, within the framework of the sixth edition of the Romanian National Energy Conference held in Neptun on 9-13 June 2002. For eleven countries in this European region, including Romania, it was ascertained that an average of 60% of all buildings are supplied with heat in a centralised manner and that district heating (and cogeneration) systems take 39% from the primary energy supplied; of which (54%) is from natural gas coal (36%), petroleum products (9%) and other resources (1%).

Central heating and the cogeneration of electricity and heat (district heating) represent an outcome of the central planning system. For these countries it is an important component of the power sector, comparable to the natural gas and electricity sub-sectors. In this field, the heritage of the past has produced and still generates high losses in the transmission, distribution and end use of heat, of at least 35% for the best, reaching 77% for the worst cases, in which are included the losses from the heat generation, transportation, distribution and end use. This impacts on customer satisfaction, delays the optimisation of systems and prevents investments. In Romania's case, it was estimated that urban heating and cogeneration represent the most critical energy sub-sector.
The same conclusions were drawn at the international conference on "*Restructuring the local heating sector in Central and Eastern European countries and in the Confederation*

[5] Prof. Dr. Aureliu Leca, Chairman, Romanian Member Committee of the World Energy Council

of Independent States" held in Prague in November 2002. The main problems of urban and district heating are: inefficiency (great losses, old equipment, excess capacity); absence of profitability (costs not covered by prices, subsidies, distorted prices in favour of gas and electricity, failure to collect, lack of funds for repairs and metering); general managerial problems (local policy controlled by the national body, lack of coordination between cogeneration, gas and electricity, absence of restructuring models, insufficient sustainability).

C. The situation in Romania

The (Romanian) Ministry of Public Administration (MPA), renamed after the last reshuffle "Ministry of Administration and Interior (MAI)", drew up a national strategy with respect to urban heating services in 2001. According to the strategy, there are 251 localities with centralised systems for heat generation and distribution, of which 179 operated in 2002. Thermal power was produced and distributed from own generation capacity in 101 towns; in 34 it was purchased from third parties (of which Termoelectrica SA in 24 towns), and in 44 it came partially from own production and partially from third parties. A number of 2.94 million flats are connected to centralised heating systems, representing 6.9 million inhabitants, of which 71% in urban environment.

The average age of generation, transmission and distribution installations is greater than 20 years. Efficiency in generation stands at 60-70% and losses in the rest of the system are of 30-35%. About 450,000 flat owners disconnected themselves from the centralised heating system in the last five years, either because they could not pay or because they installed individual heating sources.

"About 450,000 flat owners disconnected themselves from the centralised heating system in the last five year."

Following discussions between Romania's government and the World Bank, cross-subsidies (from industry to population) were adopted in January 1997 for social protection reasons: the industrial consumers of electricity paid an increase of 20% to 1 MWh, so that the population could pay approximately half of the real electricity price, while the industrial heat customers (in a smaller number) sustained a 40% increase for 1 Gcal. Cross-subsidies were to be gradually removed in the following three years. The cross-subsidy did not influence the natural gas price.

At the same time, a populist policy adopted in 1997-2000, with respect to electricity and heat prices made the average electricity price drop from 50 to 31.2 USD/MWh, and the average heat price drop from 17 to 9.7 USD/Gcal (VAT free). In this context, prices no longer covered the costs of electricity and heat suppliers, and consequently they recorded high financial losses. Cross-subsidies (industry → population) were withdrawn in 2000; according to many, the benefit of their application was questionable, eventually leading to dissatisfaction both for the industrial customers and the population.

Beginning with 2001, but especially in 2002, upon the request of international financial institutions, the heat price when delivered to the consumer gradually increased, reaching a national net reference price of 20 USD/Gcal that consumers paid. The difference up to the suppliers' real costs is subsidised to the extent of 45% from the central budget and to 55% from the local one.

The natural gas price increased for the population from 62 to 82.5 and recently (starting 1 October 2003) to 110 USD/1000 m^3 for industrial consumers and 120 USD/1000m^3 for households; its evolution after 2000 remained generally under the increase curve for heat.

After 1989, Romania's economic and social evolution has been unfortunately marked by a social protection policy detrimental to economic development. Consequently, the living standard dropped, reaching alarming levels while the social cleavage increased; poverty, affecting about 45% of the population is probably nowadays the most critical problem facing Romania. A working population of about 4.5 million has to sustain about 6.5 million retired people, with an average net income of about 125 Euro/person [6]. The worst situation in terms of living standard is that of old people, who, with an average pension of about 50 Euro/person can no longer cover even the monthly bills of the household. Such situations generated an extremely serious process for the poor population: they disconnected their homes from the centralised heating systems because they cannot pay and debts accumulate due to non-payment.

According to ANRE's data *(National Regulatory Authority in the Energy field)*, the average price of heat from the centralised heating systems, VAT included, is of 56.2 Euro/Gcal in the EU countries, and of 28.56 Euro/Gcal in the eastern European countries. In Romania this price is of 23.8 Euro/Gcal, respectively 800,000 ROL/Gcal (thus, the net reference price of 20 Euro/Gcal plus VAT).

In September 2002, the 180 operators producing and distributing heat recorded debts payable of 29,500 billion ROL or about US$88 million (to upstream suppliers like Termoelectrica, Distrigaz, Electrica etc. and to the state budget and local budgets) and debts receivable of 28,700 billion ROL or US$85 million (of which 56% from the population, 28% from economic agents etc.).

"In September 2002, … operators recorded … debts receivable of US$85 million"

This wide financial blockage has mainly resulted from the following:

- Alignment of fuel prices (natural gas, fuel oil, coal) to the international level, which determined the increase of heat generation costs;
- In the last two years, the heat price to the population has increased in a few stages from 9.7 USD/Gcal to 20 USD/Gcal (national reference price, without subsidies); simultaneously, the prices of the electricity and heat supplied by national companies were adjusted periodically depending on inflation;
- The number of families with low incomes has increased and consequently, the population accumulated great debts to the heat suppliers;
- The incapacity of payment of certain economic agents, which consumed heat and later became bankrupt or entered in economic-financial liquidation;
- The incapacity of central and local budgetary institutions to settle their debts to the heat suppliers;
- Improper management, with an important number of operators, who did not take the measures required to cut down losses, increase returns etc. and who currently report very high costs of the heat supplied;
- Absence of significant investments in most towns to modernise and retrofit the urban heating systems;

[6] at an exchange rate of about 1 Euro = 1 USD = 33,600 ROL.

- Absence of a national strategy to modernise, develop or direct these services in accordance with the EU directives and the country's specific climate and resources;
- An important number of industrial platforms ceased their activity (usually located near certain towns), for which the district heating power plants were the main steam suppliers (as well as hot water supplier for the population);
- Disconnection from the centralised heating systems of an important number of flats for economic reasons, leading to an imbalance of the distribution systems, with implications on the reliability of the centralised heat supply systems; for instance, in the town of Baia Mare, the disconnecting rate reached 95%, and in many medium-sized towns more than 50% of the flats have adopted individual heating units.

To regulate the public heating sector and alleviate the current critical condition, the government has taken certain measures, among which the most important are:

- Organisation and operation of public services supplying the heat generated in a centralised manner;
- Setting up the National Regulatory Authority for Public Services – ANRSC *(acronym in Romanian)*;
- Transferring 18 thermal and district heating power plants from state ownership and Termoelectrica's management into the ownership of local public authorities;
- State guarantees for certain foreign credits aimed at completing the financing for the purchase of energy in the winter of 2002-2003; also, distributing certain important credits from the state budget for urgent repairs and modernisation operations;
- Subsidies of about 7,200 billion ROL (about 215 million Euro) from the state budget and local budgets under social protection programmes;
- Rescheduling of accrued debts, collecting the debts to be received from population and economic agents, launching programmes to modernise such public services with foreign financing;
- Installing meters everywhere to the heating connections by December 2004, and individual meters by 2007.

The transfer of those 18 cogeneration power plants from Termoelectrica to the local public authorities took place upon request of the international financial institutions with a view, to provide financial viability to this national company by separating the two activities - electricity (profitable) and heat generation under cogeneration (turned unprofitable for the afore-mentioned reasons).

Except for the trading company Electrocentrale Deva SA, a thermal power plant in the system now under reinstatement, most of the transferred plants have ANRE-approved high regulated prices such as between 27 and 60 Euro/Gcal for heat to the end-user (VAT free) and between 41 and 58 Euro/MWh (VAT free) for the electricity associated to the delivered heat. A telling example is that of the cogeneration power plant of Brazi with an installed capacity of 800 MW and operating under unfavourable conditions, whose regulated prices are 35 Euro/Gcal to the end-user and 53.5 Euro/MWh.

"Handing over the 18 power plants to the local authorities is a transfer of problems, not of solutions."

Thus, handing over the 18 power plants to the local authorities is a transfer of problems, not of solutions. Unless urgent measures are taken, the situation of local heating is gradually growing worse, because of the local authorities' little experience with managing

such technical, economic and financial issues. Due to the severe drought of last summer, which affected the hydro and nuclear energy, the production of electricity has been replaced with additional lignite power plants generation, with a subsequent increase of the price of electricity of 17.5%.

Three regulatory authorities have been set up in time for power sector activities, namely- ANRE (for electricity and cogeneration), ANRGN[7] (for natural gas) and ANRSC[8] (among others, for urban heating from thermal power plants). However, due to a lack of poor co-ordination, as they belong to different ministries; there is competition between natural gas and cogeneration, because of the lack of measures, regulations and accurate economic pricing signals for the consumers. Thus, changes and disturbances have occurred that are difficult to rectify whereby cogeneration – the more economic solution – has been compromised to the benefit of individual heating.

D. An international perspective

The Energy Charter Secretariat located in Brussels has recently published an "*In-depth review of energy efficiency policies and programmes in Romania*" that was carried out in 2002.

According to this paper, Romania's annual consumption of primary resources in 2000 was 36.34 million toe (tons of oil equivalent), composed of 3.68 million toe (37.6%) natural gas; 9.81 million toe (27.0%) oil; 7.48 million toe (20.6%) coal; 2.76 (7.6%) renewable sources and waste; 1.34 million toe (3.7%) nuclear energy; 1.27 million toe (3.5%) hydroenergy.

Final energy consumption reached 24.95 million toe in 2000 and was distributed as follows: industry 10.78 million toe (43.2%); residential sector 8.44 million toe (33.8%); transport 3.81 million toe (15.3%); other consumers (including the commercial sector, the public one and agriculture) 1.93 million toe (7.8%).

The existing stock of habitable buildings in Romania is about 8 million dwelling places, grouped into 4.6 million buildings. Among these, 53% are older than 40 years, 37% are between 20 and 40 years, and 10% are under 20 years old. Family houses represent 56% in the rural and urban environment, and 39% are blocks of flats in urban areas; 5% of all dwellings are of a multi-family type other than blocks of flats.
75% of the total annual average energy consumption of a flat is for heating and domestic hot water, this being 85% in case of an individual dwelling place. According to IPCT data (Design Institute for Standard Constructions), the heat losses in the blocks of flats with concrete outer walls built until 1991 were at least two times higher than those in individual brick buildings.

There were 2.35 million dwelling places, that were connected to the urban heating systems in the winter 2001/2002. Given all the 251 localities provided with such systems, only 204 were operational in 2000 and 179 in 2001.

[7] National Regulatory Authority for Natural Gas
[8] National Regulatory Authority for Public Services (among which, urban heating)

According to the above data, residential consumption is second after industry. The specific power consumption of Romanian buildings is estimated as 2-2.5% higher than that of buildings in the EU, where large programmes have been developed, in this respect since the first oil crisis in 1973.

E. Required measures

ARCE's (Romanian Agency for Energy Conservation) estimations show that there is a 40-50% potential, to reduce the energy losses in the buildings.

a) Rehabilitation

The implication is evident: competent institutions have to draw up a long-term national programme for energy rehabilitation of existing buildings, in addition, to setting up compulsory norms of power consumption for the new constructions. There is the basic legal framework for such activities, namely Law 199/2000 regarding the efficient use of energy, and Law 325/2002 on the thermal rehabilitation of existing constructions and to promote the heat savings. Progress however is very little as long as financial sources are not identified. The recent EU Directive on the power performance of buildings provides some measures aiming at cutting down power consumption in buildings by 22% in 2010, as compared to 2000.

> "There is the basic legal framework… However, financial sources are not identified."

Rehabilitation of the existing cogeneration power plants or building new ones is also a priority, as current installations are non-performing, with high costs and exhausted lifetime or under expiry. Nowadays, at today's high parameters, it is not a problem of technology to build new cogeneration power plants. However, problems occur in terms of construction time, financing and guarantees to the investors. The power sector has a great inertia.

The construction of a cogeneration power plant lasts 4-5 years (studies; approvals; obtaining the legal documents, financing package, construction), and this has to be taken into account when planning the development of urban heating systems. Also, investments are particularly high, while financing sources are usually foreign. The investors (banks, funds, corporations etc.) usually request at least commercial guarantees such as long-term power purchase agreements at negotiated prices, which Romania has not provided yet (although the legal framework is available). The reason is the current opposition of the EU, which recommends market mechanisms and competition. However the energy market is not operational today in Romania, because the level of electricity and heat prices is kept low for social reasons, which leads to long recovery periods of investments that investors dislike. The development of the urban heating systems and the co-generation through such mechanisms is thus blocked.

b) Pricing and taxation policies

The issue of prices in the energy sector, especially in the urban heating field, is probably the most sensitive element (in economic and social-political terms) in the transition from a centrally planned economy to a market one.

Thus, it is interesting to describe the manner in which eastern European countries have determined the value added tax in the power sector, namely: Romania: 19% (unitary

value); Belarus: 20% (unitary value); Slovakia: 10% (unitary value); Czech Republic: for electricity and gas 22%, heat 5%; Estonia: for the population 0%, in the following years it will grow to 18%; Hungary: general value 18%, power 10%; Lithuania: power for industry and services 8%, for population 9%; Russian Federation: fuel, heat, electricity 20%, however VAT is returned to the power industry.

Another aspect of the current electricity and heat prices in Romania is, that they are relatively low and partially reflecting only the operational costs of certain depreciated installations of low performance. In the context of a lack of new investment for generation capacities (except for the nuclear power plant in Cernavoda), the price of power generated in the new capacities will grow, because it will have to cover the depreciation and financial costs besides the operational ones, including the risks and the profit. Therefore, the price of power generated by new capacities has to be compared with the marginal price in the power system, based on regulations issued by the institution competent to set up and supervise Romania's energy strategy.

c) Security of supply

Romania has been considered in the past, as a country rich in hydrocarbon resources, but today it is facing a marked depletion of its proven natural gas and oil reserves, the dependence on imports being ever-increasing. According to ANRGN's data, if in 1990 the domestic natural gas production was of 28.2 (in billion m^3/year) and import of 7.2, in 2001 the domestic production was of 12.9 and import of 2.9 billion m^3/year. Romania's dependence on import was of 18% for natural gas and of 54% for oil in 2001, this tending to grow in the future.

Taking into account the fuel mix for centralised urban and individual heating, where natural gas prevails, as well as the above-mentioned depletion of domestic reserves and growing dependence on imports with its associated risks, the development of a national programme to cut down losses along the entire power chain is an obvious requirement.

This programme of urban energy efficiency pursues many purposes (cutting down the energy import bill, reducing the maintenance costs of households, reducing the environmental pollution, creating jobs) and fully complies with EU energy policy, in particular with the recent "Green Paper – towards an European strategy for the security of energy supply".

F. Public service obligations

The European Commission's report on *'Services of general interest in Europe'* (COM 96-443) defines the concept of 'public service of general interest' in the power sector, which is underlined by the following principles: equality of treatment, universality, continuity, safety of people and of the service, adaptability, transparency of management, tarification and financing, competitive market and control carried out by distinct authorities.

The same principles have been and will have to be relied upon when restructuring, modernising, liberalising and privatising the sub-sector of urban heating in Romania.

G. Long-term national and local strategies

In the mid and long-run, there is an urgent need for the government to draw up and approve a strategy regarding the modernisation and rehabilitation of urban heating services. Each locality needs to undertake its own individual technical-economic review with respect to the opportunity of maintaining the current central heating system in operation or of replacing it by alternative solutions.

Financing is of crucial importance. Taking into account the population's low capacity to sustain such projects, the direct involvement of the government, Ministry of Public Finance, Ministry of Administration and Interior and local authorities in securing the financial resources is needed. It should be highlighted, in this respect of long-term credits with low or subsidised interest rates, guaranteed credits, grants and subsidies for modernisation (not for consumption), municipal bonds, governmental tax policies (environmental taxes, tax reductions and exemptions, fiscal credits, VAT reductions etc.).

H. The "Neptun Declaration"

The workshop, which the World Energy Council organised in June 2002 in Neptun, elaborated the "Neptun Declaration on Reviving the Urban Heating and Cogeneration in Central and Eastern Europe", which the WEC subsequently adopted at its Executive Assembly in Cairo in October 2002.

The Declaration contains 19 recommendations in the field of urban heating and co-generation. These are addressed to governments and municipalities with a view to stimulating national and local DH/CHP policies, rehabilitation, reduction of losses, gradual elimination of subsidies, cost covering prices, protection of the poor, competition, privatisation or public-private partnerships, and local energy planning. They deserve the widest-possible dissemination and attention.

2.4 Hungary: Questions and Answers[9]

A. Key questions

1.	Why develop long-term national energy strategies?	Why not?
2.	Why develop local energy strategies:	Why not?
3.	Why develop district heating?	Why not?
4.	Why liberalise/globalise district heating?	Why not?
5.	Why privatise district heating supply companies?	Why not?
6.	Why establish/keep local total energy supply companies?	Why not?
7.	Why regulate centrally?	Why decentrally?
8.	Why separate municipal property from regulation?	Why not?
9.	Why designate district-heating areas?	Why not?
10.	Why set official district heating production and supply prices?	Why not?
11.	Why subsidise district heating investments?	Why not?
12.	Why avoid cross financing?	Why not?
13.	Why avoid price subsidies?	Why not?
14.	Why promote cogeneration?	Why not?
15.	Why apply standard solutions in all countries?	Why not?
	Conclusion	

B. Possible answers

1.	Why develop long-term national energy strategies?

a) Pros

- Energy supply is cost-intensive;
- Energy investments are time-intensive;
- Energy production is environment-intensive;
- Energy supply alternatives can be harmonised;
- Obligations and licences may be prescribed by law.

b) Cons

- Globalisation may counter national intents;
- Long-term strategies are inflexible;
- National energy strategies need budget tools.

c) European practice

- Many countries have established long-term strategies.

d) Hungarian practice

- National energy policy approved by Parliament 1993, partly obsolete.

e) Task Force Members

- National energy policies approved in many countries.

[9] György Sigmond, Senior Adviser, FOTAV Rt., Budapest

2.	Why develop local energy strategies?

a) Pros
- Energy supply is cost-intensive;
- Energy investments are time-intensive;
- Avoiding parallel developments;
- Realising local development programmes.

b) Cons
- Restricted freedom of individual decisions;
- Restricted freedom of ventures.

c) European practice
- Typical for many large cities.

d) Hungarian practice
- Environmental law obliges municipalities to approve local environmental protection programmes;
- Weak regulation, poor results.

e) Task Force Members
- Agree.

3.	Why develop district heating?

a) Pros
- Best market for diverse efficient energy sources;
- Most effective tool for climate protection;
- Clean air;
- Better townscape.

b) Cons
- Restricted freedom of enterprises and individuals.

c) European practice
- Various practices.

d) Hungarian practice
- Uncertain national policy;
- Stagnation;
- Social priorities.

f) Task Force Members
- Agree.

4.	Why liberalise/globalise district heating?

a) Pros
- Easy capitalisation;
- Easy moving of capital to the real economic demand;
- Easy introduction of new technologies;
- Profit-oriented attitude.

b) Cons
- Neglected climate goals;
- Neglected national programmes;
- Neglected local demand;
- Easy departure of capital.

c) European practice
- Various practices.

d) Hungarian practice
- Restrictive legislation for globalisation of DH supply companies;
- No barriers for heat production;
- Initial attempts.

e) Task Force Members
- Various practices.

5.	Why privatise district heating supply companies?

a) Pros
- Easy capitalisation;
- Profit-oriented operation;
- Easy introduction of new technologies.

b) Cons
- Neglected local programmes;
- Preference for interests other than in district heating.

c) European practice
- Various approaches;
- Well running municipal and privatised district heating systems.

d) Hungarian practice
- Restrictive legislation;
- Initial attempts of privatisation.

e) Task Force Members
- Various practices of privatised and municipal district heating.

6.	Why establish/keep local total energy supply companies ("Stadtwerke")?

a) Pros
- Centralised energy supply companies;
- Avoiding parallel developments;
- Rational use of financial tools;
- Systemic thinking.

b) Cons
- Restricted competition;
- Preference for interests other than district heating;
- Danger of political decisions and of corruption.

c) European practice
- Well running various practices.

d) Hungarian practice
- Decentralised energy supply companies;
- Non-harmonised development.

e) Task Force Members
- Various practices.

7.	Why regulate centrally?

a) Pros
- Integration of district heating into a national energy and climate policy;
- Easy control of energetics and technologies.

b) Cons
- District heating is a local service established on decisions of the local municipalities;
- Too excessive central administration;
- Missed sensitivity for local demands;
- Subsidiarity.

c) European practice
- Typically multi-stage regulation;
- Reduced intervention.

d) Hungarian practice
- Diversified regulation;
- Less flexibility for municipalities because of official pricing of natural gas, electricity and heat supply from power plants;
- Globalisation results in centralisation.

e) Task Force Members
- Strong central regulation in many countries;
- Various ideas on the necessity of decentralisation.

8.	Why separate municipal property from regulation?

a) Pros
- Political interests of municipalities do not influence economic decisions.

b) Cons
- Profit-oriented operation may cause social tensions.

c) European practice
- Profit-oriented operation; consumers are less price-sensitive;
- Restricted municipality control in some cases.

d) Hungarian practice
- Municipalities are at the same time the owners of district heating plants and heat price setting authority;
- Political interests dominate economical ones;
- Result: small profit, lack of capital;
- Essential developments only possible by means of third party investment;
- Further diversification of district heating related capital.

e) Task Force Members
- Similar to the Hungarian situation in many countries;
- Degeneration of district heating in some countries.

9.	Why designate district-heating areas?

a) Pros
- DH is best consumer of all kinds of waste and CHP heat;
- Utilisation of the maximum of heat potential;
- Clean air at densely-populated area;

- Warranty for long-term development of district heating;
- Protected urban areas.

b) Cons

- Restricted freedom of individual decisions;
- Restricted competition.

c) European practice

- Local municipal and private total energy companies determine urban developments;
- Compulsory connection in Denmark and in some cities of other countries (Mannheim);
- Liberal heat market in many cities.

d) Hungarian practice

- Weak role for municipalities in the DH law;
- Local statutes in some cities;
- Political controversies.

e) Task Force Members

- Various regulations and approaches.

10.	Why set official district heating production and supply prices?

a) Pros

- Family energy costs may account for 10 to 20% of income in CEE;
- Official prices may provide social guarantee;
- Cost-related prices may give guarantee for safe operation and development;
- Proper sharing of profit between power and heat.

b) Cons

- Political decisions dominate price setting;
- Cross-financing.

c) European practice

- Official price setting (Denmark);
- Official prices at request (Austria);
- Controlled prices (Sweden: Gothenburg);
- Price agreements (Germany).

d) Hungarian practice

- Official production and supply prices;
- Typically, prices include only operation and maintenance costs;
- Cross-financing of power/heat and heat/gas is not advantageous for district heating.

e) Task Force Members

- Various regulations;
- Official supply prices not covering cost in some countries.

11.	Why subsidise district heating investments?

a) Pros

- District heating is best outlet for all kind of waste heat and heat from renewable sources;

- Heat from waste and renewables is most effective for energy saving and climate protection;
- Climate protection goals need accelerated development until 2008-2012;
- District heating revenues do not cover avoided external costs.

b) Cons

- Budget restrictions;
- Restricted competition.

c) European practice

- National and municipal programmes for the development of district heating.

d) Hungarian practice

- Very restricted national and EU funding for energy saving through district heating;
- There are no funds available for new DH systems.

e) Task Force Members

- Various tools for subsidising district heating.

12.	Why avoid cross financing?

a) Pros

- Clear competition;
- Clear determination of effective investments;
- Social tools for social problems.

b) Cons

- Easiest tool for district heating-related social goals;
- Unaccepted external costs;
- Unavoidable between cogenerated heat and power.

c) European practice

- Typically cross financed natural gas prices for supporting national industry;
- CHP: in favour of heat to the detriment of power;
- In favour of small-scale cogeneration to the detriment of other kinds of power generation.

d) Hungarian practice

- Gas prices: for the benefit of small consumers and to the detriment of bigger ones;
- CHP: for the benefit of power generation to the detriment of heat;
- In favour of small-scale cogeneration to the detriment of other kinds of power generation.

e) Task Force Members

- Gas prices: for the benefit of small consumers in many countries;
- For the benefit of cogeneration of heat.

13.	Why avoid price subsidies?

a) Pros

- Clear competition;
- Budget restrictions (Romania);
- Social tools for social problems.

b) Cons

- Lack of special social tools.

c) European practice
- Typically not applied in member countries.

d) Hungarian practice
- In 1992, all energy price subsidies were stopped;
- In 2003, social refunds were introduced in communal gas supply again.

e) Task Force Members
- Price subsidies in some countries.

14.	Why promote cogeneration?

a) Pros
- District heating-related cogeneration provides the most efficient and quickest way for energy saving and the reduction of CO_2;
- District heating provides the largest heat market for cogeneration in many countries;
- District heating-related cogeneration needs much less budget subsidies than all other tools of climate protection;
- Decentralised energy may be much cheaper than central.

b) Cons
- Restriction of power trade and competition;
- Need for restructuring of power distribution systems.

c) European practice
- Cogeneration law in some countries;
- Liberal power market in some other countries;
- Directive of the EU promotes further development of cogeneration.

d) Hungarian practice
- Legal subsidies for cogeneration;
- Frequently changing promotion rules.

e) Task Force Members
- Various regulations.

15.	Why apply standard solutions in all countries?

a) Pros
- Similar conditions for investors.

b) Cons
- Large differences in local economic, political, social, legal conditions between countries.

c) European practice
- The Cogeneration Directive of the EU and other directives acknowledge local features and allow national legislation within the frame of the directives;
- There are no unified rules on district heating regulation.

d) Hungarian practice
- Hungarian Energy Law is harmonised with the rules of the EU; there are no derogations;
- Many residues of former legislations.

e) Task Force Members
- Various regulations and various approaches.

***

Conclusion:
There can be no uniformity. No DH regulation policy is suitable for all countries. However, central and east European countries may benefit from applying good practices and avoiding mistakes of member states of the EU and of other countries of CEE.

2.5 Status and Prospects of the Development of Heat Supply Systems (DH/CHP) in Russian Federation[10]

Heat supply based on cogeneration (DH/CHP), despite its high social, economic and energy value, remained the non-integrated sector of the fuel and energy complex of the Russian Federation.

In 2000, two billion Gcal out of 400 million tce (1 tce = 7 Gcal = 29.3 GJ) or 43% of all fossil fuel resources were used for heat production. As compared with 1990, heat production declined by about 20% due to the lack of industrial demand, while domestic heat demand increased.

In the centralised DH systems, which generate 71.5% of total heat produced in the country, over 49% is generated by boiler plants and some 45% to cogeneration plants. NPP, electric boilers, etc produce the remaining heat. The decentralised heat supply sector generates 28.5% of heat, with the share of boiler plants and individual heat generators being 1/3 and 2/3 respectively.

The main heat user of the DH/CHP systems is the population (73%) and the major part of the social sector.

Meeting heat demand is an issue reaching far beyond energy supply. Inefficient heat supply has resulted in an enormous over consumption of energy, material and financial resources.

One of the causes of the present situation has been the extensive construction of buildings with poor thermal insulation. In the period between 1950-1995, the construction of buildings increased by 6.2 times with accompanying heat losses exceeding threefold, those specified for new buildings in the “Code of Practice” of 2001.

Also, the extensive development of DH/CHP systems with poor insulated long heat pipes made the operation more expensive and reduced their service life. Today, some of the heat pipes are to be replaced within 6 to 8 years instead of 20 to 25 years with adequate design and operation.

The decisions taken in the 1950s were based on cheap energy resources and an expected life of buildings of 25 years maximum. Today, with energy prices higher by several times, those buildings became inefficient for both energy and economic considerations.

At present, the population already pays 82% of the housing and municipal services. The main portion of the payments is attributed to energy services. The role of heat payments by the population, for the functioning and further development of the heat supply systems will increase continuously.

The critical situation in the country demands the comprehensive solution of the energy, economic and institutional problems.

[10] Prof. A. S. Nekrasov, Ds.Sc. and S. A. Voronina, PhD

2.6 Privatisation of Energy Supply Enterprises in East Germany[11]

(Using the city of Dresden as an example)

The reunification of Germany in 1990 resulted in a decisive transformation of the energy supply system of the former GDR. After its conclusion in 1995-1996, a number of new significant changes known as the "liberalisation of the energy market" took place.

In line with EU Directive of 28 November 1997 on the internal electricity and natural gas markets, Federal Energy Law no. 941/97 was adopted. This law authorised third parties (not only the owners of electricity transmission lines), to use grids belonging to other companies for the transmission of own-generated electricity, on a reasonable payment basis. As a result, customers were able to obtain the electricity not only from the traditional suppliers who were monopolists in the area in question, but also from new suppliers.

The process started in 1989-1990, on the territory of the former GDR and the associated changes in the system of property relations (privatisation) partly continue now as the integration of firms. After 1990, the twenty ministry-subordinate power and heat companies have been transformed into 200 independent (private) energy supply companies and the share of their stockholders is continuously increased.

A gas supply enterprise was set up in Dresden. Its shareholders, apart from the city, were private enterprises such as Ruhrgas, CEW Köln and GESO holding 49% of the shares. Thus, the process of privatisation of the electricity, heat and gas supply had been completed. "Technische Werke Dresden" was integrated into a sort of pool to provide energy supplies to the city and was managed appropriately.

This situation was consolidated for the next 20 years, in so-called consortium agreements. However, these contained the very important provision that the said companies could be transformed into integrated energy enterprises representing all energy sectors.

The economic development of Germany is closely associated with increased pressure on electricity, gas and heat prices. Since 1997, competition became more pressing, which resulted in a merger of some Dresden-based energy enterprises by the end of 1997. The synergy effect of this merger (including reduction of the number of employees) contributed to cutting down the expenses for production and to entering new areas of business activity.

The initial distribution of the DREWAG stockholder capital was as follows: the city of Dresden through TDW held 55% of the shares, with the balance held by GESO (HEW, EVS) and Ruhrgas of 35 and 10%, respectively.

The new enterprise, with less than 1900 employees, has to secure the supply of energy to the city of Dresden. The city drinking water supply system, with 1300 employees in 2003, may become part of DREWAG in the future. As any private enterprise, DREWAG not only covers the expenses, but also generates dividends for its stockholders. The share of the city is used to finance community needs, in particular transportation.

[11] Dr. S. Haziak

2.7 Increasing Energy Efficiency of Heat Consumption and Transmission Systems[12]

The energy savings potential of the country's heat supply systems is estimated to be 30-40%, of which 5-10% in generation, 15-20% in grids and 10-15% in consumption. Until now, an efficient institutional and financial strategy of heat supply management has not been set up.

The imperfection of the various components of heat supply systems is known, as are the up-to-date technologies and methods to overcome them. However, the crisis in the heat supply sector has not been overcome: energy saving is of interest only for a small number of consumers; and energy saving and heat tariffs exist independently and do not support each other.

However, heat saving is possible. The implementation of the 2-2.5 times higher thermal insulation of the building envelope saves up to 20-30% of heat. It is of interest that the annual normative heat consumption for residential buildings in Moscow before 1995 was at 130 to 140 kWh/m^2 compared with 90 to 100 kWh/m^2 in 2000.

The control of heat consumption in each flat with metering and the recycling of air heat allow the saving of half of the present heat consumption. Such flats are by 400 to 600 rbl/m^2 more expensive, but this extra charge will be paid back in 8 to 10 years through lower energy expenses.

For old buildings, heat metering and winterisation of entrances, staircases, basements and attics could save 15-40% of the heat used, with the return of investments in around five years. These measures are planned for instance in Moscow.

Today, in the Russian Federation, there are 160 to 260 thousand kilometres of heat pipelines in service. Over 30% of them are worn-out and in some regions this figure reaches 50%. Due to budgetary problems, only 1-4% of the heat pipes is replaced annually. The number of pipe damages in Russian Federation varies from 0.5-10 per 1 km.

The most frequent causes of the damages (up to 80%) are external corrosion, mostly due to the contact between the pipe metal and water because of the periodic or permanent flooding of the ducts with ground or surface water, and also stray currents (leakages from the direct-current operation of city and railway transportation, etc.).

The rate of damage to the thermal chambers is 10 to 20 times higher as compared to other areas of the heat networks. These losses are not only due to the deterioration (by 30-50 %) or failure of the mineral wool used as thermal insulation in 90% of the pipes, but also due to the insulation material becoming wet. This results in heat losses of several orders of magnitude.

In this situation, a large amount of money is spent in this country to maintain the unreliable heat networks with heat losses of 20% and more. Life expectancy is 10 to 15

[12] A.L. Naumov, V. G. Semenov

years for main pipes and 7 to 8 years for distribution lines. This compares with planned life expectancy of 25 years.

To protect the heat networks, wide use is made of electrochemical protection, which is the sole way to considerably reduce – up to 0.05 to 0.1 mm/y – the rate of the external corrosion of the surfaces, which are a source of stray currents. To eliminate inner corrosion, the most reliable methods are an increased pH value, a reduction of the oxygen content and the use of inhibitors.

Leaks can also be reduced by the replacement of the glands as the main elements of large leaks, by the expansion of bellow joints, the implementation of the ball-type shut-off valves which prevent network water leaks, the frequency-controlled electric drives of the pumps avoiding the use of the hydraulic control system and the permanent drain of the heating water via the regulators.

Pipes with expanded polyurethane insulation favourably compare with others, as they are equipped with on-line remote control systems, which enable the timely detection of defects. If those are adequately eliminated, the specified service life of the pipeline can be secured. The operational expenses are reduced by nine times.

In applying new, more reliable designs, the cost of heat networks will rise. But the increased service life of the pipelines and the lower maintenance costs are more important, in terms of economic efficiency than the costs incurred.

2.8 Upgrading Cogeneration Technologies at Russian Combined Heat and Power (CHP) Plants [13]

A. Efficiency at present

Combined heat and power generation is an energy-saving technology. It enables the utilisation of 85-90% of heat by converting a major share into electricity, which, in principle, is more valuable than heat. As compared with the best schemes of separate electricity and heat generation, the total fuel consumption turns out to be by 20-25% lower. Accordingly, emissions are also reduced.

Today, however, cogeneration-based district heating in Russia suffers a rather serious crisis. The cost of electricity and heat generation at many CHP plants, especially those using aged equipment is high, and sales at unreasonable tariffs are a difficult problem.

The situation is aggravated by the insufficient reliability of heat networks and associated transmission losses. Many consumers prefer to construct their own boiler houses and purchase electricity from other suppliers. The causes of such a situation is of a dual nature: technological and institutional (pricing, tariffs, taxes, etc.).

Let us consider, one of the numerous technological aspects of the problem - the opportunity of increasing the efficiency of CHP plants.

In Russia, there are 175 CHP plants with a total electric and heat capacity of about 65 GWe and 158 GWt (136000 Gcal/h). In 2000, the above plants had produced 276 billion kWh (with 157 billion kWh in the combined cycle) and 475 billion kWh (409 million Gcal) of heat. On average, electricity generation in combined cycle mode amounted to 37% (0.43 MWh/Gcal). The nominal data of the most efficient and widely applied steam-turbine units of CHP plants are illustrated in Table 1 below.

Table 1. Comparison of steam, gas turbine and combined-cycle CHP plants

Data	Type and operating conditions of CHP plant				
	Steam		GT	CCP	
	Condensing	Combine	Combined	Condensing	Combined
Share of fuel heat converted to: electricity % heat %	 30–36 –	 20–32 65–53	 34–36 50	 50–55 –	 48–59 38–35
Fuel heat utilisation factor, %	30–36	84–86	84–86	50–55	86–88
Electricity/heat ratio, %	∞	0.5–0.62	0.68–0.72	∞	1.2–1.4
Share of GT power	0		1.0	0.67	0.75

[13] G. Olkhovsky, Russia

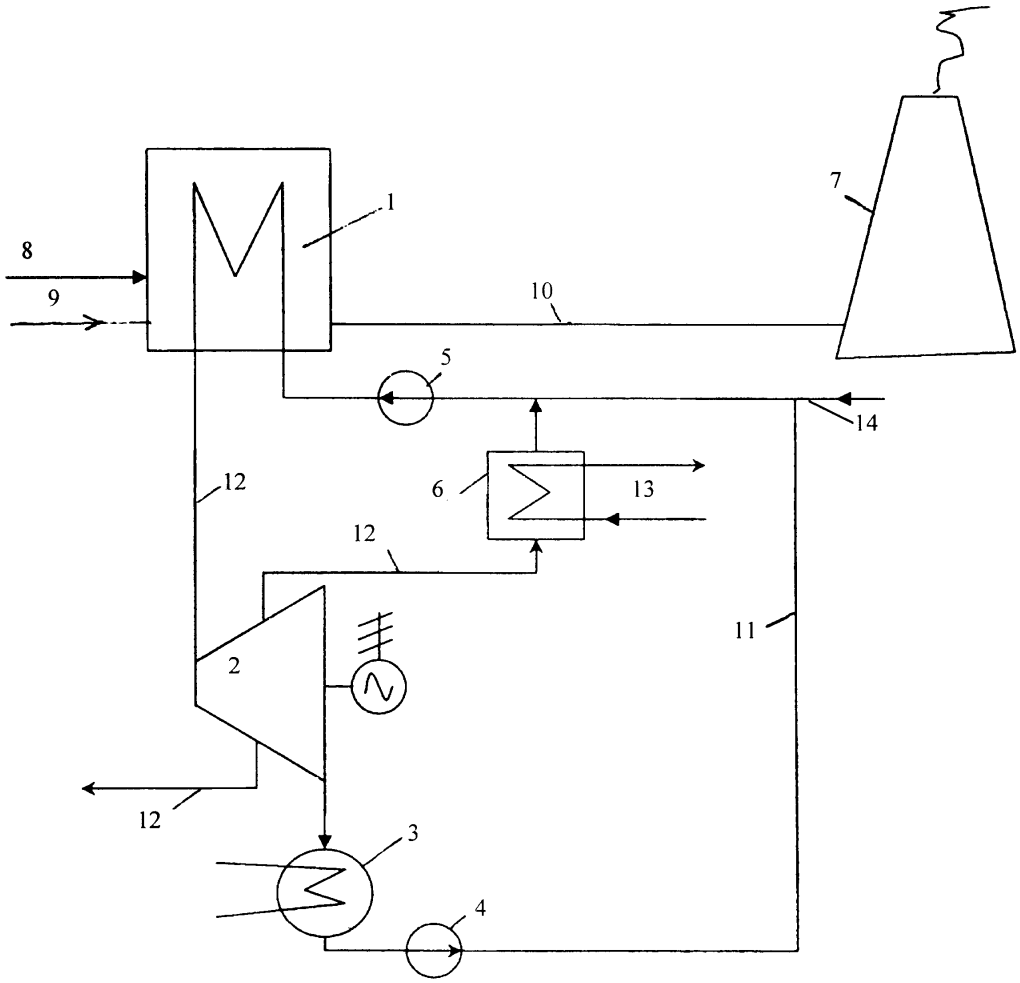

Fig. 1. Simplified Steam CHP Plant Schematic:
1 – steam boiler; *2* – steam turbine; *3* – condenser; *4* – condensate pump; *5* – feed pump; *6* – steam-water heat exchanger; *7* – stack; *8* – air; *9* – fuel; *10* – flue gases; *11* – condensate; *12* – steam; *13* – heating water; *14* – condensate return

The concept of present-day extraction turbines (Fig. 1) dates back to a situation characterised by electricity deficits. It was then necessary to independently regulate the heat and electricity load demands. The heating CHP plants operated with widely varying heat loads during the year. In summer, electricity generated by less efficient CHP plant turbines under poor vacuum was not competitive with that produced at large condensing thermal power plants (TPP). In winter, the turbine exhaust sections consumed energy to cope with friction, ventilation and cooling of the last stages.

Heat production lead to reduced electric output of steam-turbine CHP plants, which generally feature moderate electricity generation in the combined cycle. Finally, the cost per kW of steam-turbine CHP plants was considerably higher as compared to condensing TPP.

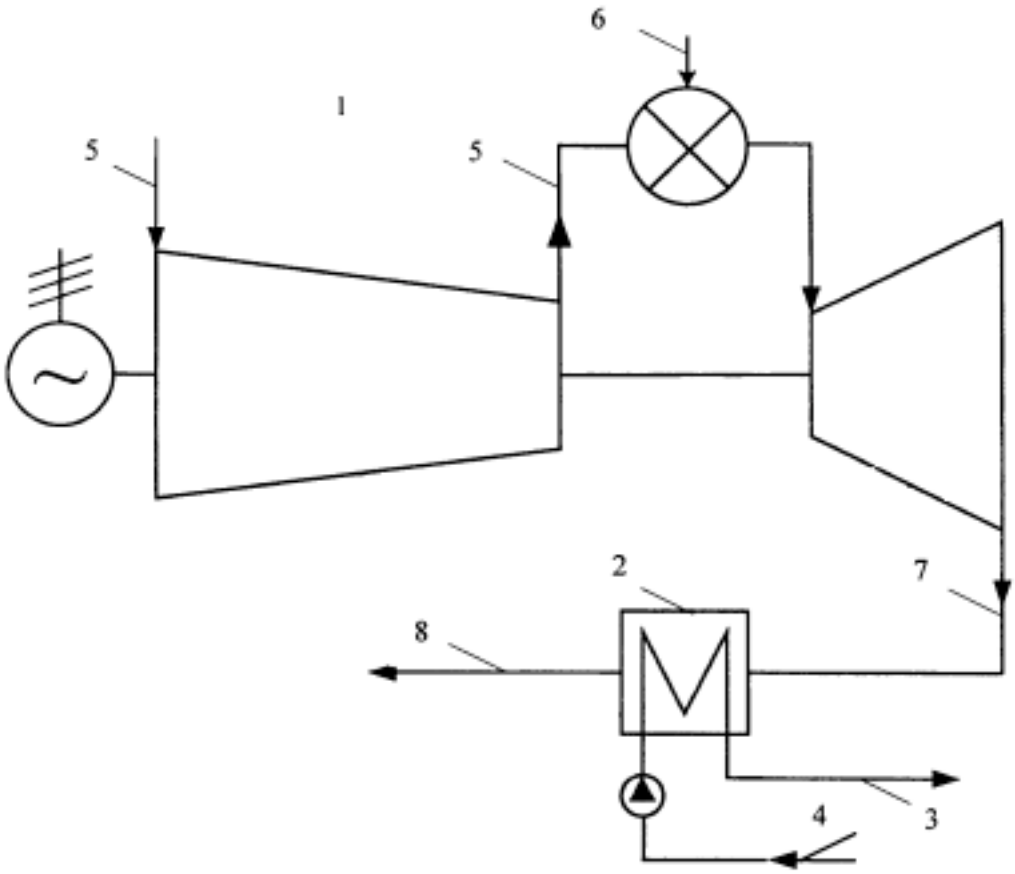

Fig. 2. Simplified GT-CHP Plant Schematic

1 – GT; *2* – heat-recovery boiler or water heater; *3* – steam or hot water; *4* – condensate or heating water return; *5* – air; *6* – fuel; *7* – turbine exhaust gases; 8 – gases to stack

B. Raising efficiency at natural gas-fired CHP

The efficiency of the natural gas-fired CHP plants can be increased significantly by applying the gas turbine (GT) and GT-steam combined Cycle (CCP) technologies (Fig. 2 and 3).
In modern large GT for electricity generation the exhaust gas temperature is 550–600°C. The exhaust gas heat can be utilised for heat supply or in a steam cycle to increase the CCP plant efficiency up to 55-58%, - a performance, which has already been obtained.

Various combinations of GT and steam turbine (ST) cycles are possible and have been in use. In prominent use are binary CCP, whose entire heat input is fed into the GT combustor. Steam is generated at high parameters in a waste heat-recovery boiler; pass the GT to use the steam in the steam turbine. Such CCP enables reaching high economical results not only in new plants but also in repowering existing CHP plants.

The GT-based CHP plants, where gases pass the GT are dumped into the heat-recovery boiler for water preheating or steam generation for external users are most simple. The efficiency of the modern GT, disregarding heat generation, reaches N_{el}/Q_{fh} = 34-36%, where N_{el} is the electrical output and Q_{fh} is the heat input to the GT with fuel. Generation of heat does not practically reduce the said efficiency. The typical ratios for nominal conditions are given in column 3 of Table 1. To increase heat production during the periods of maximum demand, use can be made of GT heat-recovery boilers equipped with supplementary-fired burners. However, fuel firing upstream of the heat-recovery boilers, together with the decrease of the heat load (underutilisation of the GT exhaust gas heat) reduces the efficiency of the GT-CHP plant. As a result, the GT-CHP plants are more attractive for industrial CHP plants with a significant share of stable steam load. Economically, they can also be profitable in case of varying heat and electricity loads. A good example is the Yakutsk TPP (practically a CHP plant) with eight GTs with a total capacity of about 250MW, which has operated successfully since 1971. In the binary CCP-CHP cycle, GT operates on the heat-recovery boiler which generates and superheats the steam supplied, for example, to the common header and, from there, to the existing steam turbines.

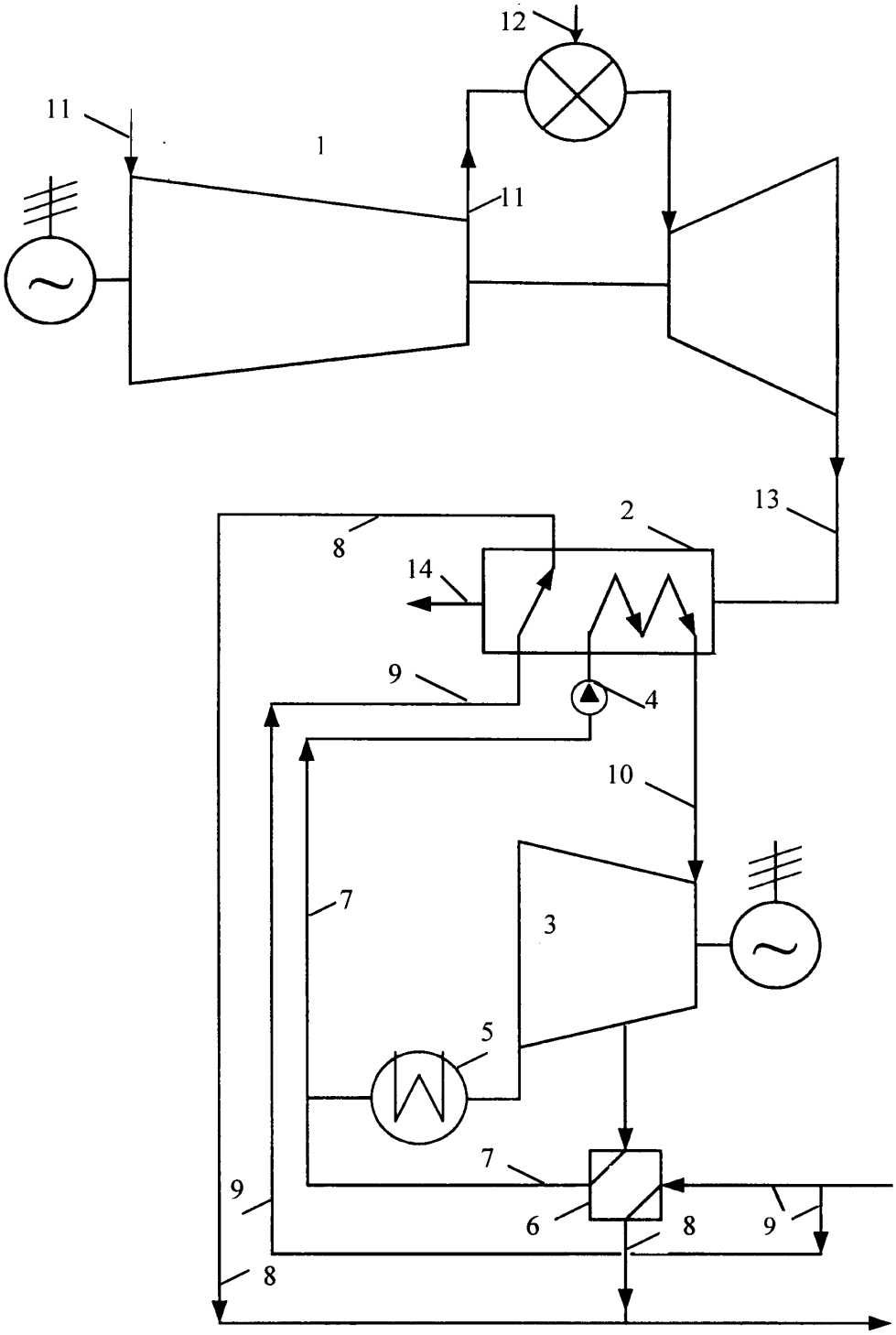

Fig. 3. Simplified Combined Cycle CHP Plant Schematic

1 – GT; *2* – heat-recovery boiler; *3* – steam turbine; *4* – feed pump; *5* – condenser; *6* – steam-water heat exchanger; *7* – condensate; *8* – hot heating water; *9* – return of heating water; *10* – steam; *11* – air; *12* – fuel;
13 – turbine exhaust gases; *14* – gases to stack

The first cogeneration binary CCP - PGU-450T - is currently in operation at the Severozapadnaya CHP plant in St. Petersburg with no heat load yet. The plant scheme allows for a wide variation of the electricity and heat ratio, while keeping a high fuel heat utilisation efficiency (Fig. 4).

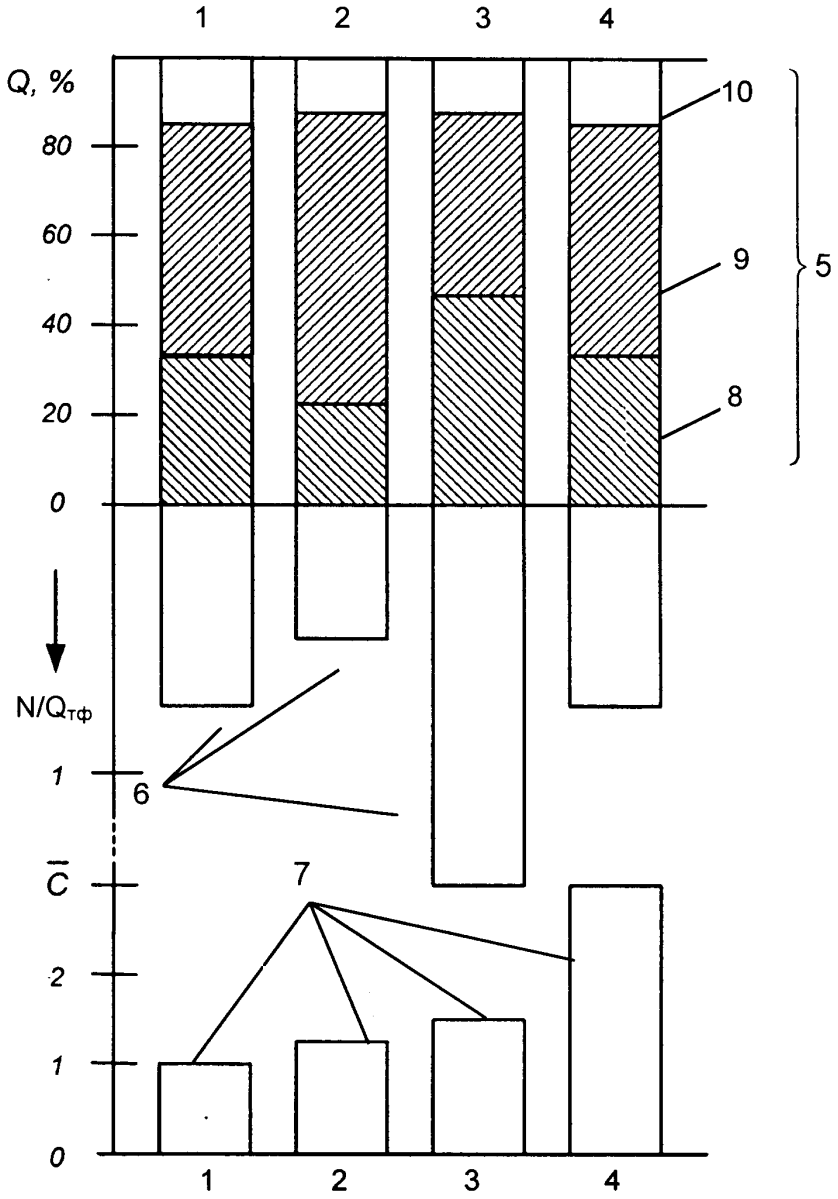

Fig. 4. Energy Balancies of Various Types of CHP Plants

1 – GT CHP; *2* – GT CHP with supplementary fuel firing before the heat-recovery boiler (water heater);
3 – CC CHP (without fuel firing before the boiler; *4* – Steam CHP (supercritical unit T-250); *5* – energy balance;
100 % - fuel heat Q; *6* – electricity generation (N) based on heat produced Q_h (N/Q_h nondimensional); *7* – relative specific (per kW) cost ($\bar{C}=1$ for GT CHP); *8* – share of generated electricity (efficiency: N/Q); *9* – share of generated heat Q_h/Q 7 + 8 = $(N+Q_h)/Q$ – coefficient of fuel heat utilization; *10* – losses

The module – a GT-240 t/h heat-recovery boiler – at the Severozapadnaya CHP plant can be directly used for the supply of the PT-60, PT-80 and T-100 turbines existing at the CHP plant. In case of full exhaust loading, the steam flow through the first stages of the turbines will be much lower than the nominal value. The steam can be passed at reduced pressure typical for PGU-450. This factor, together with simultaneous reduction of the live steam temperature to 500-510 °C, eliminates the problem of reducing the service life of such turbines. Naturally, as one can see from Table 2, the capacity of the steam turbines within the CCP will be below nominal value, however, the total unit capacity will increase more than twice. Also, the electricity generation efficiency will independently, as a mode of operation be considerably higher, compared to the best condensing units.

Table 2. Repowering effectiveness of CHP plants using T-100 and PT-80 turbines

Data	T-100		CCP with T-100		PT-80		CCP with PT-80	
	Conden-sing	Combine	Conden-sing	Combine	Conden-sing	Combine	Conden-sing	Combine
Steam turbine output, MW	100	100	76.8	66.5	82.2	67.9	74.7	58.3
GT output, MW	–	–	151.2	151.2	–	–	151.2	151.2
Total output, MW	100	100	228	217.7	82.2	67.9	225.9	209.5
Heat production, MW	–	151	–	160	–	128	–	160
Share of heat converted to electricity (efficiency) %	35.2	30.4	49.5	47.3	34.5	28.5	49.0	45.5
Fuel heat utilisation factor %	35.2	83.6	49.5	83	34.5	82.1	49.0	82
Share of electricity in the total energy generated (electricity + heat)	1	0.36	1	0.58	1	0.35	1	0.57

Such variation of parameters greatly influences the economic efficiency of a CHP plant. The total electricity and heat generation expenses will fall and competitiveness on the energy markets increases.

GT with heat-recovery boilers should be located in a new power plant building on the site of the existing CHP plant. The old boilers could remain at standby to cover the peak loads or operate on fuel oil in case of gas supply interruption.

In applying GT of the same capacity as steam turbines, two or three GT and the same number of the heat-recovery boilers will be required to provide the steam flow for steam turbines involved.

The efficiency of the steam-turbine installation of the CCP-CHP plant has a relatively low effect on the electrical efficiency of CCP, which remains at the level of 46-50% without heat load and 42-47% with full heat load. This is why the CCP-CHP is preferable in long-term operation (5-7 thousand h/y) at variable heat load.
GT and CCP can find a rather wide application at CHP plants. Such plants of over 200 MWe capacities, where natural gas constitutes 90% and more of the fuel balance, employ about 300 steam turbines with capacities ranging from 60 to 100 MW. These

turbines can reasonably be incorporated into CCP. The largest benefits can be obtained if such a replacement occurs, in parallel with a 2 to 2.5 times increase of the electrical output of CHP plants.

If necessary, natural gas can be substituted by diesel or other light liquid fuel.

Another important fact is the almost two-fold lower cost of CHP plants using GT and CCP, compared to steam CHP plants.

The problems arising in CHP plant repowering with the use of gas turbine and combined-cycle technologies are due to restricted sites, the necessity to release the excess power, to ensure a year-round reliable natural gas delivery (or a back-up by diesel fuel) and to design the plant with minimum capital investment.

C. Raising efficiency at coal-fired CHP

The opportunities for increasing efficiency of coal-fired CHP plants are limited. In the near future, there are no other technologies, apart from the presently adopted steam power units.

For operating conditions to correspond with load curves, the following is, in principle, possible:

- Operation of CHP plants turbines by the heat load curve in winter with shutdown in summer;
- Application of a separate efficient low-pressure cylinder which could be supplied in summer with steam from extraction headers;
- The use of the KT type turbines at CHP plants that operate at high efficiency in the condensing mode.
-

All these options, however, need more detailed consideration and a feasibility analysis.

To increase the efficiency of turbine units of coal-fired CHP plants without technology change, it would be advantageous to reduce the ventilation steam flow to the low-pressure cylinder and the condenser, reduce heat losses with other steam-water streams to the condenser, and use high-efficient water heaters, leak-tight oil coolers or steam-jet ejectors with mixing coolers.

Many improvements can be introduced into the boilers of the coal-fired CHP plants to increase their efficiency and reduce emissions. In many cases, however, the improvement of ecological parameters demands costly gas cleaning systems. The use of the circulating fluidised bed coal combustion technology enables efficient combustion of various grades of coals, including low-reactivity and high ash coals without lighting up by gas or fuel oil, fixation of up to 90% of sulphur at the process by limestone injection into the furnace and ensuring moderate (200-300 mg/m^3) nitrogen oxide emissions; due to rather low (850-900 °C) firing temperatures.

Some 150 CF boilers of 170-250 t/h steam capacity can advantageously be implemented in repowering the coal-fired CHP plants, which have space limitations to locate DESOx and DENOx systems.

In the near future, coal-fired CHP plants will be able to use CCP with pressurised fluidised bed coal combustion, which has already been demonstrated abroad. Their application will save 10-12% of fuel in the condensing mode, decrease of up to 80-200 mg/m^3 of sulfur and nitrogen oxides and increase electricity generation in CHP mode.

D. Conclusions:

The wide application of gas turbine and combined-cycle technologies at gas-fired CHP plants radically changes their performance characteristics and makes them commercially attractive.

Upgrading coal-fired CHP plants by applying technically proven measures can also significantly improve their efficiency.

The improvement of the combined electricity and heat production is an important element, in strengthening cogeneration-based district heating in a new economic situation.

2.9 Restructuring Simultaneously the Heat Supply Systems and the Electric Power Industry[14]

A. Importance of heat supply and losses

The severe climatic conditions in Russia predetermine heat supply as the socially most significant and at the same time, most fuel-incentive sector of the economy, consuming almost 40% of the energy supplies. Therefore, increasing heat supply efficiency is not only a method of cutting down the expenses in the Russian holding joint stock company (JSC) "EES of Russia" in the housing and municipal area, in industry and agriculture, but it is a powerful lever of improving the Russian economy in general.

At present, a number of problems have accumulated in heat supply that considerably reduce its efficiency and will continue influencing the formulation of the strategic directions of the development of the utilities. These include:

- Wear of the equipment and heat lines;
- No differentiation of authority and responsibility in the municipal power sector;
- Budget deficit;
- Inefficient management.

Over 50% of the municipal heat supply facilities and heat lines require replacement. At least 15% are in emergency conditions. Heat line damages annually amount to 70 cases per 100 km. Heat losses in the pipe reach 30%.

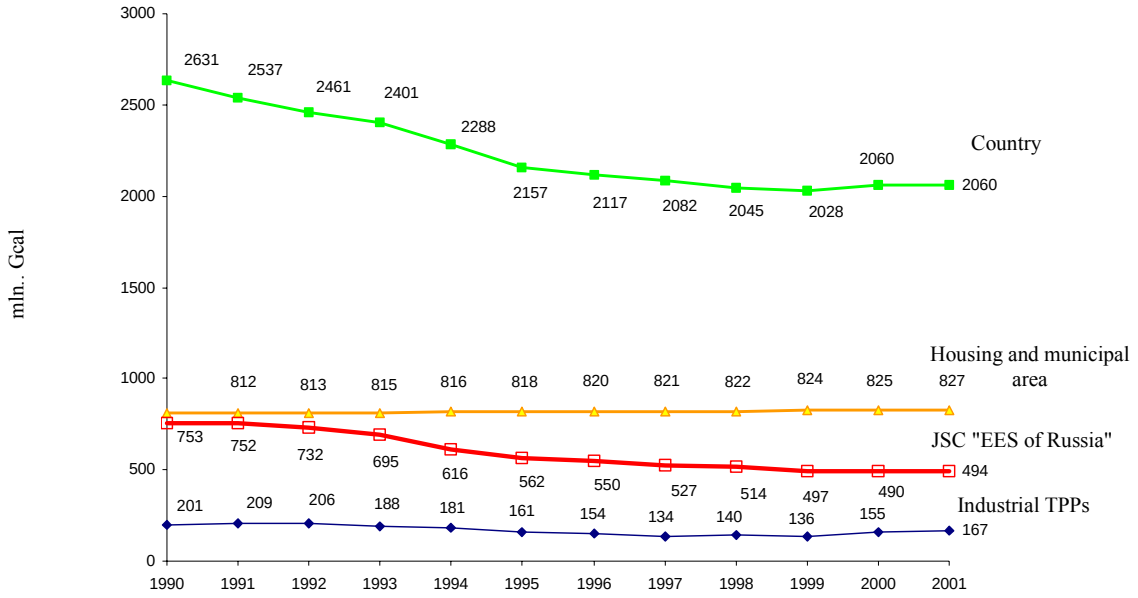

Fig. 1. The volumes of heat consumed in the country and in the housing and municipal area and heat supplied by JSC "EES of Russia" and industrial TPPs

[14] A. P. Livinski, Russia

Radical improvements are necessary and need to be closely associated with the reforms of the natural monopolies (the joint stock company "EES of Russia", Gazprom) as regards technology. The social sphere requires changes in subsidisation of the population and reforms of the budget and administrative systems in the financial and political areas.

B. The role of JSC "EES of Russia"

The JSC "EES of Russia" focuses its heat supply activity on:

- Reforms: reduction of risks during the transition period so as to ensure the financial stability of the CHP plants;
- Changes in the economic operation of the DH/CHP systems;
- Technical rehabilitation and optimisation of existing DH systems of towns and industrial areas;
- Providing the conditions for a stable and profitable business for district heat supply companies so as to guarantee the attraction of investments in DH/CHP systems;
- Changes in the institutional and functional structures of the management of the heat supply systems with different property forms;
- Laying the normative and legislative base for the functioning and development of the DH/CHP systems;
- Securing reliable and effective coverage of the heat demands of the consumers as:
  - a measure of social protection of the population;
  - one of the conditions for establishing the heat balance.

The dynamic analysis of the DH/CHP systems in recent years (1991-2001) indicates that with practically unchanged installed TPP capacity, the delivery of heat was reduced by 35% (Fig. 1).

The reduced heat supply from the CHP plants of JSC "EES of Russia" can be explained by the sharp reduction of the industrial production, and by the appearance of new industrial enterprise-owned heat sources. For example, the availability of heat sources at the oil refineries in the cities of Novokuibyshevsk and Syzran caused a sharp decrease of heat supply from the Novokuibyshevsk and Syzran CHP plants (by 6.9 and 1.8 times, respectively).

The reduction of heat supply was also influenced by the increasing aspirations of large businesses to enter the regional heat supply market (Open JSC "Gazprom", Open JSC "Sibal" oil companies).

C. Causes and trends of reduced heat production

The decline of heat demand is caused essentially by:

- Losses of the industrial heat loads during restructuring;
- Refusal by consumers of DH/CHP systems due to high tariffs;
- Non-payments by heat consumers (mostly housing and municipal consumers);
- Loss of consumers due to the appearance of independent heat generators.

Unless appropriate measures are taken by JSC "EES of Russia", there will be:

- The risk of a loss of a third of the CHP market;
- The rise of expenses for electricity and heat generation;

- Damage to ecology;
- Loss of prospects of optimal development of the existing DH/CHP systems;
- Loss of operating staff of the DH/CHP systems.

These risks are accompanied by:

1. The development of competition on the heat market independently of the activity of the JSC "EES of Russia", due to the aspirations of Russian businesses to enter the heat supply market;
2. Housing and municipal reforms which affect the localisation and decentralisation of the heat sources;
3. The dependence of the political image of the regional authorities on the conditions of heat supply in their territories, which aggravates the risks for the JSC "EES of Russia".

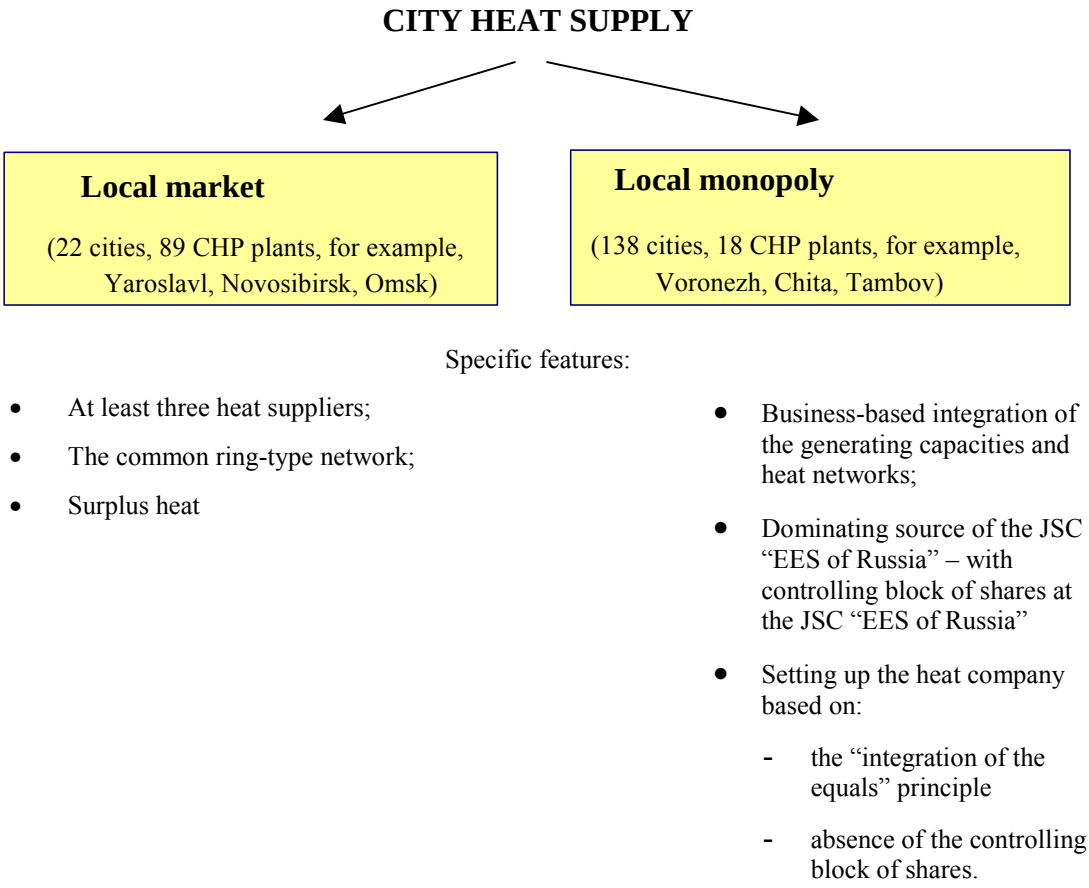

Fig. 2: Models of the city heat supply

D. Remedial strategies

The above analysis of the current situation prompted the elaboration of some models of city heat supply (Figure 2).

The largest CHP plants within JSC "EES of Russia" transfer their main lines to the municipal authorities and share the management of the grid company (Figure 3).

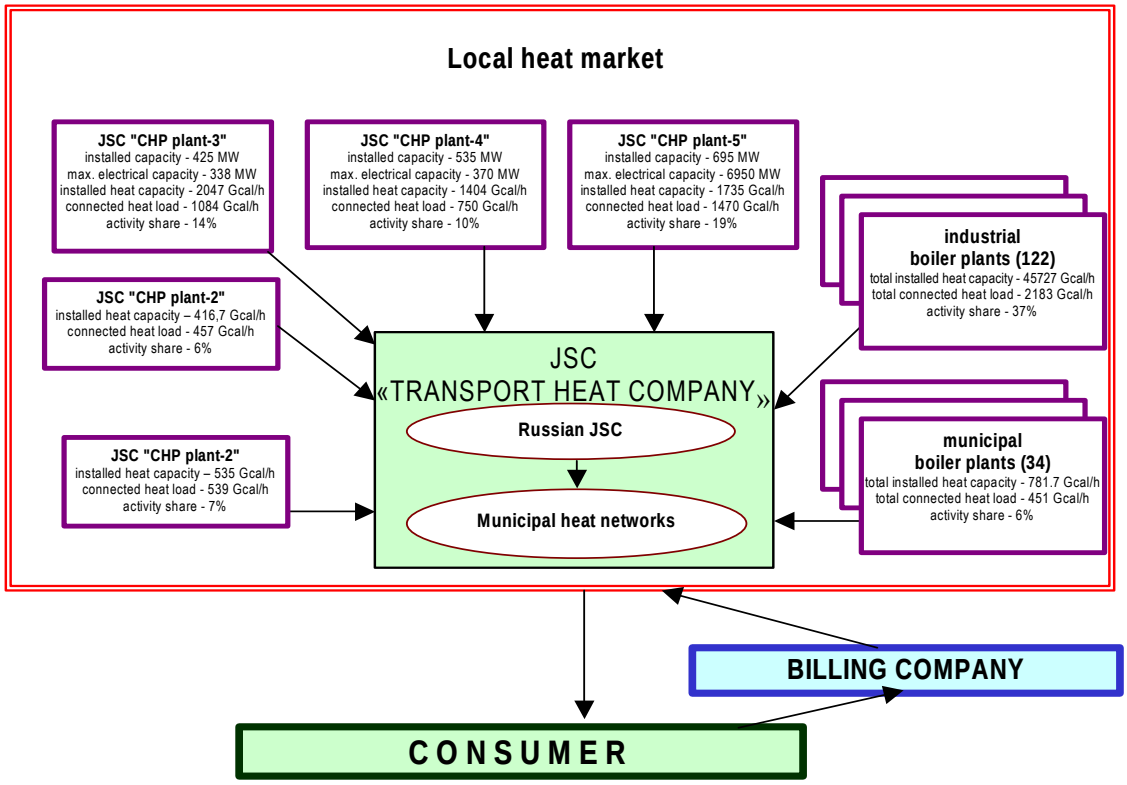

Fig. 3: Model "Local market" (22 cities, 89 CHP plants, JSC "Omskenergo, Omsk"

Specific features of this approach are:

- A local heat market;
- At least three heat suppliers;
- The common ring-type network;
- Surplus heat.

The commercial and technological company was set up, owned by the JSC "EES of Russia", integrating all heat sources entering the common heat system and the heat networks running from it to the consumer (Figure 4).

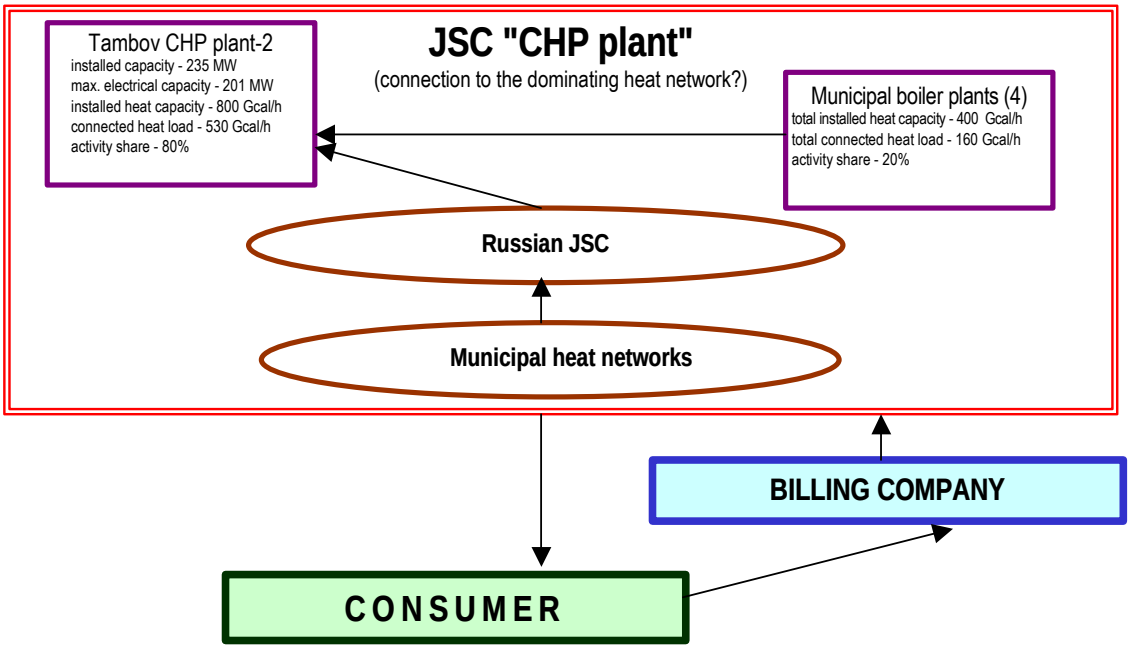

Fig. 4. Model "Local monopoly [dominating source (90 cities, 121 CHP plants, JSC "Tambovenergo", Tambov)]

Specific features are:

- Local monopoly;
- Dominating source of the JSC "EES of Russia" connecting other heat networks, including those of all forms of property;
- A controlling block of shares held by the JSC "EES OF Russia".

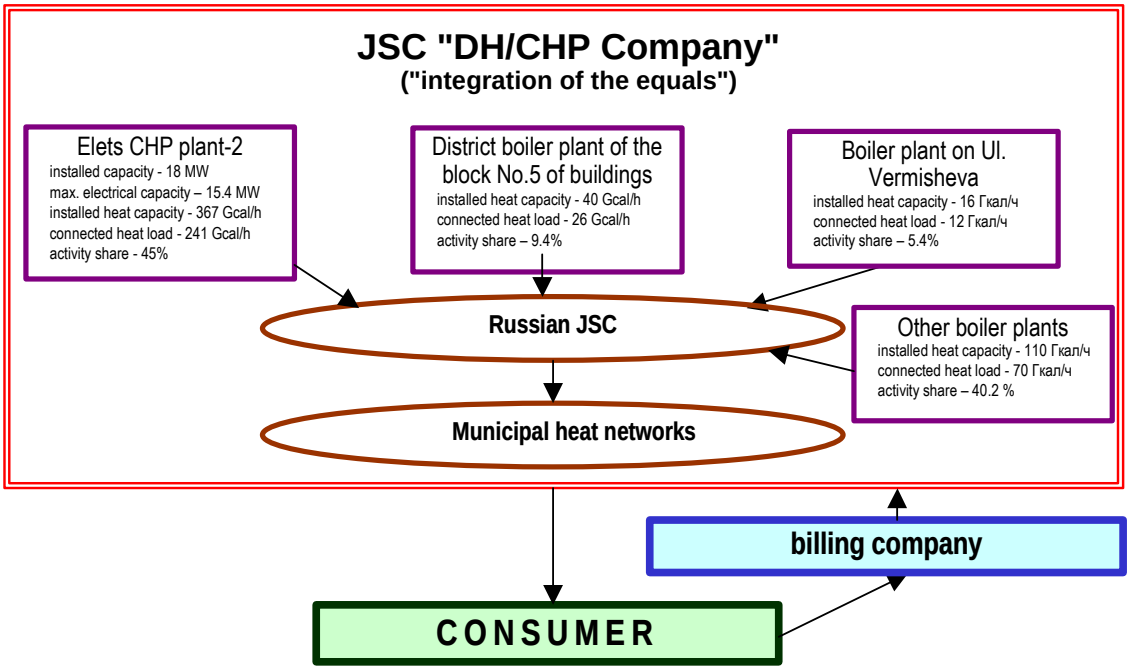

Fig. 5. Model "Local monopoly ["integration of the equals" (48 cities, 49 CHP plants, JSC "Lipetskenergo", Elets)]

The inefficient small CHP plants (which do not influence the electricity balance) and the outgoing main heat lines that leave the JSC "EES of Russia" are grouped in the new JSC "DH/CHP company" (Figure 5).

Its specific features are:
- Local monopoly;
- Setting up the district heat company according to the "integration of equals" principle;
- Absence of controlling block of shares at JSC "EES of Russia".

E. Outlook

Thus, the transformation of the Russian heat supply systems is characterised by:
- Restructuring of the JSC "EES of Russia" (CHP plant problem);
- Setting up the new structures (JSC "Russian Community Systems");
- Reforms in housing and municipal sector.

The existing situation in the heat supply sector requires radical improvements in the near future. These must be closely associated with the reforms of the natural monopolies (housing and municipal sector, the JSC "EES of Russia", Gazprom) as regards technology. In the social sphere, changes are required as regards the subsidisation of the

population and the budgetary and administrative systems in the financial and political fields.

The JSC "EES of Russia" plays a very important role in the heat market:

- Strong points:

- Inherited capacities, infrastructure, clients;
- Qualified staff;
- Guaranteed sales.

- Weak points:

- Inadequate tariff regulation;
- Obsolete infrastructure;
- Bulk management.

- Opportunities:

- Partnership with responsible agents;
- Auxiliary servicing business;
- Standardisation: relatively low expenses with high finance profits.

- Threats:

- Decentralised systems.

The main problem: CHP plants are participants of the electricity market while satisfying heat demand in the cities.

The future restructuring of the JSC "EES of Russia" and transition to market economy gives rise to a serious problem of the survival of the CHP plants, which supply the electricity market along with supplying the cities with heat. In this respect, external experiences are very useful, especially those found in the central and west European countries and in Germany.

At present, the strategies of the big businesses to participate in urban heat supply are evident; the oil companies and the gas monopoly are entering the heat market with great vigour. In recent years, they have created entities such as the JSC "Russian Community Systems" (Figure 6).

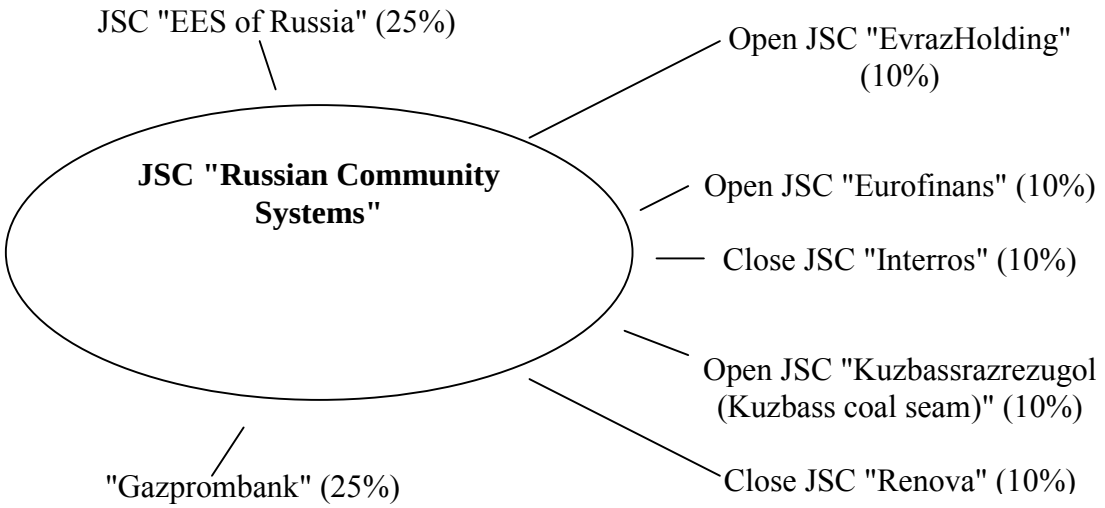

Fig. 6 New Structures

The JSC “Russian Community Systems” was registered on 29 May 2003. The stock capital is one billion roubles, fully paid by the stockholders. The founders were financial and industrial companies of Russia. At present, the leading stockholders of the JSC “Russian Community Systems” are the JSC “EES of Russia” and Gazprombank, each holding 25% of the shares. The remaining 50% are distributed equally among the five founders: “Interros”, “Kuzbassrazrezugol”, “Renova”, “EvrazHolding” and “Eurofinans”.

The JSC "Russian Community Systems" was set up to increase the quality of utility services offered to the population, and to enhance competition on the market of the housing and municipal sector.

This is expected to help restructure the municipal sector and to synchronise the process with other important reforms, which are under way in the country concerning the utility industry, industry and local self-management. Competition will result in higher efficiency and better transparency, which in turn, will make investments more attractive.

These tasks are being solved, by setting up a number of regional subsidiaries or dependent companies of the JSC "Russian Community Systems", which closely cooperate with the local administrations to achieve common goals. In agreement with the municipalities and regional authorities, such companies are authorised to represent the municipal services, lend or takeover the management of the existing enterprises, belonging to the housing and municipal sector. The priority task of the Open JSC "Russian Community Systems" is to reduce the administrative and technological expenses by 20 to 30%, which will sharply increase the efficiency of the municipal sector.

Housing and municipal sector reforms:

- Allied parties? Competitors? Partners?
  - Gas companies;
  - Water supply;
  - Municipalities;
  - Housing operating organisations;
  - Building sector;
  - Heat-generating equipment manufacturers;
  - Investors and entrepreneurs;
- Similar problems, similar solutions - possible participation in the integration process.
- Providing quality supply - training heat supply managers
  - Long-term contracts;
  - Accounting-based sales.

Restructuring of the power industry is closely connected with the reforms of the housing and municipal sector. In this respect, the interests of the JSC "EES of Russia" and of the municipalities are entwined: there are mutual interests such as maintaining municipal heat networks and DH/CHP systems as a whole, but also conflicting interests, e. g. in tariff policy.

Goals of the holding JSC "EES of Russia" companies:

- Mid-time
  - Completion of restructuring (3-5 years).
- Options:
  - Goal of heat generation: successful entering of thermal power plants into the electricity market, survival on the electricity and heat market;
  - Goal of the JSC "Russian Community Systems": occupying the niche in the housing and municipal sector;
  - Goals of new projects: establishing business in heat supply individually or in partnership with the third parties.
- Condition of successful activity
  - Adequate regulation.
- Guarantee of commercial success
  – An accounting strategy.
- Prevention of conflict of the interests
  – Priority of shareholder interests.

ANNEX A:
MEMBERSHIP OF THE WEC TASK FORCE ON REGULATING DISTRICT HEATING AND COGENERATION IN TRANSITION ECONOMIES

Chair:	Witold Cherubin (Poland)
Secretary:	Klaus Brendow (WEC Regional Coordinator, Central and Eastern Europe)
Members:	Marija Delić (Croatia) Vladimir Zeleny (Czech Republic) Jan Elleriis (Denmark) Max Pilegaard (Denmark) Anja Silvennoinen (Finland) György Sigmond (Hungary) Namejs Zeltins (Latvia) Rimantas Bakas (Lithuania) Ramunas Gatautis (Lithuania) Dimitar Hadzi-Misev (Macedonia) Marian Dobrin (Romania) Gurgen G. Olkhovsky (Russian Federation) Pavol Koren (Slovakia) Janez Groselj (Slovenia)
Ex officio:	Natan Bernot (Chairman, WEC Group Central and Eastern Europe) Elena Nekhaev (WEC Director of Programmes) Yoshihiro Hatano (WEC Manager, Regional Programmes)

ANNEX B

"Moscow Statement"

as adopted by the WEC Workshop on

Regulating District Heating and Cogeneration in Economies in Transition: Policies and Regulations
Moscow, 23 March 2004

District heating (DH) based on combined heat and power generation (CHP) is one of the most efficient and environmentally friendly heat supply technology in urban areas with high heat density. Further development of DH systems using renewables also enables the long-term sustainability of heat supply.

District heating and combined heat and power should prove viable under market economy conditions, within a regulatory framework conducive to the development of DH and CHP.

To assure such a development, decision makers are invited to consider the following:

1. DH and CHP shall be one of the priorities in long-term urban energy planning.
2. Regulatory bodies shall be independent acting according to law.
3. Regulators should assure equal treatment for all kinds of grid-based energy supply (gas, electricity, district heating).
4. District heating companies shall be self-financing entities, covering all costs, and profitable.
5. The pricing methodology shall reflect all justifiable costs (variable and fixed).
6. Tariffs shall stimulate the efficiency of district heating systems as a whole.
7. Incentives for promoting CHP and/or renewables shall be set in such a way that heat prices remain competitive.
8. Incentives for investments in new CHP shall enable payback periods attractive for investors.
9. Social issues (protection of low income customers) shall be dealt with under government or local social security programmes.

W. Cherubin
Chair
WEC Task Force on
DH/CHP Regulatory Issues

Natan Bernot
Chair
WEC Group Central and Eastern Europe

ANNEX C

WEC PAPERS ON CENTRAL-EAST EUROPEAN ENERGY ISSUES

- The Eurasian energy equation to 2020 and beyond, V. Eurasian Business Summit, Evian, 31 May- 6 June 2004
- Regulatory regimes for district heating and cogeneration in transition economies: status and prospects, Moscow, March 2004
- Liberalised markets, customer expectations, fiscal greed – a call for more equity 12th Forum, Zagreb, 28 November 2003
- ❖ Global and regional coal demand perspectives to 2030 and beyond, UNECE Committee on Sustainable Energy, Geneva, 17 and 18 November 2003
- District heating, cogeneration and gas in Central and Eastern Europe – from partnership to competition? WEC Regional Forum on Optimising Local Energy Systems, Sofia, 30 May 2003
- ❖ Restrukturierung der Fernwärmeindustrie in Mittel- und Osteuropa, Vortragsreihe "Energienetze in Mittel- und Osteuropa", Wien, 12 March 2003
- Oil for water, water for oil; meeting of the WEC Cleaner Fossil Fuels Systems Committee, Abu Dhabi, 2 February 2003
- Global oil shale issues and perspectives – Synthesis of the Symposium on Oil Shale, held in Tallinn, 18 – 21 November 2002
- Restructuring Estonia's oil shale industry: what lessons from restructuring the coal industries in Central and Eastern Europe, Symposium on Oil Shale, Tallinn, 18 – 21 November 2002
- Liberalisation of CEE energy markets, Workshop on Carbon Flows between Eastern and Western Europe, Free University of Amsterdam, Amsterdam, 23 and 24 September 2002
- ❑ Towards local energy systems: revitalising district heating and co-generation in Central and Eastern Europe; publication, London, January 2003
- Gas in South-Eastern Europe – a Business Perspective, European Business Council, Berlin, 22 April 2002
- Financing clean coal technologies in the economies in transition, Washington, 21 March 2002
- Conclusions of the 18th WEC Congress, Buenos Aires, 21 – 25 October 2001
- Furthering clean coal development in the economies in transition, report to and resolution adopted by the International Workshop on Clean Coal Use, Szczyrk (Poland), May 2001
- Deregulation- precondition for distributed power in the economies in transition, paper given at the WEC Israel/MIEC Conference on Distributed Power, Tel Aviv, April 2001
- ❖ Le charbon et l'environnement dans les pays en transition – sortir du pire, lecture given at the University of Geneva on 8 February 2001, with English summary
- Privatising and regulating the electricity and gas industries in Central and Eastern Europe: models, status, issues, lecture given at the Macedonian Academy of Sciences, Skopje, 31 January 2001
- Restructuring and privatising the coal industries in Central and Eastern Europe and the CIS; publication, London, August 2000
- Present regulatory situation in south-east European and Black Sea countries, lecture given at an IERA/BSEC/WEC Roundtable, Sofia 27 June 2000

- ❖ Chancen und Risiken russischer Erdgaseinfuhren aus westeuropäischer Sicht, lecture given at the "Seminar Ől, Erdgas, Strom" of the German-Russian Federationn Economists Association in Horb, Germany, 6 – 7 May 2000
- Round-Up, WEC Regional Forum on "Central and East European Energy Policy, Markets and Technologies for the 21st Century", Vilnius, 16 – 18 September 1999
- Status and prospects of clean coal technologies in the economies in transition, lecture given at the WEC Conference on "Prospects for Cleaner Fossil Fuels Systems in Sustainable Development", Ankara, 26 – 29 May 1999
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ANNEX D: LIST OF ABBREVIATIONS

ANRE	Romanian Electricity and Heat Regulatory Authority
ANRGN	Romanian Natural Gas Regulatory Authority
ANRSC	Romanian Communal Services Regulatory Authority
ARCE	Romanian Agency for Energy Conservation
ASEP 2020	Foundations of the Energy Policy in Poland till 2020
BG	Bulgaria
CCP	combined cycle technologies
CEE	Central and Eastern Europe, including CIS
CERC	Croatian Energy Regulatory Council
CF	coal-fired
CIS	Commonwealth of Independent States
CHP	combined heat and power generation
CZ	Czech Republic
DEA	Danish Energy Authority
DERA	Danish Energy Regulatory Authority
DH	district heating
DSM	demand side management
EES	United Electrical System of Russia
EMA	Finnish Energy Market Authority
ERA	Polish Energy Regulatory Authority (Urzad Regulacji Energetyki)
ERO	Czech Energy Regulatory Office (Energeticky regulacni urad)
EU	European Union
FCA	Finnish Competition Authority
FRERC	Russian Federal and Regional Energy Regulatory Commission
GD	Romanian Government Decision
GED	Romanian Government Emergency Decision
GT	gas turbine
H	Hungary
HEP	Hrvatska Elektroprivreda (Croatian Electric Power Company)
HOB	heat-only boilers
HR	Croatia
HTO 2000	Heat Tariffs Ordinance of 2000
INA	INA Industrija nafte (Croatian Oil and Gas Company)
IT	information technology
JSC	joint-stock company
KW	kilowatt
LEP	local energy planning
LT	Lithuania
LV	Latvia
MAC	Macedonia
MEH	Hungarian Energy Office (Magyar Energia Hivatal)
MELSP	Minister of Economy, Labour and Social Policy
MWh	megawatthour
PERA	Polish President of Energy Regulatory Authority
PL	Poland
PP	power plant
PR	public relations

PUC	Latvian Public Utilities Commission
R & D	research and development
RAB	regulatory asset base
RES	renewable energy sources
RO	Romania
RONI	Slovak Regulatory Office for Network Industries (Urad pre regulaciu sietovych odvetvi)
RU	Russia
SI	Slovenia
SK	Slovakia
ST	steam turbine
TPA	third-party access to markets
TPP	thermal power plant
VAT	value added tax
WEC	World Energy Council
YU	Former Republic of Yugoslavia