

COMBINED HEAT AND POWER ACTION PLAN

Policy Action Plan for Promotion of Combined Heat and Power Production in the Slovak Republic to 2010

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Abstract

Combined heat and power is well established in the Czech and Slovak Republic, especially in the district-heating sector. The current share in total electricity production is about 19% in the Czech Republic, and 11% in the Slovak Republic. Both governments aim to support CHP for reasons of energy efficiency improvement and, to some extent, mitigation of CO₂ emissions. However, different barriers hamper the further penetration of CHP. Therefore, this study aimed to support the Czech and Slovak government in the formulation of CHP policy. The project has delivered three documents: a background document (ECN-C--00-042) and national Action Plans for the promotion of CHP in the Czech and Slovak Republic, respectively (ECN-C--00-043/044). The Action Plans will provide policy makers in the Czech and Slovak government with concise information on potentials, priorities, and recommended policy actions.

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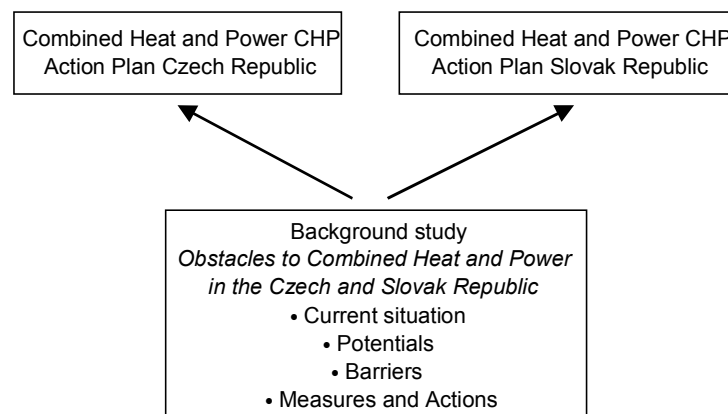
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FOREWORD

Combined heat and power generation is well established in the Slovak Republic. The current share of CHP in the electricity and heat production is slightly higher than the average in the European Union. Combined heat and power generation contribute to the three major goals of the national energy policy of the Slovak Republic: overall competitiveness, security of supply and environmental protection. Therefore, the Slovak government aims to promote CHP. The Energy Policy White Paper will provide the general framework for the future role of combined heat and power production in the Slovak Republic. In addition, it is necessary to develop specific policies addressing the impact of liberalisation of the energy markets on the prospects of CHP. The European Commission also promotes CHP. Therefore, the study ‘Obstacles to the promotion of CHP in the Czech and Slovak Republics’ was supported within the SAVE II Programme (SA/085NL). The study was co-financed by the Dutch government, and the Czech Energy Agency. The Slovak Energy Agency provided in-kind support. The project consortium consisted of the following Slovak, Czech, UK and Dutch institutes: Netherlands Energy Research Foundation ECN (project leader), SRC International CS s.r.o., March Consulting s.r.o., March Consulting Group (UK) and the Slovak Energy Agency.

The study has resulted in the following documents:

- The *Combined Heat and Power (CHP) Action Plan* addresses the promotion of CHP in the Slovak Republic (this report). The Action Plan provides policy makers in the Slovak government with essential information on potentials, targets, budgets and recommended policy instruments. The core of the Action Plan is the list of concrete policy actions, ready for implementation. The Action Plan focuses on medium- and small-scale applications. A similar Action Plan was developed for the Czech Republic.
- *The background document (separate report)*. This report is the background document to the Action Plan. It contains detailed information on options and measures, potentials, barriers and policy instruments for promoting CHP. The main part is a detailed outline for a new CHP policy. Also, it includes recommendations for financing schemes to overcome the investment constraints in the Slovak and Czech Republic.



ABBREVIATIONS

AIJ/JI	Activities Implemented Jointly/ Joint Implementation
CHP	Combined Heat and Power
DH	District Heating
d.r.	Discount rate
EMAS	Eco Management and Audit Scheme
EPC	Energy Performance Contracting
ESCO	Energy Service Company
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Fund
IPP	Independent Power Producer
LTA	Long Term Agreement
M&T	Monitoring and Targeting
MW	Megawatt
NGO	Non Governmental Organisation
PBP	Payback Period
RD&D	Research, Development and Demonstration
ROI	Return on Investment
SEA	Slovak Energy Agency
SME	Small and Medium-sized Companies

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1. POTENTIAL FOR COMBINED HEAT AND POWER

Combined heat and power production (CHP) is the simultaneous production of thermal and electric energy from the same primary energy source. CHP results in energy savings of 20-40%, compared with the separated production of heat and electricity. CHP applications in the Slovak Republic can be roughly categorised as follows:

- Large-scale ($> 50 \text{ MW}_e$) CHP plants in large public district heating systems and industry. The main technologies are combined cycle plants, gas turbines with heat recovery, and steam turbines.
- Medium-scale CHP plants ($5\text{-}50 \text{ MW}_e$) in municipal district heating systems, industry, and large building complexes. The main technologies are steam turbines and gas turbines with heat recovery.
- Small-scale applications ($50 \text{ kW}_e\text{-}5 \text{ MW}_e$), primarily in small district heating systems, small industries, and in the commercial sector. The main technologies are gas- and diesel engines.

Large power plants with limited heat extraction with high power to heat ratios are not considered CHP, because they do not have the efficiency benefits of CHP. The CHP Action Plan however will focus on the promotion of medium and small-scale applications, because the specific economic conditions for large-scale CHP projects require a more project-based approach.

1.1 Current situation and recent developments

Combined heat and power is well established in the Slovak Republic. The total installed power capacity is about 7.5 GW_e . The share of CHP capacity is about 13% (1.0 GW_e). The share of CHP plants in the total domestic power production is about 11% (2.7 TWh), which is about the average share of CHP in the European Union, but less than one third of the share in the Netherlands, Denmark, and Finland. The annual heat supply in district-heating systems (DH) is 520 PJ with a CHP-share of 19%. The total heat demand consists of about 33% steam demand and about 67% hot water demand. Figure 1.1 shows the share of CHP in total electricity generation in the Slovak and Czech Republics and the European Union.

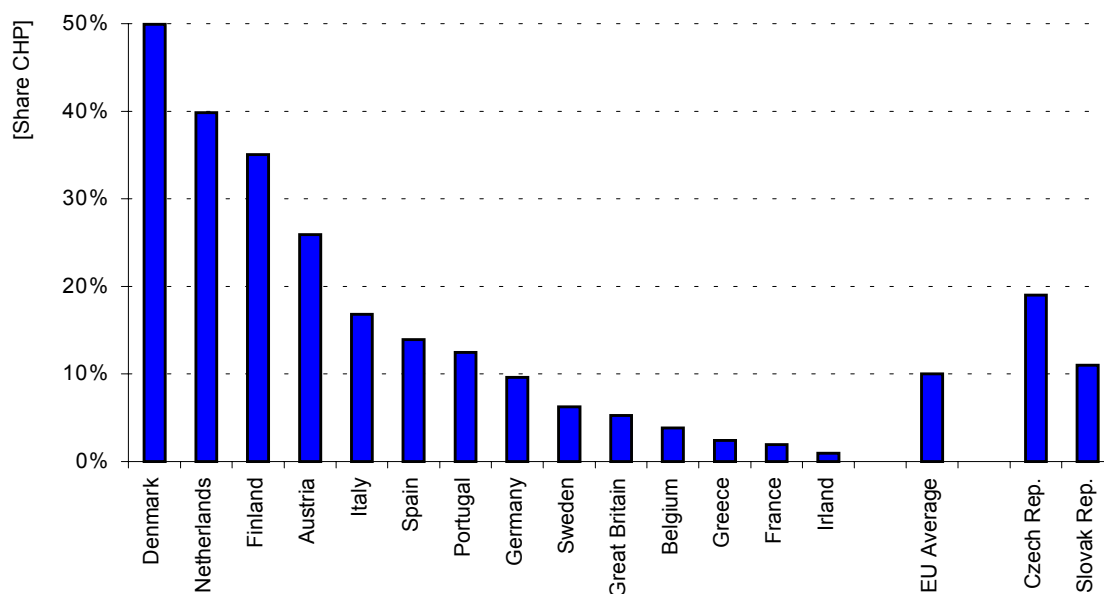


Figure 1.1 *Share of CHP in total electricity generation in the Slovak Republic and the EU* (Source: COGEN Europe and own analysis).

In recent years, a few large-scale projects were realised in the district heating sector for instance a new large gas turbine combined cycle (GTCC) in Bratislava (218 MW_e/150 MW_{th}). Recently medium-scale CHP projects were realised in industry. Most small-scale applications (about 80) can be found in small municipal district heating systems, industry and the commercial sector (including biogas and landfill gas, where total installed capacity is 10 MW_e and 16 MW_{th}). Almost all small-scale projects, implemented during the period 1993-95, received governmental subsidies.

Although a significant number of projects have been realised, the total installed new capacity is small compared to the technical potential. Furthermore, under present conditions the willingness to invest in medium-scale and small-scale CHP projects without substantial governmental support is decreasing.

1.2 Potential 2010

Two potentials for CHP have been estimated in this study: the technical and economic potential. The technical potential assumes the implementation of all technical feasible CHP options. The economic potential considers the economic viability of CHP projects. It should be noted that these potentials strongly depend on the technical and economic assumptions and should be regarded as indicative only. Only medium-scale (<50 MW_e) and small-scale applications are considered.

Technical potential

The technical potential includes all technically feasible medium and small-scale CHP options and is limited mainly by technical considerations (mainly demand for heat and the availability of heat distribution systems). Rehabilitation of existing CHP plants however is excluded from this potential. The total technical potential for new capacity (< 50 MW_e) in 2010 is estimated at 1480 MW_e. This corresponds to an increase of 150% of currently installed capacity.

Table 1.1 *Estimated technical potential of CHP in the Slovak Republic in 2010*

	Capacity range			Heat/Power ratio
	[MW _e]	[MW _e]	[MW _{th}]	
Medium-scale-Industry	5-50	180	250	1.4
Medium-scale-DH	5-50	200	280	1.4
Small-scale	0.05-5	1100	1870	1.7
Total		1480	2400	1.6

The major applications of CHP within the three categories are the following. All options include use of fossil fuels (coal, natural gas, oil) and renewable energy sources (wood, straw, biogas):

- *Medium-scale CHP plants in industry* include usually the replacement of old boilers by new CHP units, in many cases including a switch from coal to gas, rehabilitation/replacement of existing steam turbine and/or installation of new steam turbines in former boiler plants.
- *Medium-scale CHP plants in district heating* include a large variety of CHP plants: CHP plants with backpressure steam turbines, combine-cycle CHP plants, and gas engines.
- *Small-scale CHP plants* include many new projects with gas engines in municipal district boiler plants, in sewage treatment plants, and in commercial services.

Economic potential

Due to major economic barriers for CHP implementation, it is more realistic to use the economic potential of the different CHP options for setting implementation targets. A range of economic assumptions influences this economic potential. The economic potential is 565 MW_e in 2010 corresponding to approximately one third of the technical potential. See Table 1.2 for a breakdown of this potential. Detailed information on the economic potential can be found in the background document to the Action Plan.

Table 1.2 Economic potential for medium and small-scale CHP in Slovak Republic till 2010

	Capacity range			Econ/tech.
	[MW _e]	[MW _e]	[MW _{th}]	[%]
Medium-scale industry	5-50	120	180	67
Medium-scale district heating	5-50	125	200	63
Small-scale	0.05-5	320	500	29
Total		565	880	38

The conclusion can be drawn that in addition to the existing share of CHP, a large technical potential still remains in the Slovak Republic. The economic potential strongly depends on the economic condition, but with slightly more favourable conditions than at present, the economic potential till the year 2010 still represents a large potential growth.

2. POLICY OBJECTIVES AND PRIORITIES

2.1 Objectives and targets

Combined heat and power generation contribute to the three major goals of the national energy policy of the Slovak Republic: overall competitiveness, security of supply and environmental protection. Also the accession to the EU is a motivation for the promotion of CHP because CHP plays an important role in the European Union's energy efficiency and climate change policy. The EU's indicative but ambitious target regarding the share of CHP is a doubling of the share of CHP from 9% in 1995 to 18% of electricity production in 2010¹.

The Energy Policy White Paper should provide the general framework for the future role of combined heat and power production in the Slovak Republic. To promote CHP it is necessary to develop specific policies based on policy targets. The Action Plan will support this policy developing process by recommending measures and actions promoting medium and small-scale CHP.

The Slovak Government should set specific official targets for CHP for the medium term (2010). Besides building of new capacity, also replacement of existing capacity is required in the period to 2010. As a consequence, CHP targets for 2010 have to deal with additional as well as with the replacement of existing capacity. Furthermore, these targets should be consistent with the energy efficiency and renewable energy policy (biomass CHP). The economic potential can be used as a reference for the setting of a target.

2.2 Priorities

Priorities should be set in CHP policy with regard to those CHP applications that are most promising and need support. Based on the analysis of the technical and economic potential of CHP and possible impact on the environment in the Slovak Republic, the following fields can be identified as most attractive for implementation of medium and small-scale CHP and should therefore be the focus of CHP policy:

- Replacing old medium size CHP plants in industry and district heating. The old CHP plants in district heating and the industrial sector can be replaced by new options (fluidised bed CFB, combine-cycle gas units etc.). This replacement will not result in structural change in heat and power production.
- Replacing small municipal boiler plants by medium and small-scale CHP-options (< 5 MW_e). In the district-heating sector many out-dated low-efficiency coal-fired and gas-fired heat-only boilers are still in use. These boilers can be replaced by more efficient small-scale options (e.g. natural gas-fired gas-engines). This replacement will result in a structural change in local power production.
- Installation of medium and small-scale options in industry, and small and medium enterprises (SME). In the industrial sector major efficiency improvements can be achieved by application of natural gas-fired CHP options. This replacement will result in a structural change in local power production and demand.
- Biomass fired CHP options (wood, straw or biogas fired plants). Although this application is still far from being profitable, its application deserves special attention, because it both contributes to increasing energy efficiency, as well as increases the share of renewable energy.

¹ A Community strategy to promote combined heat and power and to dismantle barriers to its development, European Commission Brussels, 15.10.1997, COM (97) 514 final.

3. BARRIERS FOR COMBINED HEAT AND POWER

Combined heat and power production projects face a number of barriers that prevent further penetration of CHP technologies. The main barriers to CHP in the Slovak Republic can be summarised as follows.

Lacking policy and institutional framework

A policy framework to promote CHP, with CHP targets and priorities, is to a large extent missing. In energy policy CHP has low priority. Furthermore, the present co-operation between the various stakeholders and the Government in the promotion of CHP is rather weak. A strong institutional framework for CHP is required as a solid common basis for improving energy efficiency in the Slovak Republic.

Regulatory framework

At present no regulatory framework for CHP has been established. The proposal of a new Energy Efficiency Act defining the role of CHP is still being discussed. Legally, free access to the grid for independent producers exists. In practice, however, inadequate payment for sales of surplus capacity to the grid and high tariffs for stand-by and top-up supplies offered by the distribution companies, who are natural monopolies and make use of this position, disqualify the CHP alternative. These are key factors impeding the penetration of CHP even in a partly liberalised European energy market. Regarding the future liberalisation of the electricity and gas market, the Slovak Republic has not established regulations for the market opening yet (grid access, transport tariffs etc). In the current proposals, the impact on CHP has not been considered sufficiently.

Pricing and tariffs

Major economic barriers in generation and sale of electricity and heat arise from the distorted prices. Distortions originate in the policy of social acceptance of energy costs for households-industry pays a higher than cost-based price for electricity and gas, while households benefit from cross subsidies. It is expected that these subsidies will be removed by the year 2003.

The electricity network owners (electricity producing utilities) as well as the district heating source owners are natural regional/local monopolies. Up to established maximum limits they can set the prices of electricity and heat individually. No maximum tariffs have been set up for electricity purchased from CHP to the distribution grid. The feed-in tariffs offered by distributors do not allow making sufficient revenues from sales of electricity to the grid. Therefore, the costs of CHP production have to be recovered through the price of heat. Heat production from CHP competes with gas-fired heat-only boilers in the residential sector. With the current low gas prices, high heat prices threaten the competitiveness of CHP.

Financing

The local capital available for CHP investments is scarce and difficult to access. For investments in CHP projects, specific financial institutions other than banks are lacking, like investment funds and other financial groups. The rules for depreciation have been improved in the Slovak Republic, but the impacts of depreciation on the price of heat can make the heat produced in CHP un-competitive compared to heat-only options due to its high capital costs. In-house capital is either scarce or used for investments with higher internal rate of return than those achieved by CHP schemes. The low revenues of CHP schemes make access to commercial financing difficult, due to high price of the Slovak capital.

For lenders, CHP projects are associated with high risks because of existing uncertainties in revenues for electricity sales and in competitiveness of heat. CHP projects are too small to be interesting for international financial institutions and the credit-worthiness of Slovak investors is low. Finally, there is a shortage of trained and skilled staff to develop a bankable CHP project proposal, and investors lack the skills to select qualified external assistance.

Lack of knowledge and awareness

Many potential users and possible investors are not aware of the advantages of CHP, in particular of small-scale CHP. The need for external qualified assistance is underestimated as well as the necessity of proper project development and its relevant cost, despite the fact that lack of experience can lead to large overhead costs for the development of small CHP projects or risk of project failure.

4. POLICY FRAMEWORK FOR CHP

The lack of a clear energy efficiency and CHP policy is a main barrier to the promotion of combined heat and power in the Slovak Republic. The need for a policy framework for CHP is supported by two external commitments of the Slovak Government: first, by signing the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects, the Slovak Republic has committed itself to draw up a programme to support energy conservation, including CHP. This includes relevant legislative and regulatory measures as well as subsequent enforcement. Second, one of the basic political objectives of the Slovak Republic is the accession to the European Union. Increasing the share of CHP is an important objective of the European Commission, which is addressed in the Community Strategy to promote Combined Heat and Power (1997).

In the Energy Policy of the Slovak Republic, the support of CHP implementation has been declared as one of the short- and medium-term goals. Nevertheless no concrete action plan has been elaborated. Without having developed an enabling environment for CHP, the government intends to introduce an obligation of CHP installation in some specified cases in the Energy Efficiency Act. Recently however, this obligation has been removed from of the latest draft of the Act that is intended to come into force from 2001 on.

Given the specific characteristics of CHP technologies, applications and markets, a separate Action Plan is required that would define the policy of the Slovak Government. The CHP Action Plan should formulate the government objectives and targets, and the set of policy measures to achieve these targets, including the role of other stakeholders in the economy, and the assessment of possible costs and benefits of the implementation of the plan. The document will commit the government to its targets and will be a necessary basis for the involvement of the other stakeholders (incl. finance), which must also support the policy. Full account should be taken of relevant European Union regulation and the commitment to the Energy Charter Protocol.

CHP policy is strongly interlinked with energy policy and energy efficiency policy, and, in the case of biomass fuelled CHP, also with renewable energy policy. Its Action Plan should therefore be integrated into the overall energy policy framework of the Slovak Government, and be harmonised with the energy efficiency policy and renewable energy policy. It is recommended that an Energy Efficiency Action Plan and a Renewable Action is also developed and adopted by the Slovak Government².

Figure 4.1 shows the relationship between the (recommended) policy documents and acts.

² See the Energy Efficiency Action Plan and the Renewable Energy Action Plan, which were developed within the framework of the National Energy Efficiency Study Czech Republic (1999). These documents were published in English and Czech by the Netherlands Energy Research Foundation ECN (ECN-C-99-064 and 065), and SRC International CS Prague, respectively.

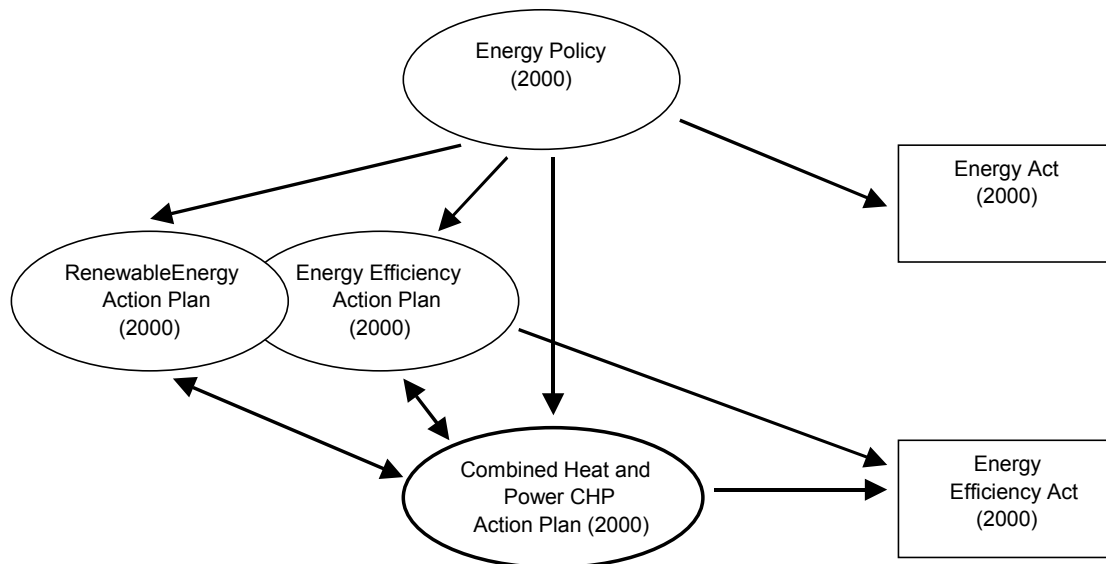


Figure 4.1 Overview of (recommended) policy documents and acts including date of enforcement

After developing a new CHP policy, it is very important to monitor and evaluate the achieved results. Regular policy updates are required to adapt to changing external conditions and changing priorities. This is done on the basis of the actual development of CHP, which will indicate the success of the policy. Therefore a prerequisite for policy monitoring is an improvement of the quality and availability of statistical data, because currently the statistics on CHP utilisation are poor. This is particularly the case with small-size CHP plants, which are not covered by the current statistical system.

Recommended actions - new policy framework

- | | |
|-------------|---|
| Short-term | <ul style="list-style-type: none"> • The Ministry of Economy will propose targets for the development of CHP in the Slovak Republic. • The Ministry of Economy, in co-operation with the Ministry of Finance of the Slovak Republic and the Ministry of Environment, will prepare an Action Plan for the Promotion of CHP • The Ministry of Economy, in co-operation with the Ministry of Environment, will prepare an Energy Efficiency Action Plan and an Action Plan for Renewable Energy. • The Ministry of Economy will ensure consistency between the CHP Action Plan, Energy Policy, the Energy Act, and the Energy Efficiency Act Plan with regard to the promotion of CHP. • The CHP Action Plan will be completed by the Ministry of Economy and approved by the government. |
| Medium-term | <ul style="list-style-type: none"> • The Ministry of Economy in co-operation with expert institutes and institutions will develop specific targets for specific sectors on the basis of the general targets/objectives for CHP development. |
| Long-term | <ul style="list-style-type: none"> • The results of short-term measures will be monitored and analysed and corresponding adjustments will be made in the energy policy/ concept of the Slovak Republic. |

Recommended actions - monitoring and evaluation

- Short-term
- The Ministry of Economy in close collaboration with the Slovak Statistical Office will implement of a new system of statistical data collection from all licence holders on power and heat production to ensure maximal coverage of the CHP production.
 - The Ministry of Economy will separately evaluate the key measures in CHP policy. The impact and costs of the policy measures and possible improvements will be assessed.
 - The Ministry of Economy will elaborate a programme evaluation action plan with more attention to monitoring in the field and feedback of participants.
- Continuously
- The Ministry of Economy will monitor the development of CHP on a yearly basis to be able to assess the progress of CHP policy, and will report on the progress. The annual costs are estimated at SKK 1,5 million per year.
 - The CHP Action Plan of the Slovak government will be updated every three to four years.

5. INSTITUTIONAL FRAMEWORK

A strong institutional framework for CHP is required as a solid common basis for improving energy efficiency in the Slovak Republic. It is necessary to strengthen the role of the Slovak Energy Agency as a central institution responsible for implementation and monitoring of CHP policy. Furthermore, the capacity at the governmental level in the field of CHP should be improved. Finally, international co-operation should be intensified.

Slovak Energy Agency

Currently, the major governmental body responsible for promotion of energy conservation is the Slovak Energy Agency (SEA), which also has an advisory and co-ordinating role. For this purpose, the capacity of the Agency should be increased. It should elaborate a business plan, that would include long-term programmes, incl. programme for the promotion of CHP, their objectives and targets, measures for the programme implementation and indicators of achievement of the objectives, implementing tools incl. financing. The Agency should also develop methodologies for auditing, monitoring, measuring and evaluating of the programmes results. In searching for the best method of CHP conditions analysis, its potential and supporting measures, a model of the CHP Centre has been used in accordance with the contract on the Austrian-Slovak partnership in the energy sector. Co-operation and contacts with expert organisations and associations are being made use of, e.g. with Association of DH producers, Slovak Energy Society (SENES). At present, the Slovak Energy Society is involved in negotiations to become a representative of the Slovak Republic in COGEN Europe.

Extended professional capacity in ministries

In ministries that manage a large building stock, or are responsible for heat and electricity supply or distribute subsidies to energy savings, at least one person should be responsible for energy issues. This person should have a relevant professional background. Currently, only a few ministries employ such experts. Their role will be to monitor the situation in energy consumption and efficiency, to prepare energy saving programmes, to prepare inputs in the government register of investments and to collaborate closely with the Slovak Energy Agency in the implementation of the energy conservation programme in the relevant sector.

International co-operation

The Slovak Republic should play a stronger role in the international networks for the promotion of CHP, in particular COGEN Europe. The contacts with the European Commission should be intensified in the field of CHP, also because increasingly the future potential of CHP in liberalised markets is increasingly a matter of concern in at the European Commission, and some of its Member States. In view of the coming accession, it is important that the Slovak Government informs the Commission on the potential impact of the energy acquis on CHP in the Slovak Republic.

Recommended actions - institutional framework

Short-term

- The staffing of the Slovak Energy Agency will be adopted to the tasks to be carried out (including monitoring and evaluation of CHP programmes).
- All Ministries that manage a large building stock, or are responsible for heat and electricity supply or distribute subsidies to energy savings, will appoint at least one person responsible for energy issues
- The government and respective ministries will intensify the co-operation with the EU and its Member States to benefit from the experience in policy making in the field of the promotion of CHP.

6. REGULATORY FRAMEWORK AND PRICING

Energy and environmental regulation have a strong impact of CHP. In this section, relevant regulatory issues are discussed. Recommendations are given for improvements of existing legislation and the introduction of new regulation.

6.1 Access to the grid, priority dispatching and purchase obligation

In the Slovak Republic, the regulating tasks of the state have been defined in the Energy Act (Act No 70/1998 Coll.). This Act specifies conditions for licensing of businesses in the energy sectors. Its § 18 stipulates that distribution companies are obliged to purchase all electricity from power sources, in case these sources are environmentally beneficial and if it is economically and technically feasible. The environmental benefits have not been specified yet and are being prepared as a part of environmental legislation. The Act thus includes the obligation of power distribution licence holders to purchase electricity from combined heat and power production elsewhere it is technically feasible.

Most CHP schemes are built to meet industrial or community heat demands, so dispatching and heat purchase obligation is not a problem. Heat demand determines power generation apart from some heat storage used to maximise power generation potential during peak periods. Heat distribution companies are obliged to purchase heat from CHP schemes. The obligation to purchase heat may need to be regulated after price stabilisation (in 2003) in order to protect wholesalers and end users from inequitable contractual requirements.

The dispatching and purchase of electricity from CHP plant should be regulated while respecting the EC directives to ensure:

- Priority dispatching for the most efficient systems (in terms of the marginal production costs), incorporating all plants supplying the electricity network. In the summer period, this may put CHP plants at a disadvantage against other power generation systems, but that will depend on the type of plant against which the CHP is being compared.
- Purchase on an avoided cost basis.

6.2 Price and tariff regulation

The price of electricity to be purchased has to be negotiated in accordance with existing pricing regulations. Slovak power companies base the feed-in prices on their tariff structures. The producer and purchaser agree the final price within the given tariff.

The heat price is artificially high because of re-distribution of production costs between power and heat. This has resulted in the need for a subsidy to the heat price in the past. The subsidies have recently been removed. The maximum price has been set up by the state, while the heat price is regulated by district authorities and the Ministry of Finance. The latter has to approve price increases on the basis of justifiable costs in specific cases.

The separation of heat price into fixed and variable elements in a two-component tariff is being discussed at the moment. A single component tariff would be retained as an option for the end user. ESCOs may wish to set minimum and maximum levels of heat purchase in order to guarantee their revenue, but wholesalers and users need to be protected from the setting of inappropriate levels of usage. This protection could take the form of specified usage ranges, recognising the normal quarterly variation in space heating requirements in conjunction with predictable annual variations, or with process demands where sales into industry are being considered.

6.3 Licensing of CHP producers

Electricity supply licences are essential for the promotion of CHP. In Chapter 3, article 6 of the Electricity Directive, the EC states that *'it must be possible for autoproducers and independent producers to obtain authorisation, on the basis of objective, transparent and non-discriminatory criteria'*. The current Energy Act in the Slovak Republic requires that anyone wishing to do business involving the sale of energy to others must have a licence. This is granted by the Ministry of Economy for a period of 20 years. The Energy Act should in the future include a requirement for a licence before undertaking and trading in the electricity business. It will regulate the granting of a licence, dictate the rights and duties of the licence holder and control the purchase of electricity.

The licensing of CHP plants is a barrier only if the licence cost is high and/or if the bureaucratic procedures are lengthy. To prevent this, these two issues should be regulated through stipulation of both the costs for different types of licence (small, medium and large industrial scale) and timetable for approval of the licence application.

6.4 Environmental regulation

There is a positive environmental impact from most CHP schemes, but not from all. New CHP schemes that only partly replace the output from existing CHP or heat-only systems using solid fuel may not produce a reduction in emissions. As the plant loading decreases and fluctuations in output increase (due to the base load effect of the CHP), the environmental performance of the solid fuel plant could be badly affected. A regulation is recommended that would require the review and evaluation of the wider environmental implications of each CHP scheme when solid fuel fired plant is being retained. In general two levels of environmental regulation is applicable on CHP plants:

- Building regulation-Environment Impact Assessment based on the Act No 127/94, which clearly stipulates the way, how the impact of the new technology on the environment should be assessed before the building/operation permission is issued.
- Operational regulation-mainly the Decree No. 92/1996 of the Ministry of the Environment, which sets the emission limits and other conditions for operation of stationary sources of pollution and protection of the environment. This Decree provides the list of air pollution substances, specifies the categories of stationary sources of pollution and technical conditions of their operation, the requirement on monitoring of air pollutants emissions, and finally requirement of quality of fuels.

The basic regulation acts needs harmonisation with the EU legislation. The emission limits should be strengthened, mainly regarding emissions of nitrogen oxides.

Recommended actions - regulatory framework

- | | |
|-------------|--|
| Short-term | • Harmonisation of the environmental regulation with requirements of EU. |
| Medium-term | • Harmonisation of legislation in the environment with requirements of EU. |

6.5 Legal framework

6.5.1 Energy Act

The Energy Act provides the legal framework for the implementation of energy policy (see Figure 4.1) in energy sectors. This Act regulates trading with energy carriers, and has to accommodate steps towards a liberalised energy market in the future. It needs to define the role of energy utilities concerning promotion of renewable energy and energy efficiency, including priority access to the grid for power and heat from CHP and renewable energy and/or obligation of purchase of heat. In terms of access to the electricity grid, provision should be made in the Act to:

- minimise licensing costs and approval procedure time,
- minimise access costs for <500 kWe CHP plant,
- ensure transparency of electricity standby charge calculation (regional basis),
- ensure transparency of electricity top-up charge calculations (regional basis),
- produce a transparent methodology for the priority dispatching of CHP plant based on overall thermal efficiency, particularly for the summer period; no economic disadvantage should result from such a dispatching mechanism,
- provide a means of appeal by customers to a regulator when charges are considered to be unfair.

The general aim of these measures would be to ensure that the electricity supply companies show the reasoning behind and basis for their charges. In terms of heat, the Act should make provision for:

- transparency in the costing of heat for individual schemes,
- guidance in the setting of contractual minimum and maximum levels of heat usage,
- establishment of a methodology for calculating heat costs (e.g. exergy method). This must be discussed with the stakeholders,
- means of appeal to a regulator where charges are considered to be unfair.

6.5.2 Energy Efficiency Act

The Energy Efficiency Act will specify the rights and obligations of private and legal persons in sphere of conversion and consumption of energy, leading to an increase in effective use of energy in the Slovak Republic and to environmental protection. The Act should stimulate reliable energy supply, competitiveness and sustainable development. In the original draft of the Act an obligatory implementation of CHP technologies was required in designing heat and power sources over 1 MW. In the formal proceedings of commenting the draft Act the obligation was cut out of the Act. The final version of the Act will be submitted to the Government and the Parliament for approval by the Ministry of Economy by end of June 2000.

Although the Act addresses some key regulatory issues, it is not enough to secure the future of CHP. Important obstacles for CHP, like gas and electricity prices, the economic viability of schemes, and access to capital, are not addressed in the Energy Efficiency Act. The EU experience has shown that CHP is not likely to be effectively promoted by the use of one single instrument only. Always, a comprehensive policy is necessary, in which a range of instruments, including regulatory, is used, each addressing different barriers. Therefore, the first priority in the Slovak Republic should be the development of a comprehensive policy on energy efficiency, in particular CHP, in which targets are specified and a combination of instruments is adopted, of which regulatory measures are a part. The Energy Charter Treaty also requires this. At the moment, such a policy does not yet exist. A regulatory framework should be implemented only in combination with such a policy.

A key area of concern in the Slovak Republic with regard to the Act is the obligation for energy audits as a means to check the technical feasibility and economic viability of energy efficiency measures, including CHP. Some formalised specification of the output from these audits will be required in standardising the government's approach to this issue. A standardised approach to the calculation of the IRR of CHP projects is also required. This should take into account all the operating cost elements allowing government to fix minimum IRR values for different applications. Finally, the required funding for implementation of the results of audits has not been arranged. Individual sectors are expected to cover the costs of both the audit and its implementation.

7. PRICING AND TARIFFS

The pricing of the products from the combined heat and power production (CHP) as well as the fuel prices are the most important economic parameters of CHP projects (electricity, heat, and gas).

7.1 Electricity prices and feed-in tariffs

Current tariff system

The current tariff system for the sale of power to end-users in the Slovak Republic is based on the average costs of power production and distribution in the power distribution system of the former Czechoslovakia. To date the old fashion tariff system remains in use and is applied with modifications using indexing methods taking into account the development of economic conditions and estimated degree of social bearing of the price increases. The existing tariff system that does not adequately respect the diversity of the needs of individual consumer groups, e.g., the seasonal character of their consumption, diversity of their needs for off-peak and peak energy supply, character of the consumption load curve, etc. It does not ensure that each consumer pays such a price to cover costs incurred by the consumer to power supplier on the power supplied to him. Therefore, power prices are being adjusted and a new tariff system is being prepared. The completion of the adjustment of power prices for households is assumed to continue up to the year 2002 when prices for households and small business with similar consumption and voltage would be levelled. The major aim of the proposed price adjustment process is that all consumers will cover short-term marginal costs.

Impact of liberalisation on electricity prices and tariffs

The Slovak Republic being the associated country to the EU committed itself to implement EU legislation. The opening power and gas market will create completely new environment for both producers and consumers. This will have to be reflected in relevant legislation (Energy Act) in the Slovak Republic, the major steps have not yet been proposed that would accommodate requirements of the EU Directive on the market opening in the electricity sector. The expected major results of the power market opening from the price point of view are:

- Competition can lead to power price drop for some categories of end-users, mainly large consumers and thus reduce the interest for building own CHP plants.
- A reduction of consumer prices would be connected with pressure on reduction of feed-in tariffs from IPPs.
- Competition will ease the access of IPPs to the grid and allow for making negotiations on the level of price mainly if special services can be offered.
- The liberalisation of electricity markets in the United Kingdom resulted in reductions in the price of electricity for industrial users of 15% to 20% and effectively ended many planned CHP schemes. In the Slovak Republic with state control over the power market being retained, it is difficult to predict what can happen. CHP is not to receive any special support. Uncertainty over future energy prices has been a factor in the slow rate of implementation of CHP schemes in the UK. The expected harmonisation of legislation related to power generation seems likely to produce the same uncertainty over prices which is likely to mean that decisions about CHP will be difficult to take.

Feed-in tariffs

Current Slovak energy legislation stipulates that the holders of power distribution licences must purchase electricity from combined heat and power production if it is technically feasible. Although the price of electricity from CHP units could be fixed by the Ministry of Finance of the Slovak Republic (MF), in practice it is assumed that the holder of a licence (regional power distribution company) should purchase the electricity from the independent producers at the 'usual' prices. The 'usual' price in the power sector of the Slovak Republic is determined between the dominant power producer SE and the regional power distribution companies (REAS).

In subsequent years, the feed-in tariff has developed differently in different regions under the influence and market strategy of individual regional power distribution companies and today the individual power distributors (REAS) fix the power feed-in tariff within the framework of their business operations and established practices. It is possible to make an estimate of today's average feed in tariff from CHP sources operated by IPPs at approximately SK 1200-1300/MWh.

For comparison, two possibilities were considered in the Czech Republic: to regulate feed-in prices at a fixed level (e.g. of CZK 1,600/MWh) or to set up the feed-in price on the basis of avoided cost. The first is easy to set up and monitor, but may produce inconsistencies from one region to another. An avoided cost basis would allow each regional distribution company to set its own price for feed-in electricity, reflecting local conditions. This would be more difficult to follow, would require transparency and auditing that could be more costly than the first method.

Standby charges

Fixing a charge for standby capacity tends to lead to a high value to cover the worst situation. This is likely to reflect the dispatching of least efficient plant during high demand periods. Ideally, a retrospective assessment of the real marginal cost would be the fairest approach to this issue since the worst case rarely occurs, but this may not be practical. It would involve complex individual calculations, requiring sophisticated software and would be expensive to establish. An analysis of historical performance would allow the calculation of an average standby cost, perhaps on a regional basis. Average standby cost for the next year would then be calculated with data from the previous year. This method could form part of the fair access regulation.

Top-up charges

Again the danger of a fixed charge is that it probably reflects the worst case, so a retrospective calculation of the previous years average for application in the following year is probably the most practical resolution to this issue. Prices for electricity sold to an 'eligible customer' may be purchased by the buyer at a price equal to the usual sale price to that customer minus transmission and distribution charges. This part of the electricity directive could be applied after electricity prices have been brought in line with the real production and delivery costs (by 2003). These directives and other EU legislation are to be embodied in the Energy Act.

Additional services by IPPs

The current state of the power system of the Slovak Republic does not require that the independent operators of CHP energy sources provide any additional services to the distribution companies when selling electricity to them. The future opened power market however may give an opportunity to the independent small power producers to provide related additional services and thus provide them with a chance to increase their revenues from the power supply to the distribution network³.

This concerns a whole range of important services for the proper operation of power transmission and distribution systems:

- Regulation of output and frequency in the electricity system.

³ Even now some power distribution companies offer a special tariff to CHP plants if they may supply power in peak hours. In general there is a trend to use CHP plants that are connected to individual power distribution systems for load management.

- Long-term reserve output.
- Regulation of voltage and wattless current.
- Reinstatement of power supplies upon failure of the system.

The provision of these additional services by independent power producers including the operators of CHP sources is not so wide-spread in the Slovak Republic and the prices of these products have not been established in the Slovak Republic yet, neither are they stabilised.

Actions to be taken - electricity prices and feed-in tariffs

- Short-term • Comparisons will be made of tariffs and prices with the EU Member States
 Medium-term • Gradual steps necessary for harmonisation will be implemented

7.2 Heat prices in district heating

The latest heat price adjustments in the Slovak Republic have removed the major distortions in energy prices. Currently one price exists only. The development of regulated prices of heat after the year 2000 is still not yet clear. The Ministry of Finance proposes to keep the current regulated price system so that the annual growth rate of heat price would be 3 to 6% depending mostly on the development of fuel prices.

The prices of heat from CHP sources are the result of the calculations carried out by the producers, which is highly dependent upon the distribution of the costs between heat and power production. No single and final method exists for the precise distribution of costs between the two products. The heat source owner is obliged to cover justified connection cost to the heat distribution system. For a new competitive energy market it is proposed to implement a new approach to heat price setting and new rules and methods of heat sector regulation. The current approach to setting of cost-wise regulated heat price would remain as a base for setting the upper price bound which suppliers would not be allowed to overpass. Heat producers and suppliers will base their heat prices on costs of individual parts of the whole chain covering heat production, transmission, distribution and supply to end-user. The price of heat for end-user should be based cost calculation. Cross subsidies among different groups of end-users will not be allowed.

Recommended actions - heat prices

- Short-term • Through gradual steps energy prices distortions will be removed.
 Medium-term • Measures to accommodate market principles will be introduced.
 Long-term • Comparison with neighbouring countries will be made and measures will be taken for improvement.

7.3 Gas prices

In the Slovak Republic maximum prices of natural gas are being set up by the Ministry of Finance for different groups of consumers. There are at present 5 tariff groups according to technical conditions of delivery and the amount of gas consumed. Four tariff groups have two-component tariff, consisting of a fixed monthly payment and a variable component of price of gas. At present the price of gas for small consumers is only 22% higher than the price for wholesale. Prices of natural gas for business sphere have been regulated in monthly intervals by the Slovak Gas Company, who does so on behalf of the Ministry of Finance of the Slovak Republic.

After 2003, a transparent gas pricing structure must be created that will make it easier for the eligible customer to select energy suppliers. From the perspective of the Slovak customer, natural gas price will be composed of the gas buying price at the Slovak border and the price of the services required: transport, distribution or storage.

Recommended actions - gas prices

- Short-term • Comparison of the gas pricing system will be made with the Czech Republic and adjustments will be adopted.
- Medium-term • Pricing and tariff systems will be harmonised with neighbouring countries.

7.4 Levies and taxation

Value Added Tax VAT

The VAT level should be harmonised with the EU level. In case of electricity, the basis VAT rate is applied. The Slovak government wants to apply for exception from the general VAT rules and keep the current reduced level of VAT. If this is not possible, the price of heat in district heating would grow by 16.5%. This may substantially influence the competitiveness of district heating compare to local heating using natural gas and thus reduce the future potential for CHP development.

Green cent scheme

No special price/tariff incentive is available for CHP plants, although CHP technology is more environmental friendly technology than single production of power and heat. The general goal should be internalisation of external costs, which is a long-term process. In the meantime an introduction of the system, which would charge less environmentally friendly technologies and support more energy efficient ones could be promoted by the government.

As an example, the draft Energy Management Act in the Czech Republic, which is being submitted to the Parliament, proposes the so-called Green cent scheme. The scheme introduces the charge of 1 halér/1 kWh (0.03 EUR/kWh) applicable on all electric power delivered to end-users. The charges will create an income of the State Environmental Fund and will be used to support energy saving project and renewables. The draft Energy Management Act does not specify the way in which collected charges will be used to promote energy savings and renewables. This will be done in annual programmes. Clear strategy for money spending should be developed, including the manner in which CHP projects will be promoted.

Energy/carbon taxation

In the European Union and the Slovak Republic, energy or carbon taxes are being discussed as a new instrument of environmental policy. The taxation of energy carriers on the basis of their carbon content (carbon tax) will improve competitiveness of energy efficiency measures and non-fossil renewable energy production and will therefore promote a faster rate of their market penetration. However, it is important that the impact of this taxation is carefully assessed before it is introduced. The tax regime is based on currently discussed proposals in the Slovak Republic.

The introduction of energy taxes is recommended. The tax revenue will be reimbursed to the taxpayers by lowering social insurance payments and other taxes. The tax rates can be established at levels recommended in a study carried out for the Ministry of Environment.

Emission charges

In the Slovak Republic one can distinguish between air pollution charges for large and medium sources, and small sources. In general there are two problems related to current emission charges:

- Sources of pollution of atmosphere operated by physical persons (non-entrepreneurs) with thermal output up to 50 kW remained uncharged.
- Current level of charges is not satisfactory and should be increased. Charges do not yet equal external pollution costs nor do they consistently provide sufficient incentive for polluters to take abatement action.
- The introduction of increased emission charges should be considered. Emission charges involve payments that are directly related to the emission levels. Nevertheless future increase

of emission charges needs to be assessed and compared to possible introduction of environmental tax. In general the following variants exists:

- Parallel existence of both emission charges and environmental tax; and
 - Replacement of the current emission charges system by environmental tax system.
- Analysis performed in the Czech Republic showed that environmental tax system would be given the priority⁴.

Recommended actions - levies and taxation

- Short-term
- The current pollution charges should be reviewed and changes proposed that would motivate polluters to take abatement actions
 - The analysis of impacts of increased emission charges on investments required will be performed and compared with the impacts of introduction of environmental tax
- Medium-term
- A comprehensive system of environmental taxation, that would motivate to pollution abatement will be introduced, compatible with the EU legislation

7.5 Conclusions pricing and tariffs

- The proposed programme for the adjustment of energy prices for end-users should be fully implemented for prices to reflect true economic costs. The finalisation of the price adjustment process is also a necessary precondition for accession of the Slovak Republic into EU and for the opening of energy markets and hence cannot be postponed.
- The introduction of new end-user energy prices should be accompanied by setting new end-user power, gas and heat tariffs that would reflect the time, season, volume and required reliability of energy supply. The electricity, gas and heat tariffs should preferably be two-component tariffs.
- Setting clear and transparent rules for tariff setting should be the main task of the Regulator, more than the approval of individual tariffs. At the same time, a uniform price/tariff of heat should be available in each district heating systems for small heat consumers (households, SMEs). These tariffs should be published. Additionally large consumers should have the right to negotiate the tariff, nevertheless cross-subsidies should be restricted. A supervising role of the Regulator could be needed at least in the transition period.
- The current system where power and heat distribution companies are obliged to purchase all power and heat produced in CHP production reflects the strong regulation of the energy market and cannot continue in the full extend in the future.
- The current system of feed-in tariff setting for electric power purchased from CHP plant at regulated tariff is not in favour of CHP if new CHP plants must compete with old coal fired plants or nuclear power plants. More favourable conditions can be negotiated with power distribution companies if there is a need for power supply in peak hours.
- The opening of the energy market in case of electricity and gas as required by EU Directives will be the key issue which can substantially influence the future development of the market for CHP and namely:
 - Opening competition can lead to power price drop for some categories of end-users, mainly large consumers, which take electricity from high and very high voltage grid and thus reduce the interest for building own CHP plants.
 - General reduction of consumer prices would be connected with pressure on reduction of feed-in tariffs from IPP.
 - Opening the competition will ease the access of IPP to the grid and allow for making negotiations on the level of price mainly if special services can be offered.
 - CHP plant operators could offer a whole range of important services for the proper operation of power transmission and distribution systems, like regulation of output and frequency in the electricity system, long-term reserve output, regulation of voltage and

⁴ Update of the analysis of the impact of the environmental tax reform on households and entrepreneurs. IEEP, Prague, 1999.

wattless current, and reinstatement of power supply upon failure of the system. This could substantially improve the economic viability of many CHP projects. The provision of these additional services by independent power producers including the operators of CHP sources is not so widespread in the Slovak Republic and the prices of these products have not been established yet.

- The EU Directives does not explicitly mention the opening of heat market. Nevertheless the heat market is very important in the Slovak Republic even if it has regional character. The opening of the electricity and gas markets will largely influence heat market as well. Hence much attention should be paid to the development of heat markets. It is not yet clear if the heat market will be regulated on the national or regional level in the future. This can be a crucial problem for the future development of CHP and thus should be treated with care.
- The protection of the global, national and regional environment will be given higher and higher priority. In this process CHP production can play a positive role as being more environmental friendly technology compare to the single production of power and heat. On the long-term environmental externalities could be internalised in energy prices. In the meantime other measures should be implemented to promote energy efficient and environmental friendly technologies like CHP production (green cent, emission charges, and environmental tax). The government should set priorities and propose a plan for introduction of these measures.

8. FINANCING OF CHP PROJECTS

8.1 Introduction

The wide range of technical designs and applications of CHP schemes results in a wide range of methods of financing. The financing structures of a CHP plant show fundamental differences, depending on the individual features of the project. The following financing sources are available for energy investments: 1) in-house capital (own capital sources), 2) grant financing incl. international preferential loans, 3) loans from international financial institutions, and 4) commercial loans. Third-party ownership participation can also ease the access to loans. The following ways of support to investments belong to this group: 1) privatisation, 2) Energy Service Companies (ESCOs), and 3) leasing.

Especially for CHP investments loans, and to a limited degree grants and third-party financing are the major financing sources used when the decision is made on investing into modernisation of the heat/and power sources and networks in the Slovak Republic. Most industrial energy utilities and all district-heating systems in the Slovak Republic are privately owned and have to rely on the capital from the market for new investments. Private owners of the DH systems include foreign companies and banks, domestic investors (banks, funds, individuals), municipalities, in very small portion management and employees. The amount of shares owned by other individuals is nearly negligible. The mix of owners differs very widely from one DH system to another. In industry outsourcing (i.e. purchase of energy supply from outside supplier) has become very popular (mainly after production drop) and many industrial companies have sold their energy utility.

8.2 Support from state and international funds

Some grant support and soft loan schemes are available for CHP projects in the Slovak Republic:

- The Ministry of Economy of the Slovak Republic.
- The Ministry of Agriculture.
- PHARE fund of the Ministry of Environment
- Loans from international financial institutions under preferential conditions

All these funds apply to small-scale CHP units also. However, the number of supported installations is small, The funds have only a very small impact on the market penetration of CHP for the following reasons: 1) limited available funds, 2) difficult and time-consuming application procedure, and 3) lack of experience and capacity in project development.

8.3 Conclusions and recommendations

- The project development phase is often underestimated (both in time requirements and the related costs) by those who intend to invest in heat source reconstruction or building.
- Especially for CHP investments the net profit, depreciation, loans, to a limited degree grants and third-party financing are the major financing sources used when the decision is made on investing into modernisation of the heat/and power sources and networks.
- For industrial and commercial sector any CHP project is site-specific and profitability is given in case the tariffs for electricity purchase by the plant is significantly higher than own electricity production in CHP source. Even then, the power capacity installed must be well adjusted to the needs of the plant so that the sales of electricity to the grid are minimised.

- Fiscal measures that are directly influencing economics (revenues) of CHP schemes should be prioritised against investment support, because they are ‘market productive’ and non-discriminatory. These may include either *fixed feed-in tariffs* for CHP producers, diversified according to the power installed capacity or *tax deductions* for CHP technology producers, and for companies producing electricity and heat in a CHP unit. In case of fixed feed-in tariffs, the state support should provide for reimbursement of distribution companies for the fixed feed-in tariffs to keep the competitive environment for them fair.
- The direct investment support is selective and hence ‘not market fair’, mainly in case of private investors. Yet it has proven as efficient tool for CHP promotion mainly in case of small CHP installations, financed from in-house capital. Maximum transparency needs to be maintained in the overall scheme to make the selection of projects and the decision making process easier.
- Long-term loans (at least 7 years) with preferential interest rate that would allow to repay the CHP investment without significant increase of heat price and threatening the competitiveness of heat on the market are the best way of financing in municipal district heating systems in addition to third party finance, in case it is providing similar advantages.
- Conditions of commercial loans have improved and on the basis of a well-prepared project proposal, banks are able to offer much better conditions than last year-lower interest rate (even below 10%) and longer repayment conditions.

Recommended actions - financing

The role of the Slovak Government should mainly consist in removing barriers that deform the market for CHP and facilitate financing of CHP projects. The following actions can be taken:

- Short-term
- To reduce the external political risk to CHP investments, i.e. to introduce cost-based pricing and thus remove unfair competition environment for heat supplies.
 - To alleviate market risk-support increased and reliable revenues from electricity and heat sales through improved feed-in tariffs for electricity sales, improve heat tariff structure, improve enforcement of non-payments for heat.
 - To increase support to CHP installations, mainly through soft-loan schemes, which does not exist yet in the Slovak Republic. Public entities in the Slovak Republic should be supported by extended access to direct subsidy for CHP installations.
 - Promotion of project development phase (as described in and economic and financial expertise) should be enhanced by the Slovak Energy Agency in order to improve access to commercial funding.
 - Provision of information should be improved on successful CHP installations, on companies involved in project development phase, design, installation, third party financing, and EPC through an information network, that would be easily accessible. The information should allow for detailed reference list, i.e. for the possibility to verify the information and experience of investors with companies.
 - Regarding Joint Implementation, the Slovak Republic should pursue and develop Joint Implementation as possible source of financing for CHP projects.
- Medium-term
- The state support should be increased in the future, since with the gradual removal of price distortions the demand for CHP support will rise.

9. OTHER MEASURES

9.1 Information and awareness

Many potential users and possible investors are aware of the advantages of CHP, in particular of small-scale CHP. Therefore, providing information on CHP and raising awareness is a crucial component of the CHP Action Plan. In the Slovak Republic, a nation-wide information campaign on energy conservation has not been carried out since 1990. On the short term, an information campaign for small-scale CHP should be launched. The information campaign should focus on best practice CHP technologies and projects in the Slovak Republic. Key stakeholders in the field of CHP, particularly COGEN SENES, Slovak Association of Employers in Power and Heat Sectors and the Slovak Gas Union, and branch organisations in industry and the service sector should be involved in the information campaign.

The regional authorities should be involved and should provide within own competence a promotion to activities oriented to reduction of energy intensity and use of alternative energy sources included a support to R&D in this sphere and to define it in concrete form in regional plans. For industry, CHP is an important technology for energy efficiency improvement. The Energy Efficiency Action Plan recommends to focus energy efficiency policy in industry in the short term on providing information and raising awareness, and reducing the transaction costs by providing financial support to feasibility studies and project development in the form of subsidies and expertise. CHP should have a prominent role in these activities.

Recommended actions - information and awareness

- | | |
|-------------|--|
| Short-term | <ul style="list-style-type: none">• The CHP Action Plan developed by the Ministry of Economy will include a strategic awareness and marketing plan for CHP. This plan should cover all target groups and use a wide variety of instruments. Utilities will also play a role in information dissemination to the public.• The web site of the Slovak Energy Agency will be extended to include information on benefits of CHP, project development cycle, external assistance available, funds available, etc. |
| Medium-term | <ul style="list-style-type: none">• The tasks and staffing of the Slovak Energy Agency will be based on the strategic awareness and marketing plan. A better access to its services in will be supported. Regional EKIS centres will have improved access to information. |
| Long-term | <ul style="list-style-type: none">• Methods of information exchange will be improved, awareness of the public on energy and environmental issues will be increased using successful practices applied in the EU. |

9.2 Standard contracts for small-scale CHP

The large overhead costs for the development of small CHP projects and the necessity for power purchase contracts are important barriers. These can be reduced if standardised projects and a standard contract for small-scale CHP are prepared. The standardised projects would include rules for the preparation of CHP projects of various types and capacity, including rules for submitting applications for funding from various sources (commercial sources and grants), information about planning procedure, licence and authorisation granting, etc.

The standard contract would include conditions of electricity pricing and of setting transmission and distribution/transportation charges, standard conditions for grid connection and standard legal clauses. Experiences in France and Spain have demonstrated the benefits of such contracts.

Recommended actions - standard contracts

- Short-term
- 2000: Ministry of Economy will prepare in co-operation with CHP organisation and the electricity and gas sector standard contracts for small CHP run by IPPs, and promote the use.

9.3 Tradable Green Certificates (biomass-fired CHP)

To realise environmental targets in a liberalising market the design and implementation of policy measures and incentive schemes have to be in accordance with free market principles. Current incentive schemes, most of which have been established in the pre-liberalisation situation, might not be able to fulfil this requirement. This underlines the need for new policy measures that are more in coherence with the new market environment. The major characteristic of a green certificate system is that electricity produced by renewable sources is certified. These certificates have two purposes. First, they can serve either as an accounting mechanism in case obligations set by the government have to be met, or as a proof to customers of green electricity that a certain amount of renewable electricity has been produced. Second, green certificates facilitate the creation of a green certificate market that functions independently from the market of electricity as a commodity. In the European Union, this instrument is being discussed and is already implemented by some Member States. The Slovak Republic should consider the introduction of tradable green certificates in renewable energy policy as a part of the approximation process to EU policy.

9.4 Research, Development & Demonstration in CHP

At the moment, no state programme exists for the stimulation of research and development in CHP. Given the extent of the research activities in other countries, RD&D priorities in the Slovak Republic should not focus on technology research and development, nor on standard fuel technologies (natural gas). The priority is the demonstration of those specific technologies that are most relevant for the Slovak Republic, e.g. utilisation of biogas, industrial flue gases, and interconnection of CHP installations with the public grid. The Slovak Government should actively support and co-finance the Slovak participation in energy RD&D programmes of the European Union, particularly the SAVE II and ALTENER programme of the EU, and the 5th Framework Programme.

Recommended actions - RD&D in CHP

- Short-term
- 2000: The Ministry of Economy will establish criteria for and introduce grants for R&D activities in CHP. The programme will continue in the period 2001-2010. The annual budget will be set up after specific, detailed analysis will be made.
- Middle-term
- 2000-2005: The Ministry of Economy and the Slovak Energy Agency will arrange co-ordination of the RD&D activities in CHP, including possibilities of co-financing EU programmes from Slovak sources. The annual budget will amount to SKK 80 million (all energy RD&D projects).
 - 2000-2005: The availability of CHP technologies will be enlarged by promotion of demonstration projects and stimulating the co-operation of Slovak industry with manufacturers in the EU and other countries.
- Long-term
- 2001-2010: Apart from the support to R&D stated above, the focus support will be on demonstration of CHP projects. The annual contribution of the Slovak Energy Agency for demonstration in CHP will be set up according to criteria similar to those in the Czech Republic.