Instruments and Options for Environmental Policy during the Accession Process of EU Associated Countries in the Area of Environment and Energy

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In addition to this volume, which provides general and comparative analysis and conclusions, a country report has been compiled for each Accession Country (Czech Republic, Estonia, Hungary, Poland and Slovenia). These country reports include the contributions of the co-operation partners in the Accession Countries as well as comprehensive data annexes.

The country reports are available on CD only, which is attached at the end of this volume. They are not edited by the authors of this study and should be considered as documents, upon which the analysis of this study is based.

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1 Introduction

More than four years ago the European Union (EU) decided to start negotiations on accession with possible new member countries. The Czech Republic, Estonia, Hungary, Poland and Slovenia were the first countries to be accepted into the formal accession process. These countries are accordingly the called Accession Countries.

With regard to the leading role of the EU and of individual countries such as Germany in climate protection policies and strategies in general, it is important to consider the impact of the accession process on EU climate policy. CO_2 emissions of the Accession Countries amount to at least a fifth of the carbon dioxide emissions of all 15 EU countries. Accession countries' CO_2 emissions will not influence EU commitments for the first commitment period from 2008 to 2012. However, it is important to pay early intention to the Accession Countries, because they will be included in the European commitment for the second commitment period beginning 2013.

Taking this into account, the German Environmental Protection Agency (Umweltbundesamt) commissioned a comprehensive study to analyse the options and capabilities of the five Accession Countries in the field of environment and energy. This study was carried out by research institutes in Germany in co-operation with research institutes in the five Accession Countries. The study included the analysis of the most important issues, namely:

- Status quo and development of the energy sector and structural CO_2 mitigation options;
- Legal gap assessment and analysis of performance in the accession process;
- Identification of implementation patterns through detailed policy analysis;
- Evaluation of co-operation projects in the field of environment and energy in order to develop new projects that promote the accession process.

This volume includes comparative analysis with regard to the above mentioned topics, that was conducted and terminated in April 2000 by the German team. The detailed analysis of each Accession Country, which has been carried out by co-operation partners in the individual countries, are documented in five country reports, each in a separate volume.[1]

In the first stage of the study, developments in the Polish, Hungarian, Czech, Estonian and Slovenian energy sector are assessed, along with general socio-economic, environmental and climate-policy developments in those countries since 1990 (section 2). As a result of these analyses, priority areas for environmental and climate policy have been identified.

In stage two the study then summarises systematically the composition of the energy- and environment-related *acquis*

[1] The country reports are available on CD only, which is attached at the end of this volume.

communautaire, that is, the relevant EU legislation (regulations, directives and decisions) and strategies in the field of environment and energy (section 3). This compilation lists not only the regulations but also relevant political objectives and strategies of the European Commission.

The third stage of the study consists of an assessment of the extent to which environmental provisions relevant to accession have already been implemented, have been introduced into the legislative process or are planned in the respective countries. This legal gap assessment was made in close co-operation with project partners in the Accession Countries (section 4). The legal gap analysis prepared by these project partners has been complemented by existing country analyses conducted, inter alia, by European Institutions. As a result, an analysis has been made of the extent to which existing legal gaps might be closed by the Accession Countries at the prospective date of accession.

Stage four of the study deals with progress made concerning the implementation of relevant regulations (section 5). General patterns of environmental and energy policies in the respective countries have been examined. This analysis embraces policy style, instruments used and the budgetary and institutional context. In a comparison of the political and economic frameworks of the Accession Countries with those of EU Member States, the extent has been ascertained to which these conditions need to be adapted further.

The study has prepared, in stage five, a representative list of existing projects of bilateral or multilateral co-operation in the field of environment and energy. The analysis of these projects focuses mainly on transferring 'best practice' and on the identification of criteria for the development of new co-operation projects (section 6).

Finally, conclusions have been drawn concerning existing deficiencies, and recommendations have been detailed on future action for the Accession Countries (section 7), once again in close co-operation with project partners in the Accession Countries.

2 Status quo in the sphere of environment and energy

The starting point for an evaluation and assessment of the accession process for each Accession Country is a detailed analysis of its development with regard to environment and energy since 1990. This analysis is based on socio-economic as well as energy and environmental data from international sources (OECD, EU, UNFCCC etc.). Additional data has been provided by the co-operation partners in each Accession Country.

In Sections 2.1 to 2.5 each Accession Country is assessed separately. A comparative analysis, which includes all Accession Countries as well as EU and German developments in the field of environment and energy, is provided in Section 2.6. As a result of this analysis, priority areas for environmental and climate policy have been identified in Section 2.7.

2.1 Czech Republic

2.1.1 Demographic and economic trends

The Czech Republic has about 10 million inhabitants. The total population remained comparatively stable during the nineties. However, the population for the age-group 15 to 64 (economically-active population) increased by 3% (World Bank 1999), which gave added impetus to the already-increasing unemployment rate (7.5% in 1998, MOP 1999, p. 265). Employment in agriculture was cut by half between 1990 and 1997, and by one quarter in industry. Only employment in services increased slightly by 20%.

The number of dwellings increased by about 2%, which caused a decline in average occupancy from 2.8 to 2.7 persons per flat. The average size of a flat was 71 m² in 1991. Although detailed assessments on the average flat are not available for recent years, it is very likely that the average size has also increased slightly.

With the commencement of the transition period the economy declined sharply. Real gross domestic product (GDP) decreased between 1990 and 1992/93 by 20%. Since then the economy has grown again and reached 92% of its 1990 levels in 1997 (World Bank 1999).

2.1.2 Primary energy supply

Total primary energy supply (TPES) decreased from 47 mtoe (million tons of oil equivalent) in 1990 by nearly 25% in 1991. In 1992 it increased again to about 40 mtoe and remained at this level until 1997.

2.1.2.1 Development of the primary energy structure

Primary energy supply was dominated by solid fuels (coal). But the share of coal decreased steadily by 10 percentage points from 62% in 1990 to 52% in 1997. The share of all other fuels increased slightly by about 2% (oil: from 18 to 20%, others – mainly uranium – form 8 to 10%), with the exception of gas. The share of natural gas increased

form 11% in 1990 to 18% in 1997 (DG XVII 1998).

In absolute terms the picture is as follows: The consumption of solid fuels decreased by 28% from nearly 30 mtoe to 21 mtoe in 1997. The consumption of oil and other fuels decreased slightly in the first years of that period but increased again after 1993, and in 1997 is only slightly below (oil) or above (other fuels) 1990 levels. Only the demand for natural gas increased constantly during that period, and was in 1997 more than 40% above the level in 1990.

2.1.2.2 Energy imports and exports

The Czech Republic is a net exporter of coal (solid fuels), and imports nearly all of its domestic oil and natural gas demand. Some of the decline in domestic coal demand has been compensated by increased coal exports. In 1990, 17% of domestic production was exported. This figure increased to about 23% in the following year, and has remained at this level until today. In absolute terms exports of solid fuels increased by 20% from 5.9 mtoe in 1990 to 7 mtoe in 1992. Thereafter they decreased slightly but in 1997 are still 3% higher than in 1990.

Nearly all domestic demand for oil and natural gas is covered by energy imports. Domestic production of these fuels is marginal. The increased share of natural gas therefore resulted in a visible increase in natural gas imports of more than a half.

2.1.2.3 Primary energy consumption per capita

Primary energy consumption per capita was about 4.6 toe in 1990. In the following year it dropped sharply by 22%, but increased again to 4 toe per capita in 1992 (87% of the 1990 level). Thereafter it remained more or less constant at that level. Czech primary energy consumption per capita was 20% above the EU average in 1990, but dropped sharply to the EU average in 1991, where it remained until 1996.

2.1.2.4 Primary energy supply per GDP

The energy intensity of the Czech economy did not follow a clear trend. In 1990 about 0.4 kg oil equivalent were used to produce one $US\$_{1995}$ of GDP (calculated with purchasing power parities). Czech energy intensity during the period 1990 to 1996 remained at a level about twice as high as the EU average. The development of this indicator did not follow a clear trend. The intensity decreased in 1991, but increased again to 108% of the 1990 level in 1992. Thereafter energy intensity showed a constant decline to 96% of the 1990 level in 1996.

2.1.3 Final energy consumption

Total final energy consumption dropped sharply by a quarter between 1990 and 1991, but then remained more or less stable at this level. This was mainly due to the decline in demand for solid fuels, which decreased in the period to 1996 to a third of 1990 levels. In contrast, the demand for heat increased by a factor of

2.5 between 1990 and 1996. The demand for natural gas increased – compared to heat – by merely 40%. Oil and electricity consumption decreased in the first years of that period, but then increased again almost to the 1990 level (electricity 104%, oil 95%).

Due to these developments, the share of solid fuels decreased from more than 50% to nearly 20% in 1996. The share of both gas and heat increased in 1996 by 11 percentage points to 23% and 15% respectively.

Half of total energy consumption is effected in the industrial sector. Despite the ups and downs in the Czech economy this share hardly changed during the nineties. In contrast, the share of the transport sector increased from 9% to 15%, whereas energy consumption in the commercial and residential sector declined from 42% in 1990 to 35% in 1996.

In absolute terms consumption declined by 25%, from 33.6 mtoe in 1990 to 25 mtoe in 1991. Thereafter it remained more or less at this level. The development of energy consumption in industry paralleled the development of total final consumption. More than 14 mtoe of final energy were consumed in the commercial and residential sector in 1990. However, consumption dropped by around 35% to about 9 mtoe in 1996. By comparison, final energy consumption in the transport sector seems to be of minor relevance. In contrast to the overall trend, final consumption increased by a quarter from 3 mtoe in 1990 to nearly 4 mtoe in 1996.

2.1.4 Electricity generation

Gross electricity generation decreased only slightly, by 7%, between 1990 and 1994 but then increased again, so that in 1996 it was slightly above the 1990 level. More than three-quarters (77%) of electricity is generated in thermal power plants exclusively fired by coal. But in 1995 electricity generation from natural gas began, although the share of natural gas for electricity generation is still below 5%. A quarter of electricity is generated in combined heat and power (CHP) plants. The share of CHP is slightly increasing, and reached nearly 30% in 1996.

About a fifth (20 - 22%) of gross electricity generation comes from nuclear power plants. The share of hydro and wind was only 2.3% in 1990 but increased nonetheless to 3.1% in 1996 (+35%).

Electricity imports and exports of the Czech Republic are nearly balanced, although there is substantial electricity trade with its neighbours. During the nineties it imported between 4 and 8 TWh from Poland, and in some years between 1 and 2 TWh from Slovakia. Electricity exports went also to Poland and Slovakia. Additionally, there were electricity exports to Germany and Austria of between 1 and 3 TWh. Compared to gross domestic generation, the difference in the balance of electricity trade is below 1%. Compared to electricity consumption it is mostly around 1%, except for the period between 1992 and 1993, when net electricity exports increased to nearly 7% of domestic electricity consumption.

2.1.5 District heating

At the beginning of the nineties more than 1.5 million households were connected to district heating systems. By 1995 the number of households had declined by 50,000, but it increased again thereafter. It is projected that the 1990 level will be exceeded by the year 2000. The total length of the district heating system is more than 4,000 km, with a slight increase in the second half of the nineties, although installed grid capacity dropped from more than 22,000 to less than 20,000 MW in the same period. Distribution losses went down from nearly 14% in 1990 to less than 12% in 1998.

2.1.6 Energy markets

2.1.6.1 Electricity

The largest electric energy producer is CEZ, jsc., with an aggregate installed capacity of approximately 11,000 MW. In 1997 CEZ's production represented 48,008 GWh, which is nearly three-quarters (74.3%) of gross electricity generation in the Czech Republic.

CEZ jsc. sells most of the electricity it generates to the country's eight regional electricity distribution companies, which in turn distribute electricity to end-users. It also supplies electricity directly to a few large industrial facilities.

Electricity sales to regional distribution companies in 1998 differed considerably from company to company. The largest distributors according to electricity purchases in 1998 are:

- Severomoravska Energetika, jsc.
- Jihomoravska Energetika, jsc
- Stredoceska Energeticka, jsc.

2.1.6.2 Natural gas

The Transgas company operates natural gas transit pipelines through the Czech Republic, and supplies natural gas to regional gas distribution companies. Eight regional gas companies, responsible for gas distribution, supply natural gas to other consumers.

The gas industry of the Czech energy sector has undergone development over the past years. Natural gas has become a synonym for environmental improvement. Natural gas purchases of 9,343 billion cubic meters in 1998 was effected under contracts for Russian natural gas – from Gazexport (Russia) and Wintershall (Germany) – and under those for natural gas imports from Norwegian producers Statoil, Norsk Hydro, Saga Petroleum and Total Norge. A small quantity was delivered from Czech resources – MND Hodonin. During the last five years consumption has grown by 31%.

The three biggest distributors are:

- South Moravian Gas, jsc.
- North Moravian Gas, jsc.
- Prague Gas, jsc.

The network of high-pressure and very high-pressure pipelines was developed mainly within the framework of the natural gas subsystem. In the town gas subsystem pipelines were also built, as later required for the switch to natural gas by town gas consumers. The total length of transmission pipelines in-

creased since 1994 from 24,000 to 33,500 km, which is an increase of about 40% within four years. Parallel to that, the number of consumers also increased, but not at the same pace (+13%).

2.1.6.3 Heat

Heat generation from central sources is utilized on a large scale in the Czech Republic. Most heat is generated in combined heat and electricity systems in large-scale plants. The great majority of heat plants has been privatized, and amongst current owners there are also many foreign investors.

The largest heat suppliers, according to the share of heat supply in respective categories (power and heat plants, including industrial plants) are:

- Moravskoslezske teplarny, jsc., that supplies five important towns in the North Moravia region: Ostrava, Olomouc, Prerov, Krnov and Frýdek-Mistek. 54 boilers produce heat and electricity. Total grid length is 470 km and heat power capacity is 2,267 MW.
- Prazska teplarenska, jsc., that supplies the city of Prague and the surrounding area. A lot of work has been done on switching fuel – brown coal to gas. Further investment has been made in the district heating system from Melnik II power station to Prague and in heat distribution to heat exchangers.
- CEZ, jsc., that produces heat as part of the production of electricity. Turnover of heat is approximately 4% to 5% of total production.

The CEZ, jsc. company operates great capacity sources, mainly combined heat and electricity generating plants. From these plants piping and primary distribution lines for steam and hot water are fed to exchangers. The heat exchanger stations are usually operated by customers, secondary distribution lines mainly by the proprietors of the facilities heated.

Industrial producers, themselves consuming the major part of the generated heat and selling only a small part to housing authorities and other clients, gradually decrease production on changes in ownership. According to the transformation process, the delimitation of some plants outside the CEZ company came into effect. There are also a large number of heating sources in public or municipal ownership.

2.1.6.4 Development of prices

Trends in energy prices are very heterogeneous. However, some remarkable patterns can be identified. In general, prices in real terms for electricity, fuel oil and natural gas increased substantially between 1990 and 1997, whereas the price for (district) heat decreased slightly.

Real electricity prices for industry, measured in CZK, increased by a factor of 5.8 between 1990 and 1991, but came down again after 1992 to about 390% of 1990 levels in 1997. The increase for residential use of electricity reached its peak in 1992 (340% of 1990 levels) and declined thereafter to about 270% of 1990 levels.

The pattern for natural gas is somewhat similar. First a sharp increase, then a constant decline, but still well above 1990 levels (430% for residential use, 330% for industry).

The development of fuel oil prices is rather different. For residential use it decreased first by 50% (1992) and then increased to 230% of the 1990 level in 1997. The price for fuel oil in industry first increased to 280% of the 1990 level but decreased thereafter until 1994 (180% of 1990 level), when it started to increase again up to 390% of the 1990 level in 1996.

In contrast, the price of heat decreased, both for residential use and industrial purposes. For the residential sector it decreased by nearly 50% between 1990 and 1994, but increased again to 70% of the 1990 level in 1997. The heat price for industry decreased by 45% between 1991 and 1996.

In general, energy prices increased sharply between 1990 and 1991/92 (due to economic decline and liberalization strategies, then decreased slightly, but still remain substantially above the 1990 level.

2.1.7 Energy and the environment

2.1.7.1 Greenhouse gas emissions

Greenhouse gas emissions (three-gas basket) dropped between 1990 and 1994 from about 190 to nearly 147 million tons of greenhouse gas equivalent (GHGE). This corresponds to a decline of 22%. From 1995 GHG emissions started to increase again to about 158 million t GHGE in 1997, which is still 17% below 1990 levels. Almost nine-tenths (88%) of these GHG emissions derive from fuel combustion, although this share has decreased slightly to 86% in recent years.

With regard to individual greenhouse gases developments are as follows: 88% of GHG emissions are CO_2 emissions. The share of methane (CH_4) decreased between 1990 and 1997 from 9% to 7%, whereas the share of N_2O increased from 4% to 6%.

More than 18 t GHGE were emitted per capita in 1990. This was 60% above the EU average (11.5 t GHGE/cap.). Parallel to absolute emissions, per capita emissions decreased sharply until 1994, but then increased again. However, in 1996 they were still 16% below the level for 1990 and only 30% above the EU average, which decreased only by 6%.

Carbon intensity – calculated by the ratio of overall GHG emissions to GDP at 1995 real purchasing power parities – showed a quite different development. Due to economic decline it grew between 1990 and 1991 (+8%) but then dropped until 1996 (1.4 kg/US$). With the increased pace of the economy it again started to grow to 1.5 kg/US$ in 1997, which is still 9% below the figure for 1990. However, the carbon intensity of the Czech economy was in 1990 2.5 times higher than the EU average. As carbon intensity in the EU decreased slightly faster than in the Czech Republic, Czech carbon intensity is still much higher than the EU average.

All airborne emissions declined sharply. SO_2 emissions dropped to a third of the

1990 level, NO_x emissions were nearly cut by half, and VOC emissions declined by 18%.

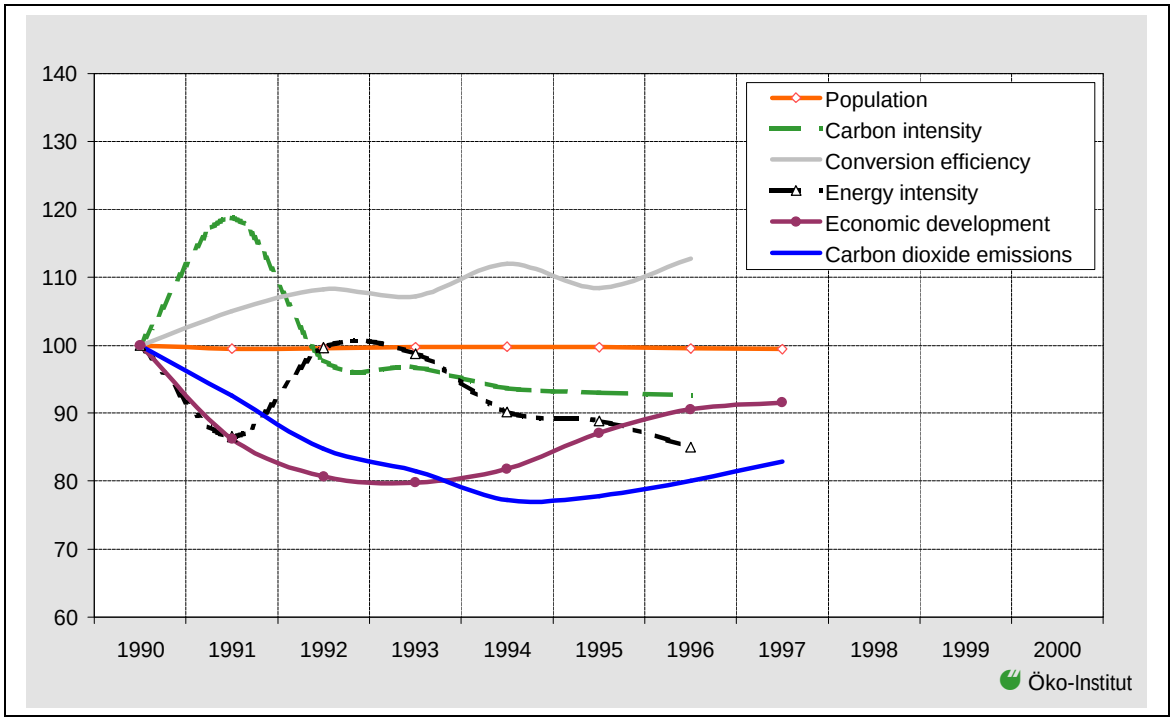
2.1.7.2 Driving forces

The following figure shows five key factors (forces) that influence the development of CO_2 emissions, namely

- population growth;
- carbon intensity, measured by the ratio of CO_2 emissions to total primary energy supply, indicates whether the primary energy structure has developed towards less carbon intensive fuels or not;
- conversion efficiency, which, calculated on the basis of total primary energy supply divided by final consumption, shows how the efficiency of energy conversion, in particular electricity generation, has developed;
- energy intensity, which, calculated on the basis of total final consumption divided by GDP at constant 1995 purchasing power parities, shows how much energy has been used to produce one unit of domestic production;
- economic development, which is represented by per capita GDP at constant 1995 purchasing power parities.

Together, all these factors could be used to analyse the development of CO_2 emissions using the following formula:

Figure 1: Driving forces of Czech CO_2 emissions



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

$$CO_2 = POP \cdot \frac{CO_2}{TPES} \cdot \frac{TPES}{TFC} \cdot \frac{TFC}{GDP} \cdot \frac{GDP}{POP}$$

with

CO_2	*CO_2 emissions*
POP	*Population*
TPES	*Total primary energy supply*
TFC	*Total Final Consumption*
GDP	*Gross domestic product at constant 1995 purchasing power parities*

(OECD 1999, p 29).

Population growth has obviously not influenced the development of CO_2 emissions in the Czech Republic. In contrast, economic development did have a substantial impact. The economic decline between 1990 and 1992/93 was mainly responsible for the decline in CO_2 emissions in the Czech Republic. Energy intensity showed an unstable development. It first fell, then increased again, but decreased constantly after 1993. In particular, the improvement after 1993 was responsible for the only slight increase in CO_2 emissions, although the economy started to grow again substantially. This was also supported by improving carbon intensity, which decreased slightly after 1993. In contrast, conversion efficiency decreased[2] by about 10% during the nineties, which offset some of the positive effects in energy and carbon intensity. Thus, efforts to improve conversion efficiency should have a key part in a Czech strategy for greenhouse gas mitigation.

[2] According to the definition of conversion efficiency as TPES/TFC, the indicator increases if efficiency declines, corresponding to an increasing curve.

2.2 Estonia

2.2.1 Demographic and economic trends

Estonia has about 1.5 million inhabitants. The total population slightly decreased during the nineties (-8%). The economically-active population in the age-group 15 to 64 decreased even more between 1990 and 1998 (more than 15%, World Bank 1999). Unemployment rates close to the EU average may be one of the major individual reasons to look for work outside the country (10.5 to 10.0% between 1996 and 1998, MOP 1999, p. 85).

The number and average size of dwellings did not change between 1995 and 1998. However, the decline in population caused a reduction in average occupancy by 4%. In 1998 each flat was occupied, on average, by 2.3 persons. The average size of these flats was 53 m².

With the start of transition the economy made a sharp decline. Real gross domestic product (GDP) decreased between 1990 and 1993/94 by 35%. Since then the economy has grown again, and it reached about 80% of its 1990 levels in 1997 (World Bank 1999).

2.2.2 Primary energy supply

Total primary energy supply (TPES) decreased from 10.4 mtoe (million tons of oil equivalent) in 1990 by about 50%

by 1993, and remained at that level (5.2 to 5.7 mtoe) until 1997.

2.2.2.1 Development of the primary energy structure

Primary energy supply was dominated by solid fuels, mainly oil shale. The consumption of solid fuels decreased in absolute terms by 35%. However, its share increased, due to the sharper decline of other fuels, from less than two-thirds to about three-quarters.

Oil consumption decreased from more the 3 mtoe in 1990 to merely 0.3 mtoe in 1997. Corresponding to this the share of oil decreased from 30% in 1990 to 3% in 1997.

In absolute terms the consumption of gas decreased by 50% from 1.3 mtoe in 1990 to 0.6 mtoe in 1997. However, as this is in line with the overall decline, the share of gas remained more or less constant at about 11% (DG XVII 1998).

2.2.2.2 Energy imports and exports

Estonia is a net importer of energy. During the nineties about 40% of its domestic energy demand was imported. Parallel to the decline in total primary fuel supply. Imports decreased from 4.6 to 2.3 mtoe between 1990 and 1996. Nearly all domestic demand for oil and natural gas is covered by energy imports. Due to the decline in domestic oil and gas demand, imports of these fuels decreased accordingly.

Imports of solid fuels decreased from 0.8 to 0.5 mtoe. This is about 30% less in 1996 than in 1990. However, compared to the decrease in other fuels the decline in fossil fuels was moderate.

2.2.2.3 Primary energy consumption per capita

Primary energy consumption per capita was about 6.6 toe in 1990. By 1993 it had dropped substantially by nearly 45% to 3.7 mtoe per capita and remained more or less at that level until 1997. Estonian primary energy consumption per capita was 80% above the EU average in 1990, but dropped to the EU average by 1993, where it remained constant until 1996.

2.2.2.4 Primary energy supply per GDP

The energy intensity of the Estonian economy did not follow a clear trend. In 1990 more than 1 kg oil equivalent was used to produce one $US\$_{1995}$ of GDP (calculated with purchasing power parities). Energy intensity decreased by nearly one third to about 0.7 kg oil equivalent per US$.

Compared with the average EU energy intensity, Estonian energy intensity exceeded the European average by more than the factor 5 in 1990. Despite the decrease in energy intensity it was still substantially above the European average in 1996 (0.19 kg/US$).

2.2.3 Final energy consumption

Total final energy consumption dropped sharply by 60% between 1990 and 1993, but remained more or less at that level in subsequent years. Solid fuels showed the sharpest decline. In 1993

final consumption of solid fuels was only 15% of the 1990 level. However, demand for solid fuels increased again, and was less than 20% below the 1990 level in 1997.

In 1990 the share of oil was above 40%. Oil consumption was reduced substantially until 1993 from 2.6 to 0.7 mtoe. Correspondingly, the share of oil dropped to 27% in 1997. In contrast to oil, the share of heat remained more or less at its 1990 level. However, parallel to the decrease in overall final demand, heat demand fell by more than 50% from 2 mtoe in 1990 to less than 1 mtoe in 1997. Gas is of minor relevance. Its share was below 5% during the nineties, with a slightly decreasing trend.

Electricity consumption decreased from 0.6 to 0.4 mtoe between 1990 and 1996. This is equivalent to a decline in demand of about 30%. As electricity demand fell less than overall final demand, its share increased from 9 to 15%.

In 1990, 30% of overall final energy consumption was induced by industry. The share of the transport sector was merely 10%. The rest of final energy demand was induced by the residential and commercial sector. The share of this sector (60%) remained at that level until 1997, whereas there was a shift from industry to transport. The share of industry decreased to 27%, whereas the share of the transport sector increased to 13%.

2.2.4 Electricity Generation

Gross electricity generation decreased from more than 17 TWh in 1990 to about 9 TWh in 1993. Electricity generation dropped in that period by nearly 50%, but subsequently remained at that level. Net electricity exports decreased from 3.2 TWh in 1992 to about 1 TWh in 1997.

Installed generation capacity amounts to 3.4 GW. All electricity is generated in thermal power plants. Since 1993 all domestically-generated electricity comes from CHP plants.

The share of solid fuels (oil shale) in electricity generation increased from 85% in 1990 to more than 95% in 1997. Electricity generation from oil or gas is of only minor relevance in Estonia (each below 2%).

2.2.5 District heating

Detailed information on district heating and its development (connected households, capacity, transmission losses etc.) is not available. However, about a third of total heat demand is provided by district heating systems, and nearly all thermal power plants are CHP plants. These two facts already show, that the application and development of district heating is an important element of the Estonian energy sector.

2.2.6 Energy markets

2.2.6.1 Electricity market

2.2.6.1.1 Electricity generation

The Estonian Energy Act § 27 lays down: "The state shall maintain at least 51% ownership of the share capital of commercial undertakings which are founded on the basis of power stations

Table 1: Installed generating capacity of the most important power plants

Power plants	Electricity	Heat	Fuel	Commissioned
	- MW -			
Eesti PP	1,610	84	Oil shale	1969-73
Balti PP	1,390	690	Oil shale	1959-65
Iru CHP	190	825	Gas/heavy oil	1980-82
Kohtla-Järve CHP	39	534	Oil shale/heavy oil	1948-58
Ahtme CHP	20	335	Oil shale	1951-53
Diesel plants	8	0	Diesel oil	
Total	**3,257**	**2,468**		

entered on the list of commercial undertakings that are of strategic importance to the state."

Large thermal power plants are owned and operated by AS Eesti Energia (Estonian Energy). Eesti Energia consists of several sister companies (power generation, network, energy sales etc.). Eesti Energia is a joint-stock company which is 100%-owned by the state. Currently AS Eesti Energia is an entity whose subsidiaries include business activities in electricity production, transmission, and distribution. Privatization, projected for the year 2000, was approved by the Government in 1998. According to AS Eesti Energia's privatization plan, it is foreseen that 49 % of state-owned shares will be sold to a strategic investor, leaving 51 % remaining with Eesti Energia. In the future, in 2000, it is planned to sell off the State-owned shares by public offer. Increasing capital assets is also a possibility. The Government has proposed, as a novel idea, the merger of oil shale mining ventures with the oil shale chemistry ventures of AS Eesti Energia. The Privatization Agency will participate in the privatization of AS Eesti Energia according to plans approved by the Government of the Republic.

Municipal co-generation plants in Kohtla-Järve and Ahtme (Table 1), with thermal energy distribution and transmission networks, are operated by the joint-stock company AS Kohtla-Järve Soojus and owned by AS Eesti Energia (59.2 %) and the City of Kohtla-Järve (40.8 %). The Company provides thermal energy to the Järve and Ahtme urban districts of Kohtla-Järve and Jõhvi, as well as to the rural municipalities of Jõhvi and Kohtla.

Industrial power plants/cogeneration plants cover about 2% of total electricity generation capacity (more than 98% of electricity is produced in four oil shale power plants).

2.2.6.1.2 Electricity transmission and distribution

The electricity transmission and distribution grid is operated by Eesti Energia and its sister companies, AS Narva Elektrivõrk (Narva Energy Network) and AS Läänemaa Elektrivõrk (Western Energy Network).

AS Narva Elektrivõrk is a joint-stock company, which is owned (49% as of 09.11.98) by Startekor Investeeringute OÜ (51% state owned). The privatization of the company is in progress. In the Privatization Programme for State Property for 1999 privatization of 51% of the shares of AS Narva Elektrivõrk is planned through an 18% share offering to other shareholders. According to Article 2, Section 4 of the Privatization Law, the price will be established by the Board of the Privatization Agency, which will also determine the privatization methodology for the remaining 33 % of the shares.

AS Läänemaa Elektrivõrk (Western Energy Network) is a joint-stock company, which is 100% owned (as of 04.11.98) by the joint-stock company AS IVO Energia. The privatization of the company has been completed.

2.2.6.2 District heating market

The joint-stock company Tallinna Soojus (Tallinn District Heating) is solely owned by the city of Tallinn. Tallinna Soojus has one subsidiary, AS Estterm and one affiliated company, OÜ Termest.

The Tallinn district heating grids are owned by the joint-stock company AS Tallinna Soojus, which meets approx. 71 % of the thermal energy demand of City of Tallinn. The city of Tallinn has commenced privatization of the company.

Other heating plants (apart from those mentioned in 2.2.6.1.1) are owned by municipal utilities/other companies. Most Estonian cities have heating plants owned by the municipality or joint-stock companies. In general, the same companies own district heating grids in the area.

2.2.6.3 Gas market

Gas production is operated by AS Eesti Gaas (Estonian Gas). Eesti Gaas is a joint-stock company owned by Russia's OAO Gazprom (30,64 %), Germany's Ruhrgas AG (32,04 %) – two of the largest gas companies in Europe –, Neste OY (10,01 %), the state of Estonia and small shareholders comprising private and legal persons. The share capital of Eesti Gaas amounts to EEK 155.2 million.

The customers of AS Eesti Gaas and its subsidiaries include 147,237 residential users, 526 commercial and public institutions, 158 industrial consumers, 61 district heat generators and 3 heat and power co-generators.

Gas imports and exports, as well as the gas transmissions grid, are managed and operated by AS Eesti Gaas. The distribution grid is managed and operated by its sister companies.

2.2.6.4 Mineral oil and coal market

Oil shale production is carried out by AS Eesti Põlevkivi (Estonian Oil Shale Company). Eesti Põlevkivi is a joint-stock company which is 100% state owned. The privatization of the company has not yet started. The Privatization Agency will participate in the privatization of AS Eesti Põlevkivi according to plans approved by the Government of the Republic.

Mineral oil production (in Estonia, oil shale liquefaction) is carried out by Galoter in Baltic Power Plant and Viru Keemia Grupp (former AS Kiviter). located in the north-eastern part of Estonia in Ida-Virumaa county.

There are two crude shale oil production technologies. The Galoter processing technology installed at the Eesti Power Plant uses the same oil shale (crushed) as the power plant (heating value around 8.6 MJ/kg). The Kiviter processing technology uses higher-quality enriched (coarse) oil shale with a heating value of around 12 MJ/kg. In March 1999, the liquefaction joint-stock company Kiviter went bankrupt due to the low world market price of crude oil.

2.2.6.5 Development of prices

Trends in energy prices are very heterogeneous. However, some patterns can be identified. In general, current prices, for electricity and heat, measured in EEK, increased between 1993 and 1997. In contrast, prices for oil and gas did not change substantially.

Electricity prices for private households showed the sharpest increase. In nominal terms (current EEK) electricity prices increased by about 300% between 1993 and 1997. However, in real terms the increase amounted to merely 60%. Electricity prices increased by 100% in nominal terms. In real terms the electricity price for industry was nearly the same as in 1993.

Heat prices for the residential sector increased only slightly in nominal terms. Between 1993 and 1997 they increased by 70%. This corresponds to a decline in heat prices in real terms of nearly 30%.

Prices for oil and gas did not change much in real terms, either for industry or for private households. In real terms oil and gas prices dropped by half between 1993 and 1997. However, development of oil and gas prices is of minor relevance in Estonia, because their share of overall fuel demand is quite low.

2.2.7 Energy and the environment

2.2.7.1 Greenhouse gas emissions

Greenhouse gas emissions (three-gas basket) dropped between 1990 and 1993 from about 40 to nearly than 24 million tons of greenhouse gas equivalent (GHGE). This corresponds to a decline of 40%. Subsequently, GHG emissions remained at the level achieved in 1993. More than nine-tenths (92%) of these GHG emissions derive from fuel combustion, although this share has decreased slightly to 89% in recent years.

With regard to individual greenhouse gases developments are as follows: more than 90% of GHG emissions are CO_2 emissions. The share of methane (CH_4) increased between 1990 and 1997 from 5 to 9%, the share of N_2O by around 2%.

In 1990, nearly 26 t GHGE were emitted per capita. This was more than double the EU average (11,5 t GHGE/Cap.). Parallel to absolute emissions, per capita emissions decreased sharply by about 40% up to 1993, and persist at this level. However, in 1996

they were still 45% above the EU average, which decreased only by 6%.

Carbon intensity – calculated by the ratio of overall GHG emissions to GDP at 1995 real purchasing power parities – showed a quite different development. It did not decline until 1992. Thereafter it declined by merely 30% up to 1997.

Calculated at 1995 purchasing power parities, 4.2 kg of GHGE were emitted in 1990 per US$ produced. This as nearly seven times average EU carbon intensity. Due to a slight improvement, Estonian carbon intensity is still six times the EU average in 1997 (3,4 kg GHGE/US$).

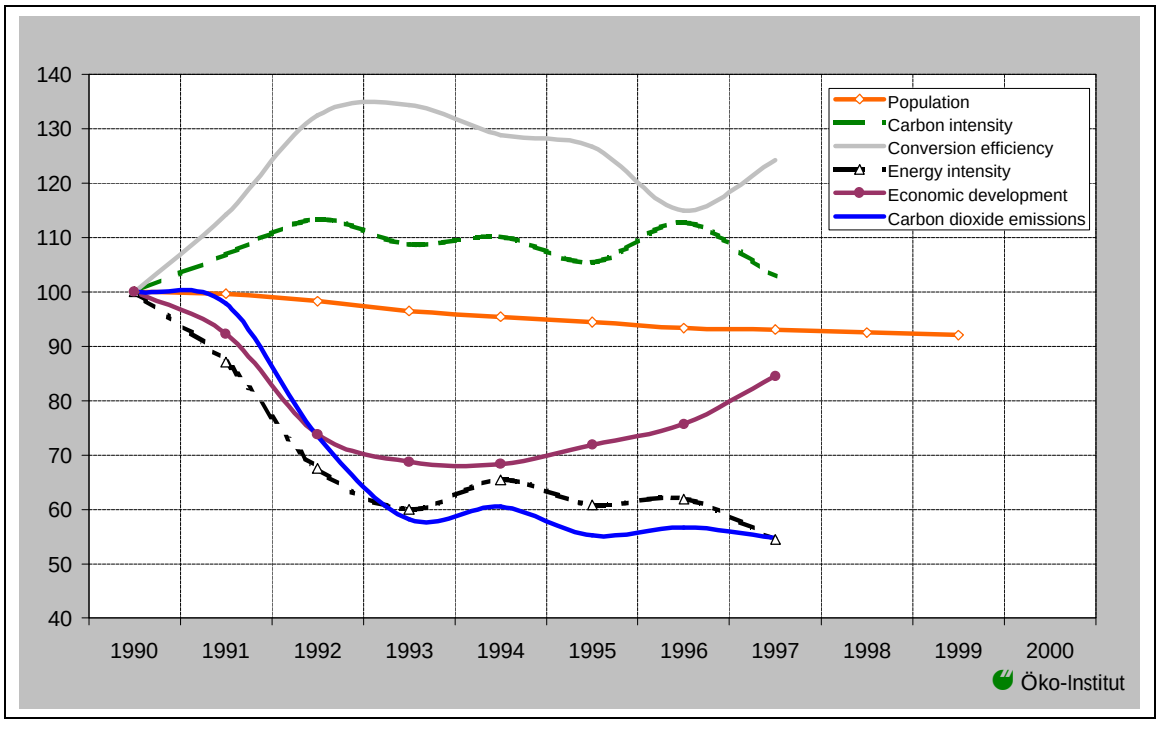
VOC emissions were cut by more than half between 1990 and 1997. NO_x emissions declined by almost 40%. Data on SO_2 emissions is not available.

2.2.7.2 Driving forces

The following figure shows five key factors (forces) that influence the development of CO_2 emissions (compare 2.1.7.2).

Population growth has obviously not substantially influenced the development of CO_2 emissions in Estonia. In contrast, economic development has had a substantial impact. The economic decline between 1990 and 1993 was mainly responsible for the decline in Estonian CO_2 emissions. In 1995 the economy started to recover. However, the economic recovery did not induce a further

Figure 2: Driving forces of Estonian CO_2 emissions



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

increase in CO_2 emissions.

There is obviously a strong correlation between energy efficiency and absolute CO_2 emissions. A decline in energy intensity results in a corresponding decline in CO_2 emissions. Despite a deterioration in conversion efficiency, energy intensity decreased until 1993 and remained at that level thereafter. However, due to the shift to oil shale carbon intensity increased by about 10% and thus offset some of the improvements in energy intensity.

This figure shows that efforts to improve conversion efficiency and reduce carbon intensity should be the main focus of an Estonian strategy for greenhouse gas mitigation.

2.3 Hungary

2.3.1 Demographic and economic trends

Hungary has about 10 million inhabitants. The total population remained comparatively stable during the nineties. The population decreased only slightly, by 3%, between 1990 and 1999. About 7 million people are in the age-group 15 an 64 (economically-active population). This figure did not change during the nineties. However, due to labour market liberalization the labour force decreased by about 20% between 1990 and 1998 (World Bank 1999). The unemployment rate increased from less than 2% in 1996 to nearly 6% in 1998 (MOP 1999, p. 281). Employment in agriculture fell by two-thirds between 1990 and 1998, and in industry by two-fifths. Only employment in services did not decrease substantially (-10%).

The number of dwellings increased by 5% from about 3.8 to more than 4 million flats. This caused a decline in the average occupancy form 2.7 to 2.5 persons per flat. Due to the decline in overall population, the decrease in average occupancy is slightly above the increase in the number of apartments, amounting to about 7%.

With the start of transition the economy declined substantially. Real gross domestic product (GDP) decreased between 1990 and 1992 by 15%. It remained for about 2 years at that level, but started to grow again in 1994. In 1997, however, real GDP was still 6% below the 1990 level (World Bank 1999).

2.3.2 Primary energy supply

Total primary energy supply (TPES) decreased from 28.6 mtoe (million tons of oil equivalent) in 1990 by 15% in the period to 1994. From 1995 to 1998 it increased again to about 25 mtoe, which is about 87% of the 1990 level.

2.3.2.1 Development of the primary energy structure

Primary energy supply showed a fairly balanced picture. About 30% of total primary energy supply (TPES) was covered by oil and gas. 22% of TPES were solid fuels and 17% other fuels, which was mainly uranium for nuclear power plants. The shares of all fuels decreased, with the exception of gas. Solid fuels showed the sharpest decline. Their share went down by 5 percentage points to

17%. The share of oil and other fuels decreased only slightly by 2 percentage points respectively. In contrast, the share of gas increased substantially. In 1998 more than two-fifths (41%) of Hungarian TPES was covered by gas (DG XVII 1998).

In absolute terms the picture is as follows: The consumption of solid fuels decreased by 30% from nearly 6.2 mtoe to 4.2 mtoe in 1998. The consumption of oil deceased between 1990 and 1991 from 8.6 to 7.7 mtoe (-10%). It remained at that level until 1997, and then decreased again to about 80% of the 1990 level (6.9 mtoe in 1998). Other fuels decreased from almost 5 mtoe in 1990 to 4 mtoe in 1993, and remained at that level until 1996, decreasing once again in recent years to 75% of its 1990 level. Although demand for natural gas also decreased in the first years of that period by almost 15%, it has increased again since 1993. In 1998 10.4 mtoe natural gas were consumed in Hungary. That is 14% above the 1990 level.

2.3.2.2 Energy imports and exports

Hungary is a net importer of fossil fuels, although it itself produces each of the three fossil fuels. However, more than 55% of fossil fuel supply derived from imports in 1990. This share increased slightly to almost 60% in 1998. Domestic oil production covers only 20 to 30% of Hungarian oil demand. Correspondingly, about three-quarters of oil demand is covered by imports. For solid fuels the picture is quite different: about 70% of solid fuel demand is covered by domestic production, the rest is imported. Parallel to the increase in gas consumption, the import quota increased from 58% to about 65% between 1990 and 1996.

Oil imports decreased between 1990 and 1996 from 6.5 to 5.5 mtoe (-15%). With natural gas the picture was also quite different. Imports increased from 5.2 mtoe in 1990 to 6.6 mtoe in 1996. This is equivalent to an increase of nearly 30%.

2.3.2.3 Primary energy consumption per capita

Primary energy consumption per capita was about 2.8 toe in 1990. By 1994 it had dropped slightly by about 15% to 2.4 toe per capita, but then started to increase again. In 1998, on average 2.5 toe were consumed per capita. That is still 10% below the 1990 level. Hungarian primary energy consumption per capita was 25% below the EU average in 1990, and dropped slightly more than 30% below the EU average in 1996.

2.3.2.4 Primary energy supply per GDP

The energy intensity of the Hungarian economy did not follow a clear trend. In 1990 about 0.37 kg oil equivalent were used to produce one $US\$_{1995}$ of GDP (calculated with purchasing power parities). It increased to 0.4 kg oil equivalent in 1991 but dropped thereafter to 0.35 kg oil equivalent in 1997. This is about 7% below the 1990 level.

In comparison with EU figures, Hungarian energy intensity between 1990 and 1996 was constantly about 90 - 100% above average EU energy intensity (0.19 kg oil equivalent per US$ cal-

culated at 1995 purchasing power parities).

2.3.3 Final energy consumption

Total final energy consumption dropped by almost a quarter between 1990 and 1994, but started to increase again in subsequent years. However, in 1998 final energy consumption was still 15% below the 1990 level. This was mainly due to the decline in demand for solid fuels and oil, which decreased in the period to 1996 to 40% and 60% respectively of 1990 levels. Demand for heat decreased by merely 20% up to 1996, but then increased again to its 1990 level. Electricity demand decreased only slightly by 10% between 1990 and 1993, and remained at this level thereafter. In contrast, gas demand was initially comparatively stable, but started to grow after 1993. In 1996 it was almost 30% above the 1990 level, but it diminished again slightly thereafter.

Due to these developments the share of solid fuels and oil decreased during the nineties, whereas the share of electricity remained quite constant. The share of heat increased from 11 to 14%, and the share of gas from 28 to 35%.

In 1990, half of final energy consumption (52%) was consumed in the residential and commercial sector. Nearly a third of final energy went to industry, and merely 16% to the transport sector. During the 1990s the share of the residential and commercial sector increased to about 60%, whereas the share of the industrial sector decreased to almost 25%.

In absolute terms, consumption declined by 22% from 20 mtoe in 1990 to 15.6 mtoe in 1996. The development of energy consumption in industry paralleled the development of total final consumption. More than 10 mtoe of final energy were consumed in 1990 in the commercial and residential sector. In the period to 1992 it decreased to 9 mtoe, but grew again in subsequent years. In 1997/98 it was close to the 1990 level. Final energy consumption in industry shrank from 6.4 mtoe in 1990 to 3.7 mtoe in 1996, but grew again to 4.5 mtoe in 1998.

2.3.4 Electricity generation

Despite decreasing electricity demand, gross electricity generation increased between 1990 and 1998 by almost a third. The additional electricity generated mainly substituted electricity imports from the Ukraine. Apart from the Ukraine, only electricity imports from Slovakia are of major importance. All other electricity imports or exports were substantially below 1 TWh during the whole period. Overall net electricity imports dropped from more than 11 TWh (a third of overall electricity demand) to about 1 TWh in 1998.

Almost half of domestic electricity generation derived from nuclear power plants. The other half is generated by thermal power plants. Hydro and wind capacities are rather small and amount to less than 1% of electricity generation. Electricity generation from nuclear energy did not change during the nineties. All additional electricity generation was covered by thermal power plants. As a result, the share of thermal power plants in electricity generation increased to more than 60%, whereas the share of nuclear energy shrank to less than 40%.

Almost two-thirds of electricity from thermal power plants in 1990 were generated from solid fuels. The share of gas in electricity generation was 30%. Oil had only a minor share in 1990, but almost all additional electricity generation during the nineties came from oil-fuelled power plants. Oil input for electricity generation increased roughly fourfold in 1998. Electricity generation from gas was approximately the same in 1998 as in 1990. In contrast, electricity generation from solid fuels declined by more than 10% between 1990 and 1998.

2.3.5 District heating

Almost 640.000 households are connected to district heating systems. This corresponds to a share of about 15% of all households. Grid capacity declined by nearly 25% during the nineties. However, the number of households connected to the grid remained more or less constant.

Heat generation shrank by 30% from 89 PJ in 1994 to 62 PJ in 1998. Due to efficiency increases, heat generation declined faster than final heat demand. In 1990 almost 50% of heat was generated in CHP plants. By 1998 the share of CHP plants had grown to more than 60%.

Table 2: Main shareholders in electricity generation in Hungary

	Bakony Power Stn	Budapest Power Stn	Pecs	Vertes	Matra	Tisza	Dunamenti	Paks	Borsod	Csepel	EMA Power Ltd.	Tiszaviz Hydro
	- Share percentage, Dec. 31, 1998 -											
State ownership	25.14	2.88	16.77	41.64	0.59							100.00
MVM Co.				42.92	25.49		25.00	99.95				
Transelectro Ltd.	25.05											
EuroInvest Ltd.	25.05											
Mecsek Energia Ltd.			68.45									
Nograd Coal ltd.									16.04			
Tisza Power Plant Co.									67.92			
Dunaferr Co.											50.00	
AES Hungary Investment Ltd.									16.04			
AES Summit Generation Ltd.					28.57	95.77						
EPIC Energy Hungary BV											50.00	
EnBW AG					21.43							
Imatran Voima Oy IVO		14.79										
IVO Holding		25.00										
Tomen Corporation		39.79										
Tractebel SA							73.75					
Powergen Holdings B.W.										100.00		
Total	**75.24**	**82.46**	**85.22**	**84.56**	**76.08**	**95.77**	**98.75**	**99.95**	**100.00**	**100.00**	**100.00**	**100.00**

2.3.6 Energy markets

2.3.6.1 Electricity market

2.3.6.1.1 Electricity generation

The large thermal power plants are operated by 10 companies. The privatization of most of these companies has been completed. Power generation has been opened up for foreign investors. Some of these companies (e.g. Budapesti Erömü Co.) are in the meantime dominated by foreign companies. However, direct or indirect state influence through the national utility Magyar Villamos Müvek Co. (MVM Co.) still exists (Table 2, page 20).

There is only one nuclear power plant in Hungary, Paksi Atomerömü Rt., located in the south. It is state owned through Magyar Villamos Müvek Co. (MVM Co.), the national utility.

Paksi Atomerömü Co. is state-owned but commercially-run. Though the Government thought of privatizing the plant, and the Nuclear Act of 1996 makes private ownership of nuclear facilities possible, there are now no plans to sell it according to our information.

The share of hydro power in Hungary is very small. There is only one hydro power plant, the Tiszaviz Vizerömü Ltd. which is 100% state-owned.

Information on municipal cogeneration plants and their ownership structure would require further research. What can be said, is that in general the share of cogeneration is very small in Hungary, but since built-in heat capacity is very large in the district heating industry, there could be major opportunities for co-generation in the future.

Industrial power plants are also negligible in terms of the total generation capacity of the country (about 200 MW of the 7,500 MW total installed capacity in the country), but as a recent example has shown,[3] it can be expected that more and more privatized companies will build their own power plants.

2.3.6.1.2 Electricity transmission and distribution

The electricity transmission grid is state-owned and operated by Magyar Villamos Müvek Rt. (MVM Rt.). MVM Rt. is a state-owned company, and operates the transmission grid through Országos Villamostávvezeték Rt. (National Power Line Company Ltd.), which is nearly wholly-owned by MVM Rt.

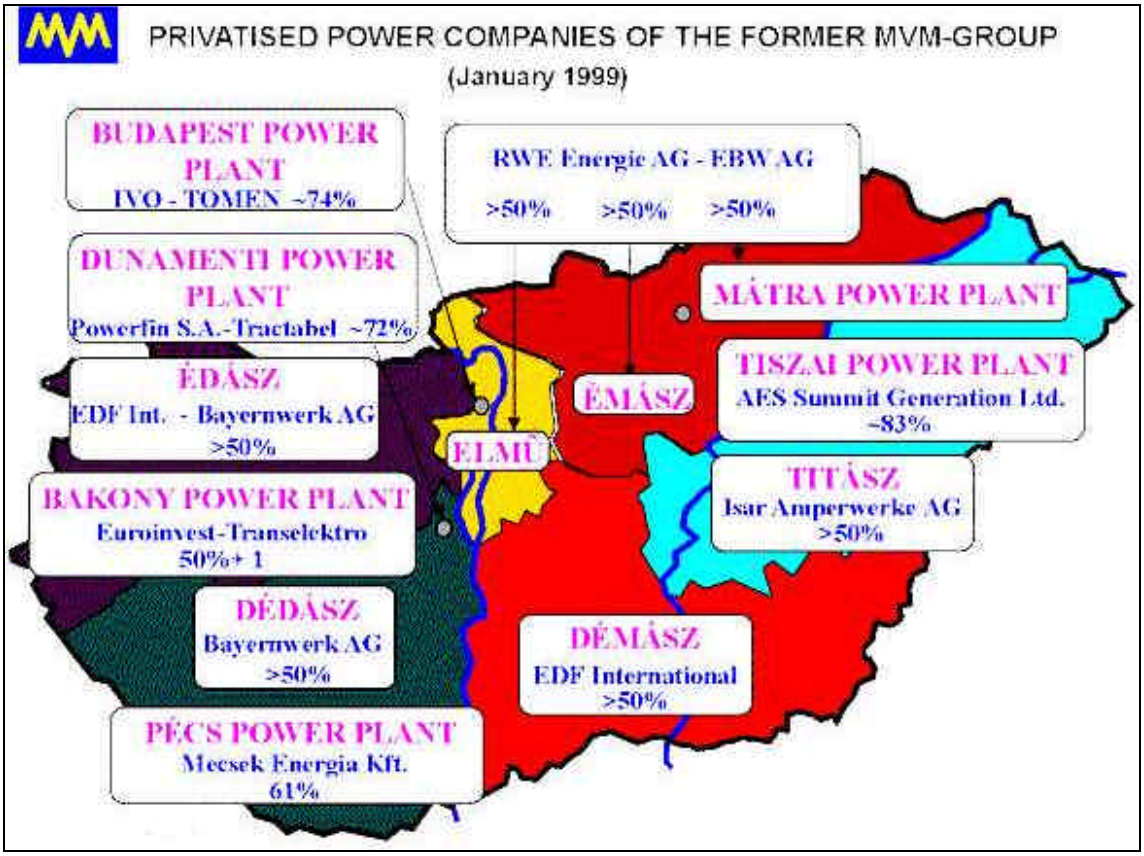
[3] The Borsodi Vegyi Kombinát, a chemical factory, was bought by a German company, that recently proceeded to build a power plant for the factory.

According to the regulations in force, the basic role of MVM Rt. is the operative control of the power system, as well as electricity transmission and wholesale.

Table 3: Main shareholders in electricity distribution in Hungary

	DÉMÁSZ	ÉMÁSZ	ELMÜ	TITÁSZ	DÉDÁSZ	ÉDÁSZ
	- Share percentage, Dec. 31, 1998 -					
State ownership		2.18	4.66	5.41	10.75	7.20
Morgan Guaranty Trust (US)	25.04					
RWE Energie AG (D)		50.00	50.62			
EnBW AG (D)		21.43	25.00			
Isar Amperwerke AG (D)				75.00		
Bayernwerk AG (D)					47.25	
Bayernwerk Hungaria Co, (D)						23.77
Deutsche Börse AG (D)					15.29	5.97
Electricité de France Int'l (France)	50.00					27.38
Total	**75.04**	**73.61**	**80.28**	**80.41**	**73.29**	**64.32**

Figure 3: Power distribution companies and main power plants



Source: MVM 1999

This includes electricity export-import as well. MVM Rt. purchases electricity from the power plants or import sources, and sells it to the distribution companies. During its operation, MVM Rt. is obliged to ensure the optimal utilization of the power plants and the national grid at the least cost.

The electricity distribution grid is operated by 6 regional distribution companies: ELMÜ Co., ÉDÁSZ Co., ÉMÁSZ Co., DÉDÁSZ Co., DÉMÁSZ Co., and TISÁSZ Co. which were all partly privatized in late 1995 (Table 3, Figure 3, page 22).

In Hungary the 'single buyer system' prevails, and this system is likely to remain after partial liberalization of the electricity market, due to start in 2001. The Hungarian electricity system can be characterized in the current situation mainly as a single buyer model. All generation companies sell the electricity produced to the only transmission company. The distributors purchase the agreed amount of electricity from the grid.

2.3.6.2 District heating market

A new District Heating Act was passed in 1998, and privatization of the district heating companies has slowly begun. Therefore, it is not possible at this point to know much about the ownership structure and the number of companies that will remain. Neither is it possible to say at this point when privatization will end. We can say that before privatization began there were more than 600 companies, mainly owned by municipalities, usually one heating plant owned by one company, except for Budapest where, because of its size, one company owned more than one heating plant.

District heating grids are normally owned by the municipalities, but here, too, privatization has started, and it is difficult to know how ownership will change as a result.

2.3.6.3 Gas market

Gas production, imports and exports, as

Table 4: Main shareholders in gas distribution in Hungary

	MOL Co,	DDGÁZ	DÉGÁZ	ÉGÁZ	FÖGÁZ	KÖGÁZ	TIGÁZ
	- Share percentage, Dec. 31, 1998 -						
State ownership	25.00	0.36					0.23
The Bank of New York (US)	38.17	41.21					
Ruhrgas (D)		40.19					
VEW ENERGIE AG (D)					16.34		
Ruhrgas Energie Hungary Ltd,					32.67		
Westfalische Gasversorg, AG (D)						29.73	
Bayernwerk Hungaria Co, (D)							25.16
RWE (D)			67.60	63.19			
Gaz de France Int'l						29.73	
EVN (Austria)							40.00
Italgas (Italy)							10.00
SNAM (Italy)							
Total	**63.17**	**81.76**	**67.60**	**63.19**	**49.01**	**59.46**	**75.39**

well as the transmission grid, are all owned and operated by Magyar Olaj-és Gázipar Co. (MOL), the state-owned utility. MOL Co. enjoys a monopoly of these activities. It was partly sold to investors, but the state retained 25 % plus 1 of the shares. Other investors in MOL are the Bank of New York, USA, with 38.17% of shares.

There are 9 regional distribution companies: DDGÁZ Co., DÉGÁZ Co., ÉGÁZ Co., FÖGÁZ Co., KÖGÁZ Co., TIGÁZ Co., ZAB Co., FÖNIX-GÁZ Ltd., MOL-GÁZ Ltd. Privatization of most of these companies has been completed. Some of the gas distribution companies are meanwhile dominated by foreign companies (Table 4, page 23).

The activities of MOL Co. are more diversified than gas distribution, as it is also involved in oil refinery, owns gas stations, is investing in the oil and gas market in the region, for example in Romania and Croatia, and is also expanding its involvement along the coast of the Adriatic Sea.

2.3.6.4 Mineral oil and coal market

Coal production is not very important in Hungary since closing mines has been part of the Government's policy since the early 1990s. Some mines were sold along with the coal power plants during privatization, and are now in private ownership. The Government is about to phase out all coal mining and delays in implementing this are due to the social aspects of the question.

Mineral oil production is carried out by MOL Co., but since Hungary has very small reserves of its own, MOL tries to involve itself in extraction in other countries.

2.3.6.5 Development of prices

Trends in energy prices have been very heterogeneous. However, some remarkable patterns can be identified. In general, prices in nominal terms have increased substantially. Though in real terms, prices for industry declined or remained constant between 1990 and 1997, prices for the residential sector increased.

Despite increasing nominal electricity prices for the residential sector, they did not increase in real terms until 1994, when the real electricity price was 30% below the 1990 level. Since then nominal price increases have been higher than inflation, which has resulted in an increase in real electricity prices to 20% above the 1990 level in 1997. Nominal price increases for industry have been rather small. Correspondingly, real electricity prices for industry shrank substantially and in 1998 were 50% below the 1990 level.

Nearly the same pattern applies to gas prices, both for industry and the residential sector. Nominal oil price increases for industry have been more or less in line with inflation. Thus, real oil prices did not change considerably during the nineties. They were at exactly the same level in 1997 as in 1990.

Heat prices for residential purposes increased by a factor of four between 1990 and 1991 in nominal terms. This is equivalent to a real price increase of almost 200%. However, due to inflation real heat prices decreased again in sub-

sequent years, but in 1997 were still about 90% above the 1990 level.

2.3.7 Energy and the environment

2.3.7.1 Greenhouse gas emissions

Greenhouse gas emissions (three-gas basket) dropped between 1990 and 1997 from about 87 to nearly 79 million tons of greenhouse gas equivalent (GHGE). This corresponds to a decline of 10%. Four-fifths of GHG emissions derive from fuel combustion. Due to the rise in fugitive emissions from fuels, this share reduced slightly to 75% in 1997.

With regard to individual greenhouse gases developments are as follows: about 75% of GHG emissions are CO_2, and around 22% are methane (CH_4) emissions. The share of N_2O emissions was below 3%. Despite small deviations this structure did not change much during the nineties.

Approximately 8.5 t GHGE were emitted per capita in 1990. This was 27% below the EU average (11,5 t GHGE/cap.). Per capita GHG emissions decreased more or less in line with overall GHG emissions. In 1994 they were 10% below the 1990 level, but increased again thereafter. In 1996 7.8 t GHGE were emitted per capita. This was still 7% below the 1990 level, and almost 30% below the EU average.

Carbon intensity – calculated by the ratio of overall GHG emissions to GDP at 1995 real purchasing power parities – showed a quite different development. It grew between 1990 and 1991 from 1.1 to 1.3 kg GHGE per US$ (+15%), but then dropped in the period to 1996 to its 1990 level. The carbon intensity of the Hungarian economy was in 1990 almost 80% above the EU average. As average EU carbon intensity decreased up to 1996, Hungarian carbon intensity was more than twice as high as the EU average.

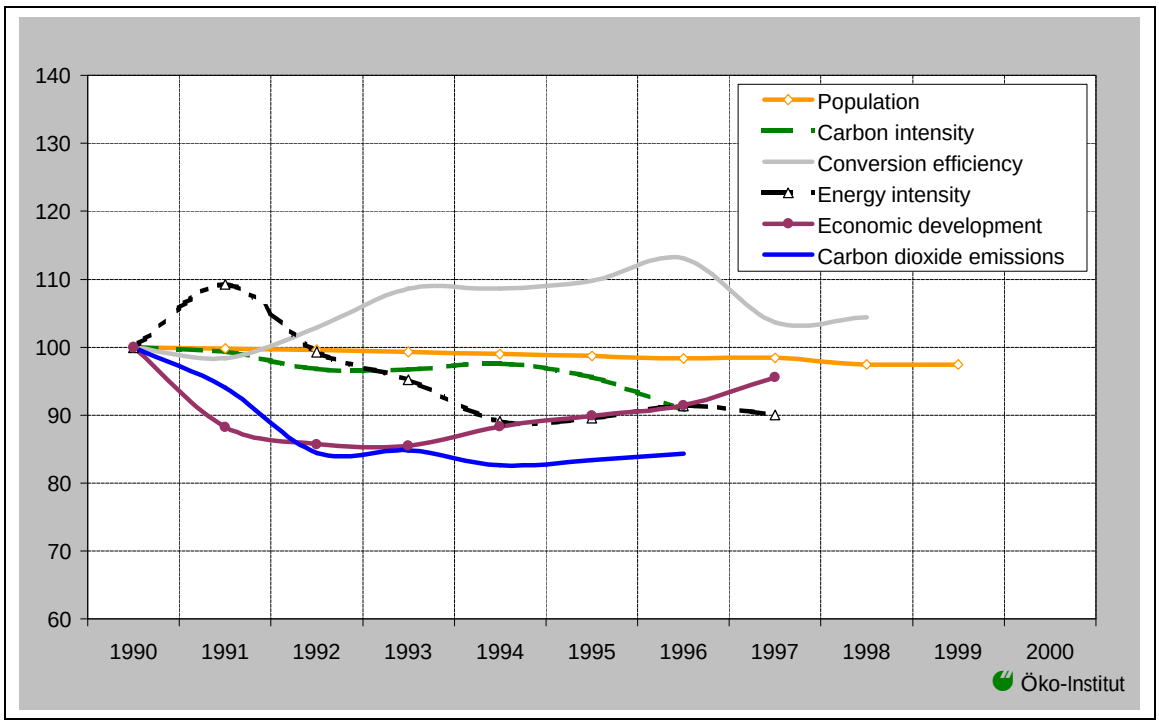
2.3.7.2 Driving forces

The following figure shows five key factors (forces) that influence the development of CO_2 emissions (compare 2.1.7.2).

Population growth has obviously not influenced the development of CO_2 emissions in Hungary. In contrast, the economic development did have a substantial impact. The economic decline between 1990 and 1992/93 contributed substantially to the decline in CO_2 emissions. Due to the increasing energy intensity between 1990 and 1991, CO_2 emissions declined slower than the economy. Due to subsequent improvements in both energy intensity and carbon intensity, CO_2 emissions did not increase, although the economy started to grow again from 1994. Conversion efficiency increased by approximately 13% up to 1996, but improved again to almost the level of 1990, and was then again quite close to the EU average.

Policies and measures to reduce greenhouse gas emissions might address further improvements in conversion efficiency. More important, however, are further improvements in energy intensity, which declined only between 1990 and 1993 but have remained at that level ever since. Thus, strategies to reduce

Figure 4: Driving forces of Hungarian CO_2 emissions



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

energy intensity should be given a prominent role in greenhouse gas mitigation policies.

2.4 Poland

2.4.1 Demographic and economic trends

Poland has about 38 million inhabitants. The total population remained comparatively stable during the nineties, and grew by only 1% between 1990 and 1997. However, the population in the age-group 15 to 64 (economically-active population), and hence the labour force, increased by more than 5% between 1990 and 1997 (World Bank 1999). The unemployment rate was quite high in the middle of the nineties (above 13%), but declined to almost 10% in 1998. Estimates for 2000 show that the unemployment rate might increase again at the end of the nineties to about 11.5% (MOP 1999, p. 183).

The number of dwellings increased by about 5%, which caused a decline in average occupancy from 3.4 to 3.3 persons per flat (-4%). The average size of a flat was 60 m² in 1991. By 1997 it had increased slightly to 61 m² (+2%). As a result, total heating space went up from less than 660 to more than 700 m² in 1997 (+8%).

Between 1990 and 1991 real gross domestic product (GDP) shrank by 7%, but started to increase again in the following year. In 1994 Polish GDP was already above the level for 1990, and continued to grow by 5 to 7% in real terms (World Bank 1999). In 1997 it

was 27% above the 1990 level. Estimates show continued growth until the end of the nineties, but at a slower pace (MOP 1999, p. 183).

2.4.2 Primary energy supply

Total primary energy supply (TPES) decreased slightly, by 5%, from 102 mtoe (million tons of oil equivalent) to 96.6 mtoe between 1990 and 1994. Since than TPES has increased again to more than 108 mtoe. In 1996 it was 6% above the 1990 level.

2.4.2.1 Development of the primary energy structure

Primary energy supply was dominated by solid fuels, i.e. coal. But the share of coal decreased by 4 percentage points from 74% in 1990 to 70% in 1995. The share of all other fuels did not change much, with the exception of oil. Its share increased from 13% to almost 17% in 1996. The share of gas remained around 9%, and the share of other fuels around 4 to 5% (DG XVII 1998).

In absolute terms the picture is as follows: The consumption of solid fuels has remained more or less at 75 mtoe, although it was almost 10% lower in 1994 and 1995. Supply of oil increased from 13 to 18 mtoe between 1990 and 1996 (+36%). Gas supply increased from around 9 to 9.5 mtoe in 1996 (+7%) and the supply of other fuels from 4.4 to 5.2 mtoe (almost +20%).

2.4.2.2 Energy imports and exports

Poland is a net exporter of coal (solid fuels) and imports all of its domestic oil and natural gas demand. In 1990, 20% of domestic coal production was exported. In some of the subsequent years the export quota was somewhat above or below that level, but did not change substantially during the nineties.

In absolute terms exports of solid fuels oscillated between 14 and 18 mtoe. Oil imports increased from more than 14 to almost 18 mtoe (+24%) and gas imports from 13 to 15 mtoe (+16%).

2.4.2.3 Primary energy consumption per capita

Primary energy consumption per capita was about 2.7 toe in 1990. In the following years it decreased slightly until 1994, but increased again in the subsequent period to 1996 to 5% above its 1990 level. Polish primary energy consumption per capita was constantly more than a quarter below the European average during the nineties.

2.4.2.4 Primary energy supply per GDP

In 1990 more than 0.5 kg oil equivalent were used to produce one US$$_{1995}$ of GDP (calculated with purchasing power parities). Polish energy intensity between 1990 and 1996 was constantly about twice as high as the EU average. However, Polish energy intensity increased between 1990 and 1991, but declined thereafter. In 1996 it was about 10% below its 1990 level.

2.4.3 Final energy consumption

Total final energy consumption did not change much during the period between

1990 and 1995. However, in 1996 it was boosted by about 10%. With regard to individual fuels the picture is quite heterogeneous. Final consumption of oil and solid fuels (coal) increased remarkably up to 1996 (+48% and +39% respectively). Consumption of gas did not change much, and remained until 1996 more or less at the 1990 level. In contrast, heat consumption dropped substantially. In 1996 it was more than 40% below its 1990 level.

In 1990 almost 30% of final energy consumption was accommodated by coal (solid fuels). More than a quarter of final energy consumption was covered by heat. The shares of oil and electricity consumption were around 15% and the share of gas below 10%. By 1996 this picture had changed significantly. The share of solid fuels grew to more than 35%, whereas the share of heat dropped sharply below 14%. The share of gas and electricity remained more or less constant. Only the share of oil increased, also substantially, and was around 20% in 1996.

Half of total energy consumption is consumed in the residential and commercial sector. Despite slight oscillations, this share grew only slightly by 2 percentage points in the period to 1996. Almost 39% of final energy was consumed in the industrial sector in 1990. By 1992 the share of industry had dropped to 32%. The share of the transport sector grew by two percentage points from 13 to 15% in 1996.

In absolute terms consumption grew by 11%, from 61 mtoe in 1990 to more than 66 mtoe in 1996. Consumption of solid fuels increased from 17 to almost 24 mtoe, and consumption of oil grew from 9 to almost 14 mtoe in 1996. Heat demand went down from 15.6 to 9.2 mtoe. Final energy demand amounted to 23 mtoe in 1996. This is exactly the same amount as in 1990, although it was down to 19 mtoe in the meantime. Final energy consumption of the residential and commercial sector increased from 29 to more than 33 mtoe (+14%). The transport sector performed the highest increase. Final energy demand grew by more than 25% from 7.8 to 10 mtoe.

2.4.4 Electricity generation

Gross electricity generation did not change substantially between 1990 and 1996. It grew slightly by about 5% from 136 to almost 143 TWh. The development of net electricity generation showed a similar trend.

With the exception of less than 3% electricity from hydro and wind power plants, all electricity is generated in thermal power plants. Almost all thermal power plants are coal-fired plants. Electricity generation from oil, gas or other fuels is negligible, together amounting to less than 4%, with a decreasing trend during the nineties.

Polish electricity imports and exports are nearly balanced. However, there is some electricity trade with its neighbours. Between 1990 and 1997 Poland imported between 5 and 10 TWh, mainly from Germany and the Ukraine, although imports from the latter country were reduced substantially in the early nineties. Electricity exports were between 11.5 and 7 TWh, in particular to

Germany and the Czech Republic. Electricity exports slightly exceeded imports, but are negligible compared to domestic electricity consumption (below 4%).

2.4.5 District heating

Data provision on district heating is very poor in Poland. However, some remarkable patterns can be identified. The length of the district heating grid grew by more than a third between 1990 and 1997. Due to efficiency improvements, heat generation dropped between 1993 and 1997 by more than 25%. Two thirds of all heat generation was produced in CHP plants, although this share has been decreasing. In 1997 almost half of all heat generated came from heat and not from CHP plants.

2.4.6 Energy markets

2.4.6.1 Electricity market

Currently, there are 47 public thermal power plants (co-generation plants) and 124 public hydro plants in Poland. Most of the thermal public plants are fired with hard coal. Additionally, there are 17 large power plants (3 are fired with brown coal and 14 with hard coal). Additionally, there are 178 industrial power plants. The privatization process began in the power generation sector in 1998. On July 2, 1998 the Cabinet's Economic Council approved the document *Programme and Conditions for Energy Sector Privatization*. The document stipulates that all energy enterprises will be privatized individually. Implementation of the programme has not been very successful, and it has often been criticized on account of delays.

Almost the whole energy sector has been put on a commercial footing, which means that generation and distribution companies operate commercially and are in the sole ownership of the State Treasury.

2.4.6.1.1 Electricity generation

Most public power plants are in the sole ownership of the State Treasury. The only one not commercially run is the Turow Power Plant (the fourth largest electricity producer in Poland, with annual output of 9,167 GWh). Patnow-Adamow-Konin Power Plant Group was the first to be privatized; it is currently owned by: Elektrim S.A. (20%) and the State Treasury (80 %).

The privatization process for the Polaniec Power Plant (1,600 MW) will be completed in December 1999. There are three investors interested in purchasing the shares: AEF Horizons, Easter Power and Energy and Tractebel.

Additionally, by the end of 1999 the State Treasury Ministry intends to sell the Rybnik Power Plant (1,640 MW, fired with hard coal). The ministry decided to privatize the Polaniec and Rybnik Power Plants sooner than other power plants, because of their low production costs and the advanced privatization process.

The biggest single producer of electricity in Poland, Belchatow Power Plant, in the sole ownership of the State Treasury, has recently been put on a commercial footing. The plant is fired with

brown coal and its installed capacity is 4,320 MW. The electricity generated in 1997 amounted to 27,360 GWh.

The ministry's policy is to encourage the development of competitiveness in the energy market. If the Treasury Ministry successfully implements its privatization programme, almost all public thermal plants will be partially privatized by the end of 1999. As a consequence, only four thermal plants will remain in the sole ownership of the State Treasury: Zabrze Thermal Plant – 76 MW, Bydgoszcz Thermal Plant – 204 MW, Bytom Thermal Plant – 118 MW and Lodz Thermal Plant – 598 MW.

In 1997 installed capacity in industrial power plants amounted to 2,958 MW, electricity production of such plants was 7,988 GWh (6,345 GWh in co-generation). Industrial power plants delivered 278 GWh of electricity to the grid in 1997. The largest amount of power generated in industrial power plants occurred in the following industries: production of chemicals (2,400 GWh in 1997); production of coke and oil products (1,751 GWh).

2.4.6.1.2 Electricity transmission and distribution

The transmission grid is currently operated by the Polish Grid Company (PSE S.A.), which is in the sole ownership of the State Treasury. According to the Treasury Ministry privatization of the company will commence in 2000 and be completed by the end of 2002. After 2002 the role of the company will be limited to transmission services only (currently PSE S.A. is also system op-

Table 5: The ten biggest electricity producers in Poland

Plant name	Ownership structure	Installed capacity [MW]	Fuel type
BELCHATOW Public Power Plant	Sole shareholder company of the State Treasury	4,320	Brown coal
PAK S.A.	A join stock company. 80% of shares - the State Treasury, 20% ELEKTRIM S.A.	2,738	Brown coal
KOZIENICE S.A.	Sole shareholder company of the State Treasury	2,700	Hard coal
TUROW Public Power Plant	State-owned enterprise (not commercialised yet)	2,000	Brown coal
DOLNA ODRA S.A. Public Power Plant Group	Sole shareholder company of the State Treasury	1,768	Hard coal
RYBNIK S.A. Public Power Plant	Sole shareholder company of the State Treasury	1,640	Hard coal
T. KOSCIUSZKO S.A. Public Power Plant	Sole shareholder company of the state Treasury. Currently, an ongoing privatisation process. This process shall be completed by December 1999	1,600	Hard coal
JAWORZNO III S.A. Public Power Plant	Sole shareholder company of the State Treasury	1,511	Hard coal
LAZISKA S.A. Public Power Plant	Sole shareholder company of the State Treasury	1,100	Hard coal
ELEKTROCIEPLOWNIE WARSZAWSKIE S.A. Public Thermal Power Plant Group	Sole shareholder company of the State Treasury. The privatisation process may be finished by the end of October 1999	945	Hard coal

erator).

At present there are 33 distribution companies in Poland. All of them are in the sole ownership of the State Treasury. Their privatization will begin in the autumn of 1999 and be completed by the end of 2002. The Treasury Ministry assumed that the best way of selling the distribution companies was to open negotiations with interested investors, and it was decided that privatization via the stock exchange would be used only as a complementary measure. According to the Ministry's guidelines, the negotiation procedure will be preceded by an open invitation. The Ministry argues that this procedure should encourage public transparency, clarity and competitiveness. Regarding fair competition, the maximum market share of a single investor was regarded as 12 - 15% (measured by electricity sales to final customers). It is possible that some time after privatization the Treasury Ministry, or the President of the Consumer and Competition Protection Office, will allow a larger concentration of shares. The State Treasury will begin privatization by offering investors minority shareholdings, for example 20 - 25% of the shares of each company. Majority shareholdings will be offered after investors have met their investment and employee obligations.

The Polish Energy Law allows third-party access (TPA) to the grid. Depending on their annual electricity purchases final consumers have, or will have access to the grid. Although the TPA rule is limited to fuels extracted in Poland and energy produced from them), the Polish government has declared its intention to abolish this limitation by the and of 2002.

2.4.6.2 District heating market

Most Polish district heating grids have been transformed into companies operating on a commercial basis, for example, joint-stock (S.A.) and limited liability companies. As a rule district heating (distribution) companies (przedsiêbiorstwa energetyki cieplnej, PEC) are owned by municipalities (gmina). For instance the District Heating Company (S.A.) in Krakow, which supplies heat to over 7,000 buildings with a heating space equivalent to 13,275 m², is wholly-owned by Krakow municipality. However, many distribution companies in the sole ownership of the municipalities have begun to offer shares to strategic investors.

Wroclaws' District Heating Company, which delivers heat to about 55 % of Wroclaw dwellings, is a joint-stock company 95%-owned by the municipality, and 5%-owned by one of the thermal power plants and a building cooperative from the region. In some cases shares are bought by other investors, such as the Warsaw company that delivers heat mainly to public buildings (hospitals etc.), which is owned by ABB (80 %) and the State Treasury (20 %). In the Silesia region some of the distribution companies are employee-owned, as is the case where distribution companies were formerly part of mining enterprises. During restructuring and liquidation processes involving mining enterprises the heat distribution divisions were hived off. This facilitated the liqui-

dation process and partially compensated for loss of jobs.

It should be noted, however, that ownership structures are changing very rapidly, and no generally-available centralized database exists, that could provide regularly-updated information in this respect. Considering that the number of independent entities providing district heat is around 1,000 or more (even obtaining the exact number was impossible), any dealings in this area should be approached from the municipal level.

At the moment there are 376 heat plants, each with an installed capacity of up to 100 MW. These plants have a range of ownership structures. Often they are owned by the heat distribution companies, or are joint-stock/limited liability companies owned by municipalities. The process of their privatization is similar to that of heat distribution companies. There are also some privately-owned plants.

2.4.6.3 Gas market

The Polish Oil and Gas Company (Polskie Gornictwo Naftowe i Gazownictwo - PGNiG S.A.) has a monopolistic position on the Polish gas market; production, imports, transmission and distribution are operated by PGNiG S.A. Guidelines for restructuring the company were adopted by the Council of Ministers in a document from April 2, 1996, entitled *Programme of restructuring the public utility enterprise - PGNiG*. Since that time PGNiG, which is in the sole ownership of the State Treasury, has been put on a commercial footing. According to the government's programme, PGNiG S.A. has established subsidiaries, that formerly operated as divisions of PGNiG. There are about 20 such companies, which incorporate assets of the former units. They deal with a wide range of tasks, such as exploration, maintenance and the construction of utilities. Among them are: GEOFIZYKA Krakow, Oil and Gas Exploration Jaslo, Gas Equipment Repair Works ZRUG - Torun, Drilling Unit - Zielona Gora.

According to Aleksander Findzynski, the president of PGNiG S.A., the next step in the restructuring of PGNiG S.A. should be the hiving off of transmission and distribution services. PGNiG S.A. is often criticised for delays in its reorganization.

The Treasury Ministry is currently in the process of choosing a privatization advisor, who will be in charge of preparation of the gas sector analysis, and will update the aforementioned *Programme of restructuring the public utility enterprise - PGNiG*.

2.4.6.4 Oil market

Polish refineries use about 15 million tons of crude oil, whereas domestic oil production amounts to about 300,000 tons per year, less then 2 % of total demand. Domestic production plays an insignificant role in Poland's oil balance of, but still cannot be neglected. Recent findings show that oil extraction could double within a few years.

Historically, the major source of crude oil in Poland were oil pools in the Karpaty mountains, famous for the world's first oil-well installation in the mid-nineteenth century. At present they are operated by PGNiG S.A. Due to their long period of service, however, the deposits are almost exhausted. The largest Polish oil pools are located in the north-western part of the country. They, too, are operated by PGNiG S.A. It is estimated that total extractable oil deposits are up to 20 million tons.

The second-largest oil producer in Poland is Petrobaltic, a state-owned company operating oil-rigs in the Polish shelf. Annual extraction in 1996 was almost 150,000 tons, with a growing trend. Petrobaltic plans to build new wells in the sea shelf belonging to the Baltic Republics and the Kaliningrad region.

2.4.6.5 Coal market

The vast majority of coal mines are located in the Upper Silesia region, with only a few in other parts of Poland (near Lublin and Walbrzych). The table below lists major coal establishments.

Coal mines (approx. 60) are not legal entities. They belong to holdings called *spolka weglowa* (coal company). The coal holdings are joint-stock companies, 100%-owned by the State Treasury. The exceptions are Budryk S.A. and Bogdanka S.A. coal mines, which are also 100%-owned by the State Treasury.

There are plans to privatize several coal mines. The governmental programme of restructuring the coal industry mentions Budryk, Bogdanka and 4 other coal

Table 6: Coal holdings in Poland

Coal establishment	Sales in 1998 [million PLZ]
Nadwilanska Spolka Weglowa S.A., Tychy	2,832
Jastrzebska Spolka Weglowa S.A., Jastrzebie Zdroj	2,583
Katowicki Holding Weglowy S.A., Katowice	2,552
Rybnicka Spolka Weglowa S.A.,Rybnik	2,130
Gliwicka Spolka Weglowa S.A., Gliwice	1,975
Rudzka Spolka Weglowa S.A., Ruda Slaska	1,700
Bytomska Spolka Weglowa S.A., Bytom	N/A

Source: Rzeczpospolita TOP500

mines, that are to be privatized by 2002.

2.4.6.6 Development of prices

Energy prices developed quite heterogeneous during the nineties. But some remarkable patterns can be identified. In nominal terms all prices grew significantly. In real terms, however, not all prices increased. In particular prices for industry did not increase, but rather declined. In contrast, real energy prices for residential use increased drastically.

Electricity prices for industry grew by a factor of 5.5 between 1990 and 1997 in nominal terms. In real terms they did not increase at all. In 1997 they were more than 10% below the 1990 level. Electricity prices for industrial use were 2.5 times higher than electricity for residential use. As a result they developed quite differently between 1990 and 1997. In nominal terms they increased by a factor of 22, which is equivalent to an increase of about 250% in real terms. The biggest jumps in residential electricity prices were in 1991 and 1992, when they grew by more than 100% and 30% respectively. As result of these developments electricity prices for industry were in 1997 about 35 to 40% below prices for residential use.

The pattern for natural gas is rather similar. The gas price for industrial use was five times the price for the residential sector. Due to real price increases for residential use by almost a factor of 8, and slightly decreasing gas prices for industry, this relation inverted. In 1997 gas prices for industry were about 40% below gas prices for residential use.

Fuel oil prices for industry did not follow a clear trend. In real terms they oscillated in a range 15% above and below the 1990 level but did not change substantially. In 1997 they were about 15% below the 1990 level.

Heat prices for 1990 to 1992 are not available. Therefore, the development of heat prices cannot be compared directly to other energy prices. In 1993 heat prices for industry were already 25% below heat prices for residential use. Prices for industrial and residential use declined slightly by about 10% in real terms by 1997. The relation between residential and industrial heat prices therefore remained the same as in 1993.

2.4.7 Energy and the environment

2.4.7.1 Greenhouse gas emissions

Greenhouse gas emissions (three-gas basket) dropped between 1990 and 1997 from about 460 to nearly 426 million tons of greenhouse gas equivalent (GHGE). This corresponds to a decline of 7%. More than 80% of GHG emissions derive from fuel combustion. This share increased slightly to 83% in 1997.

With regard to individual greenhouse gases developments are as follows: 83% of GHG emissions are CO_2 emissions. The share of methane (CH_4) decreased between 1990 and 1997 from 13 to 11%, whereas the share of N_2O emissions remained more or less constant at 4%.

About 12 t GHGE were emitted per capita in 1990. This was 5% above the EU average (11,5 t GHGE/Cap.). Par-

allel to absolute emissions, per capita emissions decreased constantly. In 1997, 11 t GHGE were emitted per capita. That is about 8% below the 1990 level, but still 5% above the EU average. that decreased at the same pace.

Carbon intensity – calculated by the ratio of overall GHG emissions to GDP at 1995 real purchasing power parities – showed a quite different development. In 1990 2.3 kg per US$ were emitted. This was almost 3.7 times the EU average. By 1997 Polish carbon intensity had decreased steadily by a remarkable 25%. However, in 1996 it was still 3.4 times the EU average.

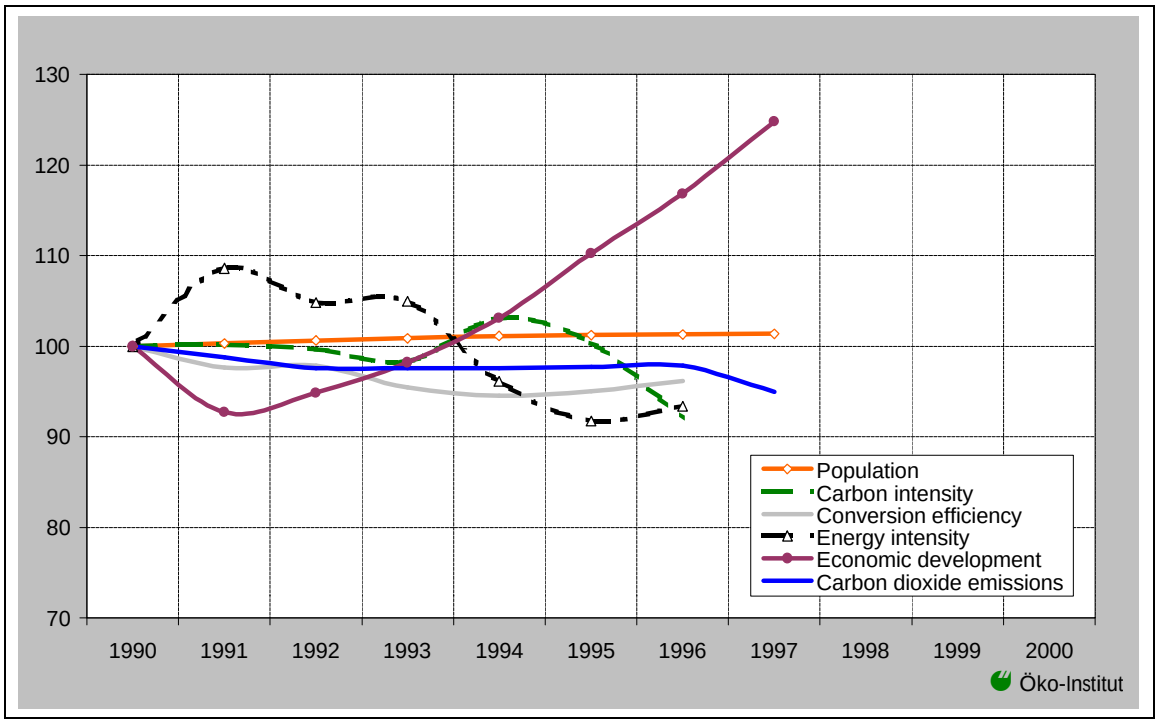
2.4.7.2 Driving forces

The following figure shows five key factors (forces) that influence the development of CO_2 emissions (compare 2.1.7.2).

Population growth in Poland was rather low. It had hardly any influence on the development of CO_2 emissions. Economic decline between 1990 and 1991 contributed to a slight reduction in GHG emissions in that year. However, due to a substantial increase in energy intensity CO_2 emissions did not decrease to the same extent as the decline in the economy.

In 1992 the economy started to grow again at a remarkable pace. But because energy intensity again dropped, the economic upturn did not result in increasing CO_2 emissions. Improvements in conversion efficiency and, later, in carbon

Figure 5: Driving forces of Polish CO_2 emissions



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

intensity kept CO_2 emissions down, although the economy continued to grow.

2.5 Slovenia

2.5.1 Demographic and economic trends

Slovenia has about 2 million inhabitants. The total population remained comparatively stable during the nineties. In 1996 almost 14% of the labour force were unemployed. By 1998 the unemployment rate had risen by another 0.5 percentage points. According to projections it will remain at that level until 2000 (MOP 1999, p. 249).

The number of dwellings increased between 1994 and 1997 by 4%. It is expected to increase by another 2% by 2000. The average occupancy decreased from 3.0 to 2.9 persons per flat, and will decrease to 2.8 by 2000. Due to this development the average size of a flat will increase from 69.6 to 71.2 m² in 2000. This is equivalent to an increase in the overall space heating area of 8% between 1994 and 2000. In 1996 almost half of all flats (45%) were heated by fuel oil. Wood waste accounted for 19% and district heating for 12%. Coal, gas and electricity accounted only for shares of less than 10%.

With the start of transition the economy declined substantially. Real gross domestic product (GDP) decreased between 1990 and 1992 by 15%. Since then the economy has grown again and reached its 1990 level in 1996. In subsequent years it continued to grow, and was about 4% above the 1990 level in 1997 (World Bank 1999).

2.5.2 Primary energy supply

Total primary energy supply (TPES) decreased from 5.2 mtoe (million tons of oil equivalent) in 1990 by roughly 10% up to 1992. In 1993 it started to increase again and was 14% above the 1990 level in 1996 (5.9 mtoe).

2.5.2.1 Development of the primary energy structure

Oil accounted for a third of TPES in 1990. Its share increased to almost two-fifths (38%) in 1996. Solid fuels and other fuels – mainly nuclear fuel – each accounted for a quarter of TPES. However, the share of solid fuels decreased to one-fifth (20%) in 1996, whereas the share of other fuels increased to 27%. Gas was the least important fuel in Slovenia but its share increased slightly from 13% in 1990 to 15% in 1996 (DG XVII 1998).

In absolute terms the picture is as follows: Consumption of solid fuels decreased by 15% from nearly 1.4 mtoe to 1.2 mtoe in 1996. Consumption of all other fuels increased between 1990 and 1996. Both oil and gas increased by more than 25% from 1.8 to 2.3 mtoe (+29%) and 0.7 to 0.9 mtoe (+26%) respectively. The demand for other fuels increased slower. It rose from 1.4 to 1.6 mtoe between 1990 and 1996 (+18%).

2.5.2.2 Energy imports and exports

Slovenia is a net importer of fossil energy resources. In 1990 two-thirds of

fossil fuels were imported. This figure increased to three-quarters (76%) in 1996. All oil and gas supply derives from imports. The only domestic fossil resource is coal. However, domestic coal production lies below domestic demand. As a result, almost 10% of domestic coal supply were covered by imports. By 1996 the share of coal imports had increased to 15%.

2.5.2.3 Primary energy consumption per capita

Primary energy consumption per capita was about 2.6 toe in 1990. By 1992 it had dropped slightly by 11%, but increased again to 3.0 toe per capita in 1996 (14% above the 1990 level). Slovenian primary energy consumption per capita was more than a quarter below the 1990 EU average. In 1992 it was 35% below the EU average but increased again and was merely 20% below the EU average in 1996.

2.5.2.4 Primary energy supply per GDP

The energy intensity of the Slovenian economy increased between 1990 and 1996 by roughly 14%. In 1990 about 0.23 kg oil equivalent were used to produce one $US\$_{1995}$ of GDP (calculated with purchasing power parities). By 2000 energy intensity had risen to 0.26 kg oil equivalent per $US\$_{1995}$ of GDP. Slovenian energy intensity in 1990 was about 25% above the EU level. Due to the increase in Slovenian energy intensity and a decline in energy intensity in the EU, Slovenian energy intensity is almost 40% above the EU level.

2.5.3 Final energy consumption

Total final energy consumption dropped slightly by 10% between 1990 and 1992 but increased again thereafter, and was 17% above the 1990 level in 1996. The demand for oil and heat increased between 1990 and 1995 by 39% and 8% respectively. In contrast, demand for solid fuels, gas and electricity decreased. The decline in solid fuel demand was most drastic. It shrank by almost 60% between 1990 and 1995. Gas and electricity demand declined only slightly by 15% and 5% respectively.

In 1990 oil accounted for almost half of total final energy consumption (45%). However, in subsequent years the share of oil increased by 9 percentage points to 51% in 1995. The share of heat remained quite constant at 5%, whereas the share of gas and electricity decreased slightly from 15 to 11% and from 25 to 21% respectively. The share of solid fuels decreased substantially from 10% in 1990 to merely 3% in 1995.

About two-fifths (43%) of total final energy in 1990 were consumed in industry. The transport sector and the commercial and residential sector both accounted for roughly 30% of total final energy demand. However, by 1995 the picture had changed substantially. Industry accounted for merely 29% of total final energy demand, whereas the transport sector and the residential and commercial sector accounted for 35% and 36% of total final energy demand respectively.

In absolute terms consumption decreased by 10% from 3.3 mtoe in 1990 to 3.0 mtoe in 1992. Subsequently it

increased again to almost 4 mtoe in 1996. Final energy consumption in industry dropped by almost 20% from 1.4 to 1.1 mtoe in 1996. In contrast, final energy demand in the transport sector and in the residential and commercial sector increased from roughly 1.0 to 1.4 mtoe in 1996. This is equivalent to an increase of more than 40%

2.5.4 Electricity generation

Gross electricity generation has not followed a clear trend. It increased from 1990 to 1991 by 2%, but then decreased in the period to 1993 to 94% of the 1990 level. In subsequent years it once again increased, and was in 1997 6% above the 1990 level.

In 1990, 37% of electricity was generated in nuclear power plants and 24% in hydro stations. The remaining share(39%) of gross electricity generation derived from thermal power plants, which are mainly fired by solid fuels (coal). Most Slovenian thermal power plants are combined heat and power plants. Thus about 85% of electricity generation from thermal power plants was generated in CHP plants. This structure of gross electricity generation remained quite constant during the nineties.

In 1990 Slovenia imported 12% of its final electricity demand. Due to the decline in electricity demand and increased electricity generation, Slovenia became a net exporter of electricity in 1991. During the period from 1991 to 1996 it exported between 1.4 and 2.1 TWh, which is equivalent to between 16% and 22% of domestic electricity consumption.

2.5.5 District heating

In 1994, 104,000 households were connected to a district heating system. This is equivalent to 16% of all households. All together, 8.1 PJ heat were generated to cover heat demand. Roughly two-thirds (62%) of heat was generated in CHP plants. The remainder was generated in conventional heat plants. By 1996 overall heat generation had increased to 9.7 PJ, 20% more than in 1994.

2.5.6 Energy markets

2.5.6.1 Electricity market

2.5.6.1.1 Electricity generation

The large thermal power plants are operated by:

1. Termoelektrarna Sostanj (Thermal Power Plant Sostanj - TES): brown coal;
2. Termoelektrarna Trbovlje (Thermal Power Plant Trbovlje - TET): brown coal;

3. Termoelektrarna-Toplarna Ljubljana (Thermal Power & Heat Plant Ljubljana - TETO): brown coal and hard coal imported from Indonesia, largest supplier of heat to the district heating system in Ljubljana;
4. Termoelektrarna Brestanica (Thermal Power Plant Brestanica -TEB): natural gas.

Table 7: Power plants in Slovenia

Name	Units	Fuel	Net capacity [MW]	Year of Commis-sioning	Status of Rehabilitation
Thermal Power Plants	16		1,013		
TPP Trbovlje	1	coal	105	1968	2004: desulphurization unit
	2	gas-oil	59	1976	
TPP Brestanica	1	gas-oil	10	1943	in progress
	1	gas	11	1961	
	3	gas	63	1975	
					2000: + 2 * 115 MW
TPP Šoštanj	2	coal	54	1956	2004: decommissioning
	1	coal	68	1960	2004: decommissioning
	1	coal	246	1972	1995: desulphurization unit
	1	coal	294	1977	2000: desulphurization unit
TE TO Ljubljana	2	coal	58	1966	1989
	1	coal	45	1984	
Nuclear Power Plants	**1**		**664**		
NPP Krško	1		664	1981	reconstruction in progress, finish until 1999, +40MW
Hydro Power Plants	122		740		
Drava river	20		506		
Fala	1		16	1977	
	2		42	1991	
Dravograd	2		14	1943	2000: + 4,5 MW
Mariborskiotok	2		34	1948	2000: + 14 MW
Vuzenica	2		45	1953	2000: + 19 MW
Vuhred	3		60	1956	2004
Ozbalt	3		60	1960	2004
Zlatolicje	2		123	1968	2004
	1		1	1989	2004
Formin	2		112	1978	
Sava River	13		128		
Moste	1		25	1978	
Medvode	2		23	1953	
Mavcice	2		38	1986	
Vrhovo	3		32	1993	
Socariver	36		99		
Solkan	3		31	1984	
Doblar	3		30	1939	2000
Plave	2		15	1940	2000
Ajba	1		4	1975	
Total	139		2,417		

All companies are state-owned, with the exception of Termoelektrarna-Toplarna Ljubljana, which is co-owned by the municipality of Ljubljana. The privatization of the companies has not yet started.

The nuclear power plant is operated by Nuklearna Elektrarna Krsko - NEK (Nuclear Power Plant Krsko) which is owned by the Republic of Slovenia since August 1998. The privatization of the company has not yet started, nor can it be predicted whether NEK will be privatized at all. NEK was formed as a joint (fifty-fifty) Slovenian-Croatian venture, operating under Slovenian law. Since a Government Decree in August 1999 it is a joint-stock company, in the majority ownership of the Republic of Slovenia. However, the Government of Croatia is not willing to accept this one-sided act by the Slovenian Government. Considering the question of ownership, the structure of management, capacities, the current status and cost of decommissioning, the modernization of the plant and other issues, there are no signs that the countries involved will be able to reach agreement in the near future.

The large hydro and pump-storage power plants are operated by the companies Dravske Elektrarne (Drava Power Plants on Drava river - north east), Savske Elektrarne (Sava Power Plants on Sava river - north west and eastern central) and Soske Elektrarne (Soca Power Plants on Soca river - west). According to the provisions of the Yugoslav Federal Energy Industry Act from 1981 and the Law on Public Utilities from 1992, that are still in force, all these companies are 'socially owned enterprises' in the form of joint-stock companies. They are legally owned by their employees; since 1992, however, ownership rights are exercised by the Ministry of Finance. The privatization of the companies has not yet started.

There is, in fact, only one large municipal cogeneration plant – TETOL (mentioned already as a large electricity producer) – situated in Ljubljana, which produces about 4% of the country's total electricity generation. However, this is not the 'usual' cogeneration, but instead a thermal power plant, which is a part of the state-owned electricity generation, transmission and distribution system, and also supplies Ljubljana with heat. Its ownership is therefore not yet clear, and there is a dispute about shareholdings and responsibilities between the city of Ljubljana and the state.

Industrial power plants/cogeneration plants cover about 3.5 % of total generation capacity. The most important sectors in this respect are paper mill and cellulose factories (more than half of the capacities) as well as metallurgy and the food, textile and wood industries.

2.5.6.1.2 Electricity transmission and distribution

The electricity transmission grid is operated by Elektro Slovenija – ELES, which is owned by the state. The privatization of the company has not yet started, and there are no clear signs whether or not the transmission company will be privatized at all.

The electricity distribution grid is operated by Elektro Ljubljana - centre and south, Elektro Maribor - north east,

Elektro Celje - eastern central, Elektro Primorska - west, Elektro Gorenjska - north west, which are all owned by the state. The privatization of the companies has not yet started.

The new energy law, confirmed in Parliament on second reading in July 1999 (the third and final readings are expected in September 1999), defines the opening of the electricity market in Slovenia in the following terms:

- free trading under market control;
- regulated TPA to the transmission and distribution networks,
- distribution companies are to be eligible customers,
- all customers with connected power in excess of 41 kW are to become eligible customers.

The single-buyer concept is not employed.

Whereas there is only one stage to market opening regarding the size of those customers allowed to choose their suppliers (eligible customers), two stages are envisaged in respect of suppliers. From around January 1, 2001 only electricity produced within Slovenia will be freely traded. From January 1, 2003 free international trading will be allowed. (January 1, 2003 is the Slovenian target date for EU accession).

The electricity market will be opened up in Slovenia to a greater extent than the minimum requirement laid down in the EU directive. It is estimated that the market opening will be of the order of 60 %. Otherwise, the concept of public service is applied. Operation of electricity generation, as well as transmission and distribution networks, are all defined as public services. These services may be performed by public service companies or by companies with concessions. It is expected that these functions will initially be performed by the public service company ELES (market operation and transmission network operation) and the five distribution companies. Distribution is also a national public service - municipalities have no say in electricity distribution.

An Agency for Energy is to be established as an independent entity with the purpose of assuring transparent and non-discriminatory operation of electricity and gas markets in the interest of all parties involved. (Note: the Agency has no role in establishing prices for captive customers, which will be set by the government).

The role of the Agency is principally to set prices for transmission and distribution, and to issue licences. The Agency will also resolve disputes (at an initial level) regarding network access (electricity and gas) and transmission and distribution pricing.

A problem with market opening in Slovenia will be electricity production from domestic coal. The cost of this production seems to be well in excess of competitive prices. The government has now estimated, that 'stranded investments' – power plants that are not competitive – may have a nominal value of between Euro 0.5 and 1 billion (a similar level of stranded costs has been estimated for Austria, which is several times larger).

How this issue will be resolved has not yet been specified by the government.

2.5.6.2 District heating market

Heating plants are generally owned by municipalities (60%) and local industrial companies (20%), which are in most cases privatized, or by local private companies (20%). The district heating grids are generally owned by public utilities, which are themselves normally owned by municipalities.

2.5.6.3 Gas market

Gas production is carried out by Nafta Lendava, a joint-stock company which is owned by PETROL joint-stock company (around 75 % of shares) and the state. Privatization of the company has been completed. However, the gas is used almost exclusively for the oil refinery in Lendava, which PETROL intends to shut down.

Gas imports and exports are managed by GEOPLIN, a joint-stock company, which is owned by the state (24 %), PETROL TRADE (12 %) and about 160 small industrial shareholders. The privatization of this companies has been completed. The gas transmission grid is also operated by GEOPLIN.

The gas distribution grid is operated by 22 companies. The 8 largest companies cover around 75 % of total natural gas supplied at the level of distribution companies. Most of these companies are joint-stock companies. Privatization of 4 of these companies has already been completed. Privatization of the remaining 4 companies has not started.

2.5.6.4 Mineral oil and coal market

Coal production is carried out by Rudniki Rjavega Premoga Slovenije (Brown Coal Mines of Slovenia, which consist of Rudnik Lignita Velenje (Velenje Lignite Mine) and Rudnik Trbovlje Hrastnik (Trbovlje Hrastnik Mine). Their sales are limited to the supply of both neighbouring large power plants Termoelektrana Sostanj I - V and Termoelektrarna Trbovlje II. Rudniki Rjavega Premoga is a joint-stock company owned by the state. The privatization of the company has not yet started.

2.5.6.5 Development of prices

Energy prices are available only for the years 1994 and 1997 (in some cases for 1996, too). However, there are two remarkable trends in energy prices. Prices for electricity and fuel oil increased between 1994 and 1997, whereas prices for natural gas and heat declined. The detailed pictures are as follows:

- The electricity price for residential use increased by 17% between 1994 and 1997. For industrial use the electricity price increase was only 8%.
- The price of fuel oil was identical for all sectors and increased homogeneously by 10% between 1994 and 1997.
- Natural-gas prices decreased substantially; for residential use they decreased by almost a quarter (-24%); the price of natural gas for industrial use was roughly 50% below the prices for residential use; however,

gas prices for industry decreased, too, by 15%.

- Heat prices for residential use declined by 12% between 1994 and 1997.

2.5.7 Energy and the environment

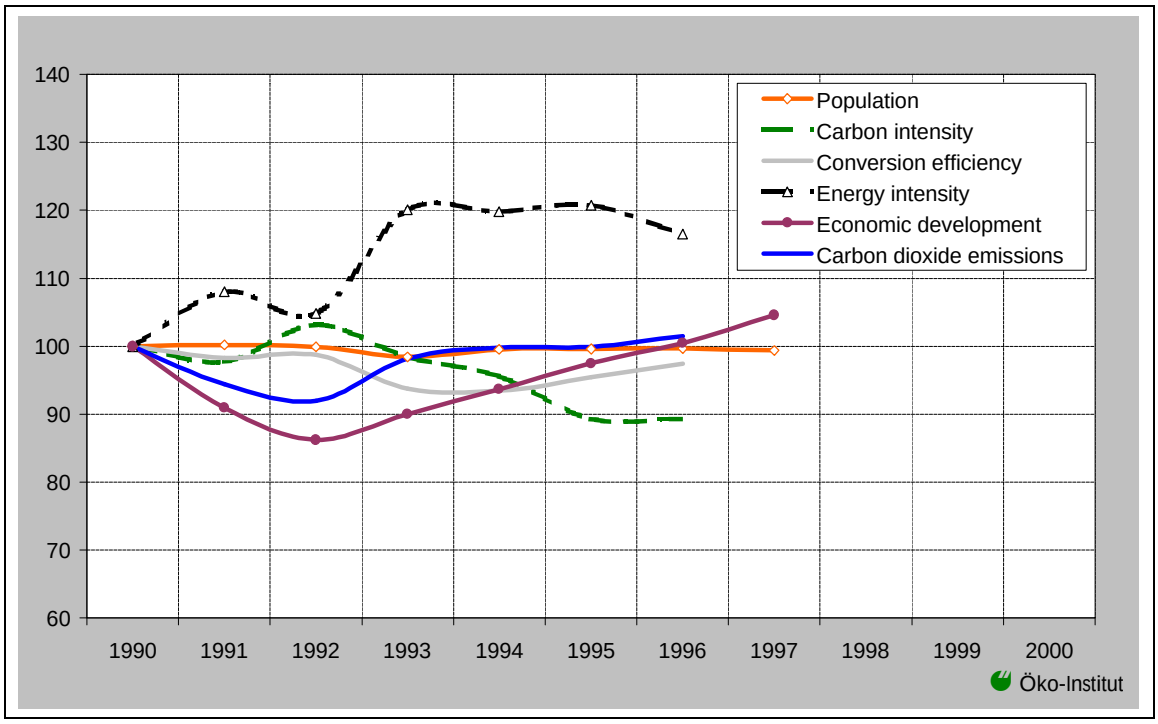
2.5.7.1 Greenhouse gas emissions

Greenhouse gas emissions (three-gas basket) dropped between 1990 and 1992 from about 19.2 to 17.7 million tons of greenhouse gas equivalent (GHGE). This corresponds to a decline by 8%. In 1993, GHG emissions started to increase again to about 19.5 million t GHGE in 1996, which is 2% above the 1990 levels. Almost three-quarters (71%) of GHG emissions derive from fuel combustion, 12% from agriculture.

With regard to individual greenhouse gases developments are as follows: 73% of GHG emissions are CO_2 emissions. The share of methane (CH_4) is almost a fifth (19%). The remaining 8% of GHG emissions are N_2O emissions.

Nearly 10 t GHGE were emitted per capita in 1990. This was 16% below the EU average (11.5 t GHGE/Cap.). Parallel to absolute emissions, per capita emissions decreased only slightly in the period to 1992, but increased again thereafter. In 1996 they were already 2% above the level of 1990 and merely 10% below the EU average, which decreased by 6%.

Figure 6: Driving forces of Slovenian CO_2 emissions



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

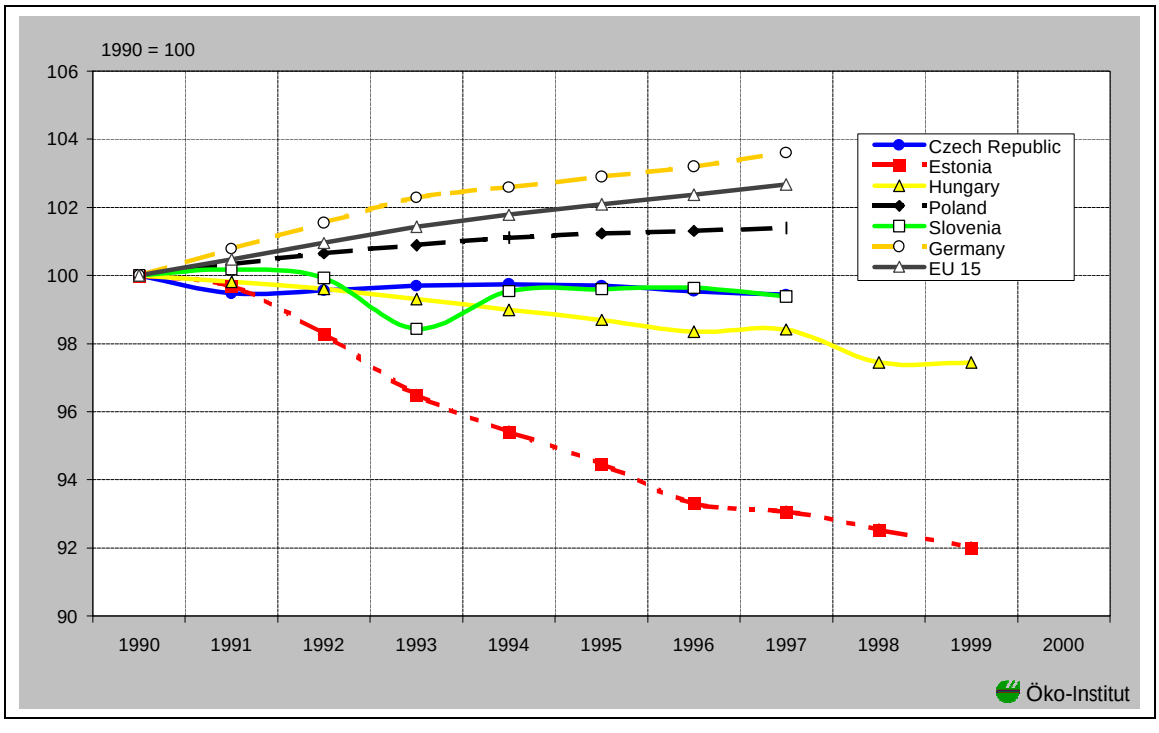
Carbon intensity – calculated by the ratio of overall GHG emissions to GDP at 1995 real purchasing power parities – did not change much during the nineties. Due to the economic decline it rose between 1990 and 1994 (+11%), but then dropped in the period to 1996 to the level of 1990 (0.9 kg/US$). However, the carbon intensity of the Slovenian economy was in 1990 37% above the EU average. Due to decreasing carbon intensity in the EU, the carbon intensity gab widened to 58% above the EU average in 1996.

2.5.7.2 Driving forces

The following figure shows five key factors (forces) that influence the development of CO_2 emissions (compare 2.1.7.2).

Population growth has obviously not influenced the development of CO_2 emissions in Slovenia, because it hardly changed during the nineties. In contrast, economic development did have a remarkable impact. The economic decline between 1990 and 1992 was mainly responsible for in decline of CO_2 emissions in Slovenia. The energy intensity of the Slovenian economy grew substantially, and in 1993 was 20% above the 1990 level. This increase was the main reason for the immediate increase in CO_2 emissions after the economic decline bottomed out in 1992. Due to the decreasing carbon intensity of Slovenian energy supply, Slovenian CO_2 emissions did not increase after 1993, although the econ-

Figure 7: Population



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

omy grew constantly. Conversion efficiency did not change much. It was slightly below the 1990 level. Efforts to further improve conversion efficiency, and to reduce energy intensity, could be points of departure for a greenhouse gas mitigation strategy.

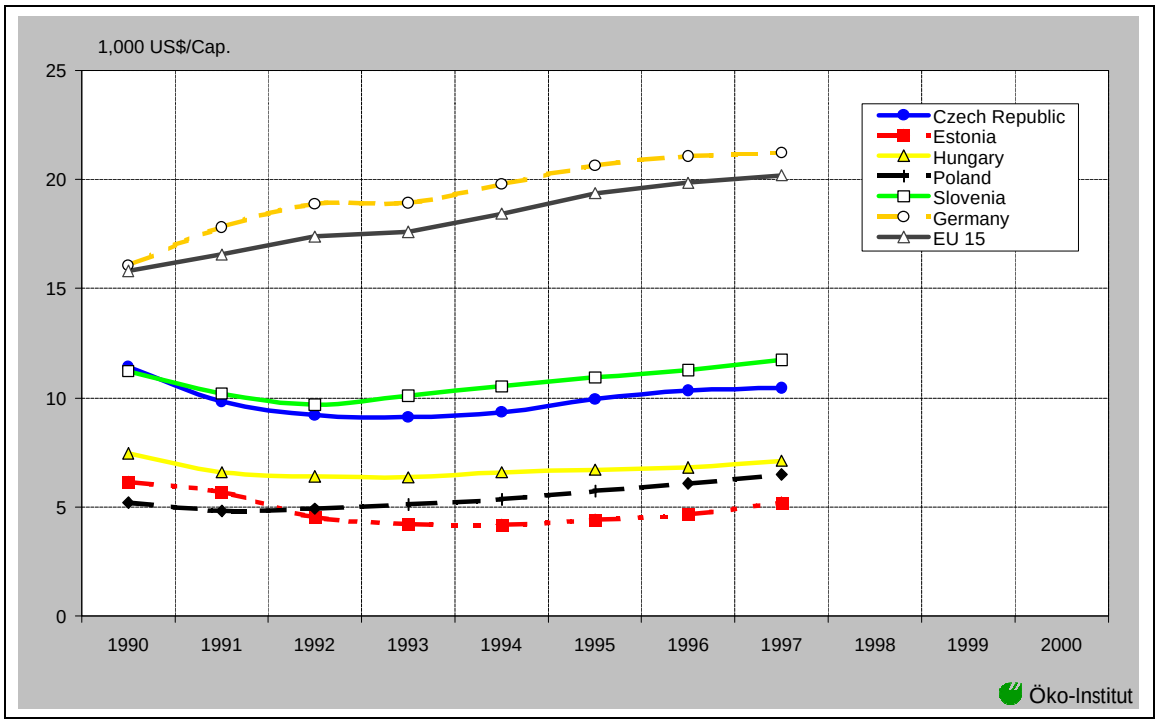
2.6 Similarities and differences

After highlighting the different characteristics of each Accession Country, their similarities and differences should be stressed. The aim of this analysis is to identify specific problems and starting points for an adequate and efficient strategy for CO_2 mitigation. We therefore focus the analysis on the driving forces behind the development of CO_2 emissions, namely the development of

- population,
- gross domestic product,
- carbon intensity,
- conversion efficiency and
- energy efficiency.

Population did not change much during the nineties (Figure 7). Apart from Estonia, changes were below 3%. Population grew in the EU, in Germany and in Poland, and remained nearly constant in the Czech Republic and Slovenia. By contrast, population shrank in Hungary (-2%) and more substantially so in Estonia (-8%). However, as changes in population were generally very low, these changes could not be considered

Figure 8: Gross domestic product per capita



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

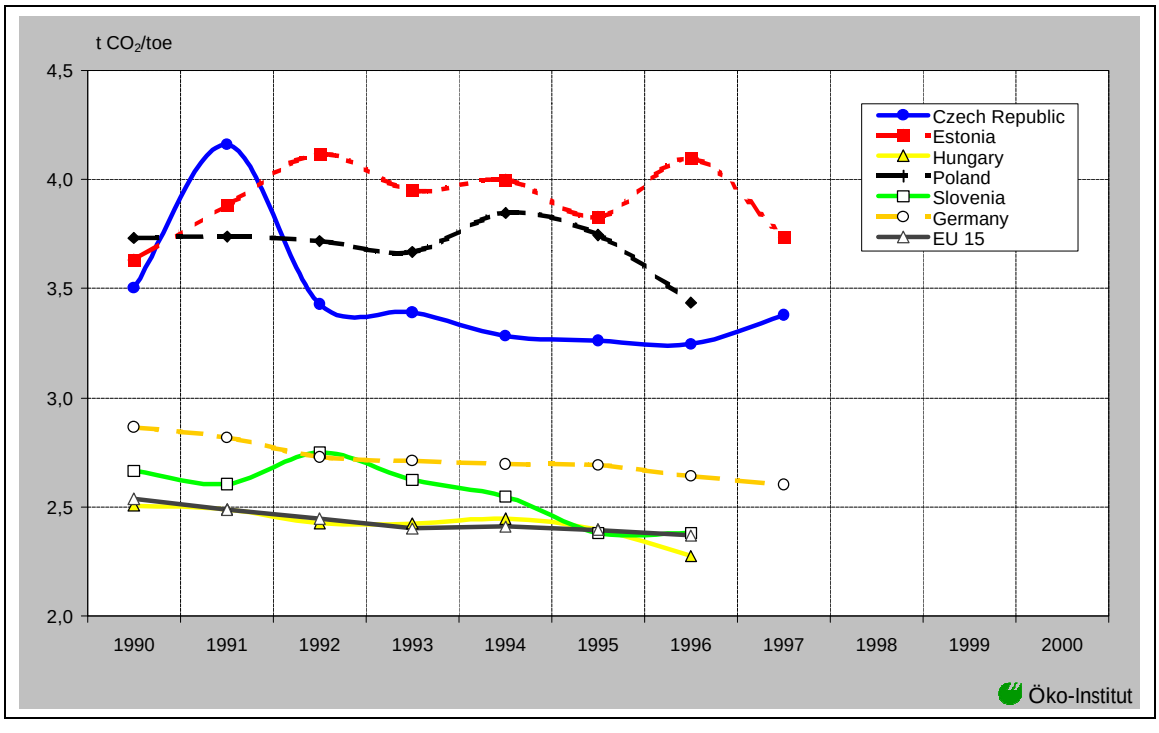
as driving forces behind the development of CO_2 emissions.

Gross domestic product (GDP) per capita in the Accession Countries is substantially lower than in the EU. GDP per capita is higher in Slovenia and the Czech Republic than in the other Accession Countries. In Estonia, Hungary and Poland it is less than half the EU average. With regard to developments during the nineties the picture is as follows:

- GDP per capita grew in the EU by 28%.
- All Accession Countries had decreasing GDP per capita in the early nineties.
- Poland was the first country whose economy started to grow again in 1992; Estonia was the last country (1995).
- GDP per capita in 1997 was above the 1990 level only in Poland (25%) and Slovenia (5%); in the Czech Republic, Estonia and Hungary it was still substantially below the 1990 level.

Changes in GDP per capita were substantial in all Accession Countries. The downturn was most dramatic in Estonia (-35%). Economic development was accordingly one of the most important driving forces behind the development of CO_2 emissions during the nineties. Economic recession contributed in all Accession Countries to declining CO_2 emissions. However, in some cases the impacts of economic development were

Figure 9: Carbon intensity



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

partly compensated by other influencing factors.

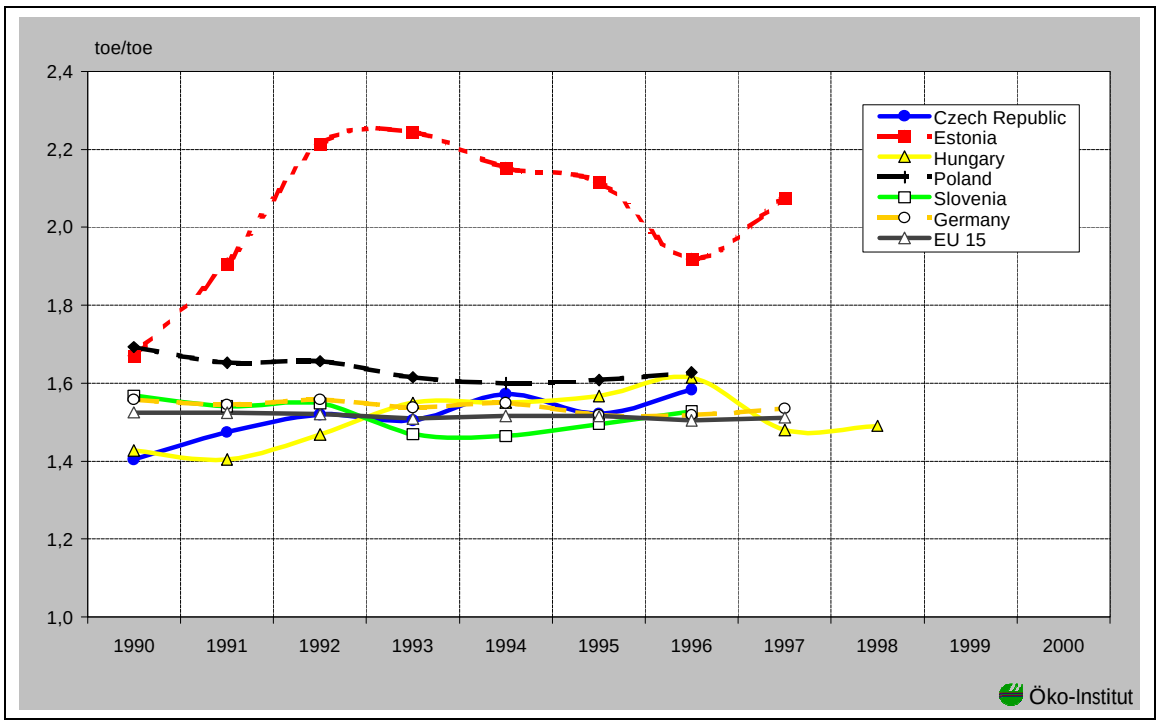
Carbon intensity is defined as t CO_2 emissions per unit of TPES. The carbon intensity of the Czech Republic, Estonia and Poland is significantly higher than the EU average, whereas carbon intensity in Hungary and Slovenia is more or less comparable to the EU average (Figure 9, page 46). In contrast to Hungary and Slovenia, the Czech Republic, Estonia and Poland do have considerable amounts of fossil resources, which have been used domestically and thereby determined the technical development of the domestic energy system (power plants etc.).[4] As these resources are solid fuels (coal and oil shale) with a high carbon content, these countries have higher carbon intensity. A second reason for the lower values in Slovenia and Hungary is the substantial share of electricity generation represented by nuclear power stations (Hungary, Slovenia) and hydro power stations (Slovenia).

Carbon intensity was very volatile, and did not follow a clear trend in most Accession Countries, apart from Hungary. However, in 1996 and 1997 the carbon intensity of Accession Countries was only 5 to 10% below the 1990 level, apart from Estonia, where it was slightly above the 1990 level. Hence policies and measures that aim to reduce carbon intensity (e.g. fuel shift to gas or renewables) would clearly contribute to a CO_2 mitigation strategy, in particular in Estonia, where carbon intensity did not decline during the nineties.

Conversion efficiency is defined as TPES per total final consumption (TFC). In general, conversion efficiency in the Accession Countries does not deviate significantly from the EU average (Figure 10, page 48). At the beginning of the nineties conversion efficiency in Estonia, Poland and Slovenia was worse than the EU average, whereas in the Czech Republic and Hungary conversion efficiency was better than the EU average. Apart from Estonia, conversion efficiency did not change substantially during the nineties. In the EU it decreased by merely 1% in the period to 1997. In Poland and Slovenia it had slightly improved (-3 respectively –4%) by 1996. In Hungary it worsened slightly, and in 1997 was only a little below the EU average. The Czech Republic's conversion efficiency worsened substantially, and in 1996 was clearly above the EU average. However, only in Estonia were the changes in conversion efficiency dramatic. In 1997 conversion efficiency was roughly 25% worse than at the beginning of the nineties, and more than one third (37%) worse than the EU average.

[4] Solid fuels are the most important fuel in Czech Republic, Estonia and Poland. In 1990 solid fuels accounted for 62% of TPES in Czech Republic and Estonia and 74% of TPES in Poland. In Estonia the share increased to 75% in 1997 but decreased to 52% of TPES in the Czech Republic and to 70% in Poland.

Figure 10: Conversion efficiency



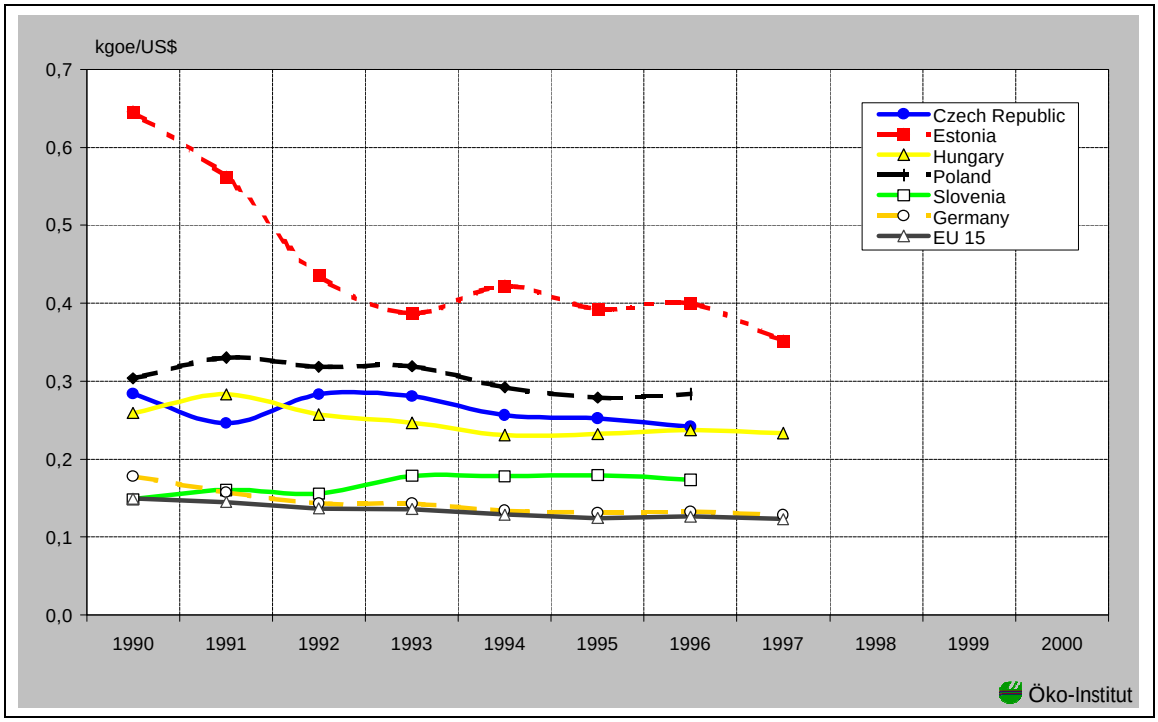
Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

Although conversion efficiency in the Accession Countries is basically comparable with EU countries, improvements in conversion efficiency should not be neglected. In particular in countries where conversion efficiency worsened during the nineties (Czech Republic, Hungary and in particular Estonia), policies and measures to improve conversion efficiency (e.g. reduction of electricity or heat losses) should gain a high priority.

Energy intensity is defined as a unit of TFC per unit of GDP measured in 1995 USD at purchasing power parities. Energy intensity was in most Accession Countries substantially higher than the EU average (Figure 11). Only Slovenia's energy intensity was, at the beginning of the nineties, within the range of the EU average. However, it worsened during the subsequent years, and in 1996 was clearly above the EU average. Energy intensity in the Czech Republic, Hungary and Poland is some 100 - 200% above the EU average. Only Estonia's energy intensity was more than 300% above the EU average. However, it dropped in most of the Accession Countries (-45%), and was 'only' 200% above the EU level in 1997. With the exception of Slovenia, energy intensity improved in all Accession Countries between 7% and 15%. Due to higher improvement in energy intensity in the EU, however, the gap between the EU and the Accession Countries widened during the nineties.

Because the energy intensity of the Accession Countries still deviates dramatically from the EU average, policies and measures to improve energy intensity (for example, efficiency improvements

Figure 11: Energy intensity



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

on the demand side) should gain a high priority. This applies to the Czech Republic, Estonia, Hungary and Poland, where energy intensity is substantially higher than the EU average, as well as to Slovenia, where energy intensity did not improve, but rather worsened during the nineties.

The resulting developments in CO_2 emissions were as follows (Figure 12, page 50):

- In the Czech Republic, Estonia and Hungary CO_2 emissions dropped substantially.
- In Poland CO_2 emissions decreased by 5% in the period to 1997, despite substantial economic growth; this was only possible because of an improvement in all driving forces (carbon intensity, conversion efficiency, energy intensity).
- Slovenia's CO_2 emissions were slightly above the 1990 level; the main reasons for this development are that Slovenia was less effected than the Czech Republic, Estonia and Hungary by economic recession, and that energy intensity worsened during the nineties.
- In Estonia the dramatic economic decline, as well as improvements in energy intensity, determined the decline of CO_2 emissions by more than 40% between 1990 and 1993.
- CO_2 emissions in the Czech Republic and Hungary were initially most influenced by the economic decline; due to improvements in carbon and energy intensity they remained at a

lower level when the economy started to grow again. However, both countries show slightly increasing CO_2 emissions since 1995, and they might reach their 1990 levels after 2000 if no CO_2 mitigation measures are taken.

In absolute terms CO_2 emissions can be compared on a per capita basis (Figure 12). CO_2 emissions per capita in Hungary and Slovenia are well below the EU average, although Slovenia's 'CO_2-advantage' shrank during the nineties.

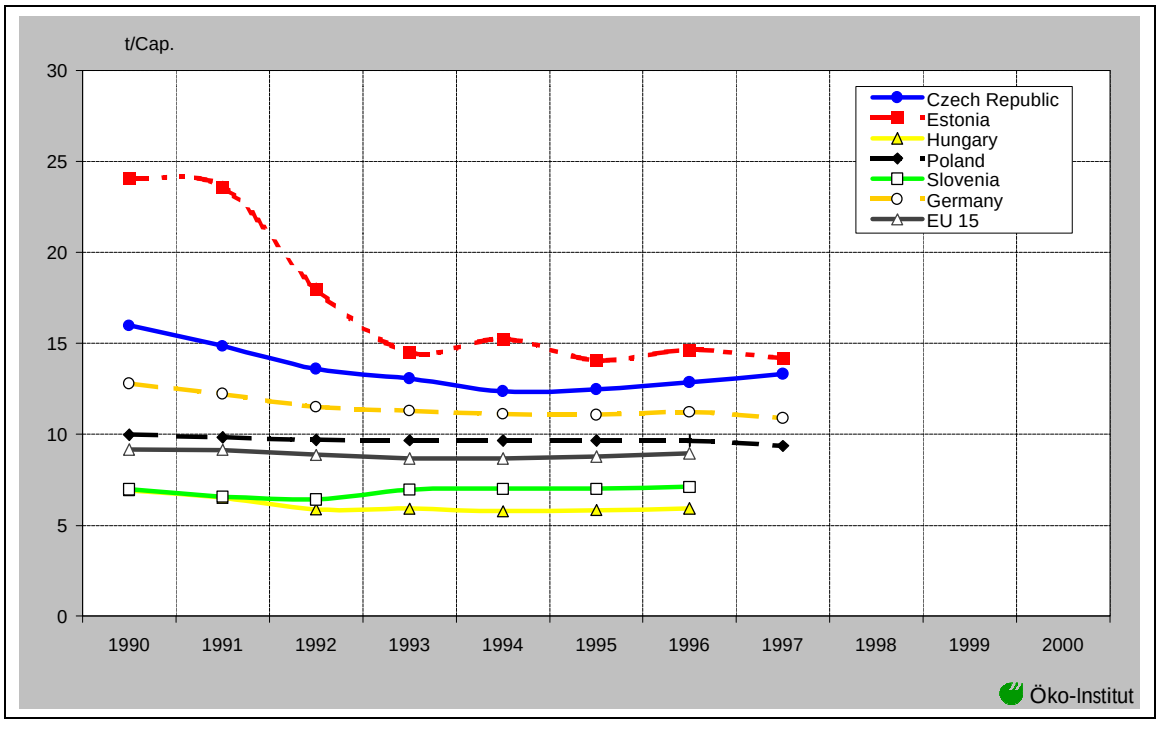
CO_2 emissions per capita in the Czech Republic, Estonia and Poland are above the EU average. Poland's CO_2 emissions are, however, only slightly above the EU average and still below Germany's level. CO_2 emissions per capita in the Czech Republic and Estonia are substantially above the EU average, although – in particular in Estonia – they decreased significantly at the beginning of the nineties.

2.7 Conclusions

The analysis shows that there are several options and starting points for CO_2 mitigation strategies in all Accession Countries. However, some of them are more appropriate for one country, and others for another country. It should therefore be highlighted, where each country should focus its CO_2 mitigation strategy:

- The Czech Republic's carbon and energy intensity are significantly above the EU average; carbon inten-

Figure 12: CO_2 emissions per capita



Source: DG XVII 1998, World Bank 1999, UNFCCC 1999, calculations by Oeko-Institut

sity improved by only 5% during the nineties; and although energy intensity decreased almost 15% since 1993, it could and should be improved further.

- Estonia was most affected by economic recession due to the transformation process; its CO_2 emissions decreased substantially. However, carbon intensity was worse in 1997 than in 1990 and energy intensity only declined between 1990 and 1993; since then it has remained more or less at that level.
- Hungary's CO_2 emissions per capita are already substantially below the EU average; however, energy intensity is still almost twice as high as the EU average. If the economy continues to grow, further improvements in energy intensity are necessary to avoid an increase in CO_2 emissions.
- Poland was least affected by economic recession during the nineties, because it started the transformation process earlier, in the eighties. Despite remarkable economic growth, CO_2 emissions did not increase. However, in comparison to most other Accession Countries carbon and energy intensity are still quite high. Improvements in energy intensity, such as that achieved since the mid-nineties, should be pursued.
- Slovenia's CO_2 emissions are below the EU average. It is, however, also the only Accession Country where CO_2 emissions increased during the nineties. Improvements in carbon intensity have been overcompensated by a deterioration in energy intensity. Slovenian GHG mitigation strategies should therefore focus on the reduction of energy intensity to the 1990 level.

In general, the analysis has also shown that economic development and energy intensity are the most important driving forces.[5] As economic development is a parameter and not a variable for GHG mitigation policies, improvement in energy intensity should have a key role in any GHG mitigation strategy. Influences of carbon intensity on the development of CO_2 emissions are substantial, but lower than the influences of energy intensity. Conversion efficiency seems to be the least important driving force. However, policies and measures to mitigate GHG emissions should focus simultaneously on all three indicators – energy intensity, carbon intensity and conversion efficiency – and not neglect any of them.

[5] Most countries show very similar patterned curves for energy intensity (Figure 11). and CO_2 emissions per capita (Figure 12). Influences of economic development on the development of CO_2 emissions are obvious in the Czech Republic (Figure 1), Estonia (Figure 2), Hungary (Figure 4) and Slovenia (Figure 6).

3 Analysis of the 'acquis communautaire'

Although the EC has no comprehensive energy policy, it has adopted a number of policy instruments relevant to the field of environment and energy. This field comprises environment-related regulations impacting the energy sector, as well as energy-related regulations impacting the environment. As a precondition for becoming EC Member States, Estonia, Hungary, Poland, Slovenia and the Czech Republic will have to transpose and implement these regulations in their domestic legal systems.

The EC has various policy instruments at its disposal. *Regulations* are directly binding and applicable within all Member States, and they do not require implementing legislation in the Member States. However, they do not currently exist in the field of environment and energy. *Directives* are also binding on each Member State with regard to their objectives. The precise way of achieving those objectives, however, is left up to domestic legislators, who are merely required to implement Directives. *Decisions* (of the Council) are binding in all their parts on those at whom they are directed. Programmes are usually adopted in the form of decisions. The accession candidates have to implement such binding instruments to the extent that they are applicable.

Recommendations, *communications* and *strategy papers* (including Green and White Papers) are not legally binding, but rather an expression of the current state of discussion on specific issues in the EC. They frequently indicate the direction of future policy development. Accession candidates may benefit from taking these into account, by being able to adapt flexibly to new policy developments as they occur in the future.

Finally, *environmental agreements* (also called voluntary or negotiated agreements) are a relatively new instrument of EC policy. At a formal level these are inter-industry agreements approved in some way by the European Commission and the Member States. Based on the understanding that such agreements will suffice to avoid future legislation on the specific issue in question, industry agrees to adhere to certain standards. While no formal legal requirements arise from these agreements, political pressure is bound to occur, with demands on relevant industries (where they exist) in the Accession Countries to join existing environmental agreements.

With the date of accession the entire set of European legislation will be applicable to the Accession Countries, obliging them to fulfil the specific requirements of the different acts of legislation. The deadlines mentioned in the Directives to transpose and implement the legislation are, of course, not applicable to the Accession Countries. This may not exclude the possibility of the postponement of the date of implementation of certain requirements of specific Directives during the Accession negotiations. It is possible, that in the case of Directives for which the transposition deadline has, at the time of accession, not yet expired, special deadlines for the Accession Countries will be laid down.

Some Directives set a specific threshold to be fulfilled by every Member State. For the Accession Countries these thresholds will be negotiated or calculated individually during the accession negotiations.

This chapter provides an overview of existing European legislation and policies in the field of environment and energy. We first introduce existing Directives and related new proposals (section 3.1) and Decisions and Programmes (section 3.2) in the field of environment and energy. Particular attention is paid to the substantive, institutional, procedural and monitoring as well as reporting requirements. Subsequently, we deal with environmental agreements (section 3.3), relevant more general policies and future strategies (section 3.4) and two concrete planned or proposed regulations (section 3.5). In chapter 4 country-specific implementation gaps and the general prospects for approximating EC policies on environment and energy are identified.

3.1 Directives (existing and proposed)

Although European Legislation allows Member States a great deal of freedom in transposing and implementing Directives, certain requirements have to be fulfilled. These requirements indicate how the objectives of the Directive are to be achieved. They can be differentiated into four categories (objectives/substantive requirements, institutional, procedural and monitoring, and reporting). Each Directive is described according to these categories. In the first section objectives are laid out. Sometimes these objectives are translated into specific standards to be met by EC Member States. Under the second heading the specific institutional requirements of the Directives are outlined. In most cases the Directives presuppose the existence of a well-functioning administrative structure capable of implementing Directives. However, some Directives explicitly require the designation of a specific authority or body to fulfil special tasks. The next section, 'Procedural Requirements', stresses the obligations of the Member States (and Accession Countries) to introduce definite procedures, such as authorization or tendering procedures. Sometimes the Directives leave the choice between different systems up to Member States, but general criteria are laid down in the Directives and must be observed. The following section, 'Monitoring and Reporting Requirements', addresses the requirements of the Directives that oblige Member States, for example, to regularly monitor that the stipulations of a Directive are fulfilled. Monitoring requirements can also apply in a narrow sense, for example to the monitoring of plant emissions or the energy efficiency of appliances.

The description of the Directives with regard to the obligations of Member States to lawfully transpose and implement the European Legislation is restricted by the scope of this study. The aim of this section is, thus, to extract and outline the most important and relevant requirements. However, in order to undertake an assessment of the legal gaps between European and national

legislation, a careful study of each individual act of legislation might be needed.

3.1.1 Liberalization of the electricity market

3.1.1.1 Objectives/Substantive requirements

The *Directive concerning common rules for the internal market in electricity (96/92/EC)* aims towards a competitive market in electricity. In order to achieve this objective, the Directive has established common rules for the generation, transmission and distribution of electricity, as well as for the organization and functioning of the electricity sector and access to the market.

The Directive regulates the operation of transmission and distribution systems. Transmission means the transport of electricity on a high-voltage interconnected system to the final customer or the distributor, whereas distribution means the transport of electricity on a medium- or low-voltage distribution system to final customers.

The production of electricity must be open to independent producers and so called autoproducers (natural or legal persons generating electricity essentially for their own use). The aim of the Directive on electricity is to liberalize the electricity market on the basis of a phased approach. The share of the market open to independent or autoproducers is laid down for each Member State. The Community will progressively increase this share of the national market over a period of six years.

Member States are obliged to bring into force the laws, regulations and administrative provisions necessary to comply with the Directive no later than 19 February 1999.

In 2005 the Commission will review the application of the Electricity Directive in order to allow the Council and the European Parliament to consider, in the light of the experience gained, a wider opening of the market.

3.1.1.2 Institutional requirements

For the *construction of new generation capacity* Member States must choose between an authorization procedure and a tendering procedure. This presupposes the existence of authorities responsible for authorization and tendering procedures. Member States, which have opted for the tendering procedure, have to designate an authority, a public or private body independent of electricity generation, transmission and distribution activities, which is responsible for the organization, monitoring and control of the tendering procedure. In connection with the tendering procedure Member States have also to designate a competent body to draw up an inventory of new means of production, including replacement capacity (Art.6).

Concerning the operation of **transmission systems**, Member States shall require undertakings, that are in possession of their own transmission systems, to designate a system operator to be responsible for operating and ensuring the maintenance of the transmission system, in order to guarantee security of supply (Art.7).

With the designation of a system operator for transmission systems Member States remain responsible for the development and publishing of technical rules, establishing, for example, minimum technical design and operational requirements for connection to the system of generating installations (Art.7, 8, 9).

Apart from transmission systems, Member States have also to designate a systems operator for **distribution systems**, to be responsible for the operation, maintenance and development of the distribution system. The system operator has to provide information to operators of interconnected systems, so as to ensure the secure supply of electricity. Furthermore, the system operator will be responsible for the dispatching of generating installations.

Member States have the overall responsibility to ensure that the operation of distribution systems function according to the provisions laid down in the Directive. The designated distribution companies have to ensure that the distribution system in their area is secure, reliable and efficient, and that it operates with due regard for the environment. The Member State may require the distribution system operator or the transmission system operator, when dispatching generating installations, to give priority to generating installations using renewable energy sources or waste, or producing combined heat and power (Art.10, 11, 12).

Additionally, Member States are required to designate an authority to settle disputes on negotiations and refusals of access to systems (Art.20 para.3).

3.1.1.3 Procedural requirements

The Directive lays down specific procedures for the construction of new generation capacity, the operation of transmission systems, the operation of the distribution systems, as well as principles regarding access to these systems.

Concerning the *construction of new generation capacity*, Member States have the right to choose between an authorization and a tendering procedure. The criteria for the granting of *authorization* are laid down in the Directive, and relate to the safety and security of the electricity system, the protection of the environment, land use and siting, the nature of primary energy sources, and energy efficiency. The criteria and details of the procedures have to be made public. Where authorization is refused, the applicant must be granted the right to resort to an appeal procedure (Art.5).

When a Member State opts for the *tendering* system, it has to ensure that tenders are published in the Official Journal of the European Commission 6 months before the closure of the tender (Art.6).

For the organization of *access to transmission or distribution system*, Member States may choose between procedures of negotiated access, regulation, or the single buyer system. In the first case, Member States have to take the necessary measures to ensure that electricity producers, suppliers and eligible customers are able to *negotiate access* to systems and to conclude supply contracts with each other on the basis of voluntary commercial agreements (Art.17 para.2).

Member States may also opt for a *regulated system* of access procedure, giving eligible customers a right of access on the basis of published tariffs for the use of transmission and distribution systems.

In the case of the *single buyer system*, Member States have to designate a legal person to be the single buyer within the territory covered by the system operator. Member States have to take the necessary measures to ensure that tariffs are published, and also that eligible customers are free to conclude supply contracts with supply undertakings outside the territory covered by the system or with producers inside the territory. Member States have also to ensure that independent producers are able to negotiate access to the system with transmission and distribution systems operators, so as to conclude supply contracts with eligible customers outside the system on the basis of a voluntary commercial agreement (Art. 18 para. iv).

3.1.1.4 Monitoring and reporting

Member States have to create appropriate and efficient mechanisms for regulation, control and transparency, so as to avoid any abuse of dominant market position or predatory behaviour, in particular to the detriment of consumers (96/62/EC, Art.22; the same applies to the Gas Directive 98/30/EC Art.22).

The technical rules required by both Directives to ensure the interoperability of systems have to be notified to the Commission in accordance with Art. 8 of the Directive 83/189/EEC, laying down a procedure for the provision of information in the field of technical standards and regulations (96/62/EC, Art.7; 98/30/EC Art.5).

In the Directive on electricity it is stipulated, that contracts concluded on a negotiated basis and within the framework of the single buyer system have to be notified to the Commission on an annual basis.

3.1.1.5 Transitional provisions

Those Member States, in which commitments of guarantees of operation were given before this Directive came into force and may not be honoured on account of the provisions of this Directive, may petition for a transitional regime to be granted to them by the Commission.

3.1.2 Liberalization of the gas market

3.1.2.1 Objectives/Substantive requirements

The *Directive concerning common rules for the internal market in natural gas (98/30/EC)* aims towards a competitive market in natural gas. The structure and content of this Directive is comparable to the electricity Directive described above. Some repetition is unavoidable. The Gas Directive establishes common rules for the transmission, distribution, supply and storage of natural gas.

Comparable to the Directive on electricity, the objective of the Gas Directive is to open up the internal market in natural gas in several phases. The market shall be opened up to so called *eligible cus-*

tomers. Eligible customers are those entities to which natural gas can be sold according to the above mentioned procedures. The Member States define which legal entities are to be designated eligible customers. At the very least, gas-fired power generators, irrespective of their annual consumption, and other final customers consuming more than 25 million cubic metres of gas per year on a consumption-site basis, must be designated as eligible customers. Member States have to ensure that the definition of eligible customers results in an opening of the market equal to at least 20% (to 38% in 2003 and 43% in 2008) of the total annual gas consumption of the national gas market. The minimum consumption level for designating final customers as eligible shall be reduced in the year 2003 to at most 15 million cubic metres per year and to 5 million cubic metres in 2008.

Member States have to ensure that *distribution undertakings act* in accordance with the Gas Directive. Each distribution undertaking has to operate, maintain and develop, under economic conditions, a secure, reliable and efficient system with due regard to the environment (Art.10).

Member States are obliged to bring into force the laws, regulations and administrative provisions necessary to comply with the Gas Directive, no later than August 10, 2000.

In 2008, the Commission will review the application of the Gas Directive in order to allow the Council and the European Parliament to consider, in the light of the experience gained, a wider opening of the market.

3.1.2.2 Institutional requirements

Member States may require authorization for the *construction or operation* of natural gas facilities, for the *supply* of natural gas, and for *wholesale customers*. If authorization is required, the Member State, or a competent authority, must be responsible for the authorization (Art.4).

Additionally, Member States have to designate an authority responsible for the settlement of disputes concerning negotiations on access and refusal of access to the systems (Art. 21 para.2).

3.1.2.3 Procedural requirements

Member States must lay down criteria and procedures for the granting of the above-mentioned authorization, and make them public. Any refusal of authorization requires that the applicant and the Commission be informed of the reasons for such a refusal (Art.4). Member States have to ensure that technical rules establishing minimum technical design and operational requirements for connection to the system of LNG facilities (liquefied natural gas), storage facilities, other transmission or distribution systems, and direct lines, are developed and made available. These technical rules have to ensure the interoperability of systems and be objective and non-discriminatory.

For the organization of *access to systems*, Member States may choose either the negotiated or regulated access procedure, or both.

In the case of *negotiated access*, Member States have to take necessary meas-

ures to enable natural gas undertakings and eligible customers to negotiate access to systems, and to conclude supply contracts with each other on the basis of voluntary agreements (Art.15).

In the case of *regulated access*, Member States are obliged to grant natural gas undertakings and eligible customers a right of access to systems, on the basis of published tariffs and/or other terms and obligations for use of that system (Art.16).

3.1.2.4 Monitoring and reporting

Member States have to publish yearly the criteria for the definition of eligible customers and send these criteria to the Commission to be published in the Official Journal of the European Communities (See Electricity Directive).

3.1.3 Energy taxation

3.1.3.1 Objectives/Substantive requirements

The Directive 92/81/EEC on the harmonization of the structures of excise duties on mineral oils, together with Directives 92/12/EEC and 92/82/EEC, regulates the taxation of mineral oils. Whereas Directive 92/12/EEC lays down provisions on the general arrangements for products subject to excise duties, Directive 92/82/EEC covers provisions with respect to the minimum rates of excise duty applicable to certain mineral oils, such as leaded or unleaded petrol, gas oil, heavy fuel oil or kerosene. The different types of mineral oils are all specified according to a Combined Nomenclature Code. For these mineral oils, the Directive lays down minimum rates.

The most significant characteristics of the new *Proposal for a Council Directive restructuring the Community framework for the taxation of energy products* (COM(97)30) are (1) the expansion of required minimum levels of taxation to cover all energy products, including mineral oils, natural gas, solid energy products (coal) and electricity, and (2) the gradual increase in the levels of taxation. If the proposed Directive is adopted, it will replace the existing Di-

Table 8: Actual and proposed minimum levels of taxation for energy products

Energy product		Minimum taxation rates			
		Actual	1st phase (1998)	2nd phase (2000)	Goal (2002)
Petrol	(ECU/1000 l)	287	417	450	500
Gas oil	(ECU/1000 l)	245	310	343	393
Liquid petroleum gas	(ECU/1000 kg)	100	141	174	224
Kerosene	(ECU/1000 l)	245	310	343	393
Electricity	(ECU/MWh)	–	1	2	3
Solid energy products	(ECU/GJ)	–	0,2	0,45	0,7

remark: COM(97) 30 final.; European Commission 1996b: 48; this table does not contain all of the planned minimum levels of taxation; for the use of kerosene exceptions are laid down.

rectives 92/81/EEC and 92/82/EEC (Table 8, page 58).

For mineral oils covered by the Directive 92/82/EEC, Member States are obliged to fix their rates at a level no less than the minimum rates prescribed in this Directive. Mineral oils other than those for which a level of duty is specified in the rules of Directive 92/82/EEC, shall, according to Directive 92/81/EEC, be subject to an excise duty if intended for use, offered for sale, or used as *heating fuel or motor fuel*. The rate of the duty to be charged shall be fixed, according to use, at the rate for the equivalent heating fuel or motor fuel (Art. 2 para. 2).

The Proposal for a Council Directive restructuring the Community framework for the taxation of energy products stipulates that, with respect to all energy products (with the exception of electricity), only use as *heating or energy materials* is to be subject to these minimum levels of taxation, and not use as raw materials. In the case of electricity, the minimum level of taxation is to be paid by the final consumer. The minimum taxation levels are to be differentiated according to the use of the energy products (1) as energetic materials, (2) for special industrial and commercial uses (e.g. agriculture or construction), or (3) as heating materials. Certain energy-intensive branches of industry are to be exempted from the obligatory taxes. In order to achieve the prescribed minimum levels of taxation, Member States are allowed to take account of all indirect taxes which apply to the product in question. Member States can continue to tax various energy products differently, as long as the agreed minimum taxation levels are achieved. In addition, the proposed Directive provides the opportunity to lower the tax burden in other areas (such as workplace taxes) in response to possible tax increases resulting from the directive. The current minimum taxation levels are to be increased every two years, until the target levels of taxation stipulated by the Draft Directive for the year 2002 are achieved.

3.1.3.2 Institutional requirements

In order to fulfil the obligations of the Directive on the harmonization of the structures of excise duties on mineral oils, a tax authority has to exist in each Member State to ensure that excise duties are charged and taxes collected.

The proposed Directive on the taxation of energy products does not require institutional innovations other than those stipulated by previous Directives.

3.1.3.3 Procedural requirements

There are no specific procedural requirements

3.1.3.4 Monitoring and reporting

Competent authorities have to monitor the charge and collection of excise duties. Member States have to inform the Commission that laws, regulations and administrative provisions comply with the Directives 92/18/EEC, 92/81/EEC and 92/12 EEC.

According to the proposed Directive on the taxation of energy products, Member States will have to inform the Commission of the levels of taxation they

impose. In particular, Member States have to inform the Commission of the measures and conditions adopted to ensure tax neutrality, that is, avoiding an increase in the overall tax burden (COM(97) 30 Art.22. para.1).

It is difficult to assess whether or not the proposal will be adopted in the near future. There is, however, strong support for adoption of the proposed Directive within the timeframe of the Finnish Presidency.

3.1.4 Large Combustion Plant Directive (and proposed revision)

3.1.4.1 Objectives/Substantive requirements

The *Directive on the limitation of emissions of certain pollutants into the air from large combustion plants 88/609/EEC* (Large Combustion Plant Directive), aims to address the principle causes of acid rain by limiting emissions of sulphur dioxide (SO_2), nitrogen oxides (NO_x) and dust. The Directive applies to all combustion plants with a rated thermal input equal to or greater than 50 MW. The Directive is not applicable to plants making direct use of the products of combustion in manufacturing processes or plants powered by diesel, petrol or gas engines, or by gas turbines. The goal of the reduction of emissions is to be accomplished by means of a combination of provisions concerning total emissions from existing plants and strict emission limits on new plants. Existing plants are subject to total national emission limits, with phased reductions and with different limits for each Member State. For new plants, emission limits applicable to individual authorizations are defined.

For each Member State national ceilings for SO_2 and NO_x emissions have been set according to gradual steps, laid out in Annex I (SO_2) and Annex II (NO_x). Member States had to draw up programmes for the phased reduction of total annual emission of these substances from *existing* plants (that is, plants whose original operating license was granted before 1 July 1987). These programmes must include timetables and implementing procedures for ensuring that these reductions comply with the ceilings.

In the Accession Countries, national emission reduction targets will have to be agreed upon with the European Union, and programmes will have to be set up for reducing annual emissions from existing combustion plants, in order to achieve national emission reduction targets.

3.1.4.2 Institutional requirements

Competent authorities for licensing and monitoring systems, as well as the reporting obligations under the Directive, must exist.

If the operation of a combustion plant is likely to affect the environment in another Member State, the Member State must ensure that the other Member State is consulted appropriately under Directive 85/337/EEC on the assessment of the environmental effects of certain public and private projects.

3.1.4.3 Procedural requirements

The Directive presupposes the existence of a licensing system for the operation of all combustion plants.

In the case of construction or operation of new combustion plants (i.e. licensed on or after 1 July 1987), the competent authority must ensure that all licenses for these plants contain conditions relating to compliance with emission limits fixed in Annexes III to VII (Art.4), and establish discharge conditions (Art.10) as well as procedures relating to the malfunction or breakdown of abatement equipment (Art.8).

3.1.4.4 Monitoring and reporting

The competent authorities must undertake regular monitoring of the emissions from combustion plants covered by the Directive (Annex IX). Emissions from new plants of more than 300 MW must be measured on a 'continual basis', while those from other plants must be measured 'regularly', as approved by the competent authority.

The Directive requires an annual emission inventory of SO_2 and NO_x from existing plants, to be established on a plant by plant basis for plants over 300 MW and refineries, and on an overall basis for other plants (Annex IX). The inventory is to be sent to the Commission. Total annual emissions of SO_2 and NO_x from new plants are also to be determined and sent to the Commission. Operators of combustion plants have to inform the authorities of the results of continuous measurements, and scientific institutions must be approached to monitor on behalf of the government.

3.1.4.5 Recent developments related to the Directive

In July 1998, the EC adopted a proposal (COM(98) 0415 final) to amend the Directive 88/609/EEC. The main feature of the new proposal is that it introduces *emission limits* twice as strict as those currently applicable. It limits emissions for three types of pollutant: sulphur dioxide, nitrogen oxides and dust. The new limits would be applicable for all new plants put into operation after 1 January 2000. The proposal enlarges the scope of the Directive to include gas turbines, and sets *limit values for NO_x* emissions from such installations. The revision also encourages the use of combined heat and power generation in new large combustion plants, and the use of biomass as a fuel.

3.1.5 SAVE Directive

3.1.5.1 Objectives/Substantive requirements

The *Directive 93/76/EEC to limit carbon dioxide (CO_2) emissions by improving energy efficiency (SAVE)* aims to get Member States to limit their emissions of CO_2.

3.1.5.2 Institutional requirements

The Member States have to ensure that authorities are available to enforce the programmes for each of the sectors mentioned above.

3.1.5.3 Procedural requirements

Member States are obliged to improve energy efficiency, particularly by draw-

ing up and implementing programmes in specific policy areas. These areas are:

- Energy certification of buildings:

Such certification should include the description of the building's energy characteristics, and provide prospective users with information on the building's energy efficiency (Art.2); thus improving transparency of the property market and encouraging investment in energy savings.

- Billing of heating, air-conditioning and hot water costs on the basis of actual consumption:

The costs have to be calculated on the basis of actual consumption. This enables the cost of these services to be distributed among the users, dependent on the quantities of heat, cold and hot water consumed by each occupier. This is applicable to buildings or parts of buildings supplied by collective heating, air-conditioning and hot water installations. Occupants should be able to regulate their consumption (Art.3).

- Third-party financing for energy efficiency investments in the public sector:

This essentially implies that the overall recovery of costs incurred in auditing, installation, operation, maintenance and financing services for an energy efficient investment is dependent on the level of energy saving (Art.4).

- Thermal insulation of new buildings:

These programmes should be of long-term perspective and based on standards set by Member States with due consideration of climatic conditions and the intended use of building (Art. 5).

- Regular inspection of boilers with an rated output of 15 kW or more:

The programmes have to contribute to the optimal performance of the installations from an environmental and energy point of view (Art.6).

- Energy audits of undertakings with high energy consumption:

The programmes have to improve efficiency and limit CO_2 emissions (Art.7). Energy audits, in particular for undertakings with high energy consumption, should be promoted to bring about significant improvements in energy efficiency in this sector.

The programmes can include laws, regulations, voluntary agreements, etc., and the scope of the programmes is to be determined by Member States (Art. 8).

3.1.5.4 Monitoring and reporting

Member States are to inform the Commission about the provisions of national law and other measures adopted by them in the areas covered by the Directive (Art. 10).

Every two years Member States have to report the results of implementation and the choices made in their programmes.

3.1.6 Directives on the labelling of the consumption of energy

3.1.6.1 Objectives/Substantive requirements

The *Directive 92/75/EEC on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances*, along with its *Daughter Directives*, aims to bring about the harmonization of national measures on product publication, particularly with regard to product labelling and information on the energy consumption of a product, thus enabling the consumer to choose an energy-efficient product. The Directive 92/75/EEC is a Framework Directive, laying out general rules on labelling and product information, whereas specific regulations are laid down in so called *Implementing Directives* or *Daughter Directives* of the Framework Directive.

The appliances covered by this Directive are:

- refrigerators, freezers and their combinations (94/2/EC),
- washing machines (95/12/EC), dryers (95/13/EC), washer-dryers (96/60/EC),
- dishwashers (97/17/EC),
- ovens (79/531/EEC),
- lighting sources (98/11/EC),
- water heaters and hot water storage appliances (planned) and
- air conditioners (planned).

Details about what should be included in the Daughter Directives are also established in this Directive (Art.12).

Framework Directives lay down general provisions, whereas Daughter Directives provide specific regulations for each appliance. The Daughter Directives are adopted in a procedure laid down in Article 10 of the Directive, taking into account technical progress. The Commission is assisted by a committee composed of representatives of the Member States (Art.10).

According to the Framework Directive, information about energy consumption and other relevant product information is to be made available to the consumer of the product by means of a fiche and a label. These labels are to be placed on each household appliance intended for sale, hire, hire-purchase or display to end users. The Daughter Directives to this Directive define the details regarding labels for each appliance. There are additional provisions regarding labelling and product information, for example the location and language of the label (Art.4a). The Directive also includes a provision on how information is to be provided to a potential customer in the case of mail-order products (Art.5).

Member States have to adopt the provisions necessary to comply with the Directive by July 1993.

3.1.6.2 Institutional requirements

As Member States are obliged to take necessary measures to ensure that the provisions of this Directive are fulfilled, a competent authority might be established to secure this obligation.

3.1.6.3 Procedural requirements

Under the Directive, suppliers of these appliances are responsible for providing all labels and information regarding the product free of charge (Art.4b). Suppliers should also provide a product fiche, contained in all product brochures, and be responsible for the accuracy of the labels and fiches (Art.3). Moreover, to enable assessment of the accuracy of labels and fiches, the supplier must maintain technical documentation on the description of the product, tests reports results of design calculations, etc. (Art.2.3), and these must be available for a period of 5 years after a product has been manufactured (Art.2.4).

Member States have also to introduce educational and promotional campaigns on energy consumption to encourage consumer awareness about responsible energy use (Art.7).

3.1.6.4 Monitoring and reporting

Member States had to communicate to the Commission the main provisions of domestic law adopted in the field covered by this Directive by June 1993.

Daughter Directives:

Each of the Daughter Directives includes details about the labels and fiches in their Annexes.

Dates of enforcement:

The provisions of the Directive on energy labelling of household electric refrigerators, freezers and their combinations (94/2/EC) had to be adopted and published by December 31, 1994 and put into effect by January 1, 1995.

The laws and regulations of the Directive on energy labelling of household washing machines (95/12/EC) had to be adopted by March 1, 1996 and enforced by April 1, 1996.

The laws and regulations of the Directive on energy labelling of household electric tumble dryers (95/13/EC) had to be adopted by March 1, 1996 and enforced by April 1, 1996.

The laws and regulations of the Directive on energy labelling of household combined washer-dryers (96/60/EC) had to be adopted by July 15, 1997 and enforced by August 1, 1997.

The laws and regulations of the Directive on energy labelling of household dishwashers (97/17/EC) –had to be adopted by June 15, 1998 and enforced by July 1, 1998.

The Directive applying to electric ovens (79/531/EEC) had to be enforced within 2 years of notification of the Directive.

The laws and regulations of the Directive applying to energy labelling of household lamps (98/11/EC) of January 27, 1998 had to be adopted by June 15, 1999 and enforced by July 1, 1999.

3.1.7 Directives on energy efficiency requirements for household appliances

3.1.7.1 Objectives/Substantive requirements

The *Directive on efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels (92/42/EEC)* and the *Directive on energy efficiency requirements for house-*

hold electric refrigerators, freezers and combinations thereof (96/57/EC) aim at increasing the energy efficiency of such appliances. Directive 92/42/EEC is applicable to all new hot water boilers fired by liquid or gaseous fuels with a rated output of no less than 4kW and no more than 400kW. The Directive lists those boilers which are not controlled by the Directive (for example, hot water boilers capable of being fired by different fuels including solid fuels, 92/42/EEC Art.3). Directive 96/57/EC is applicable to all new electric mains-operated household refrigerators, frozen food storage cabinets, food freezers, and combinations with a maximum allowable electricity consumption expressed in a linear function (Annex I of Dir. 96/57/EC Art.1).

Member States have to ensure that only those boilers and refrigerators which meet certain efficiency requirements or 'harmonized standards' are placed on the market. The Directive on hot-water boilers sets various parameters depending on the type of boiler (standard boiler, low temperature boiler or gas condensing boiler) (92/42/EEC Art.5.1).

Member States had to adopt and publish all laws, regulations and administrative provisions necessary to comply with the Directive on water boilers by January 1993 and apply those provisions one year later. In the case of the refrigerators Directive, Member States were to adopt the legislation by 3 September 1997 and apply the provisions starting in 2000.

3.1.7.2 Institutional requirements

According to Directive 92/42/EEC each Member State has to appoint a responsible body for the verification of the compliance of boilers with the efficiency requirements set out in Article 5.1. These bodies are responsible for the procedures laid out in the Directive, such as the granting of the CE label (indicating compliance with Directive requirements, see below). The bodies must fulfil certain criteria (i.e. the body and staff responsible for carrying out verification tests may not be involved in the development of the appliances inspected).

3.1.7.3 Procedural requirements

Member States may apply a labelling system with a defined symbol scheme (stars) to hot-water boilers with a level of efficiency superior to the requirements laid out in the Directive. Boilers and refrigeration appliances which comply with harmonized standards for production and measurement, and with the efficiency requirements of the Directive, have to bear the 'CE' marking, which indicates that the product fulfils the requirements of the Directive. The declaration of conformity proves that the boiler type has been examined in accordance with a special procedure laid down in Annex III of the Directive. A declaration of conformity also has to be attached. Appliances labelled with the 'CE' marking can then be placed on the market (92/42/EEC Art.7; 96/57/EC Art.5).

In the case of refrigerators and related appliances, Member States have to take the necessary measures to ensure that refrigerators can only be placed on the market if electricity consumption is

equal to or less than the maximum allowable electricity consumption. Refrigerators are classified into categories, and levels of maximum allowable electricity consumption are laid down for each category. The procedure for calculating electricity consumption is laid out in Annex 1 of Directive 96/57/EC.

3.1.7.4 Monitoring and reporting

A list of the bodies appointed (see 'Institutional requirements') must be notified to the Commission and other Member States and be referred to as 'notified bodies' (92/42/EEC Art.8 Annex V).

The reference numbers of boilers which comply with the harmonized standards have to be published in the Official Journal of the European Community, and boilers must be accompanied with the EC declaration of conformity.

Planned: A Directive on the energy efficiency requirements of commercial lamp circuits is currently being considered.

3.1.8 Directive on Integrated Pollution Prevention and Control

3.1.8.1 Objectives/Substantive requirements

The aim of the *Directive 96/61/EC concerning integrated pollution prevention and control (IPPC)* is to achieve integrated pollution prevention and control for specific industrial activities listed in Annex 1 of the Directive, to ensure the protection of the environment as a whole. For this purpose, the Directive establishes measures for the prevention or reduction of emissions to air, water and land, as well as waste generated from listed industrial activities (Art.1). It obliges operators to prevent pollution to these media. Amongst other obligations, they are also responsible for using energy efficiently (Art.3). The industries regulated by the IPPC Directive include energy industries such as certain combustion installations, mineral oil and gas refineries, coke ovens and coal gasification and liquefaction plants, as well as other energy-consuming industries.

The provisions of the Directive were to be transposed into national law in EU Member States by October 1999, and would apply immediately to new installations (not installed before the entry into force of this Directive) covered by the Directive, as well as to existing installations undergoing substantial modifications. Other existing installations have an eight-year transition period until the year 2007, when all the provisions of the Directive will apply to these installations as well.

3.1.8.2 Institutional requirements

The Directive presupposes that countries have developed administrative structures to issue environmental permits for industrial operations, and the scientific knowledge required to administer and control regimes for the environmental management of a number of industrial sectors. The existence of a competent authority responsible for implementing the provisions of the Directive is required (Art.2). Where there is more than one competent authority responsible for the granting of permits, Member States must ensure that the

conditions and procedures for granting of permits are co-ordinated (Art.7).

3.1.8.3 Procedural requirements

The key concept involved in the fulfilment of the obligations of the Directive is that of best available techniques (BAT). The Directive lays down a framework requiring Member States to issue permits for the listed industrial activities. These permits must contain conditions based on the BAT of pollution abatement. Techniques mean not only the technologies used, but also the way in which the installation is designed, built, maintained, operated and decommissioned. The Directive requires the European Commission to organize an exchange of information on the BAT between Member States and the industries concerned. The European IPPC Bureau organizes this exchange of information and produces BAT Reference Documents (BREFs), which competent authorities in the Member States take into account in their determination of the most appropriate condition for a permit under the Directive. In addition to the requirements of BAT, the Directive contains a list of 12 items to be considered when determining BAT requirements; for example, the consumption and nature of raw materials used in the process and their energy efficiency (Annex IV no.9). The drafting procedure of the BREFs is expected to last until around the year 2002, after which they will be published by the Commission.

Under the Directive all new and existing installations are to be subject to a permitting regime which applies emission limits and other controls based on BAT standards and a multi-media approach. Permits granted must guarantee that the installations comply with the provisions of the Directive. If installations do not comply with the Directive, the competent authority must refuse to issue a permit (Art.8).

The permits must include emission limit values for pollutants – especially for those listed in Annex III of the Directive – likely to be emitted in significant quantities from the installation concerned, taking into account the nature of these emissions and their potential to transfer pollution from one medium to another. If necessary, the permit shall include appropriate requirements ensuring protection of soil and ground water, and measures concerning the management of waste generated by the installation. If environmental quality standards require stricter conditions than that achievable through the best available pollution abatement techniques, then additional measures must be included in the permit (Art.10).

Where the possibility exists, that the operation of an installation would lead to negative transboundary effects, the Member State, in which the permit application was made, must forward all relevant information to the affected Member State, to allow comment on the permit before the competent authority takes a decision on the granting of the permit (Art. 17).

Public participation and the dissemination of public information are vital components of the Directive. The Member States must ensure that applications for

permits are made available to the public with sufficient time for their comments, before the competent authority reaches its decision. The final decision, a copy of the permit and any updates must also be made available to the public (Art.15 para.1).

The competent authorities shall periodically reconsider and, where appropriate, update permit conditions of the installations.

3.1.8.4 Monitoring and reporting

Authorities must regularly monitor whether or not the conditions of the permit are complied with by installation operators (Art.14).

Member States are required to send the Commission available representative data on the limit values laid down by specific category of industrial activities and, if appropriate, the BAT from which those values are derived (Art.16) every three years.

In order to facilitate the exchange of information between Member States, responsible authorities shall be established or designated.

3.2 Decisions and programmes

3.2.1.1 R&D programmes: Energy Framework Programme (1998-2002)

Currently, several relevant R&D programmes exist in the EC in the field of environment and energy. Under the JOULE-THERMIE programme – which is continued under the Fifth Framework Programme of the EC in the area of research – the technological development, demonstration and dissemination of new and clean energies, as well as research and development projects, are promoted. Through SAVE, a number of projects aiming at enhancing energy efficiency receive financial support; they include studies, pilot programmes and specific actions to improve energy management at the regional and local levels. The ALTENER programme aims at increasing the market share of renewable energy sources. In addition to financing studies and information activities, energy production based on renewable energy can be supported directly within the ALTENER framework. Together with the SYNERGY programme (which aims at energy co-operation with third countries), SAVE and ALTENER were integrated in 1998 in the Energy Framework Programme 1998-2002. This Programme also contains a sub-programme for the promotion and dissemination of clean technologies for using solid fuels (CARNOT).

It is expected that these programmes will be continued in the foreseeable future, and will thus also be relevant to the applicant countries after their accession. Even today, Central and Eastern European countries can participate in the programmes in accordance with relevant provisions contained in the protocols supplementing the association agreements. There are no direct substantive or reporting obligations flowing from these programmes. However, under the SAVE programme Member States are expected to submit annual overviews of relevant national programmes to achieve best-possible complementarity. In addition,

applicant countries may wish to adapt their institutional structures and procedures so as to be able to take full advantage of the programmes. To receive assistance it is especially necessary to submit lists of proposed projects under the respective programmes.

3.2.1.2 Coal subsidies

State subsidies for the coal sector are subject to approval by the European Commission under the rules of the European Community for Steel and Coal (ECSC). The Commission determined criteria for the approval of such coal subsidies in its Decision 3632/93/ECSC of December 28, 1993 (which may be changed in the future). Accordingly, any coal subsidies have to fulfil at least one of the following conditions in order to qualify for approval:

- The competitiveness of coal mining is improved with respect to world-market coal prices and the level of aid can be reduced.
- A contribution is made to the solution of social and regional problems associated with the reduction of coal mining.
- Investments are made to comply with environmental standards for coal mining.

Formally, the applicant countries will only be subject to these provisions after accession to the EC. However, those countries with a coal industry should check their current coal policies and adapt them to the greatest extent possible prior to accession. This will help guarantee smooth transition and avoid the fractions and social tensions that might later arise as a result of re-orientation of policies required under ECSC rules.

3.3 Environmental agreements

In the field of environment and energy two environmental agreements have been concluded with manufacturers and importers of household appliances. These determine minimum energy efficiency standards for (1) televisions and video equipment in stand-by mode and (2) washing machines. Complementary agreements on dish washers and TVs and video equipment in on-mode are under discussion or envisaged, and may be concluded prior to any enlargement of the EC.

Any country acceding to the EC is likely to face requests that its relevant industry subject itself to the same standards laid out in environmental agreements. As a first step in preparing for such requests, accession candidates may wish to assess whether and to what extent relevant industries exist in their countries. These include manufacturers of the mentioned products (TVs, washing machines, dish washers) and (sufficiently large) businesses importing these products from non-EC countries.

3.4 General policies and strategies for the future

The following deals with three areas for which the development of general policies and future strategies is sufficiently advanced in the Community: (1) the combined use of heat and power (co-

generation), (2) the employment of renewable energy sources and (3) the advancement of energy efficiency.

These strategies/policies are neither binding nor directly relevant to the applicant countries, but they will benefit from taking long-term Community orientation into account when developing their policies prior to accession. This might help to counter political opposition to or secure political support for their applications, and remove barriers to smooth post-accession integration within the Community. Applicant countries might therefore wish to design policies so as to bring them into line with the general approach pursued by the EU.

3.4.1 Combined heat and power (co-generation)

The strategic orientation of European policies with respect to co-generation was outlined in a strategy paper of the Commission in 1997 (European Commission 1997a). Accordingly, the EC aims at doubling the share of combined heat and power production in total electricity production from 9 % in 1994 to 18 % in 2010. A number of existing and planned regulations (e.g. liberalization of energy markets, taxation of energy products, the Large Combustion Plant Directive) and existing R&D programmes may contribute to an increasing use of co-generation technology.

3.4.2 Renewable energy sources

In November 1997 the Commission published a White Paper on the future Community strategy for the development of renewable energy sources (European Commission 1997b). Although the White Paper has not yet been formally approved by the Council, it can be assumed that, especially in the light of ongoing efforts at integrating energy and environmental policies in the Community, its elements will form the basis of future EC policies in this area.

First of all, the White Paper establishes the target of increasing the share of renewable energy sources in total energy supply in the EC from the current level of nearly 6 % to 12 % by the year 2010. Part of this strategy is the ALTENER programme (see above), and plans for an electricity feed-in directive (see below). Other elements aim at supporting the use of bio-fuels, furthering the production of biomass in agriculture, specific measures to enhance the use of photovoltaics, wind energy and the build-up of energy production capacity based on biomass, and the further development of European norms and standards for renewable energy technology.

3.4.3 Energy efficiency

No separate strategy has been established with respect to EC policies on energy efficiency (but see labelling and minimum standards for appliances, dealt with above). However, general political objectives have been formulated by the European Commission and the Council. The most important element of EC policy in this area has been the continual improvement in the efficiency of energy use aimed at de-coupling energy consumption and economic growth. Not least, improvements in energy efficiency have been identified as a – if not the –

central element of the Community's strategy to combat climate change.

3.5 Planned and proposed activities

3.5.1 Integrated Resource Planning Directive

In 1995 the European Commission submitted a **Proposal for a Council Directive to introduce rational planning techniques in the gas and electricity distribution sector**, which was amended in 1997 (COM(97) 69). The objective of the proposed Directive is to stabilize carbon dioxide emissions by the year 2000 at the level of 1990 in the Community at a whole, and at the same time to improve end-use efficiency in the electricity and gas distribution sectors through the introduction of rational planning techniques (integrated resource planning, IRP). Based on these techniques, investment opportunities in energy supply and energy demand are to be evaluated on a single economic basis.

It envisages the development of an energy services market, where consumers' energy needs are provided for with lower commodity consumption. In all cases the Commission suggests only economically justified investments and leaves the question of energy taxes and energy efficiency subsidies to individual Member States.

In addition, Member States are asked to create incentives for consumers to make energy efficient investments, and to draw up demand-side management plans for low-income energy users.

3.5.1.1 Administrative requirements

Member States have to appoint a responsible authority to control the implementation of economic measures arising from strategic development plans presented by electricity and gas companies and intended to increase energy efficiency.

3.5.1.2 Procedural requirements

According to the Directive, Member States have to establish a procedure by which electricity and gas enterprises are required to present an integrated resource plan to the competent authorities, showing how they intend to meet future energy demand. The plan should evaluate all energy-resource alternatives on a single economic basis.

In order to give electricity and gas companies an incentive to use cost-effective planning techniques, Member States have to ensure that electricity and gas enterprises sell energy-saving services to the consumers, and that the position of these enterprises is equal to those not covered by this Directive. This is intended to de-couple company profits from the volume of electricity and gas sales.

Member States have to review existing legislation to ensure that mechanisms are established permitting electricity and gas companies to recover expenditure on energy-efficient programmes offered to consumers (Art. 2) These mechanisms should ensure that distribution companies, that undertake demand-side management, are not net revenue losers.

Together with the European Commission, Member States are obliged to review every two years the results of measures taken on the basis of the Directive over the eight-year period following the entry into force of the Directive.

3.5.1.3 Monitoring and reporting requirements

Member States must review the implementation of economic measures for increasing energy efficiency. They must also review national legislation, in order to ensure that the competitive position of gas and electricity companies does not suffer as a result of demand-side management measures.

Further developments:

The proposal for the IRP is now with the Council of Energy Ministers, which needs to agree upon a common position. However, it is unlikely that the proposal will be adopted in the near future.

3.5.2 Feed-In Directive (renewables)

A significant discussion has taken place – both within the Commission and in the public sphere – surrounding the regulation of electricity feed-in or the equivalent promotion of power generation from renewable energy resources, in order to increase the use of renewable energies in the European Union. The European Commission recognized in its White Paper (COM (97) 599 final) that "access for renewables to the electricity networks at fair prices is a critical step for their development" and discussed the question of fair entry of renewable energies to the electricity market. The White Paper has not only recommended a European Feed-in Directive, but gone even further to propose its concrete shape.

At present, Member States are transposing the Internal Electricity Market Directive (96/92/EC) into national law. The White Paper refers to Article 8, paragraph 3 of the Electricity Directive, which permits Member States to require that electricity from renewable sources is given preference in dispatching. In a decision from July 2, 1998, the European Parliament called upon the Commission to submit a proposal by December 31, 1998, "based on a right to feed in power subject to minimum tariffs defined by state". The White Paper further refers to the ban under Article 7 paragraph 5 of the Internal Electricity Directive, which is intended to prevent grid operators from discriminating against other grid users in favour of their own subsidiaries. It states that the guidelines on the price to be paid to a generator of renewable sources "should at least be equal to the avoided cost of electricity on a low voltage grid of a distributor plus a premium reflecting the renewable's social and environmental benefits and the manner in which it is financed: tax breaks, etc.".

In October 1999, the discussion finally turned into a proposal for a Directive. The proposed Directive on the promotion of electricity from renewable energy sources in the internal electricity market follows the White Paper. It establishes common rules for the treatment of electricity from renewable energy sources, to cope with the fact that the potential

for exploitation of renewable sources of energy is underused in the Community at present.

4 Legal gap assessment

At the June 1993 European Summit in Copenhagen it was decided that the Central and Eastern European countries associated with the EU can, in principle, accede to the EU.[6] An indispensable precondition of accession is, however, that the candidate countries should meet the *Copenhagen Criteria*. These criteria are a stable democracy, the rule of law, an appropriate standard of human rights and the protection of minorities. A functioning market economy that can guarantee that the Accession Countries are capable of withstanding economic competition within the EU is considered to be a further central requirement. Finally, acceding states must be able to take on the obligations of EU membership, including adherence to the aims of political, economic and monetary union.

The important part in relation to this study are the obligations of EU membership that require existing and future Member States to transpose and implement EC legislation into national legislation. Part of the so-called *acquis communautaire* (that is, the bulk of EC legislation, consisting of the founding Treaties of the EC and the EU, the legislation adopted by the European institutions (secondary law) and the jurisdiction of the European Court of Justice) will automatically gain validity with accession. Secondary law, consisting in the environmental field of approximately 300 legal acts, not only has to be transposed into national legislation, but also implemented and enforced in administrative practice.

In preparation for the actual accession negotiations, the Commission has been involved since April 1998 in the process of 'screening' the Accession Countries' legislation to measure the extent to which harmonisation with the *acquis communautaire* has already been achieved. The screening exercise provides timely identification of both 'gaps' in Accession Countries' legislation and areas that may cause problems for the implementation of European environmental law in the future.

The *acquis communautaire* is divided into 31 chapters, for each of which legal gaps have been identified. In contrast to the legal gap assessment of this study, the relation and interaction of the environment (chapter 22) and the chapter on energy (14) are not taken account of in the official screening exercise. This section of the study attempts to provide a more detailed and inter-linked picture of the field of environment and energy than has been provided in the screening exercise.

The study's chapters contain summaries of the country reports of the Czech Republic, Estonia, Slovenia, Poland and Hungary that are annexed to this study. These summaries provide only an overview of the general situation in specific countries. For further detailed information the full country reports should be referred to. The summary section concludes by trying to identify similarities and differences in the five countries by a

[6] The meeting of the European Council took place from June 21-22, 1993 in Copenhagen.

cross-country approach for each of the issues under discussion. Major implementation gaps, and the general prospects for approximation EC policies on environment and energy, conclude this section.

The country reports follow the outline developed in chapter 3: EC regulations in the field of environment and energy. In each of the country reports, national legislation concerning environment and energy is compared to relevant EC legislation in order to identify legal gaps. The country reports have been submitted by independent national experts and do not necessarily reflect the official opinion of the respective governments.

In the country reports, national legislation in relation to existing and proposed EC Directives and Regulations are analysed taking into consideration the substantive, institutional, procedural, and monitoring and reporting requirements. Additionally, the situation in the Accession Countries with regard to environmental agreements and general policies and strategies of the EC in this field are examined to assess difficulties and challenges in future membership in the EU.

4.1 Czech Republic

Since independence, the Czech Republic has passed a number of laws and other regulations covering the field of environment and energy. The main objective of this rule-making process has been to make the Czech legislative framework live up to the challenges posed by the transition process from a centrally planned to a market economy. The revision process has also aimed at adapting the Czech legal order to EU requirements, in order to prepare for accession to the European Union.

This process has by no means been finalized. On the contrary, in most of the areas dealt with below legal gaps between Czech legislation and EU regulations relevant to environment and energy persist and need to be closed in the coming years. In order to do so, the Czech government has either already introduced a number of legislative acts, or is planning to do so during the coming years. It is expected that this might lead to full compliance with EU requirements early in the 21st century.

4.1.1 Energy markets and energy taxation

The requirements of the Directives on the electricity and gas markets and the Directive on energy taxation are not yet fully met in the Czech Republic. While the Czech law 222/1994 created a legal framework for opening up the energy markets to private business, and the electricity market is open to independent producers and autoproducers, it does not guarantee transparent and non-discriminatory access to the *electricity market* and the *internal market in natural gas*, as required by the EC Directives. The wholesale electricity market, but not the retail market, has been wholly opened up. It is unclear whether this is in line with the Directive on the electricity market. In the case of both energy market Directives, further requirements (of a procedural and institutional nature, and related to monitoring and reporting) appear to pose limited

difficulties. A more serious problem appears to be the lack of guidelines for negotiated third-party access, that would provide a level playing-field for new competitors wanting to enter the market. A further major deficiency, with respect to the gas market, is the lack of a definition of *eligible customers* under Czech law, as prescribed by the Directive.

Originally, a 'small book' was planned and drafting work started on updating existing energy law. In the meantime, however, it has been decided to create completely new energy legislation in order to bring the Czech legislation fully into line with the requirements of EC Directives. A first draft of the new law was circulated for comments in mid-1999. Full transposition was planned for 2000 (full implementation: 2001). However, some delays have already occurred, that may lead to a change in this schedule. It appears that the Czech Republic will ask for an extension of the deadlines for implementing the two Directives in the accession talks.

Significant gaps in the transposition of the Directive on the harmonization of the structures of excise duties on mineral oils also exist. First of all, Czech tax rates for petrol, gas oil and petrol mixtures are lower than those required under the EC Directive. Other energy products covered by the Directive (kerosene, liquid petroleum gas) are not taxed at all. Furthermore, excise taxes on mineral oils are currently repaid to consumers under Czech law if the taxed product is used for heating purposes and generating electricity, an exemption not in line with EC requirements. These gaps may actually widen if the proposed new Directive on the taxation of energy products is passed (as it may increase tax rates and include further energy products). In contrast to these substantive gaps, requirements related to procedures, institutions, and monitoring and reporting appear to pose few problems. While a draft new legislation is in progress in the Czech Republic, it is unclear whether and when this may be passed and whether it will fully comply with EU requirements (current best estimate: 2005).

4.1.2 Plant-specific directives

Major legal gaps also exist with respect to the Large Combustion Plant (LCP) Directive (and its forthcoming revision) and the Integrated Pollution Prevention Control (IPPC) Directive. As regards the LCP Directive, emission limits set under Czech law appear, by and large, to be in line with EU requirements. However, while source size is defined in terms of thermal output in the Czech Republic, EC rules categorize in terms of thermal input. Furthermore, emission limits under EC rules decrease linearly with plant size in the case of SO_2. In contrast, Czech law defines emission limits for certain categories of plants spanning a range of sizes. While most other requirements apparently pose no problems, the Czech Republic also has no legislation in place to ensure that other Member States, which may be affected environmentally by the operation of a combustion plant, are appropriately consulted before implementation of such a project. The Czech Republic has signed but not yet ratified the relevant

UN ECE convention on transboundary effects.

The emission limits proposed under the new LCP Directive would require further adaptation of Czech legislation, as those limits are more stringent than current Czech standards. According to planning in late 1999, a new legislative act will ensure full fulfilment of strengthened EU requirements. The new legislative act has to be approved by the government and is planned to be effective from the year 2001.

Even more serious difficulties arise in the case of the IPPC Directive. Whereas a number of relevant acts of legislation exist, these only cover parts of the IPPC Directive and operate separately (in contrast to the integrated approach required by the IPPC Directive). In particular, existing permits are not updated to ensure application of best available technique (BAT), there is no integrated approach among numerous permitting authorities and there is no public involvement.

Implementation of the IPPC Directive will thus require substantive changes to the current legislative framework and practice (including administrative rearrangements with respect to permitting authorities). The IPPC is planned to be implemented by including requirements in the Czech Act on the environment. This process (that does not appear to have reached any official stage yet) should be complete by the end of 2001. In face of the challenge posed by implementing the Directive on the ground, the Czech Republic will ask for a transitional period of three years for the application of the Directive to existing installations in the Czech Republic (which would thus be fully controlled only by the end of 2010, instead of 2007). It may, however, be even doubtful whether all requirements applicable to new plants can be implemented in time.

4.1.3 Energy efficiency

Fulfilling EC requirements laid down in the Directives on SAVE, the labelling of energy consumption and energy efficiency requirements for household appliances, all require further legislative and other action. In the case of SAVE, certain activities short of legislation exist in some of the areas listed in the Directive (energy certification of buildings, thermal insulation etc.). It is somewhat unclear, as to what extent these existing activities already fulfil the largely-procedural requirements of the SAVE Directive to fulfil and implement programmes in the areas mentioned. The effect of the existing activities, however, has apparently been very limited.

The picture is clearer in the case of the Directives on labelling of energy consumption, and on energy efficiency standards for household appliances. In both cases equivalent Czech regulations do not exist, and thus need to be developed from scratch. In relation to all three Directives, institutional capacity exists in the form of the Czech Energy Agency (CEA) and the State Environmental Fund (SEF), which should be sufficient to fulfil the institutional requirements under EC law.

The requirements of all three EC Directives related to energy efficiency will,

according to current planning of the Czech authorities, be implemented in full in the passing of a single legislative act, the proposed Energy Management Act. The fate of this Act appears to be uncertain, as the legislative process is only expected to start in the year 2000. It is not known when it might eventually be passed, but current planning is that the Act would fully implement existing EC legislation. Some follow-up activities will be required in the form of issuing relevant government decrees specifying some of the efficiency standards in particular.

4.1.4 Other policies

Two aspects of other policies, relevant to the field of environment and energy, deserve particular attention in the case of the Czech Republic: coal subsidies and policies for furthering renewable energy sources. The Czech Republic is one of the traditional coal producers in Europe, and has subsidised coal mining extensively in the past. Since independence, state subsidies for the coal sector have generally been aimed at closing down mines and phasing out mining capacity. Whereas levels of state subsidies have roughly remained at the same level throughout this process, it is believed they are in line with established EC criteria. Thus, no difficulties are expected in reaching approval of the subsidy scheme by the European Commission upon accession. The details will, however, have to be worked out with the Commission. In this context it is worth mentioning, that the Commission usually requires a stepwise reduction of subsidies).

With regard to renewable energy sources, the Czech Republic has established the objective of increasing the share of renewables in primary energy consumption about fourfold from current levels (1.4%) to 6% in 2010 (mainly by higher utilization of biomass). In relative terms this is more ambitious than the goal pursued by the EU (doubling by 2010). A proposal for guaranteed feed-in prices for electricity originating from renewable energy sources was refused by the Senate of the Czech Republic in 1998, and stands little chance of being adopted. Utilization of renewable energy sources is, however, supported through grant programmes, the granting of reduced tax rates for certain kinds of renewables (biofuels, water and wind turbines, and wood waste). Operators of renewable energy sources are also exempted from income tax for the first five years following commissioning of equipment. Buildings for renewable energy production purposes are exempted from construction tax. Further measures are currently not foreseen.

Other policy areas do not appear to constitute serious obstacles to acceding to the EU. The Czech Republic already participates in the Energy Framework Programme (1998-2002), and generally aims at increasing energy efficiency. Integrated resource planning does not appear to have major support in the country, but co-generation might be supported by legislation in the future, but this is uncertain. Finally, no major producers of relevant household appliances, for which voluntary agreements have been concluded at the EU level,

exist in the Czech Republic. Imports mainly originate from the EU itself. Thus, the voluntary agreements should not pose major problems for Czech business.

4.1.5 Conclusion

As a whole, large gaps thus remain in the implementation of EC environmental and energy policies in the Czech Republic. In none of the relevant areas are the requirements laid out in the EU Directives completely fulfilled. On the contrary, large gaps persist with respect to the liberalization of energy markets, energy taxation, and the LCP and IPPC Directives. Furthermore, legislation implementing various energy efficiency Directives is completely absent. As in the case of other Central and Eastern European countries – and indeed several existing EU Member States – the IPPC Directive appears to pose a particular challenge. The integrated approach pursued in this Directive requires extensive administrative restructuring to accommodate the fundamentally new permitting approach.

Generally, the main problems are related to the substantive requirements of the Directives; be it emission limits in the LCP Directive, the definition of eligible customers in the gas Directive, the scope of taxation and tax levels in the energy taxation Directive, energy taxation itself, or the integrated permitting procedures required in the IPPC Directive (as the IPPC Directive focuses on procedures, and thus procedural requirements form its heart). In contrast, the development of the necessary institutional structures, conditions for fulfilling procedural requirements (except those under the IPCC Directive) and requirements for monitoring and reporting appear to be far more advanced. These requirements may thus be fulfilled comparatively easily. In all the deficient areas, legislation has been or is planned to be introduced in the near future. According to the Czech authorities, the bulk of the legislation should be in place by 2001/2002. However, some of the legislative foundations under preparation will need to be fleshed out by supplementary legislative acts (government decrees etc.). Additionally, the enforcement of this new legislation on the ground will require further action. Moreover, some delays have already been encountered in a legislative process that is still very much in flux and somewhat weak in the environment and energy field. Given the uncertainties in future domestic political debates in the Czech Republic, further delays cannot be excluded. It may thus be assumed that full implementation and enforcement of relevant EC requirements may well continue beyond the first decade of the 21st century.

4.2 Estonia

Approximation in the field of environment and energy is still in process in Estonia. Only some of the main requirements of EC legislation find their equivalent in Estonia. The Estonian Energy Act, adopted in June 1997, is the most important legislative act of regulation in the energy sector. It extends basic market principles to the energy mar-

ket. The legislative process has by no means been finalized. On the contrary, the summary below shows that legal gaps between Estonian legislation and EC regulations persist, and need to be closed in the years to come. It seems, however, that legislative activities in the field of environment and energy have somehow slowed down. Whereas in the environmental field three important legal instruments – the Ambient Air Protection Act, The Waste Act and the Chemicals Act – have been adopted. The most recent act in the field of environment and energy dates from the year 1997.

4.2.1 Energy markets and energy taxation

The two Directives on electricity and natural gas markets have been transposed in Estonian law by the aforementioned Energy Act and additional secondary legislation. However, full alignment with the Electricity and Gas Directives has not yet been achieved.

The Estonian Energy Act regulates the generation, transmission and distribution of electric power. In accordance with the Electricity Directive, the production of electricity in Estonia is in principle open to independent and autoproducers. However, there are no set procedures for building new capacity. Estonia has not yet chosen between an authorization and a tendering procedure, as required by the Directive. The state-owned company Eesti Energia is responsible for the production, transmission and distribution of energy. This monopolistic structure is not in conformity with the principles of the Directive, which aims at a competitive market in electricity.

The same is true for the gas market. There is only one company – privately owned – producing, transmitting and distributing gas. Instead of a definition of *eligible customers* only *large customers* are defined, which is not in compliance with the Directive.

The authorities required in both of the Directives – one responsible for authorization procedures for access to the systems, and system operators responsible for operating and ensuring the maintenance of transmission and the distribution systems – do not find their equivalent in Estonian legislation. Additionally, there are no designated authorities to settle disputes on negotiations and refusals of access to systems.

There is no third-party access to transmission and distribution networks (electricity), and control of the state-owned power system, *Eesti Energia*, is undertaken by the Energy Market Inspectorate.

However, harmonization is gradually being continued and the Energy Act will be amended, aiming at the full compliance with EC legislation in the year 2002.

The field of taxation concerning mineral oils does not yet fully correspond to the requirements of the Directive on excise duties on mineral oils. There are excise taxes, but not for all energy products, and they are lower than required by the Directive. Gas oil and liquid petroleum oil are exempted from Estonian taxation. In contrast to these substantive gaps,

requirements related to institutions and procedures appear not to pose a problem, since there is a tax authority, a customs board and a tax board responsible for the task set by the Directive. The substantive gaps might be filled once Estonian plans to increase excise taxes, in accordance with the Directive, are adopted. However, there is no specific draft legislation aimed at compliance with EC legislation.

4.2.2 Plant-specific directives

Estonian legislation controlling air pollution from large combustion plants will require further amendment, in order to fulfil the requirements of the Large Combustion Plant Directive. Currently, Estonia has a number of legislative acts corresponding to air pollution control, as required in this Directive and the IPPC Directive.

Nineteen Estonian Companies fall under the Large Combustion Plant Directive, all of them built before 1987. As the Directive prescribes emission limit values only for new plants, major problems of compliance with the Directive are not expected. Although a national ceiling for the total emission of SO_2 and NO_x will only be negotiated during the accession talks, Accession Countries are required to set up plans for the phased reduction of total annual emission of existing plants. Estonia does not yet have such a programme.

As the Directive presumes, there is a licensing system for the operation of all combustion plants, notably to set out emission limit values for SO2,NOx and dust. It is not clear, however, whether the emission limit values set out in the Estonian legislation correspond with those of the Directive. This is especially important considering revision of the Directive aimed at even higher emission limit values and enlarging the scope of the Directive to include gas turbines.

The monitoring requirements of the Directive are not fully transposed in Estonian legislation. Due to a lack of equipment and specially-trained employees, estimation are used instead of monitoring. Therefore, the value of real emissions cannot be assessed. There is also no annual emission inventory of SO_2 and NO_x from existing plants over 300 MW and refineries, as required in the Directive.

As in most of the Member States, the transposition and implementation of the **IPPC Directive** poses problems in Estonia. To date, there is no Estonian legislation transposing the IPPC Directive, but the legal transposition is expected to be completed by 2002. A Draft Act on Integrated Environmental Permits is expected to enter into force in March 2000. Until now the Estonian permitting system has been sectorial, with separate permits provided for air, water and waste. Current Estonian environmental legislation does not comply with the Directive, as an integrated approach is lacking in the permitting system, and the BAT concept is not applied. Additionally, there are no rules on granting information on permits and applications to the public. As far as monitoring and reporting is concerned, current Estonian legislation does not require sufficient emission monitoring.

Implementation of the IPPC Directive will thus require major efforts. It is currently expected that the drafted Act on Integrated Environmental Permits will come into force in March 2000 and transpose the IPPC requirements. This act will be supported by other procedural regulations, forming the basis for an integrated permitting approach. The relatively advanced status of the draft legislation is the most probably reason why Estonia does not intend to ask for a transition period for implementation of the Directive, as is planned by most of the other Accession Countries.

4.2.3 Energy efficiency

The various European Directives tackling energy efficiency, such as the programmes under the SAVE Directive, the Directives on energy efficiency of household appliances and on hot water boilers, and the Labelling Directive concerning the consumption of energy, appear only to be partly reflected in Estonian legislation.

There is currently no legislation regarding energy efficiency in force in Estonia. An *Energy Conservation Programme* has been drafted, and was planned to be adopted at the end of 1999. The requirements of the SAVE Directive are, however, only partly-covered in the planned programme.

Neither is there legislation to cover labelling and standard product information, as required in the Labelling Directives. With a view to transposition of the Directive, the Estonian government has drafted an *Act on the Energy Efficiency of Equipment*. The new Act will harmonize Estonian legislation with the requirements not only of the Labelling Directives, but also of the Directives concerning the energy efficiency of hot water boilers and household refrigerators. To date there is no legislative structure to fulfil the energy-efficiency requirements of these Directives. Although full transposition and implementation is expected to take place in the year 2002, no date has been set when the new Act on the Energy Efficiency of Equipment will come into force.

4.2.4 Other policies

For Estonia oil shale production is of particular importance. The share of coal amounts to less than 1% of total energy supply in Estonia, and coal subsidies are thus not applicable. Although the restructuring of the oil shale industry, and the related power industry, is of a high priority for Estonia, the oil shale industry will not receive state aid. Nevertheless, Estonia's energy policy is to enhance the strategic importance of the oil shale industry, as stated in the *Long-term Development Plan for the Fuel and Energy Sector*.

With regard to energy efficiency programmes it has to be stressed, that already 13% of total electricity production in Estonia is generated in co-generation, which is to be increased by several state programmes in order to further improve energy efficiency. As far as renewable energy is concerned, according to official statistics the total share of renewable energy sources in primary energy supply amounted to 10% in 1997. The target of a two-thirds

increase in the use of renewables by the year 2010, compared with 1996, is laid down in the National Long-term Plan, by means of tax allowances for both investment and energy production. Nevertheless, it has to be mentioned that a significant share of renewable energy consists of biomass, mainly wood chips. Superseding EC legislation, clauses covering feed-in tariffs have been introduced into existing legislation in Estonia, in order to promote the use of renewable energy sources for electricity generation. Additionally, Estonia already participates in various international programmes, such as THERMIE, and is aiming to participate in ALTENER and SAVE. Concrete steps have been taken to increase energy efficiency, including measures addressing both the end user and the distributor and generator of energy.

Equipment covered by environmental agreement at the European level, is not manufactured in Estonia.

4.2.5 Conclusion

As a whole, large gaps thus remain in the implementation of EC environmental and energy policies. It seems that Estonia has not made significant progress in adapting national legislation to the requirements of EC directives. Although full compliance with EC law has not been found in any of the areas analysed, Estonia seems to be more advanced concerning the legal transposition of the IPPC Directive than other Accession Countries (and several Member States). in contrast to other countries, quite detailed draft legislation transposing the IPPC Directive into Estonian legislation already exists.

The central legislative act of transposition, the Estonian Energy Act, still needs to be further amended to comply with the Electricity and the Gas Directive. Further efforts are needed to prepare for participation in the internal energy market.

The main implementation problems can be related to the substance of the respective EC rules. Additionally, however, institutional structures needed for the proper implementation of EC legislation are not in place. Due to a lack of personnel and financial resources, similar deficits can be found in the development of the necessary monitoring and reporting procedures.

Estonia's oil shale sector, which provides 98% of the locally-generated primary electricity supply, poses a unique challenge for the country, not directly related to the EC energy or environment legislation. Oil shale production is responsible for many environmental problems. Responding to this specific problem the European Commission requires the development of a viability plan for the oil shale sector, and recommends that privatization in this sector should be accomplished in the most transparent way.

Finally, it has to be highlighted that, compared to other Accession Countries, Estonia seems to be well advanced in the use of co-generation and renewable energy. Important strategies and programmes promoting the increased use of these alternatives already exist.

4.3 Hungary

The approximation process concerning the field of environment and energy in Hungary began when the accession agreement with the European Union was signed in 1991. Since then considerable progress has been achieved. Many European Directives in this field find their equivalents in Hungarian legislation. In order to achieve full compliance with European legislation, however, substantial efforts will have to be made. It seems obvious that the objective aimed at in the National Programme for the Adoption of the Acquis Communautaire in the year 2001 will not be met. In contrast to the National Programme, where the adoption of 45 legislative acts was foreseen for the year 1999, only four acts have been adopted transposing European legislation into Hungarian legislation.

The main problem concerning transposition of EC laws and regulations in the field of environment and energy is the lack of a sufficient number of legal experts in the respective Ministries. The lack of personnel resources is even worse in the case of administrative implementation and enforcement of legislation. The position of permitting and supervising authorities in the environment and energy sector is quite weak compared to other administrative bodies. Furthermore, the lack of financial resources and know-how leads to weak monitoring and enforcement performance.

4.3.1 Energy markets and energy taxation

The requirements of the Directives on electricity and gas markets and the Directive on energy taxation are not yet fully met in Hungary.

As far as access to the electricity and gas markets is concerned. it seems that both are entirely open. With respect to the electricity market, in principle everyone can receive a permit to produce energy. Hungarian legislation does not define independent and autoproducers, as required by the Directive. For the electricity and gas market there are predetermined market shares that have to be opened up to independent and autoproducers. Regarding the openness of the market there are no such predetermined market shares in Hungary. Access to both the transmission and the distribution system appears, however, to be restricted, although there is a competent authority that grants authorization for the production, transmission and distribution of electricity and gas. So far as concerns access to the gas transmission system, it appears that Hungarian legislation does not provide for a definite regime for network access.

The institutional requirements of the Directives concerning liberalization of the electricity and gas market appear to be basically fulfilled in the Hungarian system. The Hungarian Energy Office provides operators with permits for the transmission and distribution of electricity, as well as for the acquisition and distribution of gas. At present, however, there is only one company that transmits electricity. The Hungarian Electricity

Stockholding Company retains a monopoly not only for electricity transmission but also for transit and import/export.[7] According to the Directive on the liberalization of the electricity market this monopoly has to be phased out.

In compliance with the Directives, system operators of privatized distribution systems – that sometimes hold a monopoly in particular Hungarian regions – are responsible for the maintenance and security of system supply.

Concerning the construction of new electricity generation capacity and the production of gas, Hungary has chosen the authorization system as one of the options offered by the electricity Directive. However, the criteria, according to which permits are granted, do not fully correspond to EC requirements. This has to do with the criteria relating to system safety and security, which are only regulated on the basis of technical standards, and are not easily accessible to the enquirer or the public. The environmental criteria are not well developed; it appears that in granting permits environmental aspects are handled arbitrarily in terms of the discretionary power of the Hungarian Energy Office.

The monitoring requirements, that ensure appropriate and efficient mechanisms for regulation control and transparency so as to avoid dominant market positions, appear to be fulfilled in neither the electricity market nor the gas market.

Despite the fact that both Directives are not entirely fulfilled, it is not clear which legal steps are to be taken to enhance compliance with EC legislation, and why transitional periods will not be requested during accession talks.

The taxation of mineral oils does not yet correspond to the requirements of the Directive on excise duties on mineral oils. There are environmental product fees on unleaded petrol, some other types of petrol, heavy fuel oils, gas oils and other products. These fees do not correspond to the requirements of the Directive, because they do not reach the prescribed minimum tax level, and the levying intention is also different to that of the Directive. These gaps may actually widen if the proposed new Directive on the taxation of energy products is passed (as it may increase tax rates and include further energy products). However, administrative implementation of the Directive in Hungary would not require major institutional changes, since a tax authority under the supervision of the Ministry of Finance already exists.

4.3.2 Plant-specific directives

In the field of plant-related Directives it seems that approximation concerning the Large Combustion Plant Directive has significantly advanced. It has to be noted, however, that national emission reduction targets for sulphur dioxide, nitrogen oxide and dust for Hungary will have to be dealt with during accession negotiations. Because there are no national programmes for the reduction of emissions from existing plants, it is possible that national emission ceilings,

[7] Screening report as of March 26, 1999

once set, will pose some problems for Hungary. In the past, important emission reductions have been achieved as a result of economic decline since 1980.

Hungarian legislation requires emission limits for all combustion plants equal to or greater than 50 MW, and is thus in compliance with the Directive. For new plants the Directive requires stricter emission limits, secured by a licensing system for the operation of all combustion plants. According to the Directive, *existing plants* are plants licensed before July 1, 1987. There is, however, a difference of definition regarding the Hungarian practice. In contradiction of the Directive, Hungary's cut-off date concerning existing plants is July 11, 1998. Instead of applying emission limit values for plants licensed since the latter date, Hungary intends to establish national programmes for the progressive reduction of total annual emissions. For plants considered as *new* under the large combustion plants Directive this would result in derogation and, thus, non-compliance with the specific emission limit values prescribed by EC legislation.[8]

The institutional and procedural requirements of the Directive seem to be basically ensured. There is a major licensing authority (Hungarian Energy Office) for large combustion plants. The licensing authority is also responsible for fulfilling the reporting requirements of the Directive. Environmental inspectorates are responsible for monitoring.

In contrast to the picture provided concerning the Large combustion plant Directive, the approximation of Hungarian legislation to the IPPC Directive is not well advanced. As in most of Member States, the transposition and implementation of the IPPC Directive poses problems in Hungary. Substantial modifications to the existing system are necessary to comply with the requirements of the Directive. To date, no integrated permitting system exists, although the issuing of an environmental permit requires the approval of all relevant authorities. Although not all existing plants are currently covered by the Directive, they are subject to an environmental licence. All activities covered by the Directive will also be subject to the new integrated type of permit required by the Directive. In addition. not all environmental impacts are assessed, and licences do not include requirements on emergency plans, and are also not periodically reviewed to take account of latest developments in technology. Most importantly, best available techniques (BAT) are not always applied. An additional problem will occur, contrary to the IPPC Directive, if Hungary considers as *existing* those installations that have a valid licence of establishment before the beginning of the year 2002 or, at the latest, the date of accession. According to the Directive, existing plants are defined as installations subject to a full request for authorization by October 30,

[8] European Commission, Accession Negotiations Hungary, Draft Common Position, Negotiation Chapter 22, Environment, as of 27 October 1999, Enlargement MD 501/99.

1999.[9] Redefining the cut-off date for existing and new installations, results in a situation of non-compliance with EC requirements. This is the reason why Hungary will have to demand transitional periods for implementation of the Directive.

4.3.3 Energy efficiency

The various European Directives tackling energy efficiency, such as the programmes under the SAVE Directive, the Directives on energy efficiency of household appliances or of hot water boilers and the Labelling Directive concerning the consumption of energy, seem to be partly reflected in Hungarian legislation.

For example, it appears questionable whether the Hungarian Programme on National Energy Saving and Energy Efficiency, which only partly reflects the requirements of the Save Directive**,** will effectively lead to improvement in energy efficiency and limit carbon dioxide emissions. Where it exists, programme formulation is vague (energy certification of buildings) or only covers part of the envisaged concept (billing only for heating, and not for air conditioning and hot water costs).

Whereas the requirements concerning the energy efficiency of hot water boilers are ensured by the new Decree on hot water boilers of the Hungarian Ministry of Industry, Commerce and Tourism, equivalent legislation concerning household refrigerators does not yet exist. According to the Decree, hot water boilers, that do not meet EU standards, are not allowed to be put on the market. However, a maximum of 4% deviation from these standards is allowed according to Hungarian legislation. As the Decree is new, there is insufficient experience with the practical implementation of the legislation. Verification bodies exist, but their actions can not yet be assessed.

So far as the labelling Directives are concerned, the state of approximation seems to be rather poor. Although there is a long tradition in labelling electrical products, the key requirements of the Directives, such as the obligation to inform the user about the energy consumption of the product, are not met. Since there are lists of products for which labelling is mandatory (but these lists are not legal documents), and competent authorities exist to enforce the provisions of the Directive, there is a good basis for the transposition and implementation of the labelling Directives.

4.3.4 Other policies

According to a government proposal on energy savings and energy efficiency strategy from the Minister of Economy, Hungarian energy policy aims at the gradual reduction and finally elimination of coal mining. Although there is no legal structure for coal subsidies, indirect support is widespread. Hungary plans to provide a significant part of the funds required to handle social and labour-force problems with EU support.

[9] European Commission, Accession Negotiations Hungary, Draft Common Position, Negotiation Chapter 22, Environment, as of 27 October 1999, Enlargement MD 501/99.

Not only the reduction of coal mining, but also the promotion of energy efficiency and combined heat and power forms part of the above-mentioned government proposal. However, there is no legal document or official position defining specific tools and ensuring implementation of energy efficiency measures. In some policy documents reference can be found to an increase in the actual share of renewable energy sources from roughly 3% to 6% by the year 2010.

4.3.5 Conclusions

As a whole, large gaps remain in Hungary's transposition of EC legislation in the field of environment and energy. Very few domestic policies exist, that directly transpose EU legislation into national law in these areas. Most of the relevant Directives have been transposed in such a way, that corresponding Hungarian legal requirements are located in several different legislative acts pursued by different ministries.

Analysis of implementation of various aspects of the Directives in Hungary (objective/substantive, institutional, procedural or monitoring and reporting requirements) reveals an uneven picture. At this time no area of the environment and energy policy rubric is in full compliance with EC legislation. However, even if the institutional structure currently does not fulfil the required tasks, these institutions do provide a good framework for future implementation of the respective Directives. This is especially the case concerning the *labelling tradition* in Hungary. In the implementation of the Directives, the Hungarian authorities can make use of existing labelling institutions or tax authorities.

Hungary can rely on its well-developed administration network of permitting and supervising authorities in the environmental and the energy sector. This may explain why the approximation of procedural requirements is rather good. In contrast, the pace of implementation, the development of monitoring devices and the enforcement of transposed Directives is rather weak. As previously mentioned, the lack of financial and personnel resources, as well as the low standing of the environmental authorities in public administration, largely explains the negative results observed in implementation in these areas.

4.4 Poland

Poland introduced and passed a number of legislative acts in the field of environment and energy in the 1990s, so as to achieve and smooth the transition to a market economy and prepare for accession to the European Union. The process of adapting the legislative framework continues. The most prominent undertaking in this respect appears to be the preparation of a new act on environmental protection based on a draft prepared by a team of lawyers led by Prof. Sommer, the so-called *Sommer Team Draft*. In addition, changes to current regulations (ranging from existing laws to administrative guidelines) and the establishment of supplementary executive regulations will need to be undertaken to achieve complete compliance with EU requirements.

However, in a number of areas Poland has already largely adjusted its national rules to EU requirements (for example, electricity market, labelling, efficiency standards). Further adjustments are envisaged and under preparation. It is therefore expected that Poland might have implemented the bulk of EU regulations by 2002. Delays are, however, neither excluded nor unlikely. As of the time of writing, however, only a very limited number of exemptions are intended to be asked for by Poland in the accession talks, for a transitional period.

4.4.1 Energy markets and energy taxation

No uniform picture arises from the legal gap analysis regarding the EC Directives on the electricity market, the gas market and energy taxation. The accession process appears to be most advanced with respect to the electricity market Directive. The relevant Polish Energy Law was passed in 1997. As this was after the adoption of the EC Directive, most of its provisions were taken into account in the drafting of the Polish law. The latter determines a gradual opening of the electricity market by the end of 2005, establishes an authorization procedure for the construction of new generation capacity, and determines operators of the transmission and distribution systems. Access to the transmission and distribution systems follows a regulated third-party access rule. The main problems are related to the fact that, at present, the market is only open for Polish producers, and different definitions of transmission and distribution apply. These incompatibilities are planned to be removed by the end of 2002.

More problems exist with respect to the Directive on the internal market in natural gas. Currently, the Polish gas market is characterized by the monopolistic position of one provider. Third-party access is limited to gas extracted in Poland – a limitation that will be removed upon EU accession. Furthermore, the definition of eligible customers needs to be adapted to EU requirements so as to ensure an adequate opening of the market. This, however, is expected to be achieved only after EU accession. First, the gas industry needs to be restructured and privatized. Subsequently, at least one further year will be required to enable the Polish gas industry to adapt to free-market conditions. The Polish government will therefore ask for a temporary exemption from Articles 17 and 18 of the gas Directive in the accession talks.

The conditions for fulfilling the requirements of the Directive on energy taxation appear to exist in Poland. Excise taxes on energy products are applied, and institutions and procedures for collecting these taxes are established. Problems exist with respect to tax levels, that in various cases are lower than minimum levels in the EU (in some cases they are higher). Some other minor discrepancies exist (for example, taxation of other products used for equivalent purposes in the EU, and various tax exemptions granted in Poland). Tax levels are planned to be adapted to EU requirements by the end of 2002. However, substantial domestic opposition to these plans exist and may endanger this

timetable. This difficulty might become even more relevant were the proposed new Directive on the taxation of energy products to be adopted prior to accession, as this is supposed to increase minimum tax rates and broaden their application to more energy products.

4.4.2 Plant-specific directives

The LCP Directive again poses few problems with respect to procedural and institutional requirements and monitoring and reporting. Some difficulty exists with respect to the continual measurement of emissions and the procedures to be followed in the case of malfunction or breakdown of abatement equipment. A more serious concern, however, is related to a discrepancy in the definition of *existing plants* (EU: before July 1987; Poland: before March 28, 1990). It is hoped to remove most of the difficulties once the new Environmental Protection Act (the Sommer Draft) enters into force. Further difficulties might arise with respect to the national SO_2 emission ceiling to be adopted in the course of the accession talks, to be fixed as part of the revised LCP Directive currently under discussion. Currently, however, emission limits fixed in the Polish regulations are more stringent than those of the existing LCP Directive.

As in the case of other accession candidates (and several EU Member States), the IPPC Directive appears to be the most problematic piece of legislation as regards EU requirements in the field of environment and energy (and beyond). Current Polish legislation sets limit values for various emissions, but does not provide for an integrated approach and a regular review of permits, as required by the Directive. The concept of best available techniques, introduced by the Directive, has no basis in Polish law. Finally, permit conditions are not made public and transboundary effects are not taken into account. Deficiencies thus exist with respect to institutional (integrated issuing of permits) and procedural requirements, as well as monitoring and reporting.

Implementation of the IPPC Directive will thus require substantive changes to the current legislative framework and the administrative practices of issuing permits for installations falling under the remit of the Directive. The necessary legal foundations are planned to be laid once the new Environmental Protection Act (the Sommer Draft) has been adopted (planned for 2000/2001). However, establishing the necessary administrative and enforcement structures might require more time. It is also estimated that the IPPC Directive would apply to about 4,000 existing installations and, in addition, to about 300-400 new installations every year. Preliminary estimates for the energy sector indicate that implementation costs of the provisions of the Directive in this sector alone would be more than 6 billion Euro. In view of the challenges posed by the implementation of the IPCC Directive, the Polish government has therefore asked for a transition period of three years with respect to applying the Directive's provisions to existing installations (which would thus become subject to the requirements of the Directive at the end of 2010 instead of 2007).

4.4.3 Energy efficiency

In contrast to the situation regarding the IPPC Directive, Poland is already well advanced in the implementation of the requirements of the SAVE Directive and the Directives on the labelling of the consumption of energy, and energy efficiency standards. With respect to the scope of the SAVE Directive, legislative activities and/or programmes have been introduced in most of the areas listed in the Directive. Authorities to enforce the related provisions are generally available and designated. The main area of concern, that may require further action, is the energy certification of new buildings. This, however, should not pose a particular problem within the accession process.

With respect to both the labelling Directive and the Directive on energy efficiency standards for household appliances, Poland has recently implemented regulations that bring it close to fulfilling the respective EU requirements. Based on the Energy Law of 1997, an ordinance of the Minister of Economy of February 1999 goes a long way to fulfilling the requirements of the two Directives. The Polish regulations even impose the obligation, to label the consumption of energy and to achieve certain minimum standards of energy efficiency, to a broader set of appliances than required by the EC Directives. Institutional capacity to enforce and administer the said provisions also appears to exist. Obviously, the labels applied are not yet EC labels. The procedures for determining compliance with energy efficiency requirements, proscribed by European regulations, also differ from those applied under Polish law. Some adaptation of the Polish regulations may thus be required, which is, however, not expected to lead to insurmountable problems.

4.4.4 Other policies

Among other EC policies and regulations, the treatment of coal subsidies has a particular relevance for Poland as a major coal producer. Restructuring of the coal mining sector is one of the major challenges in Polish energy policy, that is pursued within the framework of a *Programme of Coal Mining Reform in 1998-2002*. This programme aims at achieving profitability/economic viability in the sector, in particular by the financial restructuring and reorganization of coal mining establishments, restructuring of employment and environmental protection measures. The programme planning, as such, appears to be largely compatible with the criteria for coal subsidies established in the EU, especially since it aims at reducing and eventually phasing out subsidies. However, the assumptions underlying the planning appear to be outdated, since prices have declined below levels that formed the basis of programme planning. Profitability is thus much endangered, and compliance with EC rules remains uncertain. This points to the possibility, that serious problems in the area of coal subsidies might be faced upon accession of Poland to the Union. This is especially true in light of the importance of the coal mining industry to the Polish economy and society.

The promotion of energy efficiency, combined heat and power production and renewable energy sources all form part of the *Energy Policy Strategy until 2010* prepared by the Ministry of the Economy in 1995. Little concrete action to support co-generation and the use or feed-in of energy from renewable sources (such as tax breaks, a feed-in obligation or guaranteed prices) appears to have been undertaken. The official goal, however, is to increase the share of renewable energy in total energy supply to 6% in 2010 (current share: 1.5%). Parliament and several societal actors have expressed their interest in developing this aspect of Polish energy policy.

More concrete steps have been taken in the area of energy efficiency. First of all, Poland already takes an active part in the different components of the Energy Framework Programme (1998-2002). Furthermore, the National Energy Conservation Agency (KAPE S.A.) was created in 1994, and is involved in the implementation of various programmes aiming at enhancing the efficiency of energy use. Its activities are not least related to the areas of implementation of the SAVE Directive (see above). In addition, the National Fund for Environmental Protection and Water Resources, the Bank of Environmental Protection, and several non-governmental organisations, are actively involved in furthering energy efficiency.

Finally, the instrument of integrated resource planning has some support in Polish energy law, that mandates local-municipal authorities to engage in preparing energy plans. However, the Polish government has not yet developed any particular mechanisms to implement integrated resource planning techniques. (These are to some extent applied and promoted by non-governmental actors.)

4.4.5 Conclusion

All in all, it is hardly surprising that legal gaps still remain which need to be addressed, in order to bring Polish environmental and energy legislation in line with EU requirements. Significant progress has, however, already been achieved in a number of areas. Thus few further adaptations are needed in the areas concerning the creation of an electricity market and regulations dealing with energy efficiency (SAVE, labelling, energy efficiency standards). More substantial adjustments are needed with respect to implementation of the LCP Directive and the creation of minimum excise taxes for mineral oils. These difficulties could become more severe if proposed revisions of the existing Directives are adopted. Poland faces more serious problems with respect to the Gas Directive, where market opening and restructuring lags have resulted in a request for an extended transition period. The biggest problem, though, is again posed by implementation of the IPPC Directive. As in most other applicant countries and many existing Member States, implementation of the Directive will require major amendments to the existing legislative framework and administrative/procedural structures. Finally, the coal mining sector poses special difficulties in Poland's accession process. While a substantial restructuring programme has been initiated, that

should ensure that coal subsidies are used in line with EC criteria, these reforms are unlikely to prove sufficient.

The main implementation problems are related to the substantive requirements of the respective EC regulations. Appropriate institutional structures are generally (with some exceptions) already in place. Much the same holds true for monitoring and reporting mechanisms and procedural requirements. The major exception to this general rule is the aforementioned IPPC Directive, that creates far-reaching demands for procedural and administrative restructuring. In other words, the substance of this Directive lies in its procedural requirements. Plans exist to address the remaining legal gaps by implementing further reforms, that should lead to full compliance by 2002. A new Environmental Protection Act is expected to be a major step forward in this process. Additional transition periods have been requested in the case of the Gas and the IPPC Directives. There is a danger, however, that other legislative adjustments will not be passed in time, or will require further adaptation periods (for example, energy taxation, coal subsidies). There is thus some likelihood that legislative adjustments to EU requirements in Poland will be a process that may well extend beyond 2002.

4.5 Slovenia

Slovenia made a major step forward in the accession process when the new Energy Act was adopted on 30 September 1999. This new law is relevant to implementation of the majority of the Directives in the field of environment and energy. Because of the recent date of adoption, it was possible to take into account most of the requirements that became part of the acquis communautaire only relatively recently (such as the Gas Directive, in 1998). The new law thus goes a long way towards bringing the Slovenian legislative framework into line with EU requirements.

At the same time, the new law only provides the basis for implementation of the respective requirements. It establishes a framework that needs to be fleshed out in the future by executive action and the adoption of secondary legislation authorized by the new law. Some uncertainty exists about feasible time schedules, as considerable delays were experienced in the legislative process involving the Energy Act. Thus, while a relatively-solid legislative foundation now exists, further action will be required in the coming years to bring Slovenian law and implementation in the field of environment and energy fully into line with EU requirements.

4.5.1 Energy markets and energy taxation

The two Directives on the electricity and natural gas markets have been transposed in Slovenian law by the aforementioned Energy Act. Slovenian energy taxation is regulated in the Excise Duties Act of 1998. Accordingly, Slovenia has opted for an authorization procedure with respect to construction of new generation capacity for electricity. From 2003 market opening will relate to

electricity generated outside Slovenia (and will then fully comply with the Electricity Directive in this respect). Slovenia also opted for a system of regulated third-party access to transmission and distribution systems. An Energy Agency has been established as an independent regulatory body. Apart from that, a certain amount of secondary legislation will be required to take care of the more specific regulations required.

This also holds true for the Gas Directive. The definition of eligible customers is not fully compatible with EC rules, since a slower market opening is determined until 2006, when Slovenia will realize a wider opening than required under EC rules. With respect to the construction and operation of gas facilities and the supply of gas, Slovenia has adopted a mixture of an authorisation and a tendering procedure. It is somewhat uncertain whether all aspects of this are in line with EU requirements. In terms of third-party access, Slovenia has opted for a system of negotiated access.

As mentioned previously, further secondary legislation will be required to fully implement the two energy-market Directives in Slovenia. To the extent that the new Energy Act itself may not be fully compatible with the EU rules, it is rather unlikely that revisions will be carried out in the near future (due to the recent adoption of the law). Those aspects will thus most likely become the subject of discussion in the accession process.

The Slovenian Excise Duties Act implemented from July 1, 1999 largely transposes the requirements of the existing Directive on minimum rates of taxes on mineral oils. Its structure is generally compatible with European law, in that it applies to the same products, has similar exemptions and follows the same logic. Tax levels are in most cases above those required by the EC Directive. Only with respect to gas oil for heating, kerosene for heating and liquid petroleum gas for heating are tax levels lower than required under the Directive. Further need for adjustments might arise from the proposed Directive on the taxation of energy products, once adopted. The latter could require an increase in tax levels and a broadening of the scope of taxation to also cover electricity and solid energy products.

4.5.2 Plant-specific directives

Slovenian legislation controlling air pollution from large combustion plants will only require few amendments in order to fulfil the requirements of the LCP Directive. The relevant Decree sets rather strict limit values to be complied with by 2000-2004. Furthermore, institutional structures and administrative procedures are in place, which allow compliance with the related requirements.

Limit values for $NO_{x,}$ however, are not fully compatible, and further demand for adjustments in this respect might arise from the new upcoming LCP Directive. Moreover, there is no provision under Slovenian law requiring that neighbouring countries be informed and consulted about projects that might be of concern to them. A revision of the relevant Decree to bring it fully into line with EU

requirements is planned to be achieved by the end of 2000. A difficulty that cannot be resolved in this way, but needs to be addressed in the accession talks, is the unavailability of 1980 emission data that usually forms the basis of national emission ceilings under the Directive. This should not, however, be a major obstacle.

A major issue to be resolved is the implementation of the IPCC Directive. Although the necessary legal and institutional framework exists, Slovenia's legislation does not yet provide for the issue of integrated environmental permits for the operation of installations, in the sense of the EC Directive. Emission and immission limit values are mostly in compliance with those of the EU, but the principle of best available techniques is not yet embodied in Slovenian law. Standards of public participation will also need to be introduced and guaranteed.

Implementation of the IPCC Directive will thus require major efforts. Currently, the introduction of the required legislative amendments is planned for the year 2000. While adoption could be as early as 2001, it should be possible to reach full transposition before the end of 2002. Beyond adaptation of legislation, real co-ordination of different ministries and agencies in issuing integrated permits will pose a considerable challenge. Furthermore, as in the case of other Accession Countries, application of the IPPC Directive to existing installations constitutes particular difficulties. In addition to technical and economic difficulties faced in this respect, revoking existing permits might create constitutional problems, as these have been issued without time limitations. For all these reasons, Slovenia has asked for a transition period of four years (end of 2010 instead of 2007) for fully implementing the provision of the IPCC Directive with respect to existing installations.

4.5.3 Energy efficiency

Large gaps remain in the implementation of the three EC Directives related to energy efficiency (SAVE, labelling, efficiency standards for household appliances) in Slovenia. The area covered by these Directives again falls under the remit of the recent Energy Law of September 1999. Implementation will need to be ensured by passing secondary legislation. This is supposed to happen within the next 1-2 years (in 2000 and 2001), but no concrete timetable appears yet to exist.

The implementation task is mainly related to the substance of the aforementioned Directives. Thus, the required implementation of programmes in the six areas listed in the SAVE Directive is lacking. Labels have to be defined, but details do not have to be regulated; the general obligation has been introduced in the new Energy Law. Finally, the new Energy Law empowers the Minister for Economic Affairs to determine the required minimum energy efficiency standards for different appliances and products, but related regulations have not yet been adopted. In reality it is likely that relevant Slovenian businesses already comply with the labelling and energy efficiency requirements of the EU, since

this is a precondition for their being able to export to the EU market.

Once the legislative conditions have been created, implementation and enforcement on the ground can rely on an established institutional capacity. In addition to the responsible Ministry of Economic Affairs, the Agency for Rational Use of Energy, the Energy Inspectorate and the Market Inspectorate will be available for further implementation steps.

4.5.4 Other policies

The instrument of integrated resource planning is not currently foreseen under Slovenian law. It could be introduced relatively easily in the planning process, as electricity and gas distribution companies have to prepare two-year plans. There is, however, no intention to do so in the near future.

With respect to renewable energy sources, the new Energy Law contains some rudimentary provisions for preferential access to the market by so-called *qualified producers*, to which producers of electricity from renewable energy sources belong. However, no further more-detailed regulations yet exist, and current rules are believed to provide for rather limited support for renewable energy sources.

4.5.5 Conclusion

Slovenia has made major progress towards implementing EC energy and environmental Directives through the adoption of the new Energy Law signed in September 1999. Whereas prior to that date virtually no transposition legislation existed for the implementation of Directives concerning the establishment of the energy market and the promotion of energy efficiency, the main foundations have now been established. These need to be fleshed out by extensive secondary legislation in the years to come, in order to bring Slovenia into full compliance with EC standards. The case of Slovenia thus illustrates the dynamic situation within many Accession Countries. In the current situation, whole policy fields may have to be completely overhauled, depending on the state of existing legislation.

As in the case of other Accession Countries, institutional capacities and capabilities, necessary to fulfil monitoring and reporting obligations, may need to be strengthened, but in general they exist. The remaining major challenges are mostly related to passing and enforcing the substantive requirements contained in the Directives themselves (defining labels and energy efficiency standards). As in other Accession States, the IPCC Directive also deserves special attention in Slovenia. Although the existing permitting system may allow adaptation for the issue of integral environmental permits, this requires major adjustments. The activities of various authorities need to be co-ordinated; and administrative procedures will need to be adapted. Furthermore, introducing the concept of best available techniques requires legislative adjustments.

According to Slovenian government plans, the legislative foundations will be laid by the end of 2002 at the latest. However, as experience with the new

Energy Law demonstrates, legislative proposals might be delayed in the domestic legislative process. It is thus hard to predict whether the deadline will be met. In any event, implementation and enforcement of the relevant legislation, and of the IPCC Directive in particular, will require extra effort and time. It may thus be expected that the implementation of EU legislation will not be fully completed in Slovenia until sometime after 2002 (as illustrated by the request for a transition period in the case of the IPCC Directive).

4.6 Conclusion

It is hardly surprising that several years prior to the planned accession of the Czech Republic, Estonia, Hungary, Poland and Slovenia, there remain significant gaps in the transposition and implementation of the requirements of EC law in the field of environment and energy. Progress appears to be generally most advanced with respect to the transposition of institutional and procedural requirements (with notable exceptions, see below). Most of the Accession Countries have established the institutions, competence and administrative procedures necessary to assign responsibility to specified authorities and to fulfil the formal conditions for effective enforcement. It has to be mentioned, however, that institutional capacity (personnel, training etc.) in many instances needs to be strengthened, in order to live up to the implementation and enforcement challenge in reality. This is particularly true for the monitoring and reporting requirements of several Directives.

The most serious legal gaps exist with respect to the following issues: substance, including the opening of energy markets to *eligible customers*; energy tax definitions and levels; energy efficiency standards for household appliances; and application of emission limit values to specific installations. In the case of the IPPC Directive, the major requirements are of a procedural nature. As a consequence (and as an exception to the aforementioned rule), the major difficulties in the implementation of this Directive are also related to procedures. It is a common feature, that Accession Countries, the integrated approach pursued by the IPPC Directive is unknown in the Accession Countries. Transposition thus poses a particular challenge to all Accession Countries (but also to many EU Member States). In particular, the transposition of the integrated approach requires not only certain legislative amendments, but also the complete restructuring of the environmental authorities and licensing procedures. More problems can thus be expected to occur in the future in the implementation of the IPPC Directive.

Summing up the whole field of environment and energy, it must be concluded that most efforts have been focused on the liberalization of the electricity and gas markets. Although progress has been made, further adjustments are necessary, aimed at an open market in electricity and gas, especially concerning third-party access to transmission and distribution systems. In practice, in several countries monopolistic structures

still prevail, although the legislative acts have been aligned (e.g. Czech Republic).

Energy taxation, in accordance with the Directive on excise duties on energy products, will pose a problem in most of the Accession Countries. Although for most of the energy products some form of taxation is levied, with the exception of the Czech Republic and Estonia, which do not impose taxes on kerosene and liquid petroleum, the level of the taxes does not (yet) correspond to the minimum levels required in EC legislation. In this respect Slovenia seems to be further advanced, imposing taxes in some cases higher than their European equivalents. In the other countries the problem of excise taxes will be further aggravated by the adoption of the proposed amendment to the Directive, with plans to include additional energy products, as well as raising the minimum levels of taxation.

The situation with respect to the rules on energy efficiency is diverse. Whereas in the Czech Republic, Estonia and Hungary only basic rules exist concerning the labelling of products or programmes implementing the SAVE Directive, it seems that Poland faces less problems. In Slovenia, legislation to further detail existing acts has still to be adopted in order to comply fully with EC rules.

The degree of harmonization seems to be most advanced in all countries regarding the Large Combustion Plant Directive. All countries enforce an authorization system for new and existing plants, and profit from the low emission levels resulting from the industrial decline. This, however, is to be taken into account during the accession talks setting national emission reduction targets for each of the Accession Countries.

As a whole, large gaps still remain with regard to relevant EC legislation in the field of environment and energy in the Accession Countries. In no single country, nor in any of the areas where EC Directives exist, are the requirements completely fulfilled. In all Accession Countries, main or framework legislation has been recently introduced, or is planned to be introduced in the near future. Further action is however required through the passing of supplementary legislative acts – government decrees or ordinances – that form the basis for administrative implementation and enforcement.

All the Accession Countries seem to face more difficulties than expected concerning the speed of the legislative process. Given this experience, it seems probable that the envisaged timeframes for full implementation of EC legislation in the field of environment and energy by 2001-2003 will not be met. Transition periods for more than the requested Directives will be negotiated in the accession talks. It is therefore likely, that approximation in the Accession Countries will be in progress far beyond the date of accession.

5 Patterns of regulation and implementation (policy assessment)

5.1 Purpose of the chapter

Not only the *transposition* of the legislative framework, but also its *practical application* (implementation) and *enforcement* have been defined as key elements of the approximation process by the European Commission. Formal compliance, and the mere existence of laws, policy plans and regulations, do not automatically guarantee environmental success. These policies have to be translated into action and enforced. This serves as a point of departure for this chapter.

This chapter completes the findings of the foregoing chapters, employing a more comprehensive approach. The process of transposing and implementing EU legislation should not be treated in isolation from the respective environmental and energy policy-making context. This chapter explores the performance and innovativeness of existing environmental and climate protection policies related to the energy sector. It follows several objectives:

Firstly, the implementation and effectiveness of existing environmental policies in the energy sector are investigated. A second objective is to explore country-specific regulation (or policy) patterns, and to assess the extent to which elements of an innovation-friendly environmental policy framework can already be identified in different countries. This step includes a systematic analysis of the instrumentation, *policy styles* and actor configurations in the field of environmental and climate protection policy in the energy sector. It helps to make policy formulation and implementation in different countries more transparent. Structural and institutional shortcomings can thus be revealed. Based on the respective findings, recommendations for future capacity building are derived.

5.2 Rationale and analytical context

As various comparative studies in the field of environmental policy research indicate, the effectiveness of environmental policy measures is less determined by individual, isolated factors (for example, the utilization of one single policy instrument), but rather by a complex set of interacting factors, comprising situational, economic, cultural and political variables. For instance, the economic performance of a country, the openness of decision-making processes for innovators, the policy style in which decisions are made and implemented, the strength, competence and constellation of policy actors in a policy field, and the capabilities for policy learning, have all been identified as key variables determining environmental policy effectiveness.

By analogy, recent transboundary studies[10] provide empirical evidence, that essential pre-requisites for the development and diffusion of environmental innovations in a country are similar characteristics of the policy-making process and corresponding policy framework conditions. Besides the *structure and set* of policy instruments applied *(policy instrumentation)*, the country-specific *policy style*, which determines environmental policy formulation and implementation, and *sector-specific actor configurations* combined with further *institutional framework conditions*, all provide meaningful explanation.

These key attributes refer to the entire process of public decision-making, and can be described as *dimensions* or *components* of a country-specific *regulation pattern*. Our understanding of *regulation* is a broad one, and comes close to that applied by the OECD. The OECD subsumes the full range of legal instruments by which governing institutions, at all levels of government, impose obligations or constraints on private sector behaviour (OECD 1997).

As described above, one objective of our investigation is to explore such regulation patterns for each country by means of the three policy dimensions already discussed. These policy dimensions have been made more operational for the analysis. The concept of country-specific *regulation patterns* serves as a suitable tool, allowing evaluation of the performance and innovativeness of the policy-making system.

The following section will specify the term *regulation pattern* with its various dimensions in order to make these abstract categories more operational for our analysis.

5.3 Analytical framework

The performance of environmental policies and policy instruments cannot be analysed without adequately taking into account the entire process and context of public decision-making. Such an effort requires a rather holistic perspective enveloping the entire policy making process, which can be divided analytically into different phases: agenda-setting/ policy definition, target and policy formulation, policy implementation and policy evaluation.

We employ the concept of country-specific regulation patterns to our analysis, in order to assess the performance of environmental policies in the energy sector, and in order to evaluate to what extent elements of an innovation-friendly policy framework are developed in each country so far. Crucial policy variables influencing the innovativeness of environmental policy-making are the following:

1. Policy instrumentation

[10] We refer particularly to the findings of the interdisciplinary Research Group on the Innovation Effects of Environmental Policy Instruments (FIU), which has been set up by the German Federal Ministry for Education, Science, Research and Technology (BMBF). The analytical concept of country-specific regulation patterns has been developed and employed within the framework of this project (cf. FIU 1999, Blazejczak/Edler/Hemmelskamp/Jänicke 1999)

2. Policy style
3. Sector-specific actor configurations and related *innovation-friendly* institutional framework conditions (for example, intra- and inter-sector policy co-ordination)

In the following, these variables are further specified in order to derive more operational indicators for our analysis.

The term *policy instrumentation* requires a *comprehensive* research perspective and refers to the whole set of policy instruments applied. The *type*, *design*, *structure* and *combination* of instruments need to be examined. Environmental policy research shows, that intended policy effects are achieved not by a single best instrument, but by a *mix* of various instruments. Furthermore, *economic instruments* such as environmental taxes can play a crucial role both in stimulating environmental innovations and for effective *inter-sector policy integration.*

The *strategic orientation* of policy instruments is of particular importance for environmental innovations and policy performance. Ideally, policy instruments should be integrated elements of a *concise* and *comprehensive* environmental *strategy*, orientated towards clear and binding goals, instead of having the character of isolated and selective measures.

Policy style can generally be defined as the mode of policy target setting, policy formulation and implementation. It implies the *forms of interaction* among the political actors on the one side, and between the state and non-state institutions on the other side. Important dimensions to be examined are the *strategic orientation* of policy making, the degree of *participation* of relevant target groups and the *conflict behaviour* of the environmental/energy decision makers (consensual/co-operative vs. authoritarian/conflict-orientated).

The *decisiveness*, *calculability*, *reliability* and *continuity* of environmental policy making are further attributes facilitating environmental innovations and policy success. A *pro-active consensual* policy style based on *dialogue and co-operation* between the state and non-state actors (for example, by already incorporating the various target-groups at the outset of decision-making), and among the state actors themselves, has been identified as a pre-requisite for the success of environmental policies and the development of environmental innovations.

Analysing specific *actor configurations* in the field of environment and energy requires clarification on how, and with whom, state institutions co-ordinate policy goal-setting and policy formulation. Important issues to be considered are the *competence, responsibilities* and *institutional strength* of the energy and environmental regulating authorities.

Crucial factors are furthermore *intra-sector* and *cross-sector policy integration*. *Intra-sector* integration depends on the level of administrative fragmentation/concentration in policy formulation and implementation, and refers to institutions of the same or different state levels (central, regional, local) within a policy field. *Cross-sector* policy integra-

tion includes the commitment and policy efforts to *integrate* environmental issues into sector policies such as, for example, privatization/liberalization or fiscal policies. The openness of decision-making processes and institutional conditions, providing access for relevant parties and environmental innovators to policy formulation and implementation processes, likewise deserve attention.

A close relationship between regulating and regulated parties, and the participation of target groups in goal-setting, promote environmental innovations and facilitate implementation. A crucial question is whether and to what extent the affected parties are involved (*pluralistic-inclusive* actor configuration) during the different stages of the policy process, or whether policy-making is limited to one or very few actors (*exclusive* actor configuration). This requires examining more deeply the *specific relationship* between the *regulating* authorities and the regulated target groups (energy utilities, consumers, non-governmental organisations).

Core issues are the *interest profiles* of the actors, the *distribution of power* between the different interested parties (state autonomy, balance of power, instrumentalization of state authorities by target groups or vice versa), the *forms of interaction* between them (consensual, co-operative, adversarial, conflicting, protective etc.), the *strategies* of

Table 9: Dimensions and elements of country-specific regulation patterns

Policy dimension	Level of development (high, medium, low)
1 Instrumentation	
1.1 Variety of instruments	
1.2 Economic incentive effect	
1.3 Strategic orientation	
1.4 Support for process	
2 Policy style	
2.1 Dialogue orientation	
2.2 Reliability and calculability	
2.3 Level of demands	
2.4 Flexibility	
2.5 Management and knowledge orientation	
3 Actor configuration and institutional setting	
3.1 Policy integration	
3.2 Networking among regulated	
3.3 Networking between regulator and regulated	
3.4 Influence of stakeholders	

Source: Jänicke 1997

state institutions concerning target groups (administrative guidance and active networking, delegation or imperative command-and-control) and the strategies of the latter for influencing state decisions.

Apart from that, close and intensive networking *among* the regulated target groups themselves (for example, business stakeholders, the scientific community, non-governmental organizations) and the creation of *innovation networks*, must be considered as influential factors for environmental innovations.

Table 9 (page 102) gives an overview of the dimensions and elements of an innovation-friendly policy framework, as described above. These characteristics serve as key variables for the analytical part of the chapter.

Country-specific regulation patterns and *policy profiles* can be graphically illustrated by means of multi-axial diagrams, where the individual policy dimensions and elements are arranged along respective axes.

5.4 Methodology and proposed structure

This chapter is based methodologically on a *policy analysis.* The dimensions and elements of innovation-friendly regulation patterns form the analytical screen of the study. The respective set of variables has been further specified by means of separate research guidelines. The analytical concept of country-specific regulation patterns is still in an explorative stage. In particular, the process of *measuring* the innovativeness of the policy framework in the applicant countries, and the employment of multi-axial diagrams, are not based on substantiated quantitative-mathematical methods, but merely on a qualitative comparison of the findings from each country. Even if such an approach may be criticized from a mere methodological point of view, we consider this approach to be useful in illustrating country-specific strengths and weaknesses related to the policy framework.

Ideally, the country studies follow a three-part structure, including a *descriptive* summary of the core actors, the institutional framework, existing policies (for example, legislation, strategic plans, action programmes), implementation practices and environmental expenditure, an *analytical* section devoted to the analysis of country-specific regulation patterns and a *concluding* section, where recommendations for further capacity-building are made. However, in order to maintain a sufficient degree of flexibility, and in order to take into account the availability of information, the project partners in charge of preparing the country reports were free to determine the final structure on an individual basis. The following section summarises key findings from the country-studies.

5.5 Key findings from the country studies

5.5.1 Czech Republic

5.5.1.1 Institutional framework

The Czech Republic has developed a relatively differentiated and effective institutional framework for promoting energy efficiency and the use of renewable energy sources in the country.[11] At the state level, particularly, the *Czech Energy Agency* and *SEVEn*, the *Czech Energy Efficiency Centre*, a non-profit organization, perform important promotional, financing, co-ordinating and networking functions. The Czech Energy Agency has created a network of *Energy Consulting and Information Centres* (EKIS) throughout the country. These centres have been established in co-operation with local energy consulting companies. In total, 56 of these centres existed at the beginning of 1999. Further institutions, which deserve attention, are the *State Environmental Fund* and the *Energy Conservation Fund*, which was launched in 1997. This revolving fund finances energy conservation measures by means of soft loans.

[11] The following summary is based on the respective country-study, which has been prepared in the context of this project by Dr. Martin Bursik, Ecoconsulting, Prague. In addition, the following information sources were used: KPMG 1998, REC 1998, Fagin/Jehlicka 1998, Hronec 1999, Kocenda/Cabelka 1999 Sejak 1998 and the country report of the Czech Republic, which was submitted to the CTI Capacity Building Seminar for Energy Efficiency Centres, which took place in Ostritz, December 6-10, 1999.

5.5.1.2 Policy formulation and implementation

The period up to 1992 can be characterized as exceptionally successful from an environmental policy point of view. Considerable progress was made in terms of creating an effective institutional and legislative framework for environmental policy. Comparatively strict air pollution control legislation was adopted during this period. The *Clean Air Act*, adopted in 1991, provided for the phased introduction of new air-quality standards explicitly based on those of the European Union (Large Combustion Plant Directive). This led to massive investments in air pollution abatement technologies, particularly flue gas desulphurization devices for coal-fired power plants.

The environmental programme of the national electricity company, CEZ, included the desulphurization of the total power capacity of 5,930 MW in 32 coal-firing units, and the construction of seven fluidized bed boilers at four power stations. Capacity of 2,020 MW has been scheduled to be commissioned (Hronec 1999). The reduction in major air-borne pollutants, achieved by the mid 1990s, was certainly a result of numerous clean-up projects carried out in this period. Nevertheless, the Czech Republic still remains one of the major polluters in Europe. It cannot be overlooked, that clean-up activities focused primarily on end-of-pipe technologies, instead of on integrated technological solutions. The share of renewable energy sources in the energy balance is still very low.

After the electoral success of the Civic Democratic Party in 1992, the ethos of radicalism and a rather progressive approach to environmental policy lost momentum. The period between 1992 and 1997 has been described as a period of conceptual vacuum in the field of environmental protection. Only recently, a process of 'upgrading' environmental policies could be observed. In 1998, the newly-elected government launched a new state programme for environmental protection. This strategy, the *State Environmental Policy*, is currently under debate. This programme formulates requirements in the field of energy use and production, and emphasizes the concept of sustainable development. One has to point out the fact, that after 1992 the government's fierce hostility to the very notion of sustainable development extended as far as rejecting any references to the term within the official *State Environmental Policy* (Fagin/Jehlicka 1998). A major weakness of the programme, however, is the absence of operational targets, instruments, responsibilities and monitoring provisions.

For the energy sector a corresponding strategy has been recently prepared after seven years of strategic vacuum. The draft *State Energy Policy* was presented in mid-1999, and should have been adopted by the Government by the end of 1999. From an environmental point of view, however, this concept shows significant shortcomings. For instance, the planned ecology-orientated tax reform has not been integrated into the concept. Besides this, the proposed adjustment of energy prices has been criticized for being too moderate and slow. Further drawbacks are the planned extension of nuclear power for electricity generation and the neglect of energy conservation measures.

The Ministry of the Environment together with the Ministry of Industry and Technology prepared a *State Programme in Support of Energy Conservation and Alternative Sources of Energy*, including a catalogue of measures. In late 1999 the Government passed an updated version of this programme. The scope of the programme, however, is restricted by limited financial resources (approximately USD 20 million per year). The planned amount has been considerably reduced compared to the initial target to allocate 0.01% of GDP from the state budget. Subsidies for household energy consumption clearly outweigh those for energy conservation. In 1995, budget allocations for energy conservation measures represented 1.7% of those for energy consumption subsidies (Sejak 1998).

5.5.1.3 Policy instrumentation

In the field of air pollution control the Czech Republic has implemented mainly regulative instruments, supplemented by economic instruments, based primarily on the pollution permit/charge/non-compliance financial penalty models in place, for instance, in Poland and the Baltic countries. Revenues from emission charges have largely been earmarked for the *State Environmental Fund*, which provides grants and soft loans for environmental investments on a co-financing basis. The introduction of tradable pollution permits in conjunction

with the existing charge structure is planned for the medium term. The Ministry of the Environment and the Ministry of Finance are jointly preparing proposals for a comprehensive and systematic ecological tax reform.

In the field of energy efficiency, policy instrumentation compares well to other transition countries. The core state actors here are the Czech Energy Agency, the State Environmental Fund, and the State Energy Inspection. The Czech Energy Agency focuses on supportive programmes through state subsidies. It actively supports energy service companies. The draft Energy Management Act includes a set of energy efficiency measures, such as energy certification, third party financing, compulsory energy audits for public and private entities, labels and standards for electrical appliances, and a legal obligation for heat and electricity producers to install CHP devices when reconstructing heating and electricity generation sources.

There are several *economic instruments* applied in order to stimulate the use of energy-efficient technologies and renewable energy sources. These include preferential VAT treatment for environmentally-sound products and technologies, as well as income tax allowances and exemptions. Preferential purchase (feed-in) tariffs for electricity from renewable energy sources have been set up by voluntary agreement between the Ministry of Industry and Trade, the Ministry of the Environment, regional power distributors and renewable energy associations. The proposal to set up legally fixed and guaranteed purchase tariffs has been recently rejected. The existing support scheme for renewable energy sources must be considered as comparatively weak.

Economic instruments were seldom created systematically, and discrepancies often exist between the proclaimed and the real functions. The *strategic orientation* of policy instruments is not very high. The long absence of strategic concepts both for environmental and energy policies must be considered a crucial constraint. Policy instruments have mostly the character of *selective measures* rather than being elements of a systematic and concise strategy.

The programme of desulphurizing North-Bohemian power plants is an example of the Czech Government's *uncoordinated approach* to environmental management. The management of the national power utility CEZ sees desulphurization as an unavoidable and costly measure, which, once completed, will enable the company to declare its production as 'clean'. This removes the barrier to increasing production and resuming electricity exports. A major drawback is that this policy approach neglects the problem of CO_2-emissions. The Czech Republic has still a leading position in terms of carbon emission intensities.

In some sectors, such as the water sector, the *economic incentive effect* of economic instruments is considered to be relatively high. Water-effluent charge rates have approached the marginal abatement costs they are intended to internalize. The level of air-pollution charge rates for SO_2 and NO_x emissions is considerably lower than the Polish or

Lithuanian equivalents, but is comparable to the levels in other transition countries. The current rates are several times lower than estimated average marginal abatement costs. So far, they have not been indexed for inflation. On the other hand, the revenue-raising potential of economic instruments, such as emission charges, is high and almost comparable to Poland in terms of per-capita revenues. According to *State Environmental Policy* it is planned to reassess existing pollution charges and to consider introducing tradable pollution permits in the mid-term.

Distorted pricing mechanisms must be considered a severe drawback in the Czech Republic. The energy prices for households are still substantially cross-subsidised and time-of-use-pricing is underdeveloped. There is considerable state support for conventional fossil fuels. Price reform in the coal, electricity and natural gas sectors still remains to be completed (for more details see *Country Report Czech Republic*). The Czech Republic lags behind Poland and Hungary in terms of structural and price reforms in the electricity sector.

5.5.1.4 Policy style

A fundamental problem of environmental policies is seen in their general orientation and narrow interpretation. Environmental problems are said to be basically perceived as problems of pollution, which are to be resolved by scientific expertise, technological progress and end-of-pipe solutions. Priority has been given to expensive end-of-pipe measures. There has been a lack of emphasis on sustainable development and preventive policy approaches in recent years.

Environmental policy still lacks effective integration with other sector policies, and is highly selective in terms of its focus on certain isolated remedial measures, without due attention to their further ramifications and broader context. In contrast to the beginning of the transition period in the early 1990s, when, to a large extent, the environmental reform was pushed forward by domestic pressure, in subsequent years the major factor behind reform was, almost exclusively, systemic influences upon the Czech Republic emanating from the international system, i.e. mainly from the European Union (cf. KPMG 1998).

The example of eco-labelling illustrates that state support through accompanying measures is often too weak. Additional state-supported promotion, advertising campaigns and dissemination of consumer-orientated information have been underdeveloped (KPMG 1998).

In the field of environment and energy an atmosphere of *strong competition* and *conflict* predominates between the responsible ministries of environment on the one hand, and of industry and technology on the other hand. The *dialogue orientation* of the respective actors involved in environmental policy-making seems to be relatively low. Participation of the public in environmental policy-making was rather restricted between 1992 and 1997. The management and target orientation of environmental policy-making, as well as its flexibility, must be considered as still comparatively low.

Calculability, however, seems to be higher than in other transition countries. The intention of the Clean Air Act, for instance, was to give industry reasonable advance notice of change, in order to give companies time to make the necessary investments and adjustments before the implementation deadline (01.01.1999).

According to Kocenda/Cabelka (1999), the intervention of the Czech Government in the energy sector is driven by lobby pressures, rather than by a consistent, clearly-defined, long-term policy. Consequently, privatization is not yet complete, and clear rules for entrepreneurs are still lacking

5.5.1.5 Actor configurations

Several institutional innovations facilitating *cross-sector policy integration* could be identified at the beginning of the transition period. These include the *Czechoslovak Federal Committee for the Environment*, which had a surprisingly progressive structure. It was not an ordinary ministry dealing with a sector, but rather a committee headed by a chairman. This institutional arrangement reflected the idea, that the environment should not be treated as a particular and separate sector of government policy, but rather that environmental considerations should penetrate all government policies. Its members were the environment ministers of both republics, the deputy ministers of foreign affairs, finance and economics as well as the chairmen of environmental committees (cf. KPMG 1998).

At present there are several institutional provisions designed to promote cross-sector policy integration, including the *Commission for Sustainable Development* and informal inter-ministerial project units. Another example is the establishment of an *inter-ministerial co-ordinating commission* that would ensure co-ordination between the Czech Energy Agency and the State Environmental Fund in implementing the *State Programme for Energy Savings and Alternative Sources*. The ministries of environment and industry and technology are responsible for the formulation of the new *Energy Act* and the *Act on Energy Use*. Institutionalized dialogue-structures are, however, mostly lacking.

Some promising and innovative *procedural* efforts have been undertaken to integrate environmental considerations into energy policy-making. Worth mentioning in terms of energy policy strategy is the environmental impact assessment, which is combined with a public hearing. A very progressive approach, orientated towards an effective integration of environmental considerations into energy and fiscal policies, is the proposed *environmental tax reform*, which envisages the removal of all forms of subsidies, the gradual introduction of taxes on coal, liquid fuel oils, electricity from thermal and nuclear power plants and finally on natural gas and electricity.

A major drawback, however, is that restructuring and privatization of the electricity sector seems to be the exclusive domain of the *Ministry of Industry and Technology*. Particularly in this field, policy integration needs to be further strengthened. Price reforms, priva-

tization and deregulation in the electricity sector are expected to have a positive environmental impact, as traditional supply structures and technologies will be challenged by modern and efficient technologies. Furthermore, privatization and liberalization are likely to promote the pluralization of actors and have a profound impact on established actor networks and power constellations. A competitive market is also expected to put an end to all considerations concerning the construction of new nuclear power plants, for purely economic reasons.

An effective legal framework for a competitive electricity market is not yet in place, and the transposition and implementation of the EU Electricity Directive is being delayed. Current legislation does not provide for fair, transparent and non-discriminatory third-party access to the transmission grid. The creation of a politically-independent regulatory body, performing supervisory functions and controlling the rules of a competitive electricity market, is considered an additional institutional pre-requisite for a functioning competitive market.

In the electricity sub-sector, the vertically-integrated national electricity company, CEZ, which is the dominant electricity producer, exerts an extraordinary and strong influence on energy policy-making, which has remained almost untouched during the past ten years. The utility still enjoys considerable autonomy, and benefits from information asymmetries. It still has the characteristics of a *state within the state*. The role of the state as shareholder, regulator and policy-maker must be considered a structural weakness.

The country-study gives an excellent insight into the close symbiotic relationships, interdependencies and personal entanglements of the Ministry of Industry and Technology and CEZ, which are deeply rooted in the socialist period. It includes a detailed analysis of the decision-making process with reference to the construction of the *Temelin* nuclear power plant, and reveals the strategies employed by the core actors in order to achieve completion, despite compelling economic doubts concerning the project.

The country-study convincingly demonstrates the inability and unwillingness of the Ministry of Industry and Technology to effectively supervise the utility. Furthermore, it highlights political reluctance to accelerate the process of profound restructuring, privatization and liberalization, which has been postponed time and again. So far, the Ministry of Industry and Trade obviously assumes a *protective* position toward CEZ, and tends to strengthen the monopoly of CEZ.

Due to the enthusiasm and effort of the first Czech Ministry of the Environment and the *Federal Committee for the Environment*, close contacts with the international environmental community were activated immediately after these institutions were established. This was a good basis not only for the onset of mutual information exchange, but also for financial and expert assistance (KPMG 1998).

A remarkable feature of the first 'enthusiastic period' after 1989 was the close

relationship between state officials and activists from non-governmental environmental groups. In 1990, the *Czech Minister of Environment* initiated the establishment of a *Green Parliament*, a forum consisting of representatives of almost all environmental groups, serving as a consultative body. The first ministers had relatively strong political weight, particularly during this period.

Since 1992, however, the *Ministry of the Environment* has suffered from its declining authority and influence. This has been accompanied by a changing relationship between the ministry and non-governmental environmental associations during the 1990s. The initial open and dialogue-orientated policy style of the ministry, which was typical for the 'enthusiastic period' between 1989 and 1991, completely changed after 1992. Pluralistic and inclusive participation patterns have been succeeded by rather exclusive participation patterns (Country Report Czech Republic). In general, criticism has been made of a considerable democratic deficit in terms of the capacity of citizens to influence decision-making in the environmental sphere.

However, whilst the relationship between environmental NGOs and the ministry has quite clearly deteriorated, the ability of larger NGOs to forge links with deputies from opposition political parties appears to have improved (Fagin/Jehlicka 1998). Particularly in the case of the completion of the Temelin nuclear power plant, established environmental NGOs were, with few exceptions, the only partners in the limited dialogue with the Government. Apart from comprising the major opposition against the completion of the power plant, NGOs were involved in a number of energy projects.

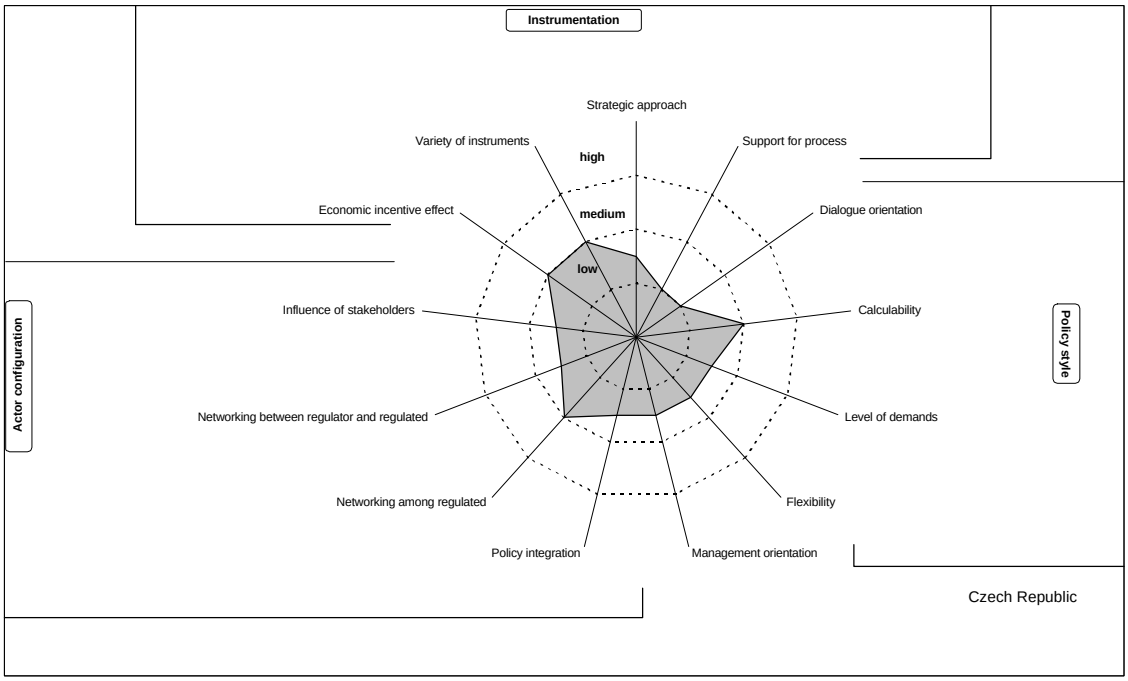
In the field of energy conservation, impressive progress has been made in terms of institutional capacity building and networking. An adequate institutional infrastructure has been developed in recent years. The Czech Energy Agency has created a rather dense network of regional energy centres performing networking functions between the various players.

5.5.1.6 Conclusions

The country report does not explicitly formulate proposals for further capacity building. The analysis revealed major constraints in the field of strategic orientation, dialogue orientation, and policy integration. Distorted pricing mechanisms are a severe drawback. The comparatively well-developed institutional infrastructure in the field of energy conservation offers favourable possibilities for further capacity building in this field through networking instruments.

The existing network of regional and local energy centres requires further stabilization. Co-operation between the energy efficiency institutions of the different state levels should be intensified and strengthened. Municipal energy planning, project monitoring and post-implementation evaluation deserve special attention. Local energy centres form important crystallization points for intensified networking at the municipal level. The establishment of a project

Figure 13: Regulation pattern in the Czech Republic



identification and co-ordination facility might be considered.

The creation of innovation networks, incorporating the education and science sector, business and public administration, should be supported. In order to facilitate cross-sector policy integration, environmental tax reform requires effective back up. In addition, inter-ministerial project units for the restructuring and privatization of the electricity sector might be established.

5.5.2 Estonia

5.5.2.1 Institutional framework and policy developments

Major structural weaknesses of the Estonian energy system are an unbalanced fuel structure and an oversized technological structure, particularly in the electricity sector. The Estonian energy sector was an integral part of the Soviet energy system, and the infrastructure designed to serve regional rather than national needs. 98% of domestic electricity generation in Estonia are based on oil shale combustion. The share of oil shale in the primary energy balance is 60-65% (Country Report Estonia). Mining, processing and combustion of this low-grade fossil fuel are regionally concentrated and have a severe environmental impact, being also a major source of transboundary air pollution. The high mineral carbon content increases the carbon emission factor of oil shale and specific CO_2 emissions.

From a resource and climate protection point of view, consequent restructuring and down-sizing of the oil shale mining and power complex, the closure of mines and the decommission of obsolete

and superfluous electricity generation units, a pronounced shift to less polluting fossil and renewable energy sources (wood, wind), and, particularly, a systematic energy conservation policy, should all be accorded priority in Estonian energy policies.

One has to bear in mind, that after regaining independence the Baltic countries faced the challenge of having first to establish the fundamental institutions of sovereign national states. Several actors perform public energy management functions in Estonia. However, institutional capacities for the promotion of energy conservation measures and renewable energy sources are underdeveloped. The current institutional structure is insufficient. Estonia does not have an energy (conservation) agency or a comparable energy efficiency institution at the central state level, as is the case with other transition countries. Such an institution could perform important co-ordinating and networking functions. Climate protection tasks need additional institutional support. Promising capacity-building measures at the local level include the foundation of three regional energy centres and the development of an investment preparation facility for regional development and energy planning. These initiatives are supported by the EU PHARE programme.

The state-owned oil shale mining and oil shale based electricity supply industry could maintain a dominant position in the energy policy arena. A regulatory body has been established under the Ministry of Economic Affairs (*Energy Market Inspectorate*). Policy-making and regulatory functions have been institutionally separated. The political and financial independence of the *Energy Market Inspectorate*, however, has to be considered as comparatively weak.

Concerning the electricity sector, consequent deregulation and liberalization policies, combined with supporting environmental measures, are expected to have positive environmental effects, facilitating the entrance of new players as well as modern and efficient technologies into the market. Estonia has already taken initial measures regarding the transposition of the respective EU Electricity Directive. The privatization of the vertically-integrated state-owned joint stock company *Eesti Energia* has been on the political agenda since 1996. The company formally introduced the unbundling of its financial accounts in 1999.

However, core elements of the EU Directives, particularly the principle of non-discriminatory *third-party access* to the transmission network, have not been put into concrete terms and still require further elaboration. Compared to initial privatization concepts, the current approach of restructuring and ownership transformation in the oil shale mining and electricity sector shows significant differences. Since 1998, a pronounced shift in the restructuring and privatisation policy of the Government can be observed. Only two small distribution networks were privatized in 1998.

The degree of vertical integration is now even going to be increased rather than decreased. Oil shale mining and electricity production will be amalgamated into

one single value-creating chain, and the vertically integrated, state-owned utility *Eesti Energia* aspires to integrate the transmission and the remaining distribution networks into one single network company. Quite recently, the Estonian Government and the US company *NRG Energy*, with whom the Government is exclusively negotiating the privatization of *Eesti Energia*, have concluded an agreement, under which the state will secure a market for the entire output of the oil shale based power stations through a wholesale agreement. The main rationale is to stabilize the decreasing competitiveness of oil shale based electricity, to preserve economies of scope and scale, and to increase electricity exports to neighbouring countries.

Estonia is well advanced in designing an environmental strategy for the pre-accession period. The National Energy Strategy and the National Environmental Action Plan provide a solid and operational policy framework for the energy sector. Policy monitoring and implementation, however, need to be adequately supported. First and foremost, these policies have to be matched with corresponding energy sector policies and action programmes. So far, environmental and energy policy-making have been rather segmented and insulated from each other.

Until 1998 the energy sector was characterized by the absence of a comprehensive and consistent long-term development strategy or policy. The recently-adopted *Long Term Development Plan for the Estonian Fuel and Power Sector* will hardly overcome this drawback. This plan must be considered a rather weak policy framework lacking sufficient operational targets and priority setting. An *integrated* strategy equally matching environmental challenges with other energy policy targets (restructuring/privatization, security of supply etc.) is still lacking. Estonian energy policy is heavily supply-orientated, and there is a bias towards the strategic importance of the oil shale sector. Environmental commitment by energy policy-makers is rather limited. Environmental problems are mostly seen as technological challenges.

Oil shale seems to remain the dominant fuel for the short and medium term in Estonia. Restructuring of the oil shale mining and oil shale based electricity sector is a highly complex task. Such an effort requires a balanced problem-solving approach, equally addressing environmental, socio-economic and regional challenges. *Regional* policy approaches, which have been already partially endorsed during the transition period (cf. *Programme of Sustainable Development of the Ida-Viru County*), should be reinforced and combined with involvement on the part of international financing organizations. Multipartite configurations, incorporating the relevant players, facilitate the efficiency and effectiveness of sector restructuring.

5.5.2.2 Environmental expenditure

Estonia has been particularly successful in attracting foreign assistance, with some 35 - 40% of environmental investments being financed by international grants and loans, compared with an average of below 15% in Central and

Eastern European countries. In 1997, Estonia ranked first among Central and Eastern European countries in terms of per capita financial assistance for the environmental sector.

The *water sector* still absorbs the major share of environmental expenditure in Estonia. 80% of annual environmental investments are channelled into the construction of new municipal wastewater treatment, treatment plants and associated sewage systems. Domestic investment in air pollution control technology is rather low. Some industrial plants, however, such as the *Kunda Tsement* factory, made considerable investments after privatization. Total environmental expenditure on air pollution control is not known. In other transition countries, for instance in Poland or the Czech Republic, a considerable share of environmental investments goes into air pollution control measures.

In the electricity, gas, steam and hot water supply sector, end-of-pipe technologies have been clearly dominant so far. Environmental investments in the oil shale fired power plants comprise exclusively end-of-pipe measures (50 MW flue gas desulphurizing test unit, installation of two ash precipitators). There is rather broad consensus among policy-makers, domestic business and the scientific community, that replacing conventional pulverized combustion technology in oil shale combusting power plants by more efficient and less polluting atmospheric or pressurised fluidised bed combustion, is the most suitable strategy to achieve compliance with the environmental requirements set by the respective EU Directives and further international environmental agreements. Preparations for the refurbishment of one 200 MW unit and the installation of a flue bed combustion boiler have recently started. These technologies, however, are highly expensive and generate additional waste problems.

Particularly during the first years of transition, a considerable part of foreign loans and grants was used to finance fuel purchases and energy supply measures. Generally speaking, the Estonian Government can be characterized as comparatively *conservative* and cautious with regard to its borrowing activities. Several accounts, such as the EBRD loan, have not been utilized to the full amount originally foreseen.

Some progress has been achieved with regard to the rehabilitation of district heating systems and the conversion of heat-only boilers to local fuel burning (mainly wood). This has been supported by several foreign assistance programmes and loans (World Bank, EBRD, Swedish EAES Programme etc.). However, most of these activities have concentrated on the *supply side*. The end-use sector has been neglected so far, but offers a vast potential for cost-effective conservation measures. Allocations in this area have been made mostly for the installation of metering equipment and devices. Supporting organizational and financing instruments are greatly needed in this area.

Numerous projects have been financed through multilateral and bilateral foreign assistance. A fundamental problem is that only a modest share of the state budget is made available to implement

energy efficiency measures. The budget of the Energy Conservation Programme has been considerably reduced since 1995. Complementary financing mechanisms are required.

The *Estonian Environmental Fund* shifts financial resources from the energy sector to other sectors in the form of pollution charges, non-compliance fines and resource taxes. On the other hand, energy efficiency and climate protection are not a financing priority of the Fund. The redistributive effect has been substantial so far, and additional resources should be earmarked for air pollution control and energy conservation measures. The main advantage of such extra-budgetary funds is that they do not compete with other sectors and programmes for limited state resources.

The Environmental Fund could serve as an effective instrument, allowing for effective integration of environmental and energy policies. It is rather difficult to assess the real performance of this institution, and local decision-makers criticize severe deficits regarding transparency and control. The establishment of an extra-budgetary energy saving/conservation fund, as has been set up in other transition countries (e.g. Slovenia, Lithuania, Latvia), should be considered. In order to reduce transaction costs, its functions could be likewise managed by a reorganized Environmental Fund.

5.5.2.3 Policy instrumentation

Compared to other transition countries, the *variety* of policy instruments for environmental protection in the energy sector is rather low. The dominant instrument type in the field of air pollution control is command-and-control instruments, with economic instruments performing complementary functions. Particularly with regard to energy conservation and the promotion of renewable energy sources, the policy mix requires further diversification. So far, fiscal instruments are dominant. The *economic incentive effect* of resource and air pollution charges has been quite low so far, but shows an increasing trend. The share of these charges in oil shale and electricity production costs is still rather small (at present 0.5-2%). However, the recent introduction of a (very low) CO_2 emission charge and the constantly-increasing rates of other air pollution charges, make environmental costs increasingly perceivable to energy producers, due to the massive amount of emissions.

Estonia has made some progress in removing price subsidies and achieving cost recovery. There are no direct price subsidies for oil shale mining and cross-subsidies between households and industry have been partially removed. The electricity price level is the lowest in Europe, but in recent years there have been considerable real price increases.

The *strategic orientation* of environmentally-related policy instruments must so far be considered low, but it is increasing following adoption of the National Environmental Action Plan. Continuous reorganization of the ministerial apparatus, lack of qualified staff, failing resources and capabilities in the ministries, and a high civil service turnover, which is the result of the low level of

wages in the public sector, are all crucial drawbacks. Only recently have environmental and energy sector policy strategies been endorsed. The current energy sector strategy lacks sufficient implementation and orientation. Policy monitoring and post-implementation evaluation are generally underdeveloped.

Despite the energy conservation programme, energy conservation measures are based on a rather *haphazard* approach. There has not been a systematic, target-orientated energy conservation policy so far (not to speak of a systematic climate-change mitigation policy). The recently adopted introduction of a CO_2 emission charge is a promising approach, but this instrument has more the character of an isolated measure, than of an integral part of a systematic and consistent energy efficiency or climate-change mitigation policy. With regard to co-generation and renewable energy sources, domestic experts criticize governmental *abstinence* and a *laissez faire* approach.

5.5.2.4 Policy style

Environmental policy-making in the Estonian energy sector is relatively legalistic, hierarchical and mostly *reactive*. Further characteristics are a somewhat *technocratic* approach to environmental policy-making. There are, however, perceivable differences between the Ministry of the Environment and the Ministry of Economic Affairs, in terms of their *dialogue orientation* and the degree of *participation* of interested parties in decision-making processes. Whereas environmental policy formulation practices under the domain of the Ministry of the Environment increasingly show *inclusive* participation patterns, participation in energy related policy development is still rather *exclusive*. Restructuring and privatization of the energy sector, in particular, are a closed and highly-exclusive decision-making process.

5.5.2.5 Actor configurations

Environmental and energy policies require more co-ordinated efforts. In the period between 1993 and 1995, Estonia developed several promising legislative, institutional and planning tools, in order to overcome segmented sector decision-making and to promote cross-sector policy integration. However, these provisions and instruments remain rather weak in effect, and policy integration in the area of environment and energy is still a major drawback. Environmental commitment is rather low in the Ministry of Economic Affairs. Inter-ministerial co-operation is rather poor, particularly at higher administrative levels. There is still a lack of an *integrated* energy policy, matching economic targets and demands (security of supply, price policy, restructuring and privatization) with environmental and resource protection requirements.

Due to its small size, Estonia has good preconditions for the development of well co-ordinated and effective policies and for overcoming fragmented and insulated decision-making, both between different actors within a certain policy area and between actors from different levels of state administration. *Intra-*

policy co-ordination suffers, however, from decreasing resources and capacities both at the central state level, and particularly at the local/municipal level. The absorption of qualified staff and experts by the private sector is a very serious problem.

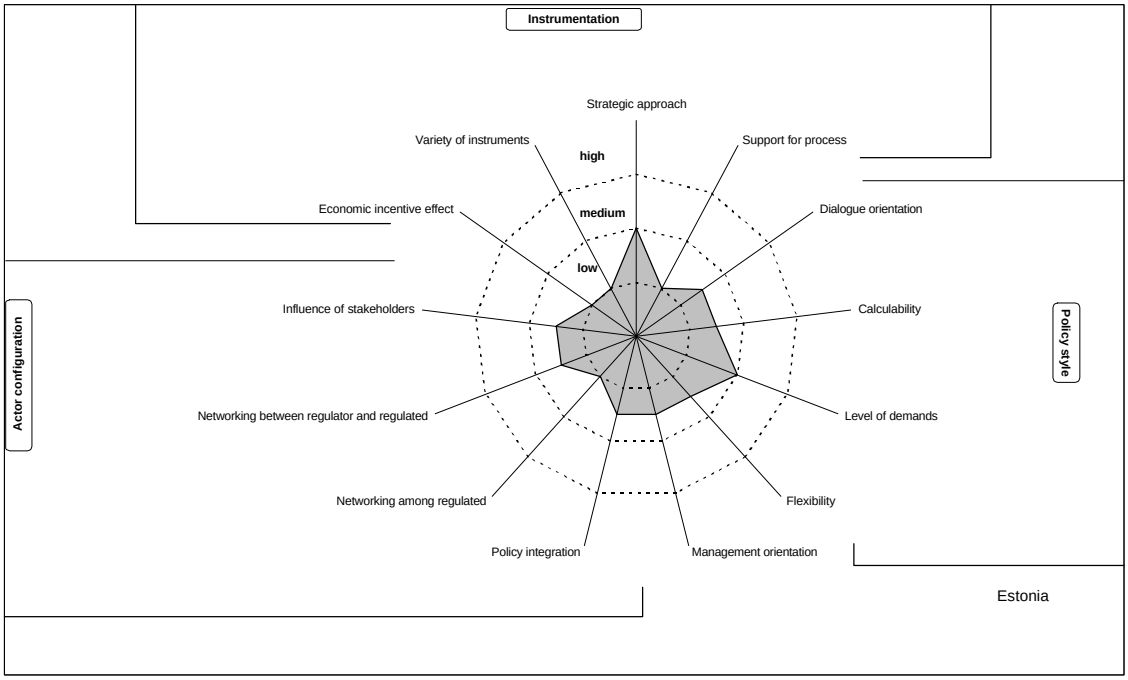
The establishment of three regional energy centres by the EU PHARE programme is a promising step, but their functions are rather limited, covering mainly advisory tasks. The future development of these centres is uncertain, and the absence of a corresponding co-ordinating institution at the central state level is perceived as a crucial weakness. The example of other applicant countries shows, that energy agencies perform crucial networking and co-ordination functions in the field of energy efficiency. Networking between various interested parties and potential innovators is rather weak.

5.5.2.6 Conclusions

The current institutional framework for energy conservation and climate protection is inadequate. Interviews clearly revealed that a *public institution* for guiding energy-saving activities is needed at the *central state level*. This institution should be relieved of daily administrative tasks and enjoy adequate freedom of action; it could perform important co-ordination and networking functions.

Local experts recommend the establishment of a separate energy conservation/efficiency fund, which could be co-

Figure 14: Regulation pattern in Estonia



financed by the state budget and a proportion of pollution charges. This organization could support research programmes, soft loans, regional energy conservation plans, energy audits and energy saving campaigns. The Environmental Fund, once reorganized, could also perform these tasks. In any case, measures should be undertaken orientated towards reallocating a proportion of pollution charge revenues to energy conservation projects.

Numerous small-scale energy investment projects have been implemented in Estonia since 1991. However, the targeted energy saving objectives have not always been achieved, and a recent post-implementation analysis of selected energy (conservation) projects, which have been mostly implemented with foreign assistance, draws a critical picture. Another drawback is, that the bulk of projects focus on the supply side. State support for utilizing the vast energy conservation potential in the end-use sector is very weak. Additional financing mechanisms need to be developed. In order to strengthen policy implementation, the introduction of performance-monitoring procedures and post-implementation evaluation policies should be secured.

5.5.3 Hungary

5.5.3.1 Legislative and institutional framework

Hungary[12] became the first country in the region to start the long process of creating the legislative and institutional framework for privatizing the energy industry (approximately 10% of the electricity market will be open to competition by January 1, 2001), expecting that this would allow a reduction in its huge foreign debts and attract foreign investors, who would modernize the old power plants.

Energy and environmental issues are intermingled in complex ways, and should be jointly integrated into specific sectorial policies. Unfortunately, this is not the case in Hungary.

Detailed attention is focused here on two areas: environmental regulation directed at air pollution, and the energy generating (electricity) sector as well as energy efficiency and energy saving policies.

The legislative and institutional framework for energy policy in Hungary aimed at establishing a competitive, market-orientated energy sector in Hungary. In 1993 the Hungarian Parliament adopted the new *Energy Policy*, which created the framework for privatizing the energy industry, but failed to create an accompanying Energy Framework Law, which could have provided a conceptual basis for implementation. Several specific bills, necessary for the institutional background to privatization, were passed by Parliament: the *Gas and the Electricity Acts* (1994), the *Nuclear Act* (1996), and the *Act on District Heating* (1998). The adoption of the *Act on Environmental Protection* (1995) followed the Gas and Electricity Acts, so the privatization process of the energy sector started without a proper

[12] This summary is based on the respective country-study, which has been prepared by Zsolt Boda, Energy Club, Budapest.

environmental strategy. The Gas Act established the *Hungarian Energy Office* as the new gas and electricity regulator, headed by the Ministry of the Economy (the former Ministry of Industry and Trade), which is responsible for licensing and operative regulation of the gas and electricity industry, for general consumer protection, and for promotion energy efficiency.

Hungary's energy profile has been determined since the 1980s by scarce mineral resources of rather low-quality brown coal, gas, and oil, and by the use of nuclear energy. Half of the country's primary energy demands are covered by imports. Energy efficiency is increasing, but energy intensity is still 2 to 3 times higher than in Western European countries.

Energy and environment: The most important environmental problem associated with energy is air pollution. Total SO_2 emissions are about 650,000 tons per year, of which 540,000 are produced by the energy sector, and they are among the highest per capita emissions in the region. CO_2 emissions are 7 tons per capita, which is below the OECD average. The energy sector's share amounts to one-third of total CO_2 emissions.

Nuclear energy represents about 40% of electricity consumption and 12% of total final energy consumption in Hungary. The official service life of the four reactors is expected to end around 2010, by which time the phase-out plan to replace this capacity should be available. There are plans, however, to extend plant service life, and even to expand existing nuclear power plants. In 1996, the new Nuclear Act established the Central Nuclear Financial Fund, which is weakly regulated, being dependent on the yearly budget discussion of Parliament and showing no transparent spending procedures. Since the Russian Parliament in 1993 passed a law banning the taking back of spent nuclear fuel from the former socialist countries, the Hungarian government and Paks NPP have been negotiating about the possibility and cost of depositing spent fuel at Mayak. Hungary is therefore in the situation of having to find a solution for permanent storage of nuclear wastes.

5.5.3.2 Policy formulation and implementation

Regulation patterns in Hungary follow the energy and environmental policy principles formulated in the Energy Policy from 1993 (legislative acts on gas, electricity, nuclear power, and district heating) and in the National Environmental Programme 1997-2000 (adopted in 1997 and based on the Act on Environmental Protection from 1995), which lays down the following principles: sustainable development, the principle of precaution, the principle of prevention, partnership defined as participation and subsidiarity, and stewardship. In July 1999, the Ministry of the Economy published a paper on the *Foundations of Hungarian Energy Policy and the Energy Market Model*, which lays out the strategic orientation of the Government's energy policy and will serve as a basis for a governmental decree on the topic.

Implementation is the weakest part of environmental policy, with reference to both energy and environment issues. The lack of continuing political determination to promote energy efficiency has certainly contributed to its slow and inadequate implementation. Furthermore, there is no body in state administration solely responsible for the co-ordination of energy efficiency measures, and no regional agencies that might supervise local energy efficiency programmes and serve as consulting centres. Communication problems within the state administration are caused by a lack of consistency at the strategic level and problems of integration at the policy-making level. Inter-ministerial committees on energy and environmental issues do not exist; groups being formed where necessary on an ad hoc basis.

5.5.3.3 Policy instrumentation

Instrumentation, as shown in the currently-discussed National Energy Saving and Energy Efficiency Programme, is based on an instrument mix including standards (on building insulation), positive incentives (providing preferential credits and investment support schemes), awareness-raising (through dissemination of information on efficiency, education and training), and economic incentives (least-cost planning, elimination of price subsidies); positive incentives apparently receiving priority. By promoting energy efficiency in transport, agriculture and residential sectors, and by increasing the use of renewable energy sources from presently 3% to 5% by 2010, the basic objective of this programme is to save 7% of current energy consumption by the same year.

Air quality regulation uses command-and-control systems, such as standards and fines for non-compliance with these standards. The Decree 22./1998 (VI.26) of the Ministry of the Environment demands that EU-conform air quality standards be met by all power plants by January 1, 2005. The quality and environmental standards of gasoline have been improved in past years, and meet EU requirements.

Economic instruments are being applied. For instance, there is a product fee levied on gasoline and built into the gasoline price, but since it amounts only to 5%, it does not have the effect of reducing consumption, but rather aims at raising funds for environmental investments, being one of the largest sources of the environmental fund managed by the Ministry of the Environment. The introduction of an environmental emission fee system on air, water, and soil is currently planned by the same ministry, primarily concerning the energy sector, with air emission fees on SO_2, NO_x, CO, particles, and other toxic emissions.

5.5.3.4 Policy style

Policy style in Hungary with reference to energy issues was, in the 1980s, largely shaped in informal co-ordination and bargaining processes between the main actors (Ministry of Industry and MVM, the national electricity utility); integration with other policy areas did not take place. Tools of public policy analysis, such as the evaluation of alternative decisions according to multiple criteria,

were rarely made use of. Although the institutional and political arena has changed or disappeared, some elements of the old system still partly characterize current energy policy-making. Some of these elements relate to the lack of appropriate institutional arrangements, such as the low level of cross-sector integration; others only slowly evolving cultural patterns, such as the role assigned to hearings and other means of public participation (which are treated more as barriers to, and less as constitutive elements of decision-making processes); and others arising in personal relations in the form of informal lobbying and bargaining.

Policy evaluation reveals that Hungarian energy policy has a well-enough designed structure, acknowledged by the country report of the European Commission from 1995, which stated that the strategic orientation of Hungary's energy policy is in harmony with that of the European Union. Furthermore, Hungary is to date the only Central and Eastern European country, that has become a member of the International Energy Agency; which means that it meets the IEA's complex requirements in terms of energy policy, regulation, safety, and environment.

Environmental policy does not seem to be equally-well developed to date, since it shows rather little integration in sectorial policies and a lack of internal consistency. So in spite of the formulation of sustainable development and the principles of precaution and prevention as obligatory objectives, no connection is made with greenhouse gas emission mitigation. Neither does an approved governmental programme exist concerning this issue. It is assumed that Hungary will meet its international obligation, according to the Kyoto Protocol from 1997, to reduce CO_2 emissions by 7% between 2008 and 2012 compared to average emissions for the years 1983-1987, as a result of the economic recession and the related drop in energy consumption, and also due to increased energy efficiency induced by further structural and technological change in the economy.

5.5.3.5 Actor configurations

Actors and institutions in the energy sector are to a certain extent different to those in other Central and Eastern European countries. Since the energy sector has been almost completely privatized, no monopolistic structures have been preserved; which means, that many actors are present in this arena. Currently, MVM (national electricity utility), MOL (national oil and gas company), foreign investors and owners of plants and distribution facilities (French, Germany, Belgian, and Italian) as well as of district heating plants, are participating in the transformation process. Their ownership structures are as follows:

- The state holds 50% plus one share of MVM, the remaining share is held by small domestic investors and domestic and foreign institutional investors. MVM owns the National Grid Company, the Paks Nuclear Plant and the Vértes Power Plant. It has long-term contracts with power plants and is obliged to purchase

electricity from them at prices fixed by the Hungarian Energy Office.

- 50% plus one share of the generating companies were sold to strategic, mostly foreign investors (RWE Energie AG, EnBW AG, Rheinbraun, AES Summit Generation Ltd., Tractabel, Fortum-TOMEN).
- Less than 50% of the shares in the regional gas distribution companies and regional electricity utilities were sold to foreign investors (EDF Internationale, Bayernwerk AG, Isar Amperwerke AG).
- The state holds a 25% blocking minority shareholding in MOL. 30 - 35% of the shares were sold to small domestic investors and to the Bank of New York. Although oil trading is liberalized in Hungary, MOL is by far the biggest oil trader (in Central Europe) and has a monopoly in gas trading.
- The Hungarian district heating sector is presently undergoing great changes. There are several hundred district heating companies throughout the country involved in the privatization process, which, according to the new District Heating Act (1998), is a possible task for municipalities.

The *executive apparatus* contains the Ministry of the Environment, Ministry of the Economy, the Hungarian Energy Office, the Hungarian Atomic Energy Agency and Commission, Regional environmental authorities, and other governmental bodies such as the Energy Centre, and the Energy Information Agency.

According to Decree 22./1998 (VI 26) of the Ministry of the Environment, power plants have to comply with EU air quality standards within the five-year period to January 1, 2005. Environment-related investment costs have to be approved by the Hungarian Energy Office in order to be incorporated in the energy price. The planned environmental emission fee, and its possible effects on energy prices, are another question concerning the Ministries of Environment and Economy.

The Ministry of the Environment has no department dealing with energy issues. It has played no major role in shaping energy efficiency and energy saving policies, which have been totally taken over by the Ministry of the Economy. The Environment Ministry's activity concerns the energy sector through environmental regulation (air, water waste, etc.), which aims to be EU-conform in the coming years.

The Energy Centre is a semi-governmental body with the main task of administering energy efficiency programmes and projects. Since it is a small and politically quite weak organization, it is questionable whether it will be able to influence and mobilise other ministries, such as the Ministries of Transport and Agriculture, in favour of increased attention to energy efficiency.

The Energy Information Agency collects energy data, but not environmental data related to the energy sector. Failing transparency is certainly also due to the decreasing willingness of privatized en-

ergy companies to provide the Agency with their data.

Regional Environmental Authorities are in charge of implementing environmental policy measures. They have a monitoring and sanctioning function, and they collect fines when environmental standards are not met. But their strength and competence is severely limited by insufficient resources, for instance to guarantee regular monitoring.

Local governments can be regarded as weak players in the energy-environment field. They do not have ownership rights over energy utilities, with the exception of some district heating plants and certain shareholdings in the regional gas distribution network; and it seems that they are presently losing control over the pipeline system. So *Stadtwerk*-type local energy utilities do not exist in Hungary, which means that in this area subsidiarity is lacking. The relative weakness of local governments is also due to the fact, that they work in isolation, rather than in useful networks, with the result that they are unable to represent themselves in a well-organized, unified way. Local governments do not appear to enforce their rights to impose stricter environmental quality standards for power plants, or strict requirements for new constructions. They are recipients of a certain amount of energy efficiency support, for instance from the Energy Saving Credit Programme.

Large energy consumers, such as district heating plants, are organised in the *Association of Hungarian Energy Consumers*. Their concerns are closely linked to those of the energy sector, and do not represent real consumer interests. However, business as such should be interested in energy efficiency issues and demand-side management, and might support further deregulation of the energy sector. An important future task for environmental NGOs might be to create coalitions with those business players who are potentially interested in energy efficiency and the spread of renewables.

Particularly remarkable is the great activity of banks in financing energy efficiency programmes, even where no direct benefits were guaranteed. This is to be explained by the sharp competition in the Hungarian banking sector to secure potential clients.

NGOs and other civil organizations are very active in this arena, compared to several other countries in the region, but they are still underdeveloped and weak in comparison to Western countries.

Also concerned with energy issues are several NGOs, such as for example, the Energy Club, the Clean Air Protection Group, the Pécs Green Circle, E-Mission, the Energy and Environment Foundation, the Green Action, Reflex, and Göncöl. Co-operation among environmental NGOs is organized through the *Green Energy Network*, which includes 12 NGOs and is co-ordinated by the Energy Club. They mainly deal with awareness-raising campaigns and demonstration projects in their local areas. Active in lobbying, policy making and legislative work are merely the two organizations located in Budapest, namely the Energy Club and the Clean Air Action Group, the latter having commissioned the publication of the *Green*

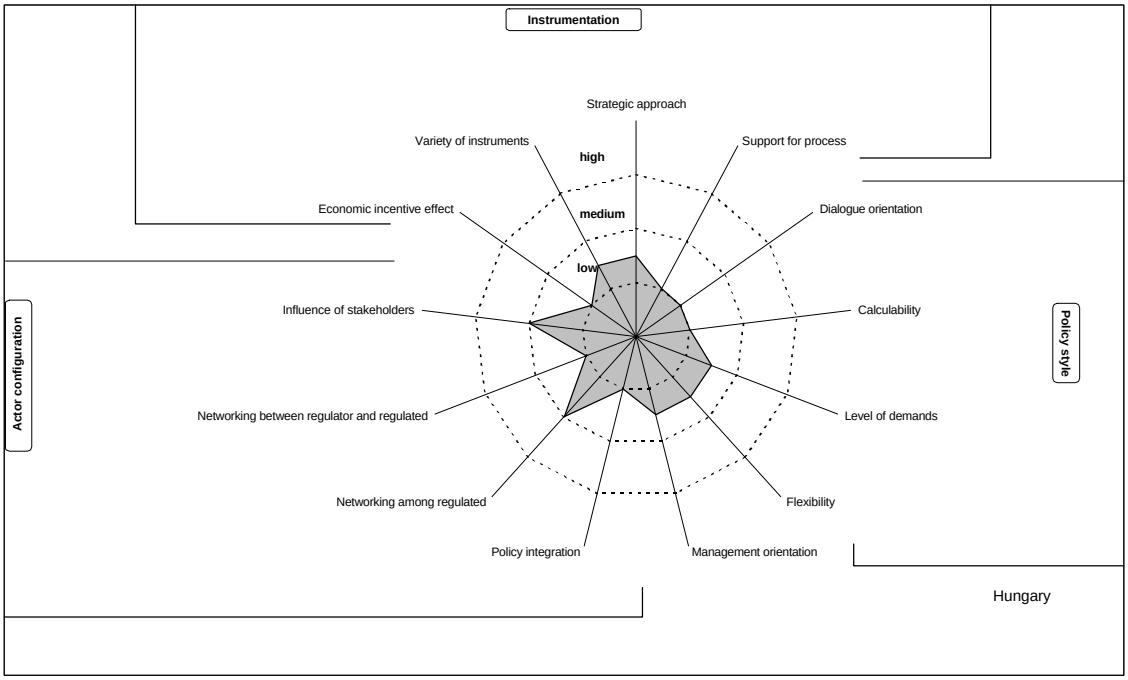
Budget Proposals, which promote a green tax reform with a tax on energy consumption.

Academic organizations, universities, think tanks, and consulting firms have been dealing with energy and environment issues, including the Departments of Environmental Economics and Technology of the Budapest University of Economics and the Technical University of Budapest, as well as the Department of Environmental Sciences and Policy of the Central European University, amongst others. They have prepared papers to back-up the Government's energy efficiency programme, as well as a concept for an emission trading system among power plants.

Coalitions and interaction will definitely be needed, particularly between NGOs and the business sector, focusing on electricity companies and Chambers of Commerce and Industry, in order to promote energy efficiency and demand-side management. Another important ally would be public authorities, since energy efficiency has no effective lobby in the political arena, and the lack of inter-ministerial and inter-sector integration has contributed to the relative weakness of energy efficiency policies. To date, co-operation between public authorities and NGOs has been rather sporadic.

Hungarian policymaking is not dialogue-orientated, and public participation is not adequately institutionalized. Institutions concerned with this issue, such as the National Council of Environmental Protection and the Industrial and Commercial Council of the Ministry of the

Figure 15: Regulation pattern in Hungary



Economy, are very inefficient in practice, so that the energy sector is in many cases more effective in lobbying.

5.5.3.6 Conclusions

From a critical point of view it can be argued that the *strategic orientation* of Hungarian energy and environmental policy could definitely be improved. A well-prepared long-term strategy, built on clear principles, should therefore be developed. *Calculability* is rather low regarding the chances of introducing a green or energy tax. *Policy instrumentation* might have a chance to improve once policy measures such as an emission permits trading system and environmental emission fees, as well as positive incentives, are implemented. *Dialogue orientation* should be intensified, since evidence suggests that communication is difficult even within the state administration, and public participation is not adequately institutionalized. Energy and environmental policies are still centralized, and there are no local agencies to promote energy efficiency projects. To overcome these shortcomings, *subsidiarity* in the field of energy and environment should be increased. *Proactiveness* is to be seen partially, for example in the new National Energy Efficiency Programme, and in considerations referring to introduction of environmental emission fees and a green tax reform.

Capacity-building proposals are not formulated in the policy analysis concerning Hungary. However, as shown in the conclusions to this summary there are widespread possibilities for the support of activities which would promote networking between different interested parties in the energy and environmental policy arenas. Up to now only environmental NGOs have succeeded in establishing a stable and well-functioning network, which allows co-operation throughout the country. There is definitely a need to create networks also between NGOs and business, as well as between public administration and NGOs, and also to strengthen and extend already-existing connections between public administration and the scientific community, in order to create and implement innovation-friendly, dialogue-orientated, calculable and reliable policies in the field of environment and energy.

5.5.4 Poland

5.5.4.1 Legislative and institutional framework

The basic legal framework of the Republic of Poland provides the foundation for the development and implementation of various policies and measures targeting the improvement of the environment:

The *Constitution of the Republic of Poland* from October 1997 refers directly to sustainable development protecting independence, guaranteeing freedoms and rights, and ensuring environmental protection in order to provide ecological security to the present and future generations. It determines the rights and duties of individuals, as well as of public authorities, in order to secure the protection of the environment, human health, and biological diversity.

The *National Environmental Policy* from 1991, presently being revised in order to consider new socio-economic conditions occurring within the EU integration process, is and will in future be the fundamental document concerning all further policies in the area of environmental protection. Various legislative acts concerning environmental issues, such as the *Act on the Protection and Shaping of the Environment* (1980; last amendment 1998), the *Act on Nature Conservation* (1991), the *Act on Spatial Management* (1994), the *Act on the Protection of Agricultural and Forest Land* (1995), the *Act on the Energy Economy* (1997), and the *Act on Environmental Impact Assessment* (1998), are also of crucial importance. The establishment of the *Energy Regulation Authority*, in 1997, created an agency with the most important tasks, namely, the protection of consumer interests against non-justified levels of energy prices, and the integration of energy and environmental policies.

In bilateral and international agreements Poland co-operates with neighbouring countries and on a global level. Most important in the area of climate protection policy are the Geneva Convention on Long-Range Transboundary Air Pollution (1979) with subsequent Protocols, the Vienna Convention for the Protection of the Ozone Layer (1985) with the Montreal Protocol on Substances Depleting the Ozone Layer (1987), and the UN Framework Convention on Climate Change (1992) with Kyoto Protocol (1997).

To date, national total emission reduction targets do not exist in Poland, but with the ongoing legal harmonization process European emission standards for air pollutants will become obligatory for Polish emission reduction policy, when EU directives concerning air quality improvement have been incorporated into Polish legislation and implemented.

One of the major future tasks of climate protection policy will be the enhancement and improvement of the monitoring of air pollutants.

Institutional setting and implementation structure are currently influenced by the spatial, reform that came into force in January 1999 and changed administrative structures in Poland by the re-introduction of counties (powiaty), thus creating a third administrative level. With this reform the competencies and responsibilities of lower levels of public administration (counties and municipalities) have definitely been strengthened.

The re-organization of the *Ministry of Environmental Protection, Natural Resources, and Forestry* in April 1998, involving the consolidation of environmental policy with European integration in the newly-created Department of Ecological Policy and European Integration, stressed the serious intention to achieve the goals necessary for complying with the environmental *acquis communautaire*.

The *Ministry of the Economy* is responsible for energy policy issues. It is in charge of implementing the goals formulated in the Energy Policy Strategy until 2010, which will cause great changes in the structure of energy supply and have a strong impact on employment and social issues. The above-

mentioned *Energy Regulation Authority* sets prices for energy agents, and issues licences for energy-related utilities.

The *Committee for Regional Policy and Sustainable Development of the Council of Ministers* and the *Energy Regulatory Authority President's Consultative Council* are bodies, whose task is the integration of energy and environmental policies.

The *National Fund for Environmental Protection and Water Management*, the *Voivodships' Funds for Environmental Protection and Water Management*, and the *Municipal Funds for Environmental Protection and Water Management*, all play an important role in financing environmental investments and projects through their revenues from environmental charges and non-compliance fines.

5.5.4.2 Policy formulation and implementation

The following strategies and programmes form the basis for present and future environmental policy performance:

- The *Energy Policy Strategy for Poland until 2010*, from 1995, formulates the need to promote combined heat and power production as well the use of renewable energy sources, whose share at the time amounted to 1.5% of total energy supply and is intended to be increased to 6% by 2010.
- The *National Social and Economic Strategy*, from 1995, outlines the directions of the social and economic development of the country, considering the principle of sustainable development as an integral element.
- The *National Strategy for Integration into the EU*, from 1997, formulates in its ecological part the adaptation activity programme aimed at the transposition of the environmental *acquis communautaire* into Polish legislation and its implementation and execution.
- The *Strategy for Sustainable Development of Poland until the Year 2025*, adopted by the Sejm in March 1999, is to be presented to Parliament by the Council of Ministers by the end of June 2000.

In preparation are the *National Strategy on Environmental Education* and the *Country Strategy on Biodiversity*.

In order to execute these strategies several programmes have been drawn up, focussing on particular environmental issues such as the reduction of emissions of sulphur dioxide, increasing forest cover, cleaner production etc. The *National Programme of Preparation for Membership in the European Union*, from 1998, is directed at transforming the priorities recorded in the Accession Partnership, and proposed by the European Commission in its screening reports as tasks of significant importance for integration. A national climate programme is currently under preparation.

5.5.4.3 Policy instrumentation

Policy instrumentation in the field of environmental protection in Poland consists of a combination of instruments. It

contains, in particular, regulatory and economic instruments including economic incentives, while voluntary agreements do not yet exist, but are to be introduced in the next few years.

Polish legislation on air protection and monitoring is included in the *Act on the Protection and Management of the Environment* (1994), presently being revised in order to comply with EU environmental legislation, and in the *Act on the State Inspectorate for Environmental Protection* (1991). The *Act on Energy Economy* (1997) regulates all issues dealing with energy supply and consumption as well as with concessions and price policy.

Economic incentives and taxes also have a regulatory effect on energy consumption and behaviour towards environmental issues. Fees and fines levied on the extraction, transportation and end-use of energy have existed in Poland since 1970, but did not show much effect before the political change in 1989, because, in an economy without market conditions plant managers had little incentive to pay attention to price stimuli. In the last ten years charges for pollution of the environment have been changed several times; some of them, like the charges on sulphur dioxide and nitrogen oxide emissions, are among the highest in the world (both: 0.30 PLZ/kg), compared to very low charges on carbon dioxide and methane (both: 0.00015 PLZ/kg). Currently, the introduction of a surcharge on energy and fuels is being considered, which would be applicable to coal, gasoline, oil and gas.

The Polish charge system, focused on the user-pays and polluter-pays principles, has become generally regarded in the region as a model for the successful implementation of economic instruments for raising earmarked investment funds. The current system of economic instruments is applied to air emissions, water extraction, waste water discharge, solid waste disposal, and cutting trees and bushes. The revenues from charges and non-compliance fees are distributed among environmental funds.

Taxation and tax allowances play a rather minor role in encouraging environmental investments, recycling, and consumption of 'green goods'. The Polish tax system provides a zero VAT rate for a number of products and services related to environmental protection.

Currently in discussion is the introduction of a tax on carbon dioxide.

Tax allowances and exemptions concern, for example, investments in environmental protection and the modernization of farming equipment, renewable energy sources, water supply and sewage collection installations.

Incentives, such as eco-labelling and eco-auditing, are practised, and are compatible with EU law. Presently being considered by Polish environmental officials is the introduction of product charges and tradable permits.

Policy instrumentation still seems to be focussed on legal and economic regulations in order to implement environmental protection targets. Despite the incomplete enforcement of environmental fees and fines, the financial as-

sets, that they generate, permit the efficient operation of funds for environmental protection and water management, which have become the driving force for investment in this area. Currently, there is definitely a growing intention to be seen to use more flexible instruments, such as soft loan credits, preferential credits and grants. Instruments of incentive, such as modifying pricing systems, simplifying charge systems, introducing specific product charges and deposit systems will be expanded in the future. At the present time there are no incentives promoting renewable energy sources, but policy will have to react upon parliament's resolution from July 1999 demanding an increase in renewables to 6% of total energy supply by 2010. Integrated resource planning, as formulated in the energy law from 1997, as well as promoting energy efficiency and encouraging voluntary self-commitments, will be of great importance for future policy instrumentation.

5.5.4.4 Environmental expenditure

Public and private expenditure in the field of environmental protection amounted in 1997 to 8.1% and on water management to 2.0% of the national economy. Major environmental investment is allowed by the rapid increase in revenue from pollution fees and non-compliance fines, which have been earmarked for environmental investment via local, regional, and national environmental funds.

Domestic sources of environmental finance provide the greatest amount of investment in this sector; the share of enterprises being 27%, followed by the National Environmental Fund with 26%, Voivodship Environmental Funds 20%, municipal budgets 12%, Municipal Environmental Funds 6%, and the state budget 5%. International aid amounts to only 4% of the total, generally financing medium-term environmental policy goals in the area of cleaner production, energy conservation, air protection, environmental monitoring, training and environmental education.

Activities implemented jointly according to the Kyoto Protocol from 1997 are presently being started. To date Poland has signed a joint implementation agreement with the Netherlands, others being expected to follow soon.

5.5.4.5 Policy Style

According to the national programmes and strategy guidelines for preparation of membership in the EU, a co-operative policy style is explicitly intended in Polish environmental policy. Despite the formulated intentions to co-operate with different interested parties, such as research institutions, business representatives, local authorities, and environmental NGOs, a more command-and-control type of policy style still seems to prevail, at least on the state level. In contrast, a *dialogue- and consensus-orientated approach* is presently rather rare, but is practised in single cases, as for instance in consultations between nature conservation authorities and inhabitants and NGOs in the Bialowieza region concerning national park issues of the *Green Lungs of Poland*, or in talks

between government officials and business managers from various enterprises. Although an increasing number of documents are being consulted, there are still no systematic and clear procedures for consultation on issues of proposed legislation, governmental programmes and plans.

Conflicts between energy policy and environmental and nature protection do not yet seem to play a dominant role, the energy sector still being characterized by a 'hard-coal mono-culture', with further investments and subsidies, and coal miners and their trade unions having great influence. As implementation of short- and medium-term goals has mainly focussed on the improvement of existing coal-based infrastructure, introducing best available technology, policy has been seen to be rather non-conflict-orientated in this area, which is certainly also due to expected negative social impacts, such as high unemployment rates in some regions of the country.

In the area of nature conservation the policy style is evidently decisive, proactive, and ambitious, whereas in the energy sector it seems to be rather reactive, insofar as there is more confidence in technological innovations and end-of-pipe solutions than in an integrated policy strategy.

5.5.4.6 Actor configurations

Due to administrative reform, enforced since the beginning of 1999, and the reintroduction of counties as a third administrative level, *intra-sectorial co-operation* will have to be established or re-established, and the actors concerned will have to build new or extended networks. Capacities and responsibilities at the lower levels of public administration have definitely been strengthened by the reform, which might promote the subsidiarity principle. With the efforts to achieve membership in the EU in the shortest possible time, intra-sectorial co-operation and networking at different levels – EU, national, regional, and local – are increasing. However, it is already obvious, that especially at voivodship level an increasing number of inter-regional contacts and co-operation exist, also with regard to environmental issues such as, for example, water management in the Odra River basin. Another already well-functioning example is the Polish *Energy Cities* network, which by now has gathered together 30 municipalities, and is being extended further.

In Poland's EU accession strategy *inter-sectorial co-operation* is explicitly demanded from all bodies concerned. Ministries, ecological funds, environmental protection inspectorates, national parks and state forests are all required to create cross-sector information systems and to popularize data on the environment.

Integration of environmental issues in other sector policies is in most cases insufficient at the present time; such as in the field of energy, for example, which has a great influence on the state of the environment but is still strongly dominated by the use of coal for energy supply. This might improve with implementation of the *Energy Policy Strategy for Poland until 2010*, from 1995, which will promote combined heat and power production as well as renewable energy

sources, and also enhance natural gas use and energy efficiency efforts.

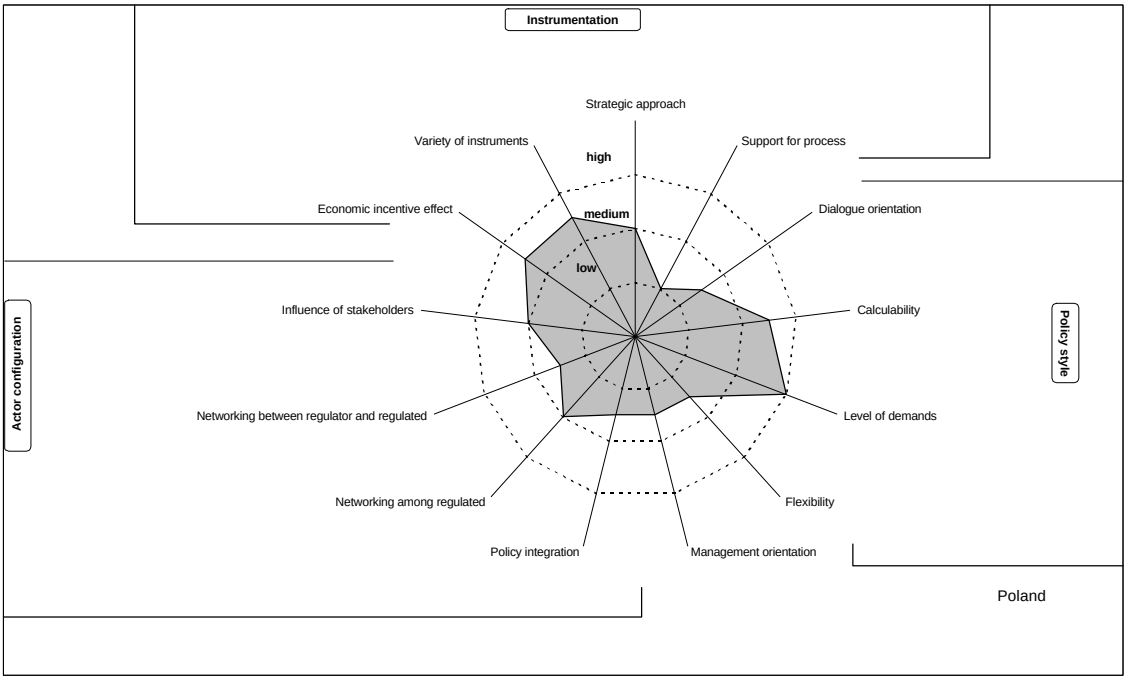
Transportation policy presently shows insufficient integration of environmental issues; it still appears to support mass motorization instead of public transportation and combined transportation. But with the recent *Transport and Environment* meeting of officials from the Ministries of Environment and Transport, representatives of the Sejm and the Senate, as well as NGO members, first intersectorial contacts seem to have been established.

Integration of environmental protection goals into different policy areas, such as transport, industry and agriculture, will definitely be improved by the work of the newly-established Committee for Regional Policy and Sustainable Development of the Council of Ministers.

Participation of domestic ministerial and non-ministerial research and development institutions, and consultations with industry in particular sectors have in part already been achieved. Discussions on the selection of optimal activity variants, including social partners such as trade unions, local governments and NGOs, eventually take place. In general, intersectorial consultations currently seem to be on the increase; but it is obvious that further capacity building at various stages and in different groups of society will be of crucial importance for future work.

Co-operation between regulators and regulated parties is currently increasing, as the influence of NGOs on decision-makers is gradually growing now that

Figure 16: Regulation pattern in Poland



their institutional capacity is being improved, but a generally functioning network is still lacking.

Co-operation among regulated parties is still sporadic, but might be enhanced in the future, for example by the newly-founded Environmental Lobbying Support Office in Warsaw.

5.5.4.7 Conclusions

Poland stands out as the most successful of Central and Eastern Europe countries in terms of environmental policy. An effective de-coupling has been accomplished between economic growth and some of the air pollution parameters, such as sulphur dioxide and particulates, while parameters like nitrogen oxide and nitrogen dioxide are still on the increase, due to an energy policy relying mainly on coal reserves for energy supply, and also to a transport policy that leads to expansion of road traffic.

Capacity-building activities directed at non-governmental groups and the staff of small enterprises are needed – and will be highly appreciated – in order to encourage small-scale projects concerning energy efficiency and energy saving as well as the raising of environmental awareness.

In particular, well-functioning networks comprising strategic actors from social groups and responsible managers and employers representing small and medium-sized firms, both groups belonging to those interested parties who are among the driving forces for innovation and modernization in the field of environmental protection, will be of crucial importance in the political arena in Poland.

Networks of small and medium-sized enterprises active in the environmental protection sector, such as the German organisation B.A.U.M. (Bundesarbeitskreis umweltbewusstes Management), which participates actively in the promotion of solar energy through the *Solar – na klar* campaign, could certainly be helpful in achieving sustainable progress in Poland.

5.5.5 Slovenia

5.5.5.1 Institutional framework and policy arenas

In 1991, the *electricity sector* was reorganized into a decentralised structure with separate production, transmission and distribution entities.[13] However, the power sector remained under the direct supervision of the Ministry of Energy (now the Ministry of Economic Affairs). The state is the owner of almost all assets in the electric power sector, with the exception of a small share of the distribution companies that is owned by employees. The attempts of the electricity industry to establish a single-head, unified representation of the interests of the electricity sub-sector through the creation of a national electricity holding company failed. The *distribution companies*, in particular, have preferred to

[13] This summary is based on the respective country-study, which has been prepared by Prof. Dr. Miha Tomsic, *Jozef Stefan Institute*, Energy Efficiency Centre, and Andrej Klemenc, Slovenian Energy Forum, Ljubliana.

enjoy relative autonomy and to pursue their own business interests. The new organizational structure, and a ban on sales of domestic coal to individual consumers, have however strengthened ties between the coal mining industry and electricity generation companies.

The electricity sector has not yet been fully privatized, remaining under the complex and rigid administrative regime, whose prime political goals have been an anti-inflationary monetary policy and a regional employment policy. Policy-making is not only influenced by different ministries (Ministry of Economic Affairs, Ministry of Economic Relations and Development, Ministry of Environmental and Physical Planning, Ministry of Finance) and the complexity of their mutual adjustment, but also by bargaining by the political parties and particular interest groups. Nevertheless, the process of restructuring and commercializing the electricity industry has progressively gained momentum.

The emergence of an *energy efficiency policy arena* can be characterized as the most important change within the energy policy community during the nineties. Although activities related to energy efficiency have a longer tradition, the first governmental strategy and related measures were launched at the beginning of the 1990s. The former *Ministry of Energy* supported the foundation of the private *Agency of Energy Restructuring*, which has worked out the first institutional programmes of support in the field of energy efficiency and renewable energy sources.

Since 1995 the central role in the field of energy efficiency has been taken over by the *Agency of Energy Efficiency* (AURE), which is also the main co-ordinator of specific programmes and activities with the EU. A number of consultant companies have emerged since 1992. The *Centre of Energy Efficiency of the Institute Jozef Stefan* (IJS-CEU) first focused on an assessment of energy efficiency potentials in the country, as well as on energy efficiency technologies and industry approaches. However, together with domestic and foreign partners it has carried out a number of general studies on efficient energy planning and policy at the national level. Recently, it has also been involved in supporting the energy efficiency policies of municipalities.

At the beginning of the 1990s the *Civil Engineering Institute* started to set up the national network of energy advisers, EN-SVET, in co-operation with Austrian partners, and it carries out major consulting as well as pilot and demonstration projects in the field of energy efficiency in the building sector. Both institutions are members of the OPET network, and have shown increasing interest in the field of renewable energy sources. Nevertheless, a dozen private consulting and engineering companies have started to deal with municipal energy planning and consulting activities for industry and the public sector since 1994. Because the majority of industries has been privatized and is now faced with competition, the market for energy efficiency in companies is growing. This will also include electricity (co-generation), due to the favourable provi-

sions of the new Energy Law. Parallel to industry's increased interest in reducing (energy) costs and improving (energy) services, there are substantial capacities in consulting, engineering and international networking in this area, as well as a well-tuned, undisputed central state agency. Less promising is the situation in the *public sector* and in *households*, where an adequate pattern of addressing and involving target groups, a corresponding institutional framework, financial engineering knowledge and practical experience are all lacking.

In contrast to the energy efficiency arena, the field of renewable energy sources still lacks a core state institution. While the provisions of the new Energy Law suggest that *AURE* will also be in-charge of supporting renewable energy, the Agency of Energy Restructuring, which since 1993 has the status of a para-state agency, has the largest experience, capacities and references in this area. However, this status is now being challenged not only by AURE, but also by some private consulting and engineering companies, which have specialized in wood-biomass-based district heating projects and/or municipal energy concepts/planning.

The role of *municipalities* is important both for energy efficiency and, especially, renewable energy policies. However, the municipalities lack the tradition and capacities to deal with (renewable) energy and, in most cases, even the political will. Despite the endeavours of consulting companies, engineering companies and NGOs in this field, neither energy efficiency nor renewable energy are considered an issue by most municipalities, with few exceptions. One reason for this is, that renewable energy and energy efficiency are not elements of environmental protection and regional development policies of the state. This, and the fact that there are not yet perceptible and centralized state functions, might be the most important reason why co-operation within EU programmes, and EU involvement in general, have so far been considerably below the country's potential in the field.

Favourable purchase (feed-in) tariffs for electricity from small-hydro power plants, which are the result of a *gentleman's agreement* between the *Ministry of Economic Affairs* and the owners and operators of such micro-plants, have led to increasing conflicts between the *Ministry of the Environment* and small hydro producers, due to the weak environmental protection, monitoring and enforcement capacities of the state. This might also explain the conservative approach of the Ministry of the Environment in relation to renewable energy in general. Recently, the national *Environmental Development Fund* started to offer soft loans for advanced wood-based heat conversion technologies within its *fuel-switching programme*. However, despite a parallel subsidy scheme for renewable energy sources, provided by the Ministry of Economic Affairs, these combined measures are not sufficient to stimulate a snowball dynamic in the field of renewable fuels.

5.5.5.2 Policy instrumentation

The most important conceptual and institutional innovations were introduced

by the *Law on Environment* and the *Law on Public Trading Services*, both designed at the beginning of the nineties. The Law on Public Trading Services (1993) provided the concept and legal arrangement of concessions. The *Environmental Protection Act* (1993) provided the legal basis for the introduction of *economic instruments* such as pollution charges, fees and taxes, and the establishment of the national *Environmental Development Fund*. Besides this, the law set up a legal framework for so-called *environmental reserves* in the privatization process, that is, for capital assets, that have to be set aside and earmarked for the improvement of a company's environmental performance and/or remediation of environmental damage within the process of privatization.

Since 1995 the Environmental Development Fund has issued soft loans for fuel switching to environment-friendly fuels for industry and households, as well as for environmental improvements related to municipal infrastructure (e.g. district-heating). The *fuel-switching programme* is one of the most important instruments supporting the penetration of natural – and to a lesser extent also liquefied – gas. However, it is inadequate as a support instrument for renewable energy.

In 1997, the Ministry of the Environment introduced a *CO_2 tax*, which was fine-tuned and substantially increased one year later from a level of 5.5 Euro/t CO_2 to 16.1 Euro/t CO_2. The tax currently contributes approximately 2 % of state budget revenues. It has, however, the character of general budget revenue, and is not earmarked for energy efficiency, renewable energy sources and climate protection measures. Another drawback is that the tax is not part of a systematic greenhouse gas reduction strategy and concept, but rather an isolated measure. The tax burden is effectively reduced by various exemptions and allowances. The Ministry of the Environment has also issued/renewed a set of emission standards for SO_2, NO_x, dust and particles for large combustion plants, heating plants and industrial combustion plants, however not for small boilers and heating devices.

In 1991, the Ministry of Energy for the first time issued soft loans for energy efficiency and renewable energy sources, as well as grants for energy efficiency promotion and demonstration activities carried out by private companies or NGOs. After 1992 loans for energy efficiency and renewable energy sources were changed into grants and subsides for project preparation, pilot and demonstration activities, issued annually by public tender organized by the Ministry of Economic Affairs. Since 1994 the Ministry of the Environment co-finances a network of energy advisors for households. Since 1995 this programme, together with the programme for the promotion of energy efficiency and renewable energy sources, is operated by AURE. Since 1996 this agency co-finances energy audits in industry and the public sector, as well as municipal energy concepts. In late 1998, the *Energy Efficiency Fund* was established. It is designed as a revolving fund aimed at providing soft loans at first for energy

efficiency in industry. Energy efficiency labelling is currently under preparation.

The recently adopted *Energy Law*, which transposes major requirements of the EU Electricity Directive, includes the criterion of sustainable development. Integrated resource planning has been identified as the approach to be used to develop the National Energy Programme. Local governments are expected to prepare municipal energy concepts. The introduction of *green electricity* certification and quotas for resellers is to be handled in a similar manner. The law includes provisions on the privatization of generation and distribution companies.

Generally speaking, a broad set of new, mostly soft instruments was set up during the 1990s. However, the assessment of policy instrumentation, that is, the 'orchestration' of policy instruments for different target groups, is a rather difficult task and remains an open issue. Certain support instruments (such as counselling, information, education and an awareness-raising campaign) are financially weak, and they lack regularity and continuity. From 1992 until recently, energy policies were subject to monetary and social policies focused on keeping inflation low, while maintaining employment in traditional industries. The *strategic orientation* of policy instruments must be considered as comparatively low. Only in the last stage of the parliamentary process have air and climate protection policies been included in the recently-adopted National Environmental Action Plan. These issues, however, are not stressed in the same manner as water protection, waste management among others.

5.5.5.3 Policy style

The Slovenian country-study convincingly demonstrates different policy styles characteristic of the main actors, (Ministry of Economic Affairs and the Ministry of the Environment), which however, were subject to changes during the transition period.

The *traditional* (socialist) type of policy-making was predominantly based on the production of expert legitimization of decisions made within an internal circle of the dominant domestic supply-side actors (energy industry, expert institutions, suppliers of technology and equipment, engineering, civil and financial engineering companies). Not expert legitimization as such, but its single-discipline approach based on 'objective truth', neither explaining presumptions nor dealing with options, risks and uncertainties, had been publicly questioned since the early 1980s, However it remained an inevitable part of all decision-making processes concerning large investment in the energy sector during the 1990s.

After a short period of pro-active, open and innovative energy policy-making between 1990 and 1992, a restoration of traditional policy styles in the electricity, mining and nuclear sub-sectors could be observed. The main characteristics of policy-making were sectorial status-quo policies, non-transparency of policy formulation and participation, clientele policies, exclusive participation limited to the interests of the electricity supply

sector and a lack of conceptual baselines. Expert knowledge has not been used as a tool for seeking consensus between different paradigms or to improve learning capacities, but as an instrument to legitimize secret decisions made before the formal policy process started. During the 1990s non-decision-making became a 'modus operandi' of energy policy. Up to 1998 the Ministry of Economic Affairs focused on energy policy as a matter of constructing new energy supply capacities corresponding to narrow, sector-defined criteria of the national interest: security of supply and use of domestic resources.

Only recently has a 'marked change' in the pro-activeness of energy policy-making and in policy style in general emerged. This change has been provoked by two factors: a reproach by the EU Commission, which criticized the slow pace of structural reforms in the energy sector on the one hand, and personnel changes in key positions within the Ministry of Economic Affairs on the other hand. The initial drafting process for the new energy law clearly showed, however, that the protection of domestic energy producers from market opening has remained the leading rationale of the ministry. Actors, who did not represent the interests of national monopolies, were not consulted during the initial drafting procedure, and neither did they have any direct access to information.

Only after important personnel changes at the top administrative level, did the mode of policy-making substantially change in favour of a pro-active, transparent and consensus-seeking policy style, based on clear policy guidelines and transparent agenda and procedures. Not maximum protection of the domestic energy industry, but rather the competitiveness of Slovenian industry and decreasing energy costs gained top priority on the policy agenda. This resulted in the re-drafting of the Energy Law in favour of more competition and market opening. The process of re-drafting has been described as an open process favouring the interaction of all interested parties, including those whose interests are marginal or not yet aggregated. This type of interaction was more consultative than formal. It is difficult, however, to judge the stability of this comparatively innovative, consensual, dialogue- and knowledge-orientated policy style.

The policy style of the *Ministry of Environmental and Physical Planning* has been characterized as expert-based, formalistic, inclusive and orientated towards the employment of new policy instruments and tools. The ministry seems to be open to new actors and approaches in ad hoc and single-issue arenas, whereas in arenas of strategic policy time and/or procedural advantages tend to be given to those actors whose interests are already aggregated. The policy-making style of the Ministry of Environmental and Physical Planning, within the process of drafting the National Environmental Action Plan, has been criticized as slow, pragmatic, lacking transparency and allowing only formal participation.

The *Environmental Protection Council* of the National Assembly and GLOBE Slovenia, which is a cross-party network of Members of Parliament devoted to the environment and open to civil soci-

ety, play an important role in the mediation of interest and as participative institutions.

5.5.5.4 Actor configurations

The lack of transparent structures and clear division of roles, responsibilities and procedures, has characterized the energy policy arena in the nineties. While traditionally-strong, supply-side actors have influenced agenda-setting and maintained direct access to the Ministry of Economic Affairs and other policy makers, they have been less successful in adjusting their collective action to a new, decentralized structure of energy policy-making within the government. In particular, they have not been able to adjust their collective identity and patterns of aggregated interest to the situation in which – due to structural changes in politics and the economy – the increase in supply-side capacities has lost its logic.

On the other side, the new proponents of demand-side approaches and renewable energy deal similarly with the problems of collective identity and aggregation of interest. A lack of economic knowledge and communicative skills, as well as an image of the global institutional set-up (like green budget reform, for example) which would open up the perspective of positive-sum game for energy servicing companies, are the barriers that prevent those actors from acting politically. The new actors in the field of energy efficiency and renewable energy try to influence, directly or indirectly, decisions in the energy policy arena, their action being predominately individualistic, that is, aimed at getting support for their individual interests from one or the other state policy manager or gatekeeper.

Only the NGOs, endowed with expert knowledge in energy matters and a mixture of professional, environmental think-tanks and non-profit organizations, publicly demanded new, more transparent procedures for the benefit of public participation. After the green parties lost party-political significance, energy issues would otherwise have been generally absent from the political and public agenda. In contrast to the 1980s, in the 1990s energy policy matters lost their general importance for the media and politicians.

Although the Ministry of the Environment announced a new, more active role in energy policy, particularly when developing the Environmental Protection Act (1993) and the Environmental Development Fund (1994), its function remained limited to the traditional role of the (environmental) gatekeeper, despite its active role in designing the CO_2 tax. The potentials of policy instrumentation provided by the Environmental Protection Act have been used, but this has not, however, influenced the role and policy style of the ministry.

The role of the Ministry of Finance (MoF) has remained limited to gatekeeping, with particular emphasis on using command-and-control tools for keeping inflation down. Because of the clear positive impact on budget revenues, the MoF proved flexible in approving the CO_2 tax. Regarding the barriers for third-party financing of energy

efficiency projects in the public sector, the ministry has not yet been able to put this issue on the agenda. This passive, gate-keeping attitude is also characteristic of the *Ministry of Economic Relations and Development* (MERD), where a supportive role in the energy field can be discovered only in the construction of large hydro power plants, which also enjoy the support of the political party SLS.

The *Ministry of Economic Affairs*, being in charge of the energy sector, has played the role both of promoter and process manager in most decision-making processes related to energy policy documents and larger state-supported investments. However, it played its role of a promoter usually on behalf of certain electricity generating and/or coal-mining companies. Thus, its policy-managing capacities within the governmental policy-making process have been undermined. Within the process of formulating the new Energy Law, the Ministry of Economic Affairs has clearly signalled, that it is no longer willing to play the role of promoter and policy manager of single options, and that priority will be given to the management of the legislative process and to procedural rationality.

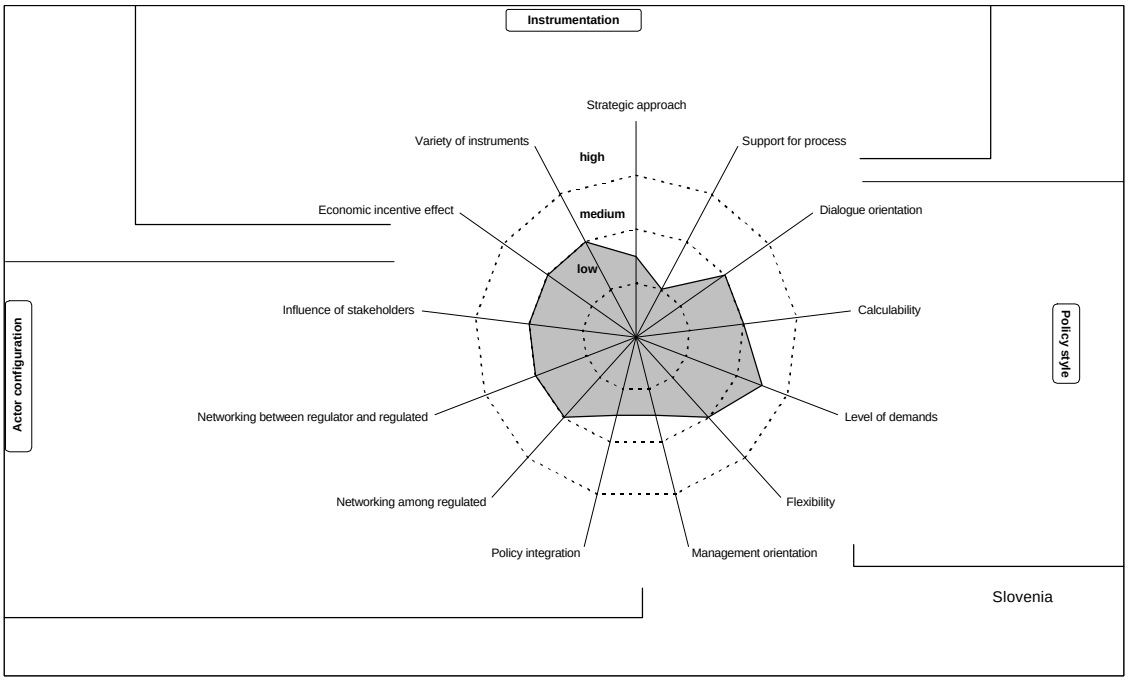
Due to its expert knowledge and well-established networks with policy makers, politicians and media, the national electricity company ELES can be regarded as the most important single domestic non-administrative actor in the energy policy arena.

In the period 1990-1992, when a representative of the Green Party was Minister of Energy, substantial efforts were made towards the *integration* of environmental considerations into energy policy. This included innovative procedural and institutional approaches, for example the co-operation programme with NGOs, or the establishment of the *Energy Advisory Council* as a consultative body, or the establishment of the Agency for Energy Restructuring. Energy policy was orientated towards consistent energy price adjustments and the abolition of state subsidies for coal mining. The ministry also actively supported energy efficiency, a strategic field of policy integration.

An important institution for policy integration is the *Environmental Development Fund* (EDF), which has a fuel switch programme. A promising institutional approach is the *Slovene Committee for Climate Change Issues*, established in 1997, which includes top-level representatives from different ministries, industry, the scientific community and NGOs. We have no information on the real performance of this organization. Systematic policy integration, however, is lacking. Intra-and cross-sector policy integration is further weakened by the comparatively *fragmented* decision-making structure and dispersion of responsibilities.

There are several representative bodies and professional associations, such as the *Association of Owners and Operators of Small Hydro Plants*, the *Slovene Solar Association*, the *Slovene Biomass Association*, and the *Association of District Heating and Cooling*. Several positive examples of networking initiatives can be found both among the dif-

Figure 17: Regulation pattern in Slovenia



ferent interested parties and between the regulating authorities and regulated interested parties. We have already mentioned the innovative, nation-wide energy advisory network for households *EN-SVET*. The association of owners and operators of small-scale hydro power plants, COGEN Slovenia, and the energy-efficiency-based Energy Forum are organized and linked to GLOBE Slovenia in order to improve conditions for independent power producers.

AURE and IJS CEU perform very important networking and co-ordination functions as focal or crystallization points in the sphere of energy efficiency, disposing of well-established contacts to the relevant professional communities, and having excellent access to policy-makers. The *Chamber of Industry* remains a vehicle for aggregating supply-side interests, and serves to a lesser extent as an intermediary body for industrial autoproducers. The traditional energy supply companies have not yet joined the energy efficiency and renewable energy networks.

5.5.5.5 Conclusions

The institutional structure in the field of energy efficiency seems to be comparatively fragmented. Responsibilities and capacities in this area are dispersed among various actors. In particular, there seems to be a lack of clear institutional responsibility for the support of renewable energy. There is also a lack of continuing support and training for *municipalities* in the field of energy efficiency and renewable energy. According to the new Energy Law, local governments are expected to prepare *municipal energy concepts*. Systematic training of local decision-makers should actively

support the implementation of this important target. Instrumentation might be further diversified. In particular, existing legal and other barriers to *third-party financing* and energy service companies should be removed. Despite some promising approaches to networking and coalition-building, there is a general weakness on the part of relevant interested parties in creating lobbying capacities and establishing stable actor coalitions.

5.6 Synopsis and conclusions

One of the objectives of the policy analysis was to explore country-specific regulation patterns in the five applicant countries. The rationale has been to analyse the performance of environmental policy in the energy sector, and to assess the extent to which the policy framework in each country includes elements that facilitate environmental innovation. By no means has the intention been to curtail the importance of the economic performance of a country as a leading, perhaps the most influential explanatory variable. The intention has rather been to focus on the environmental policy-making system itself, and to identify strengths and weaknesses in the policy framework.

Even if the methodology applied might be improved in terms of quantitative research, the qualitative comparison of country-specific policy frameworks leads to the following conclusions:

The synopsis reveals common characteristics in the field of policy styles. Major weaknesses in all countries are, for instance, a rather low level of dialogue and consensus orientation, and a predominance of command-and-control in decision-making. Regarding actor configurations in the field of environment and energy, the analysis illustrates that both intra- and cross-sector policy integration are rather poor and not effectively practised.

Further shortcomings are underdeveloped networking activities, both among regulated stakeholders and between regulators and regulated stakeholders. Several countries have established functioning and innovative networks of energy efficiency institutions at the central and regional/local state level. These networks, however, require stabilization and extension.

There are clear differences between the countries in terms of policy instrumentation. Several countries, such as Poland and to a lesser extent the Czech Republic and Slovenia, have endorsed a relatively diversified policy mix. The strategic orientation of the policy tools, however, is mostly lacking. Innovative strategic concepts, such as National Environmental Action Plans, have been adopted in most countries only recently. It is too early, yet, to judge their effectiveness and performance. Appropriate implementation mechanisms and instruments are underdeveloped in most of the countries analysed. The same applies for monitoring and evaluation provisions. In Poland, in particular, the incentive effect of economic instruments is at a high level. The Polish pollution charge system has become generally regarded as a model in the region for the successful implementation of economic instruments for raising earmarked investment funds.

In order to overcome the specific difficulties of the applicant countries on their way to EU membership, we strongly recommend that their efforts be supported and strengthened by effective capacity-building. Based on the positive experience gained by bilateral projects, such as, for example, EU PHARE Twinning projects, we would like to stress the benefits of supporting activities managed directly between Member States and Accession Countries. The possibilities to influence policy styles in a country are very limited, because these can be changed only in the long term.

An area offering favourable conditions for assistance, and of strategic importance to the applicant countries, is, in our opinion, the transformation of actor constellations by *developing capacities through networking*. This refers to networking activities between state actors and affected interest groups, as well as networking in the informal sector encompassing pro-active members of civil society, including scientists and engineers from the techno-economic community. The municipal level, in particular, has been quite neglected so far. Existing initiatives (in Slovenia, Poland and the Czech Republic) and coalitions might serve as multiplicators for creating stable innovation networks.

In addition we suggest the development and extension of cognitive-informational capabilities by enforcing networking and co-operation in the field of education and awareness-raising. Support for grass-root initiatives concerned with energy saving and renewable energy sources, which might disseminate individual experience regionally or even country-wide, could initiate innovative networks.

By favouring the networking approach we plead for the development of possibilities for capacity-building.

6 Existing co-operation

Further co-operation in the field of environment and energy between the European Union and the Accession Countries might facilitate the accession process for the latter. But before intensifying co-operation it might be helpful to assess experiences made in ongoing projects, or in co-operation projects that have already been completed. The main objective of this section is to evaluate existing bilateral and multilateral co-operation in the field of environment and energy, and to draw conclusions for future co-operation projects from this analysis.

The approach to this task encompasses the following four steps:

- screening of existing co-operation projects;
- selection of the most important projects according to the criteria given below;
- detailed description and evaluation of selected best practice projects;
- preparation of common patterns and general conclusions for future co-operation projects.

Steps one to three were carried out by the co-operation partners in the Accession Countries, as they had access to project and programme information, which was mostly available only in the domestic language. Step four of this approach is dealt with below.

The aim of the screening of bilateral and multilateral co-operation projects was to obtain an appropriate basis for the selection of best practice projects. The best practice projects that have been evaluated in detail were selected according to the following criteria:

- Broad impact: The project should have a substantial impact either with regard to the national environment or with regard to national developments initiated through an admittedly small project.
- Replicability: The project should be not be one-off, but replicable at a national or international level (for example, applicable in other Accession Countries).
- Innovation: The project should be innovative in the sense that it has never been seen before, or that the way it has been carried out is new and different to former projects.
- Building internal capacities: The project should reduce dependence on foreign aid and contribute to the generation of domestic capacity in the field of environment and energy.

The co-operation projects selected by each domestic partner, according to these criteria, as national best practice projects are detailed below. After a short description of these projects[14] common patterns and conclusions for future co-operation projects are provided.

[14] The individual contributions of each co-operation partner (screening tables, selection of best practice projects, project description and evaluation) are documented in the country profiles.

6.1 Czech Republic

6.1.1 PHARE Energy Saving Fund

In March 1997, an Energy Saving Fund was launched with PHARE funds to support small and medium-sized enterprises which introduce energy efficient technology, thus aiming to stimulate business opportunities in the energy saving sector that will decrease energy consumption in the long term. Soft loans are available for bankable energy efficiency projects - debt service is expected to be reimbursed by cost savings.

The fund is revolving. Initial payments have been disbursed. Repayments of awarded credits are recapitalized, and allow further financing (sufficient only for several projects a year). The scheme has proven to be successful, though no further payments are expected. The scheme has been useful in enabling all actors to learn about the development, financing and benefits of energy efficiency project. With the current level of interest rates the bank might finance some energy efficiency projects commercially.

6.1.2 MUFIS Programme/Fund (financing of municipal infrastructure)

A subsidiary of the Czech-Moravian Guarantee & Development Bank manages the MUFIS fund. The fund represents a kind of loan amounting to USD 100 million within the period 1994 - 1998 from private US financial sources, with state guarantees from the US and Czech governments. Loans with long-term repayment periods can be granted by the fund through commercial banks under beneficial conditions to municipalities for the development of municipal infrastructure. Loans ranging from CZK 3 to 100 million can be granted to municipalities or municipal utilities, at an interest rate of 12% and with repayment within 7 to 15 years, in cases where the supply of households represents more than 50 % of project costs.

6.1.3 Energy efficiency centres

Since the beginning of the nineties several energy efficiency centres have been established in the Czech Republic. These centres (for example, SEVEn) were established on the basis of concrete projects to be performed with financial support over a limited period. Through these pilot projects National experts are enabled to become familiarized with aspects of conducting energy projects in an effective way. Foreign partners do not manage these energy efficiency centres, but only advise them on how to conduct projects, how to obtain information, and how to manage business related to energy efficiency enterprises.

Financial support of limited duration, and an approach based on independence in decision making, in contrast to flat subsidy and direct foreign management, appeared to be the main reason for the success of many of these centres. The main goal of established national centres in the initial period is to obtain experience from the pilot project in order to continue to manage the energy efficiency activity after financial support comes to an end.

6.1.4 Project development

As experience with energy efficiency projects in the Czech Republic grows, it seems to be very beneficial to share these experiences. There is still lack of the awareness and information that help to develop energy projects. Awareness has been raised through inter-active workshops for municipalities, which were aimed at the responsible authorities in particular towns, providing them with information about energy project development and the financial background, and helping them to identify appropriate financial sources.

Other tools that help to enhance interest in energy projects are financial manuals, that help to manage energy projects. It seems very useful to provide information on available financial sources in lists, with explanation of conditions of access to these sources. Explanation of the principles of implementing energy efficiency help to create an environment, where responsible authorities and energy entrepreneurs are informed and enabled to utilize know-how and information for energy efficiency project implementation both in the governmental and private sector.

6.2 Estonia

6.2.1 Procurement of ambient air quality monitoring equipment

Air quality in Estonia is not uniform. There is a big difference between the air pollution level in the North East of Estonia, where the large thermal power stations, that run on oil shale, are situated, and in the rest of the country. About three-quarters of air pollution in Estonia has its origin in the North East. Thus, it is important to have good automatic devices for air monitoring, in order to determine the real environmental situation in the problem regions in Estonia. But most of the monitors currently in use are more than 16 years old and in a bad condition. The data collection system used is ineffective and does not allow automatic generation of reports in the required EU format. There therefore exists an urgent need for investment to keep the existing air quality monitoring system in operation, to increase the number of sites monitored, and to extend the list of measured pollutants to comply with EU directives.

The main aim of the project, within the PHARE donor programme, is the provision and delivery of equipment, material and software for monitoring ambient air quality in Estonia, together with arranging operational training. As a result of this project it is possible:

- To obtain and set up an independently-operated, completely-integrated set of equipment, accessories, hardware and software to provide air quality data associated with meteorological data in an acceptable form and quality.
- To be able to produce suitable public reports on the results of air-quality measurements, especially in the case where limit values and thresholds are exceeded.
- To be able to send information on monitoring results in the required format to relevant European Union

systems responsible for data collection.

- To fulfil the requirements of the EU Framework Directive on Air Quality, according to which the measurement of air quality must be carried out in an agglomeration in excess of 250,000.

6.2.2 Capacity 21 in Estonia

The overall strategy of the project is focused on strengthening Estonia's capacity to enter the 21st century, characterized by sustainable economic development, the solution of social problems and the proper use of natural resources. This capacity will be achieved through the integration of principles of sustainable development into state, sectorial and local strategies, as well as into master plans. This improves communication and co-ordination between key persons and institutions within the development process, and promotes the broad participation of different social groups in creating the Estonian Agenda 21 as a national development strategy.

The objectives of the project, that was financed by the United Nations Development Programme, are as follows:

- To develop the Estonian Agenda 21 as the Estonian national long-term sustainable human development strategy for the 21st century.
- To promote local community planning and Local Agenda 21 development processes.
- To enhance environmental and sustainable human development awareness, ensuring that sustainable development principles will be commonly understood through mutually-analysed knowledge and experiences.

The following output was generated through the project:

- Composing, publishing and distributing the second edition of the Local Agenda 21 Guidebook.
- Creating a WEB site in the Internet, based on the current Estonian Sustainable Development Database (www.agenda21.ee).
- Establishing online information dissemination through an email discussion forum in the Internet.

6.2.3 National Environmental Action Programme

The methodology of the project is based on the experience of carrying out the Central and Eastern Europe Environmental Action Plan (Lucern) and other national environmental action plans in some Central and Eastern Europe states. Ten ad hoc groups were formed to work out the main trends of the Plan, involving altogether 264 specialists throughout Estonia. A uniform preference system was applied to all actions evaluated.

The objectives of the project, that was financially supported through the PHARE National Programme, are as follows:

- To provide a consensus-based list of necessary state-level environmental actions, drawn up according to preference, stating financial requirements and unavoidable expenses.

- To be used as a communication tool between the Government and interested parties, giving a clear pattern of the importance attached to various environmental problems by all major interest groups in Estonia.
- To be used as a guideline for working out various environmental projects.
- To be applied as a co-ordination tool for multiparty environmental projects.
- To enhance democratic development processes in Estonia in order to achieve consensus between a broad range of interest groups in Estonia.

On May 26, 1998 the Government adopted the Estonian Environmental Action Plan.

6.2.4 Establishment of regional energy centres

The main aim of the project was to establish three permanent energy centres, staffed by local personnel, who will train and advise local municipalities on the restructuring of existing energy systems and on implementing energy efficiency measures. During the first stage of the project consultation was provided for more than 60 local projects, financial support was given to 14 projects, and local governments have been trained in energy efficiency project management issues.

The project was financed through the PHARE national programme. Its objectives were:

- Reduction of emission levels and improvement of the environmental situation through assisting and training local municipalities, companies and consultants in the process of restructuring existing energy systems and implementing energy efficiency measures. The regional energy centres should:
- Provide information on energy issues to local institutions and companies.
- Select and train staff members of municipalities and companies on energy-related topics, in order to improve their skills in project identification, project description and loan application.
- Assist and collaborate with other institutions in the carrying out of energy-related projects in the designated regions, information being transferred from the central level to local levels.
- Assist the target group with initial and technical audits.

The main results achieved through the project were:

- Enhanced local capability, especially in less-developed regions, to define and prepare feasible projects.
- Facilities have been created for securing substantially-faster implementation of projects in co-operation with national and international financial institutions.
- A newsletter was introduced and an Internet homepage installed in order to increase the efficiency of information dissemination.

- Contribution to several projects for the Ministry of Economic Affairs (project pre-selection), Ministry of Finance (feasibility studies for the Public Investment Programme), Ministry of the Environment (preparation of National Environmental Action Plan), and also to bilateral projects with the Danish Energy Agency, USAID, the World Bank, Nutek and PHARE.
- Organization of training sessions in energy planning for key persons in municipalities, in energy conservation in residential buildings for home-owner association personnel, and in energy conservation for teachers at elementary and secondary schools.

Plans for the future are as follows:

- Assistance in the preparation of loan-secure projects.
- Institutional issues, management and organization of local energy supply utilities.
- Energy-related legislation in Estonia and the Nordic countries.
- Meter-instrument handling and simple energy auditing.

6.2.5 Local and regional energy planning

The idea behind this PHARE project is to support investment projects that are part of an overall energy efficiency improvement programme. The project support includes project preparation, the detailed preparation of local energy plans in order to identify necessary investments, feasibility studies, technical design etc. Its main objectives are:

- To develop the know-how and competence required for effective energy planning in communities.
- To provide assistance to local communities and cities in energy planning activities.
- To provide planned energy efficiency projects with rapid and flexible technical assistance, tailored according to their actual needs.

The preliminary results of the Project are as follows:

- During the initial stage of the project, 61 expressions of interest were received from municipalities wishing to participate in the programme.
- By January 1, 1999, 14 projects had already been launched, and 9 were in process of preparation for an early start.
- An Energy Planning Manual has been prepared by the project team and reviewed by a focusing group consisting of Estonian experts and representatives from municipalities.

6.3 Hungary

6.3.1 Energy Saving Credit Fund - Energiatakarékossági Hitel Alap (EHA)

The Government of the Federal Republic of Germany offered DEM 50 million aid to Hungary for the purpose of purchasing coal in 1991, that was sold to Hungarian citizens. With 60% of the money generated by this action a finan-

cial resource was created under the name German Coal Aid. At the beginning of 1996 the Hungarian Fund for Developing Entrepreneurship took over management of the programme, which was renamed the Energy Saving Credit Fund.

It is a revolving fund that has already been placed four times. Its advantage derives from the low interest rate charged. The interest rate is equivalent to 50 % of the prevailing basic interest published by the Hungarian National Bank.

It has become an 'independent' source for energy saving investments in two striking ways: Firstly, it is independent of other institutions providing grants and loans, it operates according to strict and clear rules, and there is no pressure from governmental or other financial institutions.

The second element of EHA's independence is the range of institutions it can supply loans to. Though the most important task of the fund manager is to help small and medium-sized entrepreneurs, the fund is aimed at companies of any kind, irrespective of ownership structure, industry sector or company size.

As the most stable and autonomous fund in this field, EHA seems to serve energy saving and efficiency investments in a calculable and transparent way, which means, that the programme can be followed closely, and companies interested can constantly count on it. EHA has also proved to be flexible, as a result of slight improvements carried out during the past few years.

Multiplicative effects of the programme have also been noticed: in a lot of cases energy saving investments have led to an increase in the number of employees, to improvement in the export-import balance, etc.

EHA has proved to be successful, especially concerning investments targeting the modernization of public lighting and heating. Renewables will feature higher on the fund's agenda in the future.

6.3.2 Energy Efficiency Programme - ELÉG

This programme serves as a basis for future energy efficiency campaigns initiated by civil organisations. The ELÉG campaign was launched by NGOs and supported by a foreign governmental institution (the Environmental and Energy Agency of the Netherlands, NOVEM). The aims of ELÉG are threefold:

- Networking: it aims at building coalitions by trying to establish a partnership basis between different sectors affected by, and involved and interested in energy efficiency.
- Raising awareness: the programme was designed to raise awareness of energy efficiency throughout the population.
- Capacity-building: the programme was designed, thirdly, to build capacity within green NGOs for the purpose of raising awareness in this field.

The campaign was cheap and efficient. It involved a nation-wide network of participants (green NGOs, schools, elec-

tricity and gas distributors, journalists, etc.), that allowed subsidiarization of the programme and local-level decision making. Campaigning was based on several different channels (media, green NGOs). The message and concept of ELÉG were clear, accessible and simple.

Success through coalition building: experts, green NGOs, municipalities, media and departments of the government already request information and even opinions from each other. The capacity-building part of the programme is the real success. As a result there are now 10 green NGOs working and co-operating closely with local partners. They are well-known, accepted at the local level, and their expertise is widely acknowledged.

Other awareness-raising programmes have already followed ELÉG; the most recent one is organized and financed by the SCORE programme.

6.3.3 Energy Saving Credit Programme - Energiatakarékossági Hitel Programme (EHP)

The development process of the EHP dates back to 1994, when a first analysis was made by the Hungarian Energy Office (HEO) of the potential outcome of an energy-saving project targeting municipalities. A preferential loan is provided for municipalities, legal entities with economic activities that are owned by municipalities, or companies financing energy-related modernization of public institutions owned by municipalities. The preferential interest rate (50% of the prevailing basic interest rate set by the National Bank of Hungary) amounts to a grant provided by a special fund of the Ministry of the Economy aimed at economic development.

For a certain investment municipalities can apply for a preferential loan of up to HUF 30 million. A further 10 % of the investment is to be provided by the banking sector, but these funds may also come from other sources, such as the EHA. The repayment period is five years, including a one-year period of grace.

EHP is operated by an Interministerial Committee that sets the rules for the current year, decides upon applications, monitors ongoing investments every three months and evaluates the programme itself.

EHP is one of the very few possibilities that local banks have to provide financing for energy efficiency investments in Hungary. Most of the programmes currently running are financed by international financial institutions (IFIs), leaving no room for local participation. It is not the size of foreign financing that prevents local banks from entering this field, but the cross-financing of programmes, as effected by IFIs.

Feedback from municipalities appears satisfactory. According to the Ministry of the Interior, the body responsible for controlling municipalities in Hungary, EHP is helping to speed up structural change. Other advantages of the programme mentioned by government officials are: EHP reduces import dependence, decreases not only pollution but also the social burden, cost benefits, sizeable multiplicative effects such as

creating jobs and improving the import-export balance.

Being the only governmental energy efficiency programme, EHP will surely continue and probably develop further. Although its second element – financing the modernization of central heating – is being realized after three long years of negotiations and lobbying, and the third element – third-party financing – was refused in the end, the programme has already witnessed some improvements. The credit line has been increased, and from the autumn of 1999 another HUF 1 billion will be credited to the central heating reconstruction programme.

6.3.4 Building a network of regional energy advisory centres - SCORE programme

The SCORE programme is the initiative of the Government of the Netherlands. SCORE '97 was based on the result (experience, network and advisory activity) of the ELÉG campaign, since the philosophy of the two programmes is very similar: coalition building, raising awareness.

A major aim of the SCORE programme is to organize and establish a nation-wide energy efficiency advisory network, that is independent of energy market actors, that is, the energy distributors. The network is designed to help local inhabitants, public institutions, small and medium-sized enterprises in energy efficiency decision-making and to provide technical and financial information as well as to map out energy efficiency possibilities.

The general target of the SCORE programme is to establish a sustainable energy efficiency infrastructure suitable for detecting all initiatives aimed at continuous improvement in end-user energy efficiency. While SCORE '97 was planned to establish new institutions, building capacity, raising awareness and energy efficiency developments for demonstration, SCORE '98-99 aimed at establishing the basis for an autonomous, nation-wide system supporting energy efficiency activities, also at the local level. This network should operate independent of any Dutch financial resource after the turn of the century. Besides opening local offices, a telephone service is also provided, which became especially popular after informative films were shown on TV.

It is a long-term project, since it was designed to be effective beyond the period of financial support, to spread information, and to expand the network of institutions. Participants in training programmes should pass on the newly-gained knowledge; energy advisory offices sustain their activities with the help of local SMEs.

Members of advisory centres have been *recruited* from very different organizations, providing a complex view of energy efficiency. Green NGOs and members of MTESZ (a natural science and engineering-orientated organisation) could pool their knowledge and methods. Different ideas from participants are circulated in the network, enriching the activity of others.

6.3.5 Energy Service Company (ESCO) – Prometheus

ESCOs are industrial companies with extensive expertise and experience in energy conservation. These companies are able to buy, install and maintain energy-saving equipment needed by their clients at their own initial expense. The invested money is returned through real savings obtained. ESCOs are paid through contractual arrangements that convert customer savings from reduced energy costs to revenue.

In 1995, the European Bank for Reconstruction and Development (EBRD) signed a USD 5 million loan agreement with the formerly state-owned Prometheus, of which 97 % was owned by the Compagnie Général de Chauffe of France. The money was provided for renovations, new parts and safety devices, and also for the operation and maintenance of energy installations in private sector businesses and public sector enterprises operating in Hungary. The first loan was followed by a second two years later. The EBRD now also has an equity participation in Prometheus. After the first two years Compagnie Général de Chauffe and EBRD decided to set up other ESCOs in the region, and for this reason the two institutions set aside USD 150 million. The other two EBRD partners in similar projects throughout Central and Eastern European countries are Honeywell of the United States and Landiss & Gyr of Switzerland. The size of the co-operation is equivalent to USD 75 million and ECU 210 million, respectively. Current owners of Prometheus are the French Vivendi Group and the EBRD. The company is involved in about 400 programmes. Annual energy saving amounts to 176,400 GJ, according to Prometheus, which means a 20 % saving in energy bills.

Private and public institutions have been able to participate in energy conservation investments by third-party financing. This technique can supply organizations indirectly with the funding needed. EBRD participation meant the involvement of an international financial institution, and also extra resources for the company at a time when foreign financing proved to be difficult and a risk-taking institution was needed.

Prometheus has become a well-established private company since its privatization in 1992. It is expanding its activities. The EBRD is still on board, as the bank′s aim is to develop private entrepreneurship in the countries of its operation. And when its investments have *graduated* – as EBRD terminology defines favourable results – the bank severs its links with the company and sells its stake. Progress has been made in Hungary, where the EBRD has already sold its equity in two of the four banks it had invested in as shareholder.

6.4 Poland

6.4.1 Polish Efficient Lighting Project - PELP

The household share in the total energy consumption in Poland is very high in comparison with highly-developed countries, and holds the potential for hitherto only partially-exploited energy

savings. Consideration of this fact has given rise to the idea of reducing domestic electricity consumption by replacing traditional filament-bulb lighting with compact fluorescent lamps (CFL). Although CFLs save energy, there is a lack of consumer awareness that the replacement of an incandescent lamp by a CFL lamp is a profitable investment.

As a result of a market study in 1993, an electricity conservation programme, the Poland Efficient Lighting Project (PELP), was developed by the International Finance Corporation (IFC) and funded with 5 million USD from the Global Environment Facility (GEF).

One of its main components was a demand-side management (DSM) pilot project, which was designed to use CFLs to help introduce the concept of DSM to Polish electricity utilities. The main objective of the project was to introduce the concept of using DSM to defer distribution and transmission investments, and to demonstrate the potential benefits of a DSM programme implemented in real field conditions. Specifically, the pilot aimed to reduce peak power loads in geographic areas where the existing electric power grid capacity was inadequate to meet existing electric loads, or would soon be inadequate to meet future load growth.

The backbone of the DSM pilot was a CFL subsidy coupon system, which was designed to persuade large numbers of people in the selected areas to purchase and install CFLs. The CFLs sold through the pilot were subsidised with USD 100,000 of PELP project funds. A high level of CFL sales was achieved in the three cities targeted: more than 33,000 CFLs were sold in six weeks. A large number of CFLs were sold per household, which is especially notable given the low average incomes in the areas involved. The savings achieved correspond to a 15 - 16 % reduction in total electricity peak demand.

The Polish Network *Energy Cities*, has developed a project based on the methods and experiences of PELP/DSM, in which massive CFL installation will be ultimately achieved without external subsidies. The PELP project provided also a model for the GEF-IFC Efficient Lighting Initiative (ELI) being currently developed in 6 countries (South Africa, Argentina, Peru, Philippines, Hungary, Latvia and the Czech Republic).

6.4.2 City-wide energy efficiency investments plans

The Project's aim is to demonstrate that the development of new business activity in implementing low-cost heat saving measures in buildings brings benefits to the local communities in several areas:

- social: improved housing conditions, creation of new jobs, new economic activity;
- economic: reduction of energy or fuel bills, or avoidance of supply-side investment costs;
- environmental: locally, by reduction of emissions from small polluters.

Six cities have been selected for the project. They represent different regions, populations, sizes and characters, among them cities with high unemployment and retraining needs. The demonstration part

of the project in each selected city consists of:

- complete heat audits performed by certified auditors in five selected buildings, with reports identifying possible measures and their cost-effectiveness;
- actual implementation of the recommended measures in two buildings;
- post-demonstration heat-consumption data collection and analysis.

The buildings selected for the project include (for each city) a typical 4-5 story residential block and a school of a typical size.

The last step is detailed analysis by the City-wide Plan for Energy-Efficiency Investments, based on inspection of the existing building stock and heat sources, conducted energy audits and the results of measures taken in demonstration buildings. These plans list and prioritize the possible and most necessary investments (according to the least cost planning principle). The applied measures include such low costs improvements as window carpentry repairs, weather-stripping, insulation of attic space, installation of radiator shields, insulation of selected external walls.

The other major goal of the project is the creation of jobs. For this purpose 8-14 local blue-collars workers are selected in each city, typically from among unemployed local workers, who are trained on job by FEWE technicians.

The results so far are encouraging, and prove that the project has addressed important local issues. In the four cities over 40 local technicians have been trained in low-cost measures to save heating energy, and four small companies have been established by previously-unemployed trainees. One prospering small local company has extended its scope of services to include the low-cost measures demonstrated in the project. One of the indicators of success is that the cities have exceeded their contribution to the project above the assumed 26%. Another is that two other cities, having learned about the project, decided to send their technicians for training, covering the costs of the training from their own resources. Companies from two other municipalities have asked for similar training on the same basis.

6.4.3 Wood-waste combustion

The overall driving objective of the project 'Integrated Approach to Wood-waste Combustion for Heat Production in Poland' is to overcome barriers to wider and better use of biomass. Wood is considered by the general public and (often) decision makers alike to be a 'backward' solution. This is a cultural barrier of a rather psychological nature. Wood as fuel is associated with cumbersome, old-fashioned technology, used for heating and cooking in the countryside in the past. Replacing wood by coal has been ingrained in public awareness as an indicator of progress. Returning to this fuel is often perceived as a step backwards.

An extremely important barrier is the fear that wood waste is seen as an un-

stable source of energy. This is an overwhelming factor, which most often excludes from consideration any full fuel switch to wood waste. Coal supplies have been safe and stable for decades. Gas supplies were also practically never interrupted, which is an important factor in considering the replacement of coal by gas.

There is a lack of information about technologies, and an insufficient number of good practice domestic examples that would encourage potential project developers to consider the wood waste option in fuel conversion experiments.

Competition from other fuels is an important factor. Coal, particularly cheap coal, is a low cost fuel that may – and in fact does – drive biomass from its natural niches (rich wood supply) leading to 'petrifaction' of old practices. Gas and oil are also winning over biomass, because they are easily available and their supplies are stable. Lower labour (operational) costs also often offset higher fuel costs.

Another factor is the aggressive marketing and promotion of fossil fuels. This applies to coal, gas and oil alike. Coal dealers offer attractive terms of delivery and payment, competing with each other. On the other hand, gas and oil boiler suppliers and installers (most often representing western companies) provide credits and accept delayed payments, which often allows the investor to avoid troublesome procedures of obtaining equivalent bank loans.

The project is both a pilot and demonstration project, and also an assessment of the most appropriate application of biomass technologies in Poland. Four different types of framework conditions are assessed within the project:

- Single wood-waste supplier linked by a long-term contract with a single wood-waste buyer;
- Single large wood-waste supplier and a number of heat buyers (district heat system).
- Many small wood-waste suppliers and many scattered wood waste buyers.
- Self-supply: the wood waste producer converts its heating system from fossil fuel to wood-waste, produced by himself.

The first stage – financed by an GEF grant – included demonstration of an integrated approach in the city of Krapkowice. A manufacturer of wood-frames for windows, Golenia Ltd., has signed a ten-year contract with the city for wood waste supply to a grammar school, which was previously heated by coal. The school was previously thermally renovated. After thermal renovation the reduction in fuel and costs of heating are remarkable (30 – 40%).

A number of other prospective projects has been identified, and financing and implementation for three more of them will be included in the 'maximum size grant application' that is going to be prepared for GEF.

6.4.4 Education and training of local administrators

Energy efficiency projects, regardless of where they are designed, are ultimately

implemented locally. Therefore, the main political actors directly involved in the realization of such projects are municipal decision-makers. It turns out, however, that the level of environmental awareness and knowledge about sustainability issues of such people is highly inadequate. There is a huge need for education and training of local government administrators, especially in small and medium-sized cities which lack the potential and opportunity to train their cadres. The Polish Network *Energy Cities* (PNEC) was established to specifically address this target group.

The main objective of the project, *Education and Training of Local Administrators in Sustainable Energy*, has been to increase the level of environment and energy awareness of local decision-makers. The project's aim has been to provide these people with the basic knowledge about technologies of CO_2 abatement and ways of developing and financing energy efficiency and renewable energy projects. The other objective is to help establish local capacity to develop and implement such projects. This objective was achieved by organizing 16 training seminars in different parts of Poland dealing with four topics:

1. Strategic energy planning at the municipal level;
2. Possibilities of financing energy efficiency;
3. Energy saving in lighting;
4. Heat saving potential and measures in buildings.

The total number of participants was 978 representing 215 municipalities. Altogether 204 lectures were given. The project was financially supported through the Tempus Programme of the European Union.

Precise knowledge of how to identify and approach energy problems is behind the success of those cities that had their representatives trained in the seminars. The capacity to improve energy efficiency at the municipal level, that has been created by the project, is best reflected by the increase in the membership of PNEC from 9 at the beginning to 31 at the and of the project. It should also be noted, that the trainees included people who were later promoted to new positions: 38 mayors or deputy mayors and five members of Parliament.

6.4.5 Energy Cities

Title: Capacity building project of the French agency ADEME (Agence de l'Environnement et de Maîtrise de L'énergie): Creation of the *Polish Network Energy Cities*.

The most important level of policy making and implementation in energy efficiency and renewable energies is the municipal level. This fact has been recognized in the European Union, where several networks of cities or regions have been created to jointly promote sustainable energy. The leading force behind this effort has been the French agency ADEME (Agence de l'Environnement et de Maîtrise de l'énergie). It has created a network of European Union cities called *Energie Cités*, with its headquarters in Besancon, France. The importance of local policy making in the field of energy applies also to countries

in economic transition. The importance and gravity of problems in this subject area is even greater in Central and Eastern Europe, because it is only in the past decade that local governments have been given a say in any decision-making, being previously under the practical command of the central state and party apparatus.

The project objective was to create national capacity for joint actions aimed at the promotion of sustainable energy policies at a municipal level. The first step was to identify such municipalities, which required a substantial effort to reconnoitre the whole country. Initially 8 cities agreed to create the network.

In 1993, FEWE Krakow received a grant of 200,000 FF to establish a network of cities in Poland whose governments showed interest in developing local energy policies aimed at minimizing the impact of energy production and use on the environment. The statutory goal of the *Polish Network Energy Cities* is the promotion of rational and more efficient use of energy, particularly in areas which can be influenced by local authorities, namely: heating, gas and electricity supply, transport and local industry.

Currently, there are 33 municipalities associated in the Network and the number of members is still growing. Eleven members of the Polish Parliament have been involved in the work of PNEC. PNEC has run or has taken part in a number of energy efficiency and sustainable energy projects (now, in the range of several hundred thousand USD).

6.5 Slovenia

6.5.1 Biomass-based district heating in Gornji grad

Slovenia is very rich in wood biomass since it is 55%-covered by forests. In total primary energy supply wood represents around 5%, while its share in the supply of heat is around 20%. However, wood is predominantly converted to heat by obsolete and inefficient technologies, that are harmful to users and the environment. Until now there has been only one wood-biomass-based district heating system. The project aims to install a modern pilot and demonstration district heating system, based on two 2 MW boilers, fired by waste wood, sawdust and/or wood chips, and equipped with multi-cyclone and filters, thus fulfilling EU emission criteria for the emission of dust particles, CO and NO_x. The heat is distributed from a boiler house to a nearby wood-processing factory – which is also the largest supplier of wood biomass (wood wastes, sawdust) and a minor shareholder (25%) in municipal energy supply company, ENGO Ltd. – where it is used as process heat, and also to the district heating pipeline, which, when finished, is expected to distribute heat to approximately 80% of households in the small town of Gornji Grad. The whole process is controlled automatically, and each household can regulate its own supply of heat. The project started with the preparation of documentation in early 1995, and was facilitated through grants from the PHARE programme.

The main lessons learned are in the field of project management, and technical and financial engineering. With respect to project management, the main lesson is that without a mayor fully devoted to realization of such a project, its realization is hardly possible. The other lesson is that municipalities are very weak in knowledge and capacities concerning modern energy data collection and planning tools, energy management, financial engineering and management of the decision-making process. Since there are no energy companies in the field of renewable energy, which have adequate technical, organizational and financial management skills and capital, they cannot offer 'full project service' – like gas distribution companies – to municipalities. The transaction costs of municipalities are therefore very high; a barrier which, for the time being, can only be overcome by enthusiastic involvement on the part of the mayor, unchallenged by strong business or political opponents. In order to overcome this obstacle the energy advisory service for local communities is needed, as well as incentives for the creation of ESCOs in the field of renewable energy. The next lesson is that, without strict supervision consultants and technical engineering companies – whose financial revenues derive from a certain share of the total costs of a project – tend to exceed the optimal economic costs of projects by primarily considering technical limits rather then economic performance. The final lesson might be, that without the establishment of local or regional biomass markets, in the case of a dominant (single) supplier the contracted price per unit of wood biomass might be exaggerated because of its monopolistic status.

6.5.2 Integrated approach to energy efficiency in heating in the Fran Albreht Elementary School in Kamnik

The *Fran Albreht Elementary School* is a typical school building from the early sixties. It was built without thermal insulation, and before their replacement windows had wooden frames, a large number of which were damaged. Heat was provided from its own 25-year-old hot-water boilers, which also needed to be replaced. In the course of the project a number of activities have been carried out, targeting improvement in the energy efficiency of the heating system. The old boilers have been removed and the school connected to district heating. The roof has been thermally insulated and the windows and their frames replaced by insulated, low heat-emission units. Radiators in the school building have been equipped with thermostatic regulating valves, and the hot-water pumps with frequency regulators.. The school has been equipped with a computer system to control the central regulation of heating, measurement of energy consumption and monitoring of the energy processes. In addition the teachers and pupils have been informed about the advantages and importance of thermostatic regulation valves for user-friendly temperature in classrooms and for reduction of heat losses.

The *most important lesson* is that, where money is available, an energy efficiency investment with a relatively-short pay back period can be realized. However,

the fact is that neither the school nor the municipalities have the required financial resources, and both are restricted by the provisions of the Ministry of Finance regarding loans for investment in energy efficiency, even where financial savings can already be demonstrated in the medium term. Under existing laws and rules, third-party financing would be regarded from the perspective of the Ministry of Finance as an increase in public debt and thus not allowed.

The *second lesson* is that neither school management nor the (other) users of school buildings (pupils, teachers, members of sport clubs etc.) are motivated towards energy efficiency. The financial benefits resulting form energy savings, which depend on their actions, activities and deeds, would be made available to them neither at the institutional, that is school level, nor at the level of its constitutive parts, namely the classes. On the other hand, it would also be very hard to connect the curriculum with energy efficiency activities and investments in schools, and the environmental benefits of energy efficiency measures and investments for schools as buildings, do not relate to schools as an educational 'vehicle'.

The *third lesson* is that only after a central computer system for monitoring energy processes in schools is installed on site can management and maintenance staff also focus on energy efficiency parameters, while providing energy services.

6.5.3 Energy conservation strategy

Before the results of the project were presented, there had not been a general and comparative assessment of the potential of the efficient supply and use of energy, including renewable energy, in Slovenia, but only partial, sectorial or single-case studies. The project has aimed at presenting a 'total picture' of the situation. Energy-saving potential in industry according to sector and technology, energy conservation potential in the building sector (divided into public buildings and dwellings) taking account of age and type of building and the climate zone, and the supply of renewable energy, have been assessed at the level of theoretical (technical) potential and potential economic viability (based on current, that is 1994 prices for energy and energy carriers respectively). The results from each single category have been summarised at different levels, thus enabling an assessment for each technology, branch, type of building or energy carrier, an aggregated assessment at sector level, as well as, finally, an assessment of total domestic energy saving, energy conservation, and renewable energy potential. Parallel to the assessment of each single potential (by category), barriers have been identified and recommendations made for the removal of barriers and for future action programmes.

The project has contributed to the transfer of know-how in dealing with an integrated approach to energy conservation. Perhaps even more important than the transfer of skills and the methodology of assessment for each category of the study, has been the transfer of the

strategic knowledge, that despite differences in sectors, energy carriers and technologies energy conservation options are socially much more shaped by their desegregated and dispersed structure, so that differences in sectors and methodological approaches must be overcome in order to remove the barriers to potentials in this field. The actors have learned, that they have to co-operate in order to create a positive-sum game in this field; but they have not learned how to co-operate and how to design a positive-sum game.

6.5.4 Networking and training of energy advisers

Although there had been some advisory activities for consumers and initiatives in the field of energy prior to the project, when it started in 1994 it brought into being for the first time a nation-wide network, common rules and standards as well as the registered name EN-SVET[15] for the energy advisory service. Energy advisors have been provided with a common level of knowledge and training in energy processes, energy conservation and energy advising. The activities of energy advisors have been certified, supported and promoted. A media promotion campaign has been launched. Additional training and the dissemination and exchange of information and experience have been organized, as well as systematic evaluation of the results and performance of energy advisory activities. The programme had first been conducted and co-ordinated by the Institute of Civil Engineering, and when the Slovenian Agency for Energy Efficiency was established in 1995, it took over the task of co-ordinating and evaluating the programme activities.

One of the most important lessons to be learned, is that energy auditing requires permanent promotion and 'marketing'. This can not be covered and carried out only by energy advisors. The second lesson is that energy advisors need a regular and permanent exchange not only of information but also of experience (and problems), in order to create a kind of professional group identity and professional ethics. Clear rules, financial support and a system of monitoring and control have to be established, in order to prevent advisory activities in the energy field serving as hidden marketing and/or promotion of a certain company and its services/ products. If there is a lack of energetically-efficient products on the market, or if there is no adequate system of energy labelling of products, energy advisors can have only a limited impact on consumer choice, especially in the field of household appliances. Last but not least, consumers are looking for a complete service with respect to investment in energy efficiency, and not only for technical advice; they also demand support in understanding state and commercial schemes and procedures for obtaining subsides or credits under favourable conditions.

[15] In the Slovene language EN-SVET is the abbreviation for *energy advisory*, and has also the meaning of *one world*.

6.6 Results and findings

6.6.1 Project categories

Not surprisingly, the set of projects selected as best practice contains a broad spectrum of rather different projects. The selected projects differ with regard to partners, donors, size, objectives and category. However, although each project is different some common patterns and categories can be identified. Table 10 gives an overview of the projects selected for each of the Accession Countries and shows also a categorization of these projects.

Although each project has been allocated to one of the categories described below, projects often contain elements applicable to other categories:

- Credit funds: Several credit funds have been selected as best practice projects (Czech Republic, Hungary). These credit funds were initially financed by foreign donations, and are designed to finance energy efficiency improvements or the rehabilitation and development of infrastructure. Some of the funds are managed as revolving funds. These funds continue to work when the bilateral or multilateral co-operation project is terminated.

Table 10: Best practice project for existing co-operation

Project	Category
Czech Republic	
1 PHARE Energy Saving Fund	credit fund
2 MUFIS Programme/Fund (financing of municipal infrastructure)	credit fund
3 Energy efficiency centres	institution building
4 Project development	market procurement
Estonina	
1 Procurement of ambient air quality monitoring equipment	adminstrational support
2 Capacity 21 in Estonia	capacity building
3 National Environmental Action Programme	strategy development
4 Establishment of regional energy centres	institution building
5 Local and regional energy planning	adminstrational support
Hungary	
1 Energy Saving Credit Fund - Energiatakarékossági Hitel Alap (EHA)	credit fund
2 Energy Efficiency Programme - ELÉG	awareness campaign
3 Energy Saving Credit Programme - Energiatakarékossági Hitel Program (EHP)	credit fund
4 Building network of regional energy advisory centres - SCORE Programme	institution building
5 Energy Service Company (ESCO) - Prometheus	market procurement
Poland	
1 Polish Efficient Lighting Project - PELP	market procurement
2 City-wide energy efficiency investments plans	adminstrational support
3 Wood-waste combustion	technology promotion
4 Education and training of local administrators	capacity building
5 Energie Cites	institution building
Slovenia	
1 Biomass-based distric heating in Gornji grad	technology promotion
2 Integrated approach in energy efficiency in heating in Fran Albreht Elementary School in Kamnik	technology promotion
3 Energy conservation strategy	strategy development
4 Networking and training of energy advisers	institution & capacity building

- Technology promotion: Foreign assistance has been used to develop pilot and demonstration projects applying new, advanced technologies, or equipment that has not been used before in the country. In two cases these pilot projects addressed biomass (Poland, Slovenia), in another case a whole bunch of different energy efficiency technologies were applied in one object to demonstrate the entire spectrum of options to reduce energy consumption (Slovenia). The aim of these pilot projects is to reduce scepticism about these technologies, and to gain experience which can be used to identify the necessary adaptations of these technologies for domestic purposes.
- Market procurement: Some technologies, or strategies, are already known in the particular country, but are not applied intensively due to market or other barriers. Market procurement projects are designed to overcome these barriers. They may address specific technologies, such as efficient lighting with compact fluorescent lamps (Poland), facilitate the development of market actors through the initial support of ESCOs (Hungary), or assist project development by providing information on financial resources and on project administration (Czech Republic).
- Awareness campaigns: Energy saving is not only a matter of technology and economy, but also a matter of attitudes and habits. Awareness campaigns (Hungary) are designed to address the latter aspects. They may include mass media campaigns and address relevant actors directly (pupils, utilities, journalists etc.).
- Strategy development: Detailed information on the status quo of the energy sector, as well as on energy saving potential, are crucial for the development of a national energy strategy or an environmental plan (Estonia). But gathering all this information may also help to illustrate the 'total picture' (Slovenia), which itself can be used to identify and develop adequate pilot and co-operation projects.
- Administrative support: Local and regional administration play a key part in the sphere of environment and energy, as they are responsible for important elements of it (public buildings, grids, environmental compliance control etc.). The administrative bodies may be supported through the improvement of compliance-control equipment (Estonia), or through training in energy efficiency project development, preparation and implementation (Estonia), or the detailed preparation of city-wide energy development plans (Estonia, Poland).
- Institution-building: Independent institutions and energy efficiency centres can promote and facilitate interest and motivation for energy efficiency in general and, thus, contribute substantially to environmental improvements. As adequate institutions and networks are crucial for progress in the sphere of environment and energy, institution-building

projects have been selected as best practice projects in all Accession Countries. Moreover, institution-building and networking often include the training of the people involved in these projects. Some of the best practice projects therefore combine institution- with capacity-building.

- Capacity-building: Institutions and processes both depend on people and their knowledge and capabilities. Possibly the most crucial issue, in particular for countries in transition like all the Accession countries, is the training and equipping of people to identify and realize energy efficiency options. Capacity-building projects can be targeted to people from local or national administration (Estonia, Poland), or to people from independent institutions or non-governmental organisations (Slovenia).

These project categories differ with regard to their objectives, the actors they address and their need for financial resources from abroad. Credit funds need substantial amounts of financial assistance, whereas institution- and capacity-building can often be carried out with relatively-small financial resources.

6.6.2 Players

Two categories of players can be distinguished: the players that carry out the co-operation project and are responsible for implementation, on the one side, and the project target groups on the other side. However, in some projects both categories are represented by the same group.

Several projects are targeted to private households and the residential sector (e.g. efficient lighting, district heating). The commercial sector is less often explicitly addressed in the selected projects, although some of the projects are targeted to the residential & commercial sector in general. Municipalities and regional or national administrations are often both the target group of the project and at the same time responsible for implementation of the project.

In none of the selected projects is industry explicitly addressed. This probably has two reasons: projects in the industrial sector are often better characterized as technical assistance, which requires substantial financial resources, than as bilateral co-operation projects. Moreover, the industrial sector is most affected by the transition process. Energy efficiency improvements that seem to be promising, might not be, because the perspectives of the plant or production site are themselves very insecure. In other words, efficiency potentials in industry are not robust, because of the still significant impacts of the transition process on the industrial sector in the Accession Countries.

The old energy sector (utilities, power plants etc.) is also not addressed directly in the selected best practice projects, although it is involved in some of the projects. However, new players in the energy sector, such as energy service companies or project developers, are the target of some of the selected projects. These new players could often better

cope with the new challenges of the energy markets and liberalization than representatives of traditional energy sector institutions.

Some of the projects, in particular the credit funds, are not targeted to any specific group but rather directed at all players that use or produce energy.

Mainly two groups of players are involved in the preparation and implementation of the selected best practice projects. These are municipal and regional administrations and non-governmental organisations (NGOs), that work in the sphere of environment and energy. The behaviour and activities of administrative people are often restricted to the responsibilities of the organisations they work for, whereas NGO people can more frequently apply new approaches to the issues of such co-operation projects.

6.6.3 Other findings

Existing initial personal contacts are a major prerequisite for a good outcome of a project. In some cases a project has been initiated in a hurry, finding the partners only at the eleventh hour, and without having any personal knowledge of them beforehand. If it has been discovered during the course of a project, that the choice has not been the right one, it has had a rather a bad impact on the outcome of the project. Therefore, co-operation projects that facilitate the creation of multilateral networks in the sphere of environment and energy often also promote the development of well-designed follow-up projects.

Local interest is a very crucial factor for the success of a project. Where a project has been initiated and conducted only by top officials in a ministry, without involving local interest groups, the outcome of the project has often been rather poor.

A majority of the players still have a professional background in natural sciences and/or technology, but few have a theoretical understanding of economics and social processes. The majority come from national quasi-state institutions or dominant energy consultant engineering companies. They therefore prefer 'concrete technical solutions' to abstract conceptual or institutional issues.

Not enough attention has been given to raising the communication skills of energy efficiency experts, advisors and practitioners to improve communication with different target groups, and to improving the ability to identify potential allies and forge partnerships within the broader field of *sustainable development*.

Generally speaking, while a lot of attention has been paid to improving understanding and skills concerning new technologies, organizational schemes, energy planning, efficiency and conservation assessment, little attention has been paid to improving communication skills and the understanding of their importance for the design and implementation of energy efficiency programmes and projects.

6.6.4 Recommendations

Due to the lack of financial means for the improvement of energy efficiency, a

substantial share of the energy saving potential in the Accession Countries can not be realized. However, financial resources are limited in European Countries too, and as a result financial transfers to Accession Countries. Successful co-operation is not only dependent on the amount of money transferred, but also, in the case of co-operation projects, on how available resources are used to fulfil the needs of the Accession Countries.

Some considerable recommendations for future co-operation projects can be derived from an analysis of existing co-operation projects.

Apart from costly hardware and financial assistance, lots of 'soft' measures and projects do have a remarkable and sustainable impact on the domestic sphere of environment and energy in the Accession Countries. Such measures, such as institutional support, capacity-building or administrative support, can often be carried out with relatively small budgets. Although their impact on the environment might be difficult to evaluate, it should not be overlooked, because it might be more sustainable than various technical-assistance projects.

However, analysis of existing 'soft' co-operation projects has shown that such projects should comply with several of the conditions stated below:

- They should rather mobilize internal resources and capacities, than impose strategies and concepts from outside.
- The design of such projects should be such, that they can be continued independently, and without financial support, after the initial co-operation phase.
- For institutions and networks, developing adequate and advanced equipment is crucial (computer- and communications technology, offices etc.).
- Training and education on the job should be preferred to separate education schemes.
- Local authorities should be involved from the beginning in the design and implementation of co-operation projects. Top-down projects are more likely to fail.
- Training should stress economic and management issues, as well as the understanding of political processes, rather than technical or scientific issues.
- Apart from competence directly linked to energy efficiency, it is important to indirectly support necessary capabilities such as communication and presentation skills, as well as language skills.

Since the beginning of the nineties several energy efficiency centres have been established in the Accession Countries. These centres were established with financial support over a given period of time, and on the basis of various pilot projects that had to be carried out. Through these pilot projects national experts are enabled to become familiar with aspects of conducting energy projects in an effective way. Foreign partners do not manage the energy efficiency centres, but rather only advise them on

how to carry out the project, how to obtain information, how to manage business connected with energy efficiency enterprises etc. The main goal of established national centres is to obtain experience from the pilot project, in order to continue and manage the energy efficiency activity after the financial support has come to an end.

Various issues can be treated in these pilot projects. However, most important are issues such as market procurement for energy efficiency technologies, economics of energy efficiency and new approaches to liberalized energy markets, including third-party financing, contracting, energy service companies and demand-side management. Moreover, these pilot projects may include issues such as renewables, or upcoming issues such as the flexible mechanism within the Kyoto Protocol, in particular emissions trading and joint implementation.

7 Conclusions and recommendations ...

More than four years ago the European Union (EU) decided to open negotiations with possible new member countries about accession. The Czech Republic, Estonia, Hungary, Poland and Slovenia were the first countries to be invited to participate in the formal accession process.

Taking into account the leading role of the EU in general, and of individual countries such as Germany, in climate protection policies and strategies, it is important to consider the impact of the accession process on European climate policy. Moreover, if options for the harmonization of environmental and – in particular – climate policies can be identified early on in the accession process, future adoption and harmonization might be performed strategically and at less cost. Member States of the European Union may support this adoption processes through financial assistance as well as through 'soft' co-operation projects.

7.1 ... with regard to each Accession Country

7.1.1 Czech Republic

The legal gap assessment has shown, that substantial gaps remain in the implementation of EC environmental and energy policies in the Czech Republic. In none of the relevant areas are the requirements laid out in the EU Directives completely fulfilled. On the contrary, large gaps persist with respect to the liberalization of energy markets, energy taxation, and the Large Combustion Plant (LCP) and Integrated Pollution Prevention and Control (IPPC) Directives. Furthermore, legislation implementing various energy efficiency Directives is completely lacking. As in the case of other Central and Eastern European countries, the IPPC Directive appears to pose a particular challenge. The integrated approach pursued in this Directive requires extensive administrative restructuring to accommodate this fundamentally new permitting approach.

The main problems are generally related to the substantive requirements of the Directives, be it emission limits in the LCP Directive, the definition of eligible customers in the Gas Directive, the scope of taxation and tax levels in the energy taxation Directive, energy taxation itself, or the integrated permitting procedures required in the IPPC Directive.

In contrast, the development of the necessary institutional structures, conditions for fulfilling procedural requirements (except those under the IPCC Directive) and requirements for monitoring and reporting, appear to be far more advanced. These requirements may thus be fulfilled comparatively easily.

In all the deficient areas legislation has been, or is planned to be introduced in the near future. According to the Czech authorities, the bulk of the legislation should be in place by 2001 or 2002. However, some of the legislative foundations under preparation will need to be fleshed out by supplementary legisla-

tive acts (government decrees etc.). Additionally, the enforcement of this new legislation on the ground will require further action. Moreover, some delays have already been encountered in a legislative process that is still very much in flux and somewhat weak in the environment and energy field. Given the uncertainties in future domestic political debates in the Czech Republic, further delays cannot be excluded. It may thus be assumed that full implementation and enforcement of relevant EC requirements may well continue beyond the first decade of the 21st century.

The analysis of regulation patterns revealed major constraints in the field of strategic orientation, dialogue orientation, and policy integration. Distorted pricing mechanisms are a severe drawback. The comparatively well-developed institutional infrastructure in the field of energy conservation offers favourable possibilities for further capacity-building in this field through networking instruments.

The existing network of regional and local energy centres needs further stabilization. Co-operation between the energy efficiency institutions at different state levels should be intensified and strengthened. Municipal energy planning, project monitoring and post-implementation evaluation deserve special attention. The local energy centres form important crystallization points for intensified networking at the municipal level. The establishment of a project identification and co-ordination facility might be considered.

The creation of innovation networks, incorporating the education and science sector, business and public administration should be supported. In order to facilitate cross-sector policy integration, environmental tax reform requires effective back-up. In addition, inter-ministerial project units for the restructuring and privatization of the electricity sector might be established.

Greenhouse gas emissions in the Czech Republic dropped at the beginning of the nineties but since 1995 have started to increase again slightly. They were mainly determined by the economic development. However, improvements in energy intensity of about 15% by 1997 caused a de-coupling of CO_2 emissions and economic development when the economy started to grow again. This was also supported by the improving carbon intensity, which decreased slightly after 1993. In contrast, conversion efficiency decreased by about 10% during the nineties, which offset some of the positive effects in energy and carbon intensity. Thus, efforts to improve conversion efficiency and further improve energy efficiency should play a key role in a Czech strategy for greenhouse gas mitigation.

7.1.2 Estonia

The legal gap assessment has revealed that several gaps remain in the implementation of EC environmental and energy policies. It seems that Estonia has not made significant progress in adapting national legislation to the requirements of EC directives. Although full compliance with EC law has not been

found in any of the areas analysed, Estonia seems to be more advanced than other Accession Countries with regard to the legal transposition of the IPPC Directive. In contrast to other countries, quite detailed draft legislation transposing the IPPC Directive into Estonian legislation already exists.

However, the Estonian Energy Act, which is the central transposing legislative act, still needs to be further amended for full alignment with the Electricity and Gas Directives. Further efforts are needed to prepare for participation in the internal energy market.

The main implementation problems can be related to the substance of the respective EC rules. Additionally, however, institutional structures, needed for proper implementation of EC legislation, are not in place. Due to a lack of personnel and financial resources similar deficits can be found in the development of the necessary monitoring and reporting procedures.

Estonia's oil shale sector, which provides 98% of locally-generated primary electricity supply, poses a unique challenge for the country, which is not directly related to EC energy or environment legislation. Oil shale production is responsible for many environmental problems. Responding to this specific problem, the European Commission requires the development of a viability plan for the oil shale sector, and recommends that privatization in this sector should be carried out in the most transparent way.

Additionally, it has to be highlighted that Estonia pursues important strategies and programmes promoting the increased use of alternative energies. Thus, compared to other Accession Countries Estonia seems to be well advanced in the use of co-generation and renewable energy.

The current institutional framework for energy conservation and climate protection is inadequate. The analysis of the regulation patterns revealed that a public institution for guiding energy-saving activities is needed at the central state level. This institution should be relieved of daily administrative tasks and perform important co-ordination and networking functions.

Local experts recommend the establishment of a separate energy efficiency fund, financed by the state budget and a share of revenue from pollution charges, which should support research programmes, soft loans, regional energy conservation plans, energy audits and energy saving campaigns.

Numerous small-scale energy investment projects have been implemented in Estonia since 1991. However, targeted energy saving objectives have not always been achieved, and a recent post-implementation analysis of selected energy (conservation) projects, which have mostly been implemented with foreign assistance, draws a critical picture. Another drawback is that the bulk of projects focus on the supply side. State support for utilizing the vast energy conservation potential in the end-use sector is very weak. Additional financing mechanisms need to be developed. In order to strengthen policy implementation, the introduction of performance monitoring

procedures and post-implementation evaluation policies should be secured.

Estonia was more affected by economic recession than all other Accession Countries. It experienced not only the steepest but also the longest decline in gross domestic product (GDP), which dropped by more than 30% between 1990 and 1994. Parallel to economic development, carbon dioxide emissions dropped even further. They fell by more than 40% in the period to 1993, and have since remained at that level, although GDP has started to grow again slightly. The de-coupling of greenhouse gas emissions was mainly caused through improvements in energy intensity, which developed quite similarly to CO_2 emissions in the nineties.

Although substantial achievements in greenhouse gas mitigation have been made, carbon dioxide emission can be reduced further. Policies and measures should mainly address improvements in carbon intensity and conversion efficiency, which did not improve, but rather worsened during the nineties by about 10% and more than 20% respectively. However, energy intensity has not improved substantially since 1993, and could therefore be improved further.

7.1.3 Hungary

Many gaps remain in Hungary's transposition of EC legislation in the field of environment and energy. Very few domestic policies exist, which directly transpose EU legislation into national law in these areas. Most of the relevant Directives have been transposed in such a way, that the corresponding Hungarian legal requirements are embodied in several different legal acts, which have often been adopted by different ministries.

Analysis of implementation of the various aspects of the Directives in Hungary, namely objectives, substantive, institutional, procedural or monitoring and reporting requirements, reveals an uneven picture. At this time, no area of the environment and energy policy rubric is in full compliance with EC legislation. However, even if the institutional structure does not presently carry out the required tasks, these institutions do provide a good framework for future implementation of the respective Directives. This is especially the case concerning the *labelling tradition* in Hungary. In implementing the Directives the Hungarian authorities can make use of existing labelling institutions or tax authorities.

Hungary can rely on its well-developed administrative network of permitting and supervising authorities in the environmental and the energy sector. This may explain why approximation of procedural requirements is rather good. In contrast, the pace of implementation, the development of monitoring devices and the enforcement of transposed Directives is rather weak. The lack of financial and personnel resources, as well as the low standing of the environmental authorities in public administration, largely explains the negative results observed in implementation in these areas.

From a critical point of view it can be argued that *strategic orientation* of Hungarian energy and environmental policy could definitely be improved.

Thus, a well-prepared, long-term strategy, built on clear principles, should be developed. *Calculability* is rather low considering the chances of introduction of a green tax, energy tax etc. *Policy instrumentation* might have a chance to improve, once policy measures such as an emission permits trading system and environmental emission fees, as well as positive incentives, have been implemented.

Dialogue orientation should be intensified, since evidence suggests that communication is difficult even within the state administration, and public participation is not well institutionalized. Energy and environmental policies are still centralized, and there are no local agencies promoting energy efficiency projects. To overcome these shortcomings *subsidiarity* in the field of energy and environment should be increased. *Proactiveness* is to be seen partially, for example in the new National Energy Efficiency Programme, and in considerations referring to the introduction of environmental emission fees and a green tax reform.

To date only environmental NGOs have succeeded in establishing a stable and well-functioning network, which allows co-operation throughout the country. Policy assessment has shown that there is a definite need to build networks between NGOs and business, and also between the state administration and NGOs. In addition to those already existing, connections between the state administration and the scientific community should be strengthened and extended, in order to create and implement innovation-friendly, dialogue-orientated, calculable and reliable policies in the field of environment and energy.

Carbon dioxide emissions declined more or less in line with the economic recession until 1992, and since then consistently lie more than 15% below the 1990 level, although the economy started to grow again. This has been achieved mainly through an improvement in energy intensity between 1991 and 1997 of nearly 20%. Improvements in carbon intensity contributed also to the substantial reduction of CO_2 emissions. In contrast, conversion efficiency worsened during the nineties, in 1997 nearly reaching its 1990 level, which was quite close to the EU average at that time.

Policies and measures to reduce greenhouse gas emissions might address further improvements in conversion efficiency. More important, however, are further improvements in energy intensity, which declined only between 1990 and 1993, but have remained at that level ever since. Strategies to reduce energy intensity should therefore be given a prominent role in greenhouse gas mitigation policies.

7.1.4 Poland

Again, also in the case of Poland it is hardly surprising that legal gaps still remain, that need to be addressed in order into bring environmental and energy legislation in line with EU requirements. Significant progress has, however, already been made in a number of areas. Few further adaptations are needed in the areas of creating an electricity market, and regulations dealing

with energy efficiency (SAVE, labelling, energy efficiency standards).

More substantial adjustments are needed with respect to implementation of the Large Combustion Plant (LCP) Directive and the creation of minimum excise taxes for mineral oils. These difficulties could become more severe, if proposed revisions of the existing Directives are adopted. Poland faces more serious problems with regard to the Gas Directive, where market opening and restructuring lags have resulted in a request for an extended transition period.

The biggest problem, though, is again posed by implementation of the Integrated Pollution Prevention and Control (IPPC) Directive. As in most other applicant countries, implementation of the Directive will require major amendments to the existing legislative framework and administrative structures. Finally, the coal mining sector poses special difficulties in Poland's accession process. While a substantial restructuring programme has been initiated, which should ensure that coal subsidies are used in line with EC criteria, these reforms are unlikely to prove sufficient.

The main implementation problems are related to the substantive requirements of the respective EC regulations. Appropriate institutional structures are generally (with some exceptions) already in place. Much the same holds true for monitoring and reporting mechanisms and procedural requirements. The major exception to this general rule is the aforementioned IPPC Directive, that creates far-reaching demands for procedural and administrative restructuring. In other words, the substance of this Directive lies in its procedural requirements.

Plans exist to address the remaining legal gaps by implementing further reforms, that should lead to full compliance by 2002. A new Environmental Protection Act is expected to be a major step forward in this process. Additional transition periods have been requested in the case of the Gas and IPPC Directives. There is a danger, however, that other legislative adjustments will not be passed in time, or will require further adaptation periods (for example, energy taxation, coal subsidies). There is thus some likelihood that legislative adjustments to EU requirements in Poland will be a process that may well extend beyond 2002.

Poland stands out as one of the most successful of the countries in Central and Eastern Europe in terms of environmental policy. There is a real decoupling between economic growth and some of the air pollution parameters like sulphur dioxide, particulates and greenhouse gas emissions. However, an energy policy mainly relying on domestic coal reserves for power production, and a transport policy which leads to expansion of road traffic, are major obstacles to further improvement of environmental parameters.

For the future, well-functioning networks of strategic actors from social groups and responsible manager and employers representing small and medium-sized firms, will be of crucial importance in the political arena in Poland. Networks of small and medium-sized enterprises, active in the environmental

protection sector, could certainly be helpful for sustainable progress in the field of environment and energy in Poland. Last but not least, capacity-building activities directed at non-governmental groups and the staff of small enterprises are needed – and will be much appreciated – in order to encourage small-scale projects in energy efficiency or energy saving, as well as in raising environmental awareness.

Carbon dioxide emissions declined slightly but constantly during the nineties. In 1997 they were roughly 5% below the 1990 level, although gross domestic product (GDP) was about 25% above the level in 1990. Most important for this development were the improvements in overall energy intensity which decreased by more than 15% between 1991 and 1996. Small improvements in carbon intensity and later – since 1994 – in conversion efficiency, contributed furthermore to the de-coupling of economic growth and carbon dioxide emissions.

Poland's energy intensity is more than twice as high as the EU average, and in addition one of the highest of the Accession Countries, being exceeded only by Estonia. Any greenhouse gas mitigation policy should therefore give improvements in energy intensity a high priority. However, the achievements already made in carbon intensity and conversion efficiency are still small. Policies and measures to improve both indicators should therefore not be neglected.

7.1.5 Slovenia

Slovenia has made major progress towards implementing EC energy and environmental Directives through the adoption of the new Energy Law signed in September 1999. Whereas prior to that date virtually no transposition legislation existed for the implementation of Directives concerning the establishment of the energy market and the promotion of energy efficiency, the major foundations have now been established. These need to be fleshed out with extensive secondary legislation in the years to come, in order to bring Slovenia into full compliance with EC standards. The case of Slovenia thus illustrates the dynamic situation within many Accession Countries. In the current situation whole policy fields may have to be completely overhauled, depending on the state of existing legislation.

As in the case of other Accession Countries, institutional capacities and capabilities, necessary to fulfil for monitoring and reporting obligations, may need to be strengthened, but generally already exist. The remaining major challenges are mostly related to adopting and enforcing the substantive requirements contained in the Directives themselves (for example, defining labels and energy efficiency standards). As in other Accession States the Integrated Pollution Prevention and Control (IPCC) Directive deserves special attention in Slovenia as well. Although the existing permitting system may allow adaptation to issue integral environmental permits, this requires major adaptations. The activities of various administrations need to be co-ordinated and administrative

procedures adapted. Furthermore, introducing the concept of best available technology requires legislative adjustments.

According to Slovenian Government plans, the legislative foundations will be laid by the end of 2002 at the latest. However, as experience with the new Energy Law demonstrates, legislative proposals might be delayed in the domestic legislative process. It is thus hard to predict whether the deadline will be met. In any event, implementation and enforcement of relevant legislation, and of the IPCC Directive in particular, will require extra effort and time. It may thus be expected, that the implementation of EU legislation will not be fully completed in Slovenia until sometime after 2002.

The institutional structure in the field of energy efficiency seems to be comparatively fragmented. Responsibilities and competence in this area are dispersed among various actors. In particular, there seems to be a lack of clear institutional responsibilities for the support of renewable energy. There is also a lack of continuing support and training for *municipalities* in the field of energy efficiency and renewable energy. According to the new Energy Law, local governments are expected to prepare *municipal energy concepts.* Systematic training of local decision-makers should actively support implementation of this important target. Instrumentation might be further diversified. In particular, existing legal and other barriers to *third-party financing* and energy service companies should be removed. Despite some promising networking and coalition-building approaches, there is a general weakness on the part of relevant interested parties in creating lobbying capacities and establishing stable actor-coalitions.

The development of CO_2 emission is the most important indicator for the environmental performance of the total energy sector. Environmental policy, however, is not the only determinant that influences the development of CO_2 emissions. Economic development had a remarkable impact between 1990 and 1993. Since then, CO_2 emissions have been stabilised at the 1990 level, although the economy increased by about 15% between 1993 and 1997.

In contrast to other Accession Countries, the de-coupling of economic development and CO_2 emissions was not caused by increasing energy efficiency but by decreasing carbon intensity and minor improvements in overall conversion efficiency. Energy intensity substantially worsened at the same time by about 20%. Strategies to further improve conversion efficiency and – more important – to again reduce overall energy intensity, should receive prime attention, and could be points of departure for a greenhouse gas mitigation strategy.

7.2 ... of general interest

7.2.1 Performance in the sphere of environment and energy

The analysis of the status quo in the sphere of environment and energy showed that there are several options and starting points for CO_2 mitigation

strategies in each Accession Country. However, some of them are more appropriate for one country, others for another country. Carbon intensity in the Czech Republic, Estonia and Poland is still very high compared to the EU average. Conversion efficiency worsened in Estonia during the nineties. The energy intensity of all Accession Countries is well above the European average. Apart from Estonia, it did not improve substantially in any Accession Country, and even worsened in Slovenia.

In general, the analysis has shown that economic development and energy intensity are the most important driving forces. As economic development is a parameter, not a variable, for greenhouse gas mitigation policies, energy intensity should have a key role in any greenhouse gas mitigation strategy. The influence of carbon intensity on the development of CO_2 emissions is substantial, but lower than that of energy intensity. Conversion efficiency seems to be the least important driving force. However, policies and measures to mitigate GHG emissions should focus simultaneously on all three indicators – energy intensity, carbon intensity and conversion efficiency –and not neglect any of them.

7.2.2 Accession process and legal gaps

It is hardly surprising that several years prior to the formal accession of the Czech Republic, Estonia, Hungary, Poland and Slovenia, significant gaps remain in the transposition and implementation of the requirements of EC law in the field of environment and energy. Progress appears to be generally most advanced with respect to the transposition of institutional and procedural requirements (with notable exceptions, see below). Most of the Accession Countries have established the necessary institutions, competence and administrative procedures to assign responsibility to specified authorities and fulfil the formal conditions for effective enforcement. It has to be mentioned, however, that institutional capacity (personnel, training etc.) in many instances needs to be strengthened in order to live up to the real implementation and enforcement challenge. This is particularly true for the monitoring and reporting requirements of several Directives.

The most serious legal gaps exist with respect to the following issues: substance, including the opening of energy markets to *eligible customers*; energy tax definitions and levels; energy efficiency standards for household appliances; and application of emission limit values to specific installations. In the case of the IPPC Directive, the major requirements are of a procedural nature. As a consequence (and in exception to the aforementioned rule), the major difficulties in the implementation of this Directive are also related to procedures. As a common feature in Accession Countries, the integrated approach pursued by the IPPC Directive is unknown. Transposition thus poses a particular challenge in all Accession Countries (but also in many EU Member States). In particular, the transposition of the integrated approach does not only require certain legislative amendments, but also

the complete restructuring of the environmental, administrative and licensing procedures. More problems can thus be expected to occur in the implementation of the IPPC Directive in the future.

Summing up the whole field of environment and energy, it must be concluded that most efforts have been focused on the liberalization of the electricity and the gas market. Although progress has been made, further adjustments are necessary, aimed at an open market in electricity and gas, especially concerning third-party access to transmission and distribution systems. In practice, in several countries monopolistic structures still prevail, although the legislative acts have been aligned (Czech Republic, Hungary).

Energy taxation, according to the Directive on excise duties on energy products, will pose a problem in most of the Accession Countries. Although for most of the energy products some form of tax is levied, with the exception of the Czech Republic and Estonia, which do not impose taxes on kerosene and liquid petroleum, the level of taxes does not (yet) correspond to the minimum levels required in the EC legislation. In this respect Slovenia seems to be further advanced, imposing taxes in some cases higher than the EC requirements. In the other countries, the problem of excise taxes will be further aggravated by the adoption of the proposed amendment to the Directive, with plans to include additional energy products as well as an increase in the minimum levels of taxation.

The situation with respect to the rules on energy efficiency is diverse. Whereas in the Czech Republic, Estonia and Hungary only basic rules exist concerning the labelling of products, or programmes implementing the SAVE Directive, it seems that Poland faces less problems. In Slovenia, legislation extending existing acts has to be adopted to achieve full compliance with EC rules.

The degree of harmonization seems to be most advanced in all countries regarding the Large Combustion Plant Directive. All countries enforce an authorization system for new and existing plants, and profit from the low emission levels caused by industrial decline. This is, however, to be taken into account during the accession talks setting national emission reduction targets for each of the Accession Countries.

As a whole, large gaps still remain in the Accession Countries with respect to relevant EC legislation in the field of environment and energy. In no single country, and in none of the areas where EC Directives exist, are the requirements completely fulfilled. In all Accession Countries the main or framework legislation has been introduced recently, or is planned to be introduced in the near future. However further action is required through the passing of supplementary legislative acts (such as government decrees or ordinances), to build the basis for administrative implementation and enforcement.

All of the Accession Countries seem to face more difficulties than expected concerning the speed of the legislative proc-

ess. Given past experience, it seems probable that the envisaged timeframes for full implementation of EC legislation in the field of environment and energy in the period 2001-2003 will not be met. Transition periods for more than the requested Directives will be negotiated in the accession talks. It is therefore likely that approximation in the Accession Countries will be in process beyond the date of accession.

7.2.3 Patterns of regulation

The synopsis of policy analysis reveals common characteristics in the field of policy styles. Major weaknesses in all countries are, for instance, a rather low level of dialogue and consensus orientation, or a predominance of command-and-control in decision-making. Regarding actor configurations in the field of environment and energy, the analysis illustrates that both intra- and cross-sector policy integration are rather poor and not effectively practised.

Further shortcomings are underdeveloped networking activities, both among regulated stakeholders and between regulators and regulated stakeholders. Several countries have established already functioning and innovative networks of energy efficiency institutions at the central and regional/local state level. These networks, however, require stabilization and extension.

There are clear differences between the countries in terms of policy instrumentation. Several countries, such as Poland and to a lesser extent the Czech Republic and Slovenia, have endorsed a relatively diversified policy mix. The strategic orientation of the policy tools, however, is mostly lacking. Innovative strategic concepts, such as National Environmental Action Plans, have been adopted in most countries only recently. It is too early, yet, to judge their effectiveness and performance. Respective implementation mechanisms and instruments are underdeveloped in most of the countries analysed. The same applies for monitoring and evaluation provisions. Particularly in Poland, the incentive effect of economic instruments is of a high level. The Polish pollution charge system has become generally regarded in the region as a model for the successful implementation of economic instruments for raising earmarked investment funds.

In order to overcome the specific difficulties of the applicant countries on their way to EU membership, we strongly recommend that their efforts be supported and strengthened by effective capacity-building. Based on the positive experience gained by bilateral projects, such as, the EU PHARE Twinning projects, we would like to stress the benefits of supporting activities managed directly between Member States and Accession Countries. The possibilities to influence policy styles in a country are very limited, because these can be subject to change only in the long term.

An area, which offers favourable conditions for assistance, and which is of strategic importance to the applicant countries, is, in our opinion, the transformation of actor constellations by *developing capacities through networking*. This refers to networking activities between state actors and interested parties, as well as networking in the informal

sector encompassing pro-active members of civil society, including scientists and engineers from the techno-economic community. In particular, the municipal level has been quite neglected up to now. Existing initiatives (for example, in Slovenia, Poland and the Czech Republic) and coalitions might serve as multiplicators for creating stable innovation networks.

In addition, we suggest creating and extending cognitive-informational capabilities by the enforcement of networking and co-operation in the field of education and awareness-raising. Support of grass-root initiatives concerned with energy saving and renewable energy sources, which might disseminate individual experience regionally or even country-wide, could initiate innovative networks. By favouring the networking approach, we plead for the further development of possibilities for capacity-building.

7.2.4 Existing and future co-operation

Due to the lack of financial resources for the improvement of energy efficiency, a substantial share of existing energy saving potential in the Accession Countries cannot be developed. However, financial resources are limited in European Countries too, and thus also financial transfers to Accession Countries. Successful co-operation is not only dependent on the amount of money transferred, but also on the way resources available for co-operation projects are used to fulfil the needs of the Accession Countries. Some considerable recommendations for future co-operation projects can be derived from the analysis of existing co-operation projects.

Apart from costly hardware and financial assistance, lots of 'soft' measures and projects have a remarkable and sustainable impact on the domestic sphere of environment and energy in the Accession Countries. Such measures, including institutional support, capacity building and administrative support, can often be carried out with relatively small budgets. Although their impact on the environment might be difficult to evaluate, it should not be overlooked, because it might be more sustainable than various technical assistance projects.

A successful example for such a 'soft' measure are the energy efficiency centres which have been established in some of the Accession Countries. These centres were initiated with financial support for a given period, and on the base of various pilot projects that had to be carried out. Through these pilot projects national experts are enabled to familiarize themselves with aspects of carrying out energy projects in an effective way. Foreign partners do not manage the energy efficiency centres, but rather only advise them on how to carry out projects, how to obtain information, how to manage business connected with energy efficiency enterprises etc. The main goal of established national centres is to obtain experience from the pilot project in order to continue and manage the energy efficiency activity after the limited-period financial support ends.

Various issues can be treated in theses pilot projects. However, most important

are issues such as market procurement for energy efficiency technologies, the economics of energy efficiency and new approaches to liberalized energy markets, including third-party financing, contracting, energy service companies, demand-side management. Moreover, these pilot projects may include issues such as renewables, or upcoming issues such as flexible mechanisms within the Kyoto Protocol, in particular emissions trading and joint implementation.

8 References

79/530/EEC: Council Directive of 14 May 1979 on the indication by labelling of the energy consumption of household appliances (Official Journal L 145, 13/06/1979 p. 0001)

79/531/EEC: Council Directive of 14 May 1979 applying to electric ovens Directive 79/530/EEC on the indication by labelling of the energy consumption of household appliances (Official Journal L 145, 13/06/1979 p. 0007-0015)

88/609/EEC: Council Directive of 24 November 1988 on the Limitation of emissions of certain pollutants into the air from large combustion plants (Official Journal L 336, 07/12/1988 p. 0001-0013)

92/42/EEC: Council Directive of 21 May 1992 on efficiency requirements for new hot-water boilers with liquid or gaseous fuels (Official Journal L 167, 22/06/1992 p. 0017-0028)

92/75/EEC: Council Directive of 22 September 1992 on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances (Official Journal L 297, 13/10/1992 p. 0016-0019)

92/82/EEC: Council Directive of 19 October 1992 on the approximation of the rates of excise duties on mineral oils (Official Journal L 316, 31/01/1992 p. 0019-0020)

93/76/EEC: Council Directive of 13 September 1993 to limit carbon dioxide emissions by improving energy efficiency (SAVE) (Official Journal L 237, 22/09/1993 p. 0028-0030)

94/2/EC: Commission Directive of 21 January 1994 implementing Council Directive 92/75/EEC with regard to energy labelling of household electric refrigerators, freezers and their combination (Official Journal L 045, 17/02/1994 p. 0001-0022)

95/12/EC: Commission Directive implementing Council directive 92/75/EEC with regard to energy labelling of household washing machines (Official Journal L 136, 21/06/1995 p.0001-0027)

95/13/EC: Commission Directive of 23 May 199 5 implementing Council Directive 92/75/EEC with regard to energy labelling of household electric tumble dryers (Official Journal L 136, 21/06/1995 p.0028-0051)

96/57/EC: Directive of the European Parliament and of the Council of 3 September 1996 on energy efficiency requirements for household electric refrigerators, freezers and combination thereof (Official Journal L 236, 18/09/1996 p. 0036-0043)

96/60/EC: Commission Directive of 19 September 1996 implementing Council Directive 92/75/EEC with regard to energy labelling of household combined washer-dryers (Official Journal L 226, 18/10/1996 p. 0001-0027)

96/61/EC: Council Directive of 24 September 1996 concerning integrated pollution prevention and control (Official Journal L 257, 10/10/1996 p. 0026-00

96/92/EC: Directive of the European Parliament and the Council of 19 December 1996 concerning common rules for the internal market in electricity (Official Journal L 27, 30/01/1997, p. 20)

97/17/EC: Commission Directive of 16 April 1997 implementing Council Directive 92/75/EEC with regard to energy labelling of household dishwash-

ers (Official Journal L 118, 07/05/1997 p. 0001-0025)

98/11/EEC: Directive of 27 January 1998 applying to energy labelling of household Light bulbs (Official Journal L 71, 10/03/98)

98/30/EC: Directive of the European Parliament and of the Council of 22 June 998 concerning common rules for the internal market in natural gas (Official Journal L 204, 21/07/1998 p. 0001-0012)

Blazejczak J./Edler, D./Hemmelskamp, M./Jänicke, M. 1998: Environmental policy and innovation - An International comparison of policy pattern and innovative impacts, in Klemmer, P. (Ed) Innovation and the environment. Case studies on the adaptive behaviour in society and the economy, Berlin: Analytica 1999, p. 9 - 31.

COM (99) 212: Amended Proposal for a Decision of the European Parliament and of the Council adopting a multiannual programme for the promotion of renewable energy sources in the Community (1998-2002)

COM(95) 369: Proposal for a Council Directive to introduce rational planning techniques in the electricity and gas distribution sectors (Official Journal C 001, 04/01/1996 p. 0006)

COM(97) 30: Proposal for a Council Directive restructuring the Community framework for the taxation of energy products (Official Journal C 139, 06/05/1997 p. 0014)

COM(97) 514 final: A Community Strategy to Promote Combined Heat and Power (CHP) and to Dismantle Barriers to Its Development (Communication from the Commission to the Council and the European Parliament)

COM(97) 599 final: European Commission 1997b: Energy for the Future: Renewable Sources of Energy. White Paper for a Community Strategy and Action Plan

DG XI 1998: Guide to the Approximation of European Union Environmental Legislation, (http://www.europa.eu.int/comm/dg11/news/enlarg/index.htm)

DG XVII (Directorate General for Energy) 1999: Energy in Europe, 1999 – Annual Energy Review. Brussels

Fagin, Adam/Jehlicka, Petr 1998: Sustainable Development in the Czech Republic: A Doomed Process? In: Baker, Susan/Jehlicka, Peter (Eds.) 1998: Dilemmas of Transition. The Environment, Democracy and Economic Reform in East Central Europe. Frank Cass. London, Portland 1998, pp.113-128

FIU (Forschungsverbund Innovative Wirkungen umweltpolitischer Instrumente) (Eds.) 1999: Innovation Effects of Environmental Policy Instruments. Project Summary. 1999

Hronec, Andrej 1999: Energy Legislation in the Czech Republic – Steps towards the EU Model. In: Journal of Energy & Natural Resources Law, Vol.17, No.1, pp. 85-93

IEA (International Energy Agency) 1996: Energy Balances of Non-OECD Countries 1993 - 1994. Paris

IEA (International Energy Agency) 1997: Energy Balances of Non-OECD Countries 1994 - 1995. Paris

IEA (International Energy Agency) 1998a: Energy Balances of Non-OECD Countries 1995 - 1996. Paris

IEA (International Energy Agency) 1998b: Energy Prices and Taxes. Paris;
cited according to: E.V.A. (Energieverwertungsagentur) 1998:

http://www.eva.wsr.ac.at/enz/preise/evp-es.htm, 21.12.98

Jänicke, Martin 1997: Umweltinnovationen aus der Sicht der Policy-Analyse: vom instrumentellen zum strategischen Ansatz der Umweltpolitik. FFU-Report 97-3. Forschungsstelle für Umweltpolitik. Berlin

Klarer, Jürg/Lehocki, Zsusa 1999: CEE Regional Analysis. In: Klarer Jürg/McNicholas, Jim/Knaus, Eva-Maria (Eds.): Sourcebook on Economic Instruments for Environmental Policy. Central and Eastern Europe. The Regional Environmental for Central and Eastern Europe. Szentendre, Hungary

Kocenda, Evzen/Cabelka, Stepan 1999: Liberalisation in the Energy Sector in the CEE-Countries: Transition and Growth. In: Osteuropa-Wirtschaft, Vol. 44, No. 1, pp. 104-117

KPMG 1998: Environmental Policy and the Role of Foreign Assistance in Central and Eastern Europe. Copenhagen

McNicholas, Jim 1999: Poland provides the right incentives. In: REC The Bulletin 9/1 (http://www.rec.org/REC/Bulletin/Bull91/PolishIncentive.html)

MOP (Mittel- und Osteuropa Perspektiven)1999: Jahrbuch 1999/2000, Band 1 – Politischer Hintergrund und Wirtschaftentwicklung. Herausgegeben von: F.A.Z.-Institut für Management, Markt, und Medieninformationen GmbH et al., Frankfurt/Main

OECD (Organisation for Economic Co-operation and Development) 1999: National Climate Policies and the Kyoto Protocol. Paris

OECD 1997: Reforming Environmental Regulation in OECD Countries. Paris

REC (The Regional Environmental Center for Central and Eastern Europe) 1998: Doors to Democracy. Current Trends and Practices in Public Participation in Environmental Decision-Making in Central and Eastern Europe. Budapest

Richardson J.J., (Ed.) 1992: Policy Styles in Western Europe. London

Ricken, Christian 1997, Determinanten der Effektivität der Umweltpolitik. Frankfurt a.M.

Sejak, Josef 1998: The Case of the Czech Republic: Energy Policy and EU Adjustment. In: Müller, Friedemann/Ott, Susanne (Eds.): Bridging Divides – Transformation in Eastern Europe: Connecting Energy and Environment. Baden-Baden, pp. 87-112

UNFCCC (United Nation Framework Convention on Climate Change) 1999: Inventory Database, as of October 1, 1999. Bonn

World Bank 1999: World Development Indicators on CD. Washington