In-depth Review of Energy Efficiency Policies and Programmes of Hungary

ENERGY CHARTER PROTOCOL ON ENERGY EFFICIENCY AND RELATED ENVIRONMENTAL ASPECTS (PEEREA)

ENERGY CHARTER SECRETARIAT

INTRODUCTION

The Energy Charter Treaty was signed in December 1994 and entered into legal force in April 1998. To date the Treaty has been signed or acceded to by fifty one [1] states. The Treaty was developed on the basis of the European Energy Charter of 1991. Whereas the latter document was drawn up as a declaration of political intent to promote East-West energy co-operation, the Energy Charter Treaty is a legally-binding multilateral instrument covering investment protection, liberalisation of trade, freedom of transit, dispute settlement and environmental aspects in the energy sector.

The Energy Charter Conference, the governing and decision-making body for the Energy Charter Treaty, meets on a regular basis - normally twice a year - to discuss policy issues affecting East-West energy co-operation, review implementation of the provisions of the Treaty, and consider possible new instruments and projects on energy issues. All states who have signed or acceded to the Treaty are members of the Conference. Regular meetings of the Conference's subsidiary groups on transit, trade, investments and energy efficiency and environment are held in between Conference meetings.

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) is a legally-binding instrument that was signed together with the Energy Charter Treaty in December 1994 by the same 51 states that signed the Treaty itself. It requires its Signatories to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector.

Implementation of PEEREA is kept under review and discussion by the Energy Charter Working Group on Energy Efficiency and Related Environmental Aspects. A key feature of the Working Group's activities is the development of a series of in-depth reviews of individual states' energy efficiency policies and programmes. Recommendations to the authorities of the states concerned resulting from these in-depth reviews are presented to the Energy Charter Conference for discussion and endorsement.

For further information on PEEREA and the in-depth energy efficiency review series, contact Mr Tudor Constantinescu at the Energy Charter Secretariat in Brussels (Tel: +322 775 9854)

[1] Albania, Armenia, Austria, Australia, Azerbaijan, Belarus, Belgium, Bosnia and Hercegovina, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, European Communities, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan, United Kingdom.

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EXECUTIVE SUMMARY

With a population of 10.1 million and a surface area of about 93000 km^2, Hungary was one of the first Central/Eastern European countries that started a process of democratic reform and transition from a centrally planned to a market economy. Accession to the European Union is a priority for the Government. In February 2001, the Government published the "Széchenyi Plan", a medium-term economic development plan in response to the new challenges of the "post-privatisation era".

The Hungarian energy sector is characterised by a relatively high dependence on natural gas and has been subject of restructuring and partial privatisation during the last decades. Under the present regulatory regime, the Hungarian Electricity Board (MVM) and the Hungarian Oil and Gas Company (MOL) have some market dominance, due to their functions of wholesalers. Electricity and natural gas distribution companies are partly foreign owned and operate under public service contracts. New laws for the electricity, natural gas and district heating sectors are under discussion and preparation respectively aiming at further liberalisation and market opening in accordance with EU legislation.

Following the "Energy Policy Concept" of 1993, the Government adopted in 1999 the "Hungarian Energy Policy Principles and the Business Model of the Energy Sector". The "Business Model" focusses on guidelines for establishing competitive markets for electricity and natural gas, price regulation and the organisational and regulatory structure of the electricity and gas industries. Other issues addressed by the "Business Model" are: energy conservation and efficiency, renewable energies, district heating and environmental protection.

Since the economic transformation in 1990, energy prices have been gradually adjusted to actual cost levels. Since 1999, new cost-based tariff systems have come into force, aiming at eliminating cross-subsidies between consumer groups. According to the new Energy Policy Principles (the "Business Model"), price controls for power transmission and distribution and for captive consumers will remain in force. For natural gas, the Business Model foresees the development of a new system of price regulation, taking into consideration import prices and a system of setting transmission tariffs in the competitive market. The district heating sector, finally, suffers from price setting mechanisms, which appear not to take into consideration the specific characteristics of combined heat and power generation, in the absence of competitive heat and gas markets in the residential sector.

The taxation system in place favours natural gas and electricity consumption, compared to energy efficiency equipment and services. A so-called product charge on gasoline is an important source for the Environmental Fund, which could be complemented by an Environmental Emission Fee, which is at present under discussion.

The household sector is the largest user of final energy (32.8%), followed by industry (25.9%), transport (19.1%), services (17.7%) and agriculture (4.5%), (1998). In the period 1990 - 1998, primary energy intensity in Hungary has decreased by 17.2%, while final energy intensity fell by 15.2%, taking into consideration corrections for climatic conditions and structural changes of GDP.

Active energy efficiency policies in Hungary started in 1995, when the Government adopted the National Energy Saving and Efficiency Improvement Programme. Part of this programme was the Energy Saving Action Plan (ESAP) of 1996, which focused on renewables, energy efficiency (including labelling), as well as education, information and technological innovation.

Part of ESAP was the Energy Saving Credit Programme (ESCP), focusing on municipalities and the development of energy service company financing. Other funding programmes for energy efficiency are the German Coal Aid Fund, the Phare Revolving Fund, the Pilot Panel Programme and the Hungarian Energy Efficiency Co-finance Programme (HEECP), among others. Most of these programmes involve funding from international or bilateral sources.

In 1999, a new Energy Saving and Energy Efficiency Action Programme was adopted. This new programme defines energy saving and other targets until 2010 and includes a number of specific actions, in the areas of fund raising, education and awareness raising, research and development, industrial energy audits and energy-related modernisation, energy management in municipalities, least cost planning, energy efficiency in transport, heating system modernisation, promotion of renewable energy sources and district heating modernisation, among others. The Programme intends to mobilise some 200 billion HUF (€ 750 million) of investments, by providing 50 billion HUF (€ 187 million) of support over a ten year period. Support is provided either by preferential credit (subsidised interest rate) or as non-reimbursable grants.

So far, initial funding from the state budget for the period 2000 - 2001 of 6 billion HUF (€ 22.5 million) has been secured. Long-term financing is supposed to come from the planned Environmental Emission Fee, which is still under discussion.

In addition to financial incentive programmes (and probably voluntary agreements in the future), Hungary has also introduced thermal insulation standards for new residential buildings; regulation concerning metering and accounting requirements for new apartment buildings, as well as appliance labelling and minimum energy efficiency standards in accordance with EU directives.

The Ministry of Economic Affairs assumes the main responsibility for energy policy, including energy efficiency. The governmental institution for the operational implementation of energy efficiency policies is the Energy Centre, officially the "Energy Centre" Energy Efficiency, Environmental Protection and Energy Information Agency. Having its roots in the former Hungarian-EU Energy Centre, the Energy Centre in its present form has emerged from a merger of the "old" Energy Centre and the Energy Information Agency. The "new" Energy Centre has been established by Government Resolution in 2000 and is jointly owned by the Ministry of Economic Affairs, the Ministry of Environment and the Hungarian Energy Office (the regulatory agency). The same Government Resolution creates a budget title for the operation of the Centre and establishes the Energy Saving Interministerial Committee, whose main task is to approve applications for funding under the Energy Saving and Energy Efficiency Action Programme.

The role of the Energy Centre is twofold: managing energy efficiency programmes and performing reporting tasks on the one side, and advising Government on energy efficiency policies and instruments, on the other. In general, it may be stated that the Centre is in a transition process from a rather small organisation, focusing on technical advice, awareness raising, coalition building and general promotion of energy efficiency and renewable energy, to an executing agency for the implementation of Government policies. Assuming leadership, on the one hand, and maintaining and further developing a culture of co-operation among market actors, NGOs, professional organisations, consumers and the civil society - while establishing a firm institutional and financial base - seem to be major challenges to the Centre.

Non-governmental organisations have assumed an important role in developing awareness on energy efficiency and advising consumers throughout the country. A particular mention should be made to the Energy Efficiency Advisory Network established by environmental NGOs, civil associations and the Federal Chamber of Technical and Scientific Societies (MTESZ). The development of the Energy Efficiency Advisory Network and related activities have been supported by the SCORE Programme of the Dutch Government and by PHARE.

Since the mid nineties, commercial energy saving activities by ESCOs (and probably in the future by distribution companies) have steadily gained importance.

In the field of environmental protection, Hungary has adopted the National Environmental Programme (NEP), which includes specific actions aimed at an "environmentally friendly energy structure". Although the environmental situation is in general improving and Hungary is likely to achieve Kyoto targets (Hungary has not signed the agreement so far), additional instruments like the planned Environmental Emission Fee would be further steps into the right direction.

In summary, Hungary is progressing in increasing energy efficiency and improving environmental protection, in line with the provisions of PEEREA. The Energy Saving and Energy Efficiency Action Programme and the new institutional framework of the Energy Centre are important steps towards a more active involvement of the Government and a more structural approach to promote energy efficiency and renewable energy. The transition process associated to these developments brings many opportunities, but also important challenges, which will require the full attention of the Government and its implementing agency.

Based on the findings of the review team, the report provides a series of recommendations to the Government of Hungary, which - in addition to general recommendations referring to overall energy efficiency policies and strategies - relate to areas like: the institutional framework for energy efficiency, energy pricing, energy efficiency funding and fiscal policies, the implementation of specific programmes and instruments, and the promotion of renewable energy.

IN-DEPTH REVIEW OF ENERGY EFFICIENCY POLICIES AND PROGRAMMES OF HUNGARY

1. Introduction to the PEEREA Review

In April 2001, a team of representatives from the Working Group of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects reviewed the energy efficiency policies and programmes of Hungary.

The role of the in-depth energy efficiency review undertaken on a peer basis by the Working Group is to enhance the level of co-operation amongst contracting parties (Article 3.1). The in-depth review is also being used to assess progress, promote continuous dialogue and transfer information.

The review team comprised Mr. J. Vetlesen of Norway who chaired the review, Mr. S. Bevz of Ukraine, Ms. M. Kelleher of Ireland and Mr. V. Kregers of Latvia. Mr. T. Constantinescu of the Charter Secretariat and Mr. W. Lutz, consultant to the Secretariat, supported the review team.

Organisations visited are included in Annex 4.

The review team wishes to express its thanks to all Hungarian participants in meetings for the period of the review. Special thanks go to officials of the Ministry of Economic Affairs and the Energy Centre, who also undertook all the preparation of the mission, completing the PEEREA questionnaire and providing background papers and other information as requested.

The report is based on material provided by Hungary as well as data and analyses from various other sources, including the International Energy Agency, OECD, UNFCCC and other related materials. Statistical data are presented according to the most actual data available.

2. Overview

Hungary is a landlocked Central European country with a population of 10.1 million and a surface area of about 93000 km^2. The Hungarian territory mainly occupies a plain which is bound in the north by the Carpathian mountains, with maximum heights of 1000 m above sea level. The mountain area is rich in minerals. The Danube,

Hungary's main river, divides the country into a western and an eastern part, the latter being formed by the low plains of the Danube and Tisza rivers. There are also important economic differentials between the central and western parts of the country and the less developed eastern regions.

The capital is Budapest, with approx. 1.86 million inhabitants. Hungary borders Austria, Slovakia, Ukraine, Romania, Yugoslavia, Croatia and Slovenia. Hungary is an important transit country for road and railway transit and transport, as well as the Danube as major European waterway.

FIGURE 1: HUNGARY

Following first steps towards democratisation in 1989 and first democratic elections in 1990, Hungary has transformed its formerly centrally planned economy to a market economy, replacing state ownership by private ownership in many areas. Double-digit inflation and very high unemployment rates, which have characterised the first years of transition to a market economy, have given way to single-digit inflation and decreasing unemployment.

Table 1 shows the economic and industrial growth in Hungary in the period 1992 - 1998. While GDP has fallen between 1991 and 1993, it has been steadily growing since 1994.

TABLE 1: ECONOMIC AND INDUSTRIAL GROWTH IN HUNGARY (% OF PREVIOUS YEAR)

	1992	1993	1994	1995	1996	1997	1998	1999
GDP	-3.1	-0.6	2.9	1.5	1.3	4.6	4.9	4.4
Industry	-5.3	1.5	5.8	3.8	6.7	10.2	7.7	9.4

Source: Energy Centre, November 2000

In 1998, the GDP was 35.34 billion US$ using nominal exchange rates and 71.46 billion US$ using PPPs. GDP is estimated to come 65% from services, 30% from industry and 5% from agriculture. The main import-export partners are Germany, Austria, Italy, Russia and the Netherlands. Hungary exports mainly machinery and equipment, other manufactured products and agriculture and food products.

Accession to the European Union is a central priority for the Government. The accession process has effectively been underway since 30 May 1998, based on a favourable opinion by the European Commission in 1997.

In February 2001, the Government has published a medium-term economic development plan, the so-called "Széchenyi Plan" - named after 19th century reformer Count István Széchenyi. The Széchenyi Plan aims at laying the "structural foundations of permanent and sustainable growth" at a time when many economic objectives of the last decade of the past century have been achieved and new challenges of the "post-privatisation era" arise. Major challenges, which the Plan endeavours to address include: (i) redirecting foreign investments at widening the production basis and extending co-operation with Hungarian enterprises, including SMEs, (ii) bridging the gap between export-oriented, foreign-owned large companies and the Hungarian-owned SME sector, which produces for the domestic market, (iii) replacing the low added value "work-for-hire" economy of the privatisation period by an innovation driven economic development model, relying on qualified labour, innovation and capital attraction and (iv) helping the Hungarian economy to adapt as soon as possible to the global information and network economy and knowledge society, the so-called "New Economy".

In practice, the Széchenyi Plan is going to rely on the following planning instruments: (i) partnership between the Government and the business sector, (ii) limited co-financing by the Government, and (iii) co-ordinated use of Government support for programme financing. In other words: the Government undertakes to define priority areas of action - in consultation with the business community and provides limited co-

financing (maximum one third of project cost) in these priority areas, in order to help mobilise resources of foreign and Hungarian investors and local governments. Government support is strictly limited to the programmes shown in table 2, which also shows the Government co-financing for the years 2001 and 2002. Expressway and related infrastructure development programme is the largest one, and accounts for 40% of the funding during this period.

TABLE 2: GOVERNMENT CO-FINANCING FOR THE SZÉCHENYI PLAN IN 2001 AND 2002 (HUF BILLION)

Programmes	2001	2002
Enterprise development programme	31.4	37.3
Housing programme	69.9	72.6
Tourism development programme	25.0	28.1
Programme for the support of research, development and innovation	17.5	37.0
Information society and information economy development programme	15.0	28.9
Expressway development programme and related subprogrammes for infrastructure development	132.1	120.9
Regional economy development programme	5.0	6.0
Total	295.9	330.8

1 € = 267 HUF (April 2001)

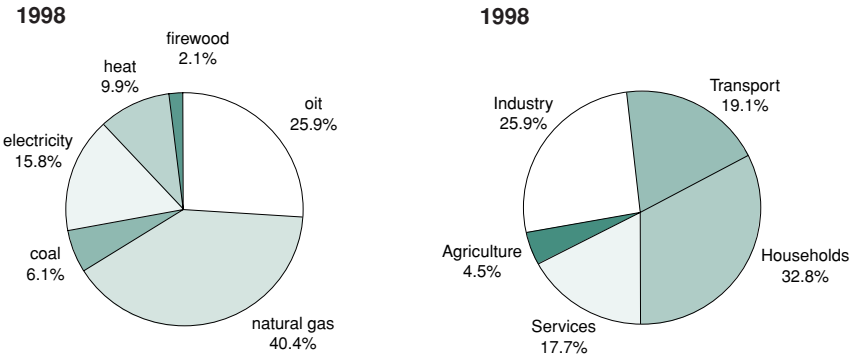
Source: Széchenyi Plan

Government co-financing in 2001 and 2002 is from the state budget. For the period 2003 - 2006 a specific amount of the annual GDP is set aside as a source of government co-financing of the Plan. Other resources may include EU pre-accession funds and other still unspecified funding sources.

Energy conservation activities are explicitly mentioned in the framework of the housing programme (see section 6).

The Hungarian energy sector is characterised by a relatively high dependence on natural gas due to (i) substantial own gas reserves and (ii) gas supply contracts with the Soviet Union and subsequently with Russia. Figure 2 shows the final energy consumption of the country by energy commodity and by end-use sector.

FIGURE 2: FINAL ENERGY CONSUMPTION BY ENERGY COMMODITY AND BY END-USE SECTOR, 1998



Source: Energy Centre, November 2000

The energy sector has been subject of restructuring and partial privatisation during the last decade.

The main features of the energy sector organisation are [1]:

The Hungarian electricity supply industry consists of twelve generation companies, six distribution and supply companies and the state-owned former monopoly supplier MVM (Hungarian Electricity Board), who still owns the transmission network and some power stations, including the Paks nuclear power plant. Generation plants and distribution companies are privatised and partly owned by foreign investors. The Hungarian state still holds a 50% plus one share majority in MVM, other shareholders are private and institutional domestic and foreign investors.

Under the present regulatory regime, defined by the Electricity Act of 1994, the market is dominated by long-term contracts between generators and MVM on the one hand, and between MVM and the distribution and supply companies on the other. A bill for a new Electricity Act has been sent to Parliament and is expected to be enacted during 2001. Gradual market opening shall lead to a fully competitive market between 2005 and 2010.

The natural gas sector is still dominated by MOL, the Hungarian Oil and Gas Company, the only gas wholesaler in Hungary, selling to distribution companies, power generators and large industrial consumers. The Hungarian state retains a 25%

[1] For more detailed information please refer to Annex 1.

plus one “golden” share blocking minority shareholding in MOL. Gas distribution companies have been privatised and are partly owned by foreign companies. They are operating under public utility contracts, with regulated end-user prices, based on the 1994 Gas Supply Act and Gas Pricing Decree. A new Gas Law is under preparation, in line with EU accession requirements.

The markets for refined oil products and coal are fully liberalised, with MOL still holding a monopoly for crude oil, and the coal sector facing problems with regard to the closure of uneconomic mines.

A particular case is the district heating sector, which, except for the electricity production from CHP plants, is under the responsibility of local self-governments (municipalities).

Environmental issues have an important impact on the energy sector. Ahead of EU accession, Hungary has introduced air pollution limits and is reviewing its environmental policy in line with the Sixth Environmental Action Plan of the EU. Hungary is a signatory state of the United Nations Framework Convention on Climate Change (UNFCCC) and has committed itself under the Kyoto Protocol to reduce greenhouse gas emissions by 6% in the time period 2008 - 2012, with 1985 - 1987 as baseline period (see section 8).

Hungary became a member of the International Energy Agency (IEA) on 3 June 1997, and has ratified the Energy Charter Treaty and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in April 1998.

3. Main Energy Policy Highlights

In April 1993, the Energy Policy Concept was approved by Parliament (Resolution 21/1993). The objectives of these policy guidelines were (i) to create the conditions for the energy sector to operate on a commercial basis, (ii) to reduce the dependence on energy imports from the former Soviet Union by diversifying supplies and (iii) to lay the foundations for the integration in the European Union. Energy efficiency, promotion of renewable energy and environmental protection are part of the Concept.

Between 1994 and 1996, three major pieces of legislation were adopted, which created the necessary conditions for privatisation: (i) the Act on Gas Supply (1994), (ii) the Act on Producing, Transmitting and Distributing Electricity (1994), and (iii) the Act on Nuclear Energy. The “Electricity Law”, discussed in the previous section, also estab-

lished the Hungarian Energy Office, under the authority of the Ministry of Economic Affairs.

In 1996, the European Commission assessed the implementation and achievements of Hungary's energy policy in the light of the country's application for EU accession. The results of this assessment were published in a Country Opinion, which states that the objectives of Hungarian energy policy are in conformity with the principal EU requirements.

In the field of energy efficiency, the Government adopted in 1995 the National Energy Saving and Energy Efficiency Improvement Programme, which was established in the framework of the Energy Policy Concept (Resolution 2399/1995). Based on this programme, the Energy Saving Action Plan (ESAP) was adopted in 1996, followed in 1999 by the Energy Saving and Energy Efficiency Action Programme (all these programmes are described in detail in section 6).

In 1999, the Ministry of Economic Affairs presented the "Hungarian Energy Policy Principles and The Business Model of the Energy Sector" (hereinafter referred to as the "Business Model"), a policy document describing a "new energy policy", approved by Parliamentary Resolution of 27 July 1999. The main objective of this new energy policy is clearly to prepare the Hungarian energy sector for EU accession. Consequently, major emphasis is given to guidelines for establishing competitive markets for electricity and natural gas, price regulation for electricity and natural gas and the organisational and regulatory structure of the electricity and gas industries. Although also part of the policy, energy conservation and efficiency, renewable energies, district heating and environmental protection appear not to be at the very centre of the Government's attention (to be discussed in more detail in the following sections of this report).

Main issues addressed by the Business Model are [2]:

The establishment of a competitive electricity market:

The Government intends to gradually open the market up to the minimum levels prescribed in the EU directives. In doing so, the Government intends to balance consumer benefits with the time required for infrastructural preparations and to find ways to solve the problem of long-term power purchase agreements, a legacy from the first phase of privatisations. The Government intends to implement transparent rules,

[2] Electricity and natural gas price regulation are dealt with in section 4.

which avoid discrimination among market actors (existing and new). For non-eligible consumers, regulated fixed prices shall temporarily remain in force.
Electricity companies that are presently in direct or indirect Government ownership shall not be privatised until the process of modernising their organisation has been completed. The Business Model also foresees maintaining the price-capped regulated public utility service model for non-eligible consumers, until first lessons of market operation have been learnt. Liberalisation of import and export rights for electricity will be phased-in until the date of accession to the European Union, taking into consideration aspects of security of supply.

The establishment of the natural gas market:

Opening up the Hungarian gas market appears to be a complex task, taking into consideration the dominant position of MOL, the sole operator in the production, transport and management of the gas system. MOL also directly supplies to large-scale industrial end-users and has lately acquired shareholdings in distribution and service operations. While the Government pursues the establishment of a transparent and non-discriminative gas market, with separation of these functions in all companies active on the market, in order to meet EU thresholds for market opening at the time of accession, MOL might apply for derogation of the application of EU Directive 98/30/EC.

The Government recognises the potential effect of opening the natural gas market to large power generators on the emergence of the electricity market, the reduction of electricity prices and positive environmental effects. Similar to the electricity market, the Government intends to protect non-eligible consumers by a public utility service obligation.

Long-term contracts for electricity and natural gas:

Long-term contracts constitute a serious problem in the Hungarian electricity sector. Under the present arrangement, based on the Electricity Act and the operational licences, power stations sell electricity to MVM under long-term contracts. MVM, taking account of consumer demand and the necessary reserves, commissions the capacity of the power stations, thus paying them a capacity fee for fixed costs and profits. MVM's agreements with power producers are based on the costs of the power stations; the price of the electricity passed on to the electricity supply companies is based on the average price paid to the producers (see Section 4). Opening up the electricity market will transform many non-competitive power stations into "sunken assets" and generate high "stranded costs", arising from the difference of the previous contract price and the lower market price. In order to retain investor confidence, the Government is examining avenues as how to at least partially refund these stranded costs, which are actually a consequence of changing the "rules of the game".

According to the Business Model, the net present value of stranded costs in the power industry will be some HUF 40 billion (€ 150 million), based on gradual market opening and meeting the requirements of the EU Directive within a period of 10 years.

In the case of the natural gas supplies the issue of long-term contracts will be incorporated into Hungarian law, in accordance with the acquis communitaires.

Conserving energy, raising energy efficiency, using renewable sources of energy:

Concerning energy conservation and efficiency, the Government mainly relies on "the co-ordinated application of domestic and foreign funds available for that specific purpose and other funds earmarked for various purposes." As in other fields of energy policy, complying with EU requirements appears to be the principal driving force. Increasing the country's renewable energy use from presently 3.5% [3] to 6-7% is another policy aim.

The Business Model announces the establishment of a "national programme to spread awareness of energy conservation and renewable energy sources, conveying their advantages and the means of implementing them", to provide investments for increasing energy efficiency, to apply tariffs based on actual costs and to extend the Energy Saving Credit Programme (see section 6).

Environmental protection:

The Business Model states as a central aspect of energy policy "the internalisation of environmentally-related costs", in a way that they "must not exceed what the public can bear and must not threaten the international competitiveness of the economy". Environmental costs will be mainly determined by the requirements of new EU-harmonised legislation.

Coal-mining industry subsidies:

Government policy aims at (i) closing uneconomic mines, (ii) phasing out subsidies and (iii) tightening environmental requirements. Rectification of environmental damage will receive some state support earmarked for this purpose, including EU funds. Operational support to mines and support to the costs of mine closures are estimated at HUF 11.4 billion. Mines integrated with power stations will be allowed to remain in operation until the operational licence of the power station connected to them expires.

[3] Including wood and biomass.

The organisational and regulatory structure of the electricity and gas industries:

The Business Model calls for a clear definition of requirements and functions of the Hungarian Energy Office (see section 7).

The competitive district heating market model:

The Government aims at a competitive district heating market, to be achieved by regulation defining the relationships between producers, suppliers and consumers of district heat, system owners and authorities. The Business Model suggests that competition between district heating companies should be introduced, by putting in place a "market-based legal environment" and "shaping the Government-controlled elements of economic regulation (pricing, tariffs, taxes)", including preferential credit facilities to finance the introduction of metre-based charging and accounting that the District Heating Law stipulates must be in place within five years.

Mention should also be made of the Ministerial Decree 55/1996 on the Establishment of the Purchase Price of Electricity by Public Power Stations. According to this decree (and as stipulated in the Electricity Law) the purchase of electricity generated from renewable sources is compulsory, once the capacity is at least 0.1 MW. The Government plans to introduce a system of tradable green certificates, as soon as the market of renewable electricity has reached a critical mass for competition of 300-350 MW. In the transition period, there will be a fixed premium system for small-scale power plants based on cogeneration or renewables (see section 4).

4. Energy pricing and taxation

Since the economic transformation in 1990, energy prices have been gradually adjusting to actual cost levels. While prices for oil products, coal and LPG were already liberalised in 1991 and 1992, natural gas, electricity and heat prices remained regulated, providing a sufficient transitory period to raise them to economic levels and to eliminate cross-subsidies, in particular from the industrial sector to households.

Prices were raised, moderately at first and rapidly after 1994, but the unexpectedly high inflation rate in the mid-1990s eroded much of the increase in real energy prices that had been achieved by that time. In 1995, it was estimated that average end-user prices for natural gas were still only half the level needed to cover costs, and that electricity prices had to increase very substantially in real terms. Subsequently, prices were raised drastically, as shown in table 3. Cross-subsidies began to be dismantled, with industrial energy prices rising less than residential prices.

TABLE 3: TOTAL AVERAGE PRICE CHANGES FOR ELECTRICITY AND GAS, 1995 - 2000 (NOMINAL, PERCENT)

Year	Electricity	Natural gas
1995	35%	29%
1996	27%	21%
1997	38%	41%
1998	18%	13%
1999	11%	2%
2000	0%	8%
Total	131%	113%

Source: OECD/IEA, Hungarian Energy Centre

Since 1997, prices for electricity and natural gas are calculated according to pricing principles and price formulas defined by the Hungarian Energy Office. The key element of pricing is cost-based prices +8% investment-related profit.

Electricity price regulation

Since July 1, 1999, a new tariff system has come into force (Decrees 9/1999 and 10/1999), which aims at complying with the EU's requirements regarding the termination of cross financing between consumer groups.

According to the new Energy Policy Principles (the "Business Model"), price controls for power transmission and distribution and for captive consumers will remain in force, at least for the time being.

For the free segments of the market, Hungary has chosen the model of regulated third party access (RTPA), which involves centrally fixed transmission and distribution tariffs, which will include the costs of reserve capacity and infrastructure developments required for providing power to eligible consumers.

In the future, costs incurred from environmental protection shall be incorporated in the price of electricity via the Environmental Emission Fee, which would mean a projected increase of electricity prices by 2-3% (see below).

Tariffs for electricity as of January 1, 2000, and authority controlled (maximum) electricity prices between July 1999 and January 2001 are included in Annex 3. A remaining price distortion is household tariff C for employees of electricity companies.

Electricity supply companies are obliged to purchase electricity produced from renewable sources above 0.1 MW and from small scale CHP (from 0.5 MW up to 20 MW) at guaranteed prices, between 12-13 HUF/kWh and 20 HUF/kWh (approx. € 0.045 - 0.075). The surplus costs of this purchase are incorporated in the consumer price.

Natural gas price regulation

Similar to electricity, cost-based tariffs were introduced by July 1, 1999 (Decree 11/1999), eliminating cross financing between consumer groups. It appears that there are still some cross-subsidies between products within MOL, natural gas being subsidised by the price of petroleum products.

The Business Model calls for the development of a new system of price regulation, taking into consideration import prices and a system of setting transmission tariffs in the competitive market. Regulated third party access is the Government's preferred option in view of Hungary's integration in the European Internal Gas Market.

Authority controlled natural gas prices in Hungary between January 2000 and July 2001 are included in Annex 3.

District heating prices

The district heating sector in Hungary suffers from price setting mechanisms by the authorities, which - due to the need for competitive electricity tariffs - penalize the price of heat delivered from large CHP stations. District heating companies, who operate under the authority of municipalities, are forced to purchase heat at artificially high prices (actually a form of cross-subsidy), while their tariffs for selling heat to their customers are kept low for social reasons and because of competitive pressures from natural gas supplies to residential consumers. The separation of district heating companies from the electricity and gas markets aggravates this situation, since it discourages the construction of efficient CHP plants.

Taxation

Value-added tax on natural gas and electricity is only 12%, compared to the regular rate of 25%, which applies e.g. for vehicle fuels. According to the Ministry of Finance, there are no immediate plans to adjust the VAT rate of natural gas and electricity to the regular rate (such an adjustment would have to be part of a comprehensive revision of the taxation system, not expected before 2003).

In some contrast to the preferential VAT rate for gas and electricity, energy saving equipment and energy efficiency services (e.g. ESCO-services) appear to be subject to the regular VAT rate. Reduced VAT for solar energy appliances has been abolished.

Currently there is also a so-called product charge of <5% which is levied on gasoline. This product charge is one of the largest sources for the Environmental Fund managed by the Ministry of Environment. Another source of income of the Fund is environmental penalties.

The Ministry of Environment intends to introduce an Environmental Emission Fee on three environmental media: air, water and soil. The Environmental Emission Fee will be levied on the amount of polluting emission, with the aim of internalising external costs [4]. The proposal is still being debated. The energy sector would be the first sector concerned with the air emission fee on SO_2, NO_x, CO, particles and other toxic emissions.

The Environmental Emission Fee is supposed to be a major source of financing of the Government's Energy Saving and Energy Efficiency Action Programme (see section 6).

5. End-use sectors

Table 4 shows the development of primary and final energy intensity in Hungary during the period 1991 - 1998. Primary energy intensity decreased in this period by 17.2%, while final energy intensity fell by 24.5%. Applying corrections for varying climatic conditions and structural changes of GDP shows a lower decrease of the final energy intensity (15.2%), as shown in the table. Looking at the decreases of final energy intensity in two distinct periods: (i) 1991 - 1994 and (ii) 1994 - 1998, it can be seen that structural impacts account for 75% of the decrease of final energy intensity more recently, compared to only 10% in the period 1991 - 1994 (table 5).

[4] In the absence of competition in the Hungarian electricity market, the emission fee in the energy sector will probably only have the role of a fund-raising instrument.

TABLE 4: PRIMARY AND FINAL ENERGY INTENSITIES 1991 - 1998

	1991	1992	1993	1994	1995	1996	1997	1998
Primary intensity	0.458	0.428	0.437	0.420	0.423	0.423	0.396	0.379
Final intensity	0.314	0.282	0.287	0.274	0.272	0.277	0.251	0.237
Final intensity at 1991 structure of GDP and with climatic corrections	0.309	0.285	0.278	0.268	0.274	0.271	0.266	0.262

Source: Energy Centre, November 2000

TABLE 5: ANNUAL VARIATIONS OF FINAL ENERGY INTENSITY AND FINAL ENERGY INTENSITY AT 1991 STRUCTURE OF GDP (WITH CLIMATIC CORRECTIONS, IN PERCENT)

	1991-1994	1994-1998
Actual final intensity (with climatic corrections)	-4.0	-2.4
Final intensity at the structure of GDP in 1991 (with climatic corrections)	-4.4	-0.6
Structural impact	0.4	-1.8
Structural impact in percentage of the current final intensity	10.0	75.0

Source: Energy Centre, November 2000

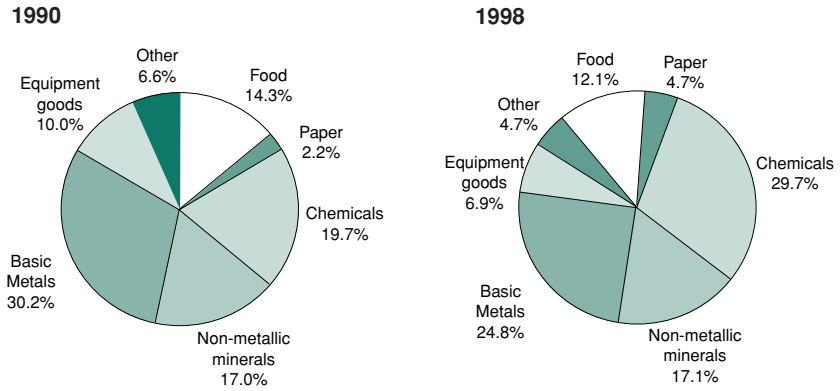
Among the reasons for the high primary energy intensities is the low average efficiency of energy conversion in the electricity sector (see below).

INDUSTRY

Figure 3 shows the energy consumption of the industry sector in 1990 and 1998. The total industrial consumption fell during this period by 34.4%. The decrease was particularly significant in 1990 - 1992, with a total of 27% or an annual average of 9%. Since then, total industrial consumption has been slightly decreasing with the exception of the years 1996 and 1998.

Regarding the structure of energy consumption, the share of basic metals and machinery in particular has been declining, while other branches such as chemicals and paper have increased their share (see figure).

FIGURE 3: ENERGY CONSUMPTION OF MANUFACTURING BY BRANCH IN 1990 AND 1998



Source: Energy Centre, November 2000

The final energy intensity of manufacturing [5] decreased at a rate of 10% from 1991 to 1994, and by 7.5% between 1994 and 1998. As table 6 shows, structural changes accounted for 22% of the intensity reduction between 1994 - 1998, and for 85% of the decrease in the period 1994 - 1998.

TABLE 6: ANNUAL VARIATIONS OF FINAL ENERGY INTENSITY AND FINAL ENERGY INTENSITY AT 1991 STRUCTURE OF MANUFACTURING (WITH CLIMATIC CORRECTIONS, IN PERCENT)

	1991-1994	1994-1998
Actual final intensity (with climatic corrections)	-10.0	-7.5
Final intensity at the structure of GDP in 1991 (with climatic corrections)	-7.8	-1.1
Structural impact	-2.2	-6.4
Structural impact in percentage of the current final intensity	22.0	85.3

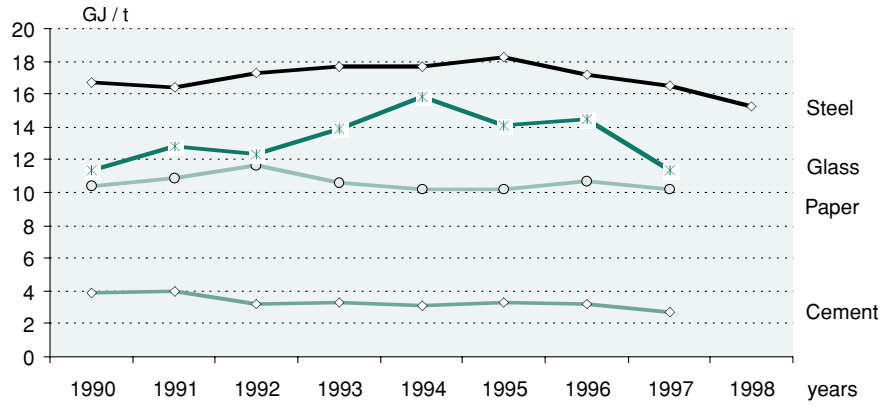
Source: Energy Centre, November 2000

The specific energy consumptions of energy intensive products have in general decreased. In the years following the political transformation, the large-scale decrease of production of some products led to an increase in specific consumption,

[5] Defined as industry excluding mining and construction.

which then, as a result of the adoption of new production processes, started to diminish (see figure 4).

FIGURE 4: UNIT CONSUMPTION TRENDS OF ENERGY INTENSIVE PRODUCTS



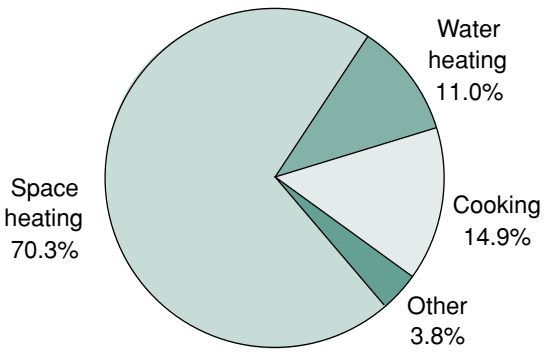
Source: Energy Centre, November 2000

Large industrial consumers, represented by the Association of Industrial Energy Consumers, are at the moment mainly focused on the forthcoming liberalisation of the electricity and gas markets, although significant energy efficiency potentials still exist in the industrial sector.

RESIDENTIAL

According to a survey of the Central Statistical Office, concluded in 1996, households use 70% of energy for space heating, 11% for water heating, 15% for cooking and 4% for electrical appliances and lighting (see figure 5).

FIGURE 5: HOUSEHOLD ENERGY CONSUMPTION BY USE, 1996



Source: Energy Centre, November 2000

Table 7 shows the specific unit consumptions of households in the period 1990 - 1998. As can be seen from the table:

- Total consumption per permanently occupied dwelling decreased from 87 GJ/dwelling in 1990 to 65.4 GJ/dwelling in 1998 (average annual decrease of 3.1%).
- Consumption for space heating decreased from 61.2 GJ/dwelling in 1990 to 45.9 GJ/dwelling in 1998, equalling the annual average decrease of total consumption per dwelling.
- Space heating consumption per square metre decreased from 0.900 GJ/m^2 in 1990 to 0.633 GJ/m^2 in 1998, i.e. an average annual decrease of 3.7%, which is higher than the decrease per dwelling.
- Electricity consumption per dwelling increased from 8.97 GJ/dwelling in 1990 to 9.44 GJ/dwelling in 1998, i.e. an average annual increase of 0.7%.

TABLE 7: UNIT CONSUMPTION OF HOUSEHOLDS, 1990 - 1998 (GJ/UNIT, WITH CLIMATIC CORRECTION)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Unit consumption per dwelling	87.0	78.5	70.3	66.8	65.5	68.6	58.6	68.6	65.4
Consumption of space heating per dwelling	61.2	55.2	49.4	46.9	46.0	48.2	41.2	48.2	45.9
Consumption of space heating per square metre	0.900	0.806	0.716	0.676	0.658	0.684	0.577	0.670	0.633
Electricity consumption per dwelling	8.97	9.50	10.19	9.39	9.47	9.39	9.61	9.55	9.44

Source: Energy Centre, November 2000

Between 1990 and 1998 the number of dwellings heated by district heating increased by 0.1% on annual average. Compared to the total number of dwellings, the share of dwellings heated by district heating decreased from 16.6% to 16%. In the same period, the consumption of heating and hot water supplied by district heating decreased by 1.3% per year, i.e. the efficiency of district heating has slightly improved.

Buildings in Hungary are in general quite old: 50% of the buildings have been built before 1945. On the other hand, poor energy efficiency is mainly a problem in apartment buildings constructed with prefabricated panels. 550 000 of the approximately 4 million dwellings in Hungary are located in such buildings, which have been built around 30 years ago. These buildings, which are in general supplied with district heat, have very high heat losses due to lack of insulation and air exchange and are often inhabited by persons with low incomes, who might not be in a position to spend money for the necessary improvements.

Regulations for thermal insulation of new residential buildings were first introduced in the seventies and updated regularly. According to the Energy Centre, the standard adopted in 1991 complies with the "average European regulation" and is based on heat loss per cubic metre. The Act on the development and protection of the built environment (Act LXXVIII. of 1997) emphasises the importance of thermal insulation in new and renovated buildings. The thermal insulation standards applied for the construction of new buildings are prescribed in the FVM (Ministry of Agriculture and Rural Development) Ministerial Decree 96/1999 (XI. 5.).

According to the District Heating Law, there is also a regulation concerning metering and accounting requirements for new apartment buildings. The Act XVIII of 1998 on the District Heating Supply prescribes the metering obligations of the suppliers. Depending on the regulations of the local governments, but at latest from 2003 the metering is obligatory.

Appliance labels and minimum energy efficiency standards have been introduced from 1994 onwards in accordance with EU legislation. The Hungarian Standards Institution is responsible for the preparation and application of appliance energy efficiency standards in Hungary. Hungary already applies all of the EU energy efficiency labelling standards for refrigerators, freezers (introduced by the Ministerial Decree 1/1998 IKIM r.) washing machines and clothes dryers (77/1999 and 78 /1999 GM r.).

Tertiary

The tertiary (services) sector is contributing 17.7% to the total final energy consumption. Its proportion has been significantly increasing during the nineties (from 10% in 1990).

Energy and electricity intensity per gross value added and unit consumption per employee are shown in table 8.

TABLE 8: ENERGY AND ELECTRICITY INTENSITY (MJ/HUF '91) AND UNIT CONSUMPTION PER EMPLOYEE (GJ/EMPLOYEE) IN THE TERTIARY SECTOR, 1991 - 1998

	1991	1992	1993	1994	1995	1996	1997	1998
Energy intensity (MJ/HUF'91)	0.073	0.066	0.081	0.085	0.088	0.096	0.084	0.083
Electricity intensity (MJ/HUF'91)	0.015	0.017	0.017	0.018	0.020	0.020	0.021	0.021
Energy unit consumption (GJ/employee)	n.a.	38.56	47.54	52.20	52.26	59.23	53.02	53.57
Electricity unit consumption (GJ/employee)	n.a.	9.65	10.25	10.79	11.71	12.23	12.95	13.38

Source: Energy Centre, November 2000

After some fluctuations, final energy intensity increased by 2% annually. The faster increase in electricity intensity over average energy intensity is explained by the increasing number of electrical appliances and the penetration of air conditioning in the services sector.

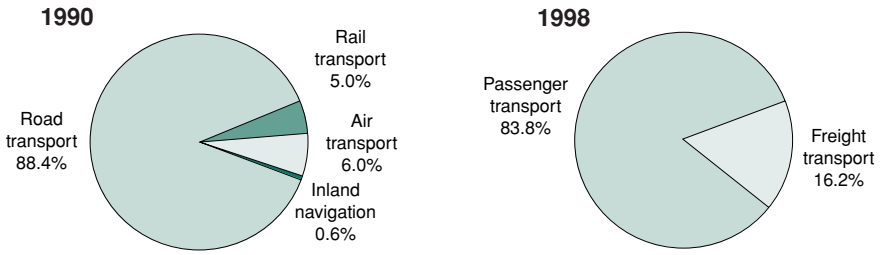
Due to growing unemployment and increasing energy consumption, unit consumption per employee went up by 6.5% on annual average. The increase is partly due to the increase in labour productivity of 1.7% annually and partly due to deteriorating energy efficiency in the services sector.

Transport

The contribution of the transport sector to total final energy consumption has been increasing from 15.7% in 1990 to 19.1% in 1998.

Figure 6 shows the energy consumption per transport mode and by service in 1998.

FIGURE 6: ENERGY CONSUMPTION BY TRANSPORT MODE AND BY SERVICE, 1998 (PER CENT)



Source: Energy Centre, November 2000

It can be seen that road and passenger transport are dominating the sector. Cars dominate road transport with a share of 66.1% in 1998. In the period 1990 - 1998, the number of passenger cars grew by an annual average of 1.8%. The number of light trucks grew even faster, while the number of trucks and buses was reduced.

Table 9 shows the energy intensity of the transport sector (relating to total GDP), as well as the unit consumption of passenger and freight transport.

TABLE 9: ENERGY INTENSITY (GJ/HUF '91) AND UNIT CONSUMPTION OF PASSENGER TRANSPORT (MJ/PASSENGER-KM) AND FREIGHT TRANSPORT (TON-KM), 1991 - 1998

	1991	1992	1993	1994	1995	1996	1997	1998
Energy intensity (GJ/HUF'91)	0.0446	0.0437	0.0436	0.0427	0.0410	0.0383	0.0402	0.0477
Unit consumption of passenger transport (MJ/passenger-km)	1.33	1.40	1.45	1.43	1.42	1.40	1.43	1.58
Unit consumption of freight transport (MJ/tonne-km)	0.76	0.69	0.79	0.76	0.73	0.74	0.81	0.94

Source: Energy Centre, November 2000

Unit consumption of both passenger and freight transport remained more or less stable until 1996, and have been increasing since then. The increases in unit consumptions are due to the structural changes in transport mode: less rail transport, more car and air transport in the case of passengers; less rail and inland water transport and more road transport in the case of freight.

Also in metropolitan public transport, the share of rail and bus transport decreases at the cost of passenger cars.

Energy Transformation

The average efficiency of energy transformation was 69.9% in 1998 [6], which is composed of the following key components:

■ Oil refining	99.8%
■ Thermal public power generation	34.4%
■ Nuclear power generation	33.6%
■ Combined heat and power production	77.8%
■ Public heat production	84.6%

Taking into consideration the shares of the different sources of electricity production (including CHP), the average efficiency of electricity generation is 38.3%.

6. Energy efficiency policies and programmes

Energy efficiency policies and programmes initiated before 1999

Active energy efficiency policies in Hungary started in 1995, when the Government adopted the ***National Energy Saving and Energy Efficiency Improvement Programme***, which was established in the framework of the Energy Policy Concept (Resolution 2399/1995). Major issues addressed by the Programme included: (i) least-cost planning and demand side management, as defined in the Electricity and Gas Laws, (ii) cost-based energy pricing in order to motivate energy saving, (iii) development of a new energy statistics and information system, (iv) introduction of individual metering and regulation in new apartment blocks with district heating supply, (v) implementation of minimum standards for the insulation of new buildings, (vi) energy efficiency labelling of household appliances, (vii) awareness raising and education on energy saving, (viii) improving energy efficiency in municipalities - via the Energy Saving Credit Programme (see below), (ix) training for energy professionals, (x) increasing the use of renewable energy and (xi) prioritising energy efficiency in state financed R&D programmes.

Based on this programme, the ***Energy Saving Action Plan (ESAP)*** was adopted in 1996, focusing on: (i) the penetration of renewables, (ii) energy efficiency improve-

[6] No detailed figures are available for the period before 1998.

ments, (iii) energy efficiency labelling and (iv) education, information and technology innovation.

It is unclear, to what extent the objectives of the 1995 Programme have been achieved. According to critics [7], performance has in general been poor, including problems such as : lack of co-ordination among the institutions involved, limitations to the application of DSM by utilities, problems to enforce building standards, lack of awareness campaigns to accompany the introduction of labels, lack of substantial incentives for renewable energy, etc.

Part of this Programme was the ***Energy Saving Credit Programme (ESCP)*** established in 1996. In the framework of this programme the total investment cost spent on energy efficiency projects was 4.692 billion HUF (€ 17.6 million), of which 3.554 billion HUF were preferential credit. So far the ESCP has focused on funding energy saving programmes at municipal level, modernisation of district heating systems and the development of energy service company financing. The funds are provided by a local bank - winner of the annual tender through which the interest rate of the loan (the lowest offer) is set. Part of the subsidy is a grant provided by the Economic Development Fund of the Ministry of Economic Affairs. Applications are evaluated by the bank and by an Inter-Ministerial Committee which analyses the technical feasibility and the level of energy saving. Main clients of the ESCP are municipalities. While the feedback from municipalities has so far been satisfactory, the upper limit of the Fund (25 million HUF) seems to be on the low side, taking into consideration that investments in heating reconstructions are the main utilisation of the Fund, in addition to projects involving the modernisation of lighting systems. So far, the ECSP has funded 326 projects.

Within the new Energy Saving and Energy Efficiency Action Programme of the Government, adopted in September 1999 (see below), the number of applications has been increasing dramatically, which may pose challenges to the evaluation and funding process.

In addition to the Energy Saving Credit Programme, various other funding schemes for energy efficiency exist in Hungary. Some of them originate from before 1995, and apparently have been important catalysts in shaping the Government's energy efficiency programmes. Table 10 provides a concise overview of programmes sponsored by the Hungarian Government and by foreign agencies, including the European Union.

[7] Energy Club, 2000.

The first programme of this kind established in Hungary is the ***German Coal Aid Fund***, which came into force already in 1991 and has spent to date more than 9.9 billion HUF (€ 37.2 million) on energy efficiency projects. The total investment cost of the projects implemented with the support of the German Coal Aid until the end of 2000 is 14.4 billion HUF. The Government estimates that this programme has so far induced an annual reduction in energy use amounting to 6.9 PJ (165 ktoe), and has resulted in annual savings of 5.549 billion HUF.

TABLE 10: ENERGY EFFICIENCY PROGRAMMES IN HUNGARY

Source: Energy Centre, 2001

	UNDP/GEF Public Sector Energy Efficiency Programme	IFC/GEF Energy Efficiency Co-financing Programme	IFC/GEF Efficient Lighting Initiative	Phare Revolving Fund (Ph VHK)	Energy Saving and Energy Efficiency Action Programme (Szchenyi Plan)	German Coal Aid Fund (EHA)	Block of flats' Credit Programme	Energy Efficiency Credit Programme (EHP)
Private sector EE measures (includes industry and residential sectors)		**Approach** Guarantees and limits technical assistance	**Approach** Financial incentives, public education, transaction support, market aggregation, utility programmes	**Approach** Financial support (unavailable to individuals and to state-owned firms)	**Approach** Financial support	**Approach** Financial support -	**Approach** Financial support	**Approach** Financial support
		Technologies Efficient lighting, building and district heating, boiler and control systems, motors and industrial processes	**Technologies** Efficient lighting	**Technologies** Energy saving projects based on professional audit; District heating modernisation, CHP, efficient lighting	**Technologies** (district heating modernisation, increasing of use of renewable energy sources, approach of energy saving, energy audit, energy-efficient traffic/transport organisation, R&D support for SMEs)	**Technologies** Energy saving projects (decrease of energy losses; use of modern, energy efficient technologies, renewable energies, district heating, efficient lighting, CHP)	**Technologies** Energy saving projects (modernisation, isolation, district heating modernisation)	**Technologies** (energy audit, district heating)
	Budget -	**Budget** (included below)	**Budget** (included below)	**Budget** (included below)	**Budget** (included below)	**Budget** (included below)	**Budget** (included below)	**Budget** (included below)
	Type -	**Type** Guarantee	**Type** n.a.	**Type** Interest-free credit	**Type** Subsidy	**Type** Interest-free credit	**Type** Interest subsidy	**Type** Interest subsidy

	UNDP/GEF Public Sector Energy Efficiency Programme	IFC/GEF Energy Efficiency Co-financing Programme	IFC/GEF Efficient Lighting Initiative	Phare revolving fund (Ph VHK)	Energy Saving and Energy Efficiency Action Programme (Szchenyi Plan)	German Coal Aid Fund (EHA)	Block of flats' Credit Programme	Energy Efficiency Credit Programme (EHP)
Public Sector EE measures	**Approach** Technical assistance and limited financial support (Support to EE policy and co-ordination, training and capacity building, EE information system, technical assistance, support to public EE finance)	**Approach** Guarantees and limited technical assistance through private firms	**Approach** Market Transformation (Project to be appraised in September-October 1999)	**Approach** Financial support (unavailable to individuals and to state-owned firms)	**Approach** Financial support	**Approach** Financial support	**Approach** Financial support	**Approach** Financial support
	Technologies Building and district heating, water heating, public lighting, fuel-switching, boiler and control systems	**Technologies** Efficient lighting, building and district heating, boiler and control systems	**Technologies** Efficient lighting (eventually)	**Technologies** Energy saving projects based on professional audit; District heating modernisation, CHP, efficient lighting	**Technologies** (Energy saving, reducing of energy costs, efficient lighting, farm electrification, development of energy management)	**Technologies** Energy saving projects (decrease of energy losses; use of modern, energy efficient technologies, renewable energies, district heating, efficient lighting, CHP)	**Technologies** Energy saving projects (modernisation, isolation, district heating modernisation)	**Technologies** (Energy saving investments)
	Budget ~ 4.6 Mn US$	**Budget** 5 Mn US$	**Budget** 1.25 Mn US$	**Budget** ~ 5 Mn _ (4.43 Mn US$)	**Budget** ~5 billion HUF (for 2001) (~16.75 Mn US$)	**Budget** ~9.951 billion HUF (for 1991-2000) (~33.34 Mn US$)	**Budget** ~10Mn US$	**Budget** ~3.554 billion HUF (1997-2000) (11.9 Mn US$)
	Type Subsidy	**Type** Guarantee	**Type** n.a.	**Type** Interest-free credit	**Type** Subsidy	**Type** Interest-free credit	**Type** Interest subsidy	**Type** Interest subsidy

The initial capital of the German Coal Aid Fund was a (non-repayable) grant from the German Government of 30 million DM [8]. The Fund works as a revolving fund (loan repayments return to the fund for new loans). Interest rates are approx. 50% of the national bank primary interest rate. From 1991 - 2000, the Fund has provided 50 loans annually, with an average amount of 20 million HUF. The Fund provides loan facilities up to 80% of the project costs, maximum loan is 80 million HUF. Out of 450 projects funded, only 10 failed, usually because of bankruptcy of firms. Typical projects are related to heating systems, building insulation, new production technologies, fuel substitution, etc. The Fund operates under the responsibility of the Ministry of Economic Affairs, with the assistance of ABN AMRO Bank (formerly the Hungarian Credit Bank) and the Energy Centre (the former Energy Information Agency).

The German Coal Aid Fund is one of the most popular and successful funding sources in Hungary, mainly due to the fact that its eligibility criteria are very broad with few restrictions in addition to a very transparent modus operandi (the Fund is open for all kinds of interested parties and has evolved as an important funding source for SMEs).

In the framework of the PHARE Programme a preferential credit scheme the so-called ***Phare Revolving Fund*** was established with € 5 million for energy efficiency purposes. The Energy Efficiency Co-financing Scheme (EEFS) established under the PHARE Programme started in 1998 and provides an interest-free credit component from the Revolving Fund together with an interest bearing loan component provided by commercial banks. The volume of the PHARE component of the loan must be between € 20 000 and 400 000 and may not exceed 25% of the total eligible project cost. By mid 2000 almost 80 loan applications were submitted to the two banks operating the EEFS. The total cost of all projects is over € 37.6 million, with a total loan amount of about € 23.6 million, including € 6.2 million interest free PHARE component. Beneficiaries are typically municipalities, private and municipality owned companies and in 10% of the cases third party financing agents. Technologies are mainly efficient street lighting, small-scale combined heat and power systems, improvements of production processes and - to a lesser extent - projects involving renewable energies. Total savings are estimated at 1.613 TJ/year of primary energy, corresponding to a reduction of CO_2 emissions of about 110 kt/year.

[8] The name "German Coal Aid Fund" refers to the fact, that the fund's capital of 30 million DM originates in the income from the sale of imported coal, purchased under a grant of 50 million DM from Germany in 1991.

The ***Pilot Panel Programme*** or Soft Loan System for Panel Reconstruction, established in 1996, makes low-interest funding available for the energy-efficient refurbishment of buildings constructed from pre-fabricated panels, including insulation and heating system modernisation. The interest rate is set at below 10%. The budget is approx. 10 million US$.

The ***Hungarian Energy Efficiency Co-finance Programme (HEECP)*** was launched in 1997 by the International Finance Corporation (IFC) Environmental Projects Unit with a total of 5.0 million US$ funding from the Global Environmental Facility (GEF). The funds are allocated as follows: 4.25 million US$ as guarantee reserves, US$ 300.000 for technical assistance and US$ 450.000 for programme administration and operations over a four year period. After successful termination of the pilot phase, the guarantee facility has been expanded to 16 million US$.

Under the guarantee programme, participating local financing institutions execute so-called Guarantee Facility Agreements with the IFC. HEECP provides partial guarantee support to credits provided by the financial institutions for energy efficiency projects (50% in the pilot phase and 35% under HEECP-2). The rationale of the project is to overcome barriers to energy efficiency project finance which are due to (i) credit risk barriers, including weak or uncertain end-user credit, (ii) the gap between perceived and real credit risk due to capital market inexperience with energy efficiency investments and (iii) lack of properly structured and creditworthy projects seeking financing, coupled with the relatively high transaction costs and risks associated with energy efficiency project development. While the guarantee programme addresses the problems associated with credit risk, the technical assistance component aims to provide technical expertise as well as make available small grants for: (i) marketing of services by participating financing institutions, (ii) project identification, development and investment preparation, (iii) general energy efficiency market promotion activities (iv) and programme evaluation activities.

Credit guarantees have so far been provided to 15 energy efficiency projects (street lighting and heating systems) with a total investment of approx. 3.7 million US$.

Technical assistance funds are also provided to ESCOs (see section 7). HEECP also seeks ways to promote expanded energy efficiency markets in Hungary in co-operation with other commercial, governmental and NGO agencies.

Other GEF-financed programmes are the UNDP/GEF Public Sector Energy Efficiency Programme and the IFC/GEF described below.

The ***SCORE Programme*** is a mechanism funded by the Dutch Government which made 165 million HUF available for the development of energy efficiency institutions and networks and demonstration projects (see section 7). In addition to these funding mechanisms, there have been various EU initiatives, including support under the THERMIE, SAVE and SYNERGY Programmes.

Energy efficiency policies and programmes initiated since 1999

With Government resolution 1107/1999, a new ***Energy Saving and Energy Efficiency Action Programme*** was adopted in September 1999, following the National Energy Saving and Energy Efficiency Improvement Programme of 1995. The new programme defines the following targets by 2010:

- Reduction of energy intensity with 3.5%/year, assuming an annual growth of GDP of 5%/year and a growth rate of energy consumption of 1.5%/year.
- Saving of 75 PJ/year (1.8 Mtoe/year) of primary energy sources.
- Reduction of 50 kt/year of SO_2 and 5 Mt/year of CO_2 emissions.
- Increase of renewable energy production from the present 28 PJ to 50 PJ/year (1.2 Mtoe/year)

Initial funding of the Action Programme is provided from the Economic Development Fund of the Ministry of Economic Affairs. While the initial budget allocation was HUF 1 billion/year for the year 2000, the budget for 2001 has been increased to HUF 2 billion, supplemented by additional funding of 3 billion HUF from the Housing Programme of the Széchenyi Plan, earmarked for funding of energy efficiency measures in the housing sector [9]. The Housing Programme is managed by the Building Department of the Ministry of Economic Affairs.

The decree also establishes the possibility to use part of the planned Environmental Emission Fee for the Programme.

The Energy Saving and Energy Efficiency Action Programme includes 15 actions, which are presented in table 11.

The main highlights of the various actions are briefly presented in the following (for further details please refer to tables 11 and 12):

[9] Compared with the total budget of the Széchenyi Plan for 2001 of 295.9 billion HUF, the budget allocation for energy efficiency corresponds to 1.7% of the total budget or 4.3% of the budget of the housing programme (see section 2).

1. Revealing the possibilities of support from the European Union

Revealing the possibilities of making use of EU grants before and after accession, in order to complement funding from national sources.

2. Energy saving attitude, ongoing education

This action aims at providing information and education via the educational system and the organisation and operation of advisory networks and consumer offices, as well as via advertisements, the media, etc. Another specific point of action is the promotion of the use of energy efficiency labels.

3. R&D relating to energy saving and expanding renewable energy sources

This action aims at encouraging the participation of Hungarian scientists in foreign research, as well as the incorporation of energy saving and environmentally friendly technologies in the Hungarian R&D, including demonstration projects. The priority of energy efficiency within R&D has to be ensured with legal instruments and with preferential credits.

4. To perform regular investigations (audits) revealing energy loss in production

The Programme will provide grants for energy audits at companies with energy costs of HUF 50 million per year or higher and support the implementation of energy saving measures identified.

5. To improve the energy management of local governments

Following the experiences of the Energy Saving Credit Programme, grants will be provided for the local governments to elaborate local energy saving concepts, energy plans and perform energy audits.

6. Planning for least cost application of programmes influencing consumer demand

In accordance with new and expected energy sector legislation, a methodology will be developed to induce energy suppliers to reduce consumer side energy demand, taking into consideration compensation for costs arising for energy suppliers from their involvement in these measures.

TABLE 11: ENERGY SAVING AND ENERGY EFFICIENCY ACTION PROGRAMME 1999 - 2010

Action	Energy saving objective	Institutions in charge	Period	Funding source	Amount of funding[10]	Funding mechanism
1. Revealing the possibilities of support from the European Union	-	Min. Economic Affairs Min. Foreign Affairs Min. Finance	1999 - 2010	-	-	-
2. Energy saving attitude, ongoing education	10 PJ/year until 2010	Min. Economic Affairs Min. Education Min. Environment	2000 - 2001 2002 - 2010	Economic Dev. Fund Environm. Emiss. Fee	HUF 25 million/year at least HUF 100 — 200 million/year	targeted grants
3. R&D relating to energy saving and expanding renewable energy sources	not defined	Min. Economic Affairs Nat. Committee for Technological Development Min. Environment	2002 - 2010	Environm. Emiss. Fee	not yet defined	preferential credit
4. To perform regular investigations (audits) revealing energy loss in production	not defined	Min. Economic Affairs Energy Centre	2000 - 2001 2002 - 2010	Economic Dev. Fund Environm. Emiss. Fee	HUF 25 million/year about HUF 100 million/year	preferential credit
5. To improve the energy management of local governments	not defined	Min. Economic Affairs Energy Centre	2000 - 2001 2002 - 2010	Economic Dev. Fund Environm. Emiss. Fee	HUF 25 million/year about HUF 100 million/year	preferential credit
6. Planning for least cost application of programmes influencing consumer demand	5 PJ/year until 2010	Min. Economic Affairs Energy Centre	2000 - 2010	Economic Dev. Fund Environm. Emiss. Fee	not yet defined	acknowledging costs of DSM by price authority
7. Energy saving organisation of transport and transportation	not defined	Min. Transport Min. Economic Affairs Min. Environment	2000 - 2001 2002 - 2010	Economic Dev. Fund not defined	HUF 25 million/year not yet defined	preferential credit and non-reimbursable grants
8. To moderate the use of industrial energy	8.5 PJ/year until 2010	Min. Economic Affairs Energy Centre	2002 - 2010	Environm. Emiss. Fee	not yet defined	preferential credit (interest subsidy)
9. Modernisation of the transport	4.5 PJ/year until 2010	Min. Transport Min. Economic Affairs Min. Environment	not defined	Environm. Emiss. Fee	not yet defined	preferential credit

[10] Original funding levels 2000 – 2001. Levels have been increased for 2001 according to table 12.

10. Energy-technological modernisation of agricultural production	0.5 PJ/year until 2010	Min. Economic Affairs Min. Agriculture	2002 - 2010	Environm. Emiss. Fee	not yet defined	preferential credit
11. Support for population and public energy saving	10 PJ/year until 2010	Min. Economic Affairs Min. Interior Energy Centre	2000 - 2001 2002 - 2010	Economic Dev. Fund not defined	HUF 100 million/year not yet defined	mainly non-reimbursable grants
12. To increase the application of alternative heating systems	not defined	Min. Economic Affairs	2002 - 2010	Environm. Emiss. Fee	not yet defined	preferential credit and non-reimbursable grants
13. Modernisation of energy consumption used for public lighting for local governments	1.2 PJ/year until 2010	Min. Economic Affairs Energy Centre	2002 - 2010	Environm. Emiss. Fee	not yet defined	preferential credit
14. Expanding the consumption of renewable energy sources	20 PJ/year until 2010	Min. Economic Affairs Min. Agriculture Min. Environment Min. Finance	2000 - 2001 2002 - 2010	Economic Dev. Fund Environm. Emiss. Fee	HUF 100 million/year at least HUF 400 — 500 million/year	preferential credit and non-reimbursable grants
14a. Expanding the use of biomass, geothermal energy, organic waste	not defined	Min. Economic Affairs Min. Environment Energy Centre	2000 - 2010	Economic Dev. Fund Environm. Emiss. Fee	not yet defined	not defined
14b. Programme for 20 000 roofs with solar cells, 2010	not defined	Min. Economic Affairs	2000 - 2010	Economic Dev. Fund Environm. Emiss. Fee	not yet defined	20-30 % of the total amount is non- reimbursable grant
15. Renewal of district heating systems, making district heat supply competitive	10 PJ/year until 2010	Min. Economic Affairs Min. Finance Min. Environment Energy Centre	2000 - 2001 2001 - 2010	Economic Dev. Fund Environm. Emiss. Fee	HUF 300 million/year not yet defined	preferential credit (suppliers) non-reimbursable grants (consumers)
Total	125 PJ/year		1999 - 2010	Economic Dev. Fund Environm. Emiss. Fee	HUF 1 billion/year in 2000 and HUF 5 billion in 2001 not yet defined	

1€ = 267 HUF (april 2001)
Sources: Government Resolution 1107/1999 (Appendix), Hungary Regular Review 2000.

7. Energy saving organisation of transport and transportation

Incentives will be provided for organisational measures that will moderate the increase of road transportation and shift it to railways, waterways and combined way, as well as to moderate the use of passenger cars and switch traffic to public transport. No further details are given.

8. To moderate the use of industrial energy

Grants will be provided for: (i) energy-technological modernisation of industrial production, (ii) improving heat insulation, (iii) improving the efficiency of energy consuming equipment and (iv) improving the efficiency of energy producing equipment.

9. Modernisation of the transport

This action is aimed at the reconstruction of energy saving and environmentally friendly transport alternatives (railway, water) and public transport, as well as improving the technical level and replacement of existing vehicles.

10. Energy-technological modernisation of agricultural production

Grants will be provided to modernise technologies leading to energy saving.

11. Support for population and public energy saving

Grants will be provided for investments aimed at the improvement of heat insulation of buildings (facades, roofs, cellars, doors and windows) and the modernisation of the internal heat supply in buildings with district heating (regulation and measurement).

12. To increase the application of alternative heating systems

This action is aimed at moderating the consumption of gas and increasing the use of biomass and dual-fired (solid fuel and gas) heat generation at household, municipal and public consumers.

13. Modernisation of energy consumption used for public lighting for local governments

This action is aimed at moderating the costs of public lighting by substitution of lamps and other technical measures.

14. Expanding the consumption of renewable energy sources

Elaboration of a programme to increase the use of renewable energy sources, identify foreign funds and grants accessible for that purpose and to provide financial support to projects.

14a. Expanding the use of biomass, geothermal energy, organic waste

This specific activity is aimed at capacity building for electricity generation from these renewable sources.

14b. Programme for 20 000 roofs with solar cells, 2010

It is intended that this programme will provide 20-30% of the investment necessary for institutional and residential buildings to install solar thermal and photovoltaic installations.

15. Renewal of district heating systems, making district heat supply competitive

Drafting a proposal for a modernisation programme for district heating systems and providing support to (i) increasing combined heat and power generation (CHP), (ii) reconstruction and implementation of heat measurement at the supply-side and (iii) introduction of regulation and cost allocation at the consumer side.

Table 12 gives some details concerning the initial phase of the Energy Saving Action Programme.

In general, the Energy Saving Action Programme intends to mobilise some 200 billion HUF (€ 750 million) of investments, by providing 50 billion HUF (€ 187 million) of support over a ten-year period. Support is provided either by preferential credit (subsidised interest rate) or as non-reimbursable grants.

In relation to the financing of the Programme, it should be noted, that the Environmental Emission Fee, which is supposed to be the major source of funding of the programme in the period 2002 - 2010, is still under discussion. Firm financing is so far only available for the period 2000 - 2001, in concrete terms for actions 2., 4., 5., 7., 11., 14. and 15, while budget allocations for 2002 are expected. While it does seem preferable from an operational point of view to concentrate in the initial phase of the Programme on a few actions, rather than a very broad approach, securing financing for the period 2002 - 2010 appears to be a high priority.

Regarding funding levels, it should be noted that - although an important increase in funding has already taken place - present levels of typically 25 - 100 million HUF/year (€ 90.000 - 375.000) per action may not be sufficient to reach the ambitious targets of the programme. In the case of action 15 (renewal of district heating systems), e.g., the amount allocated of 315 million HUF for 2001 (€ 1.2 million) is certainly negligible compared to the scale of investment needed for rehabilitation and modernisation of the district-heating sector. Extending the funding base, as stated above, will therefore be a critical factor for the overall success of the Programme (see section 9 for a more detailed discussion).

TABLE 12: SZÉCHENYI PLAN - ENERGY SAVING ACTION PROGRAMME (ACTIONS UNDER IMPLEMENTATION IN 2001)

Name of the sub programme	Beneficiary	Objectives	Total amount available (Million HUF)	Max. amount per application (HUF)
1) Residential sector	• Flat / house owners • Housing co-operatives • Entrepreneur	• Additional insulation of flats and houses (wall, roof, cellar, etc.) Change or insulation of doors and windows • Modernisation of heating and hot water supply systems	500	350 000/ 500 000
2) Energy Credit Programme (EHP)	• Local governments and • Their enterprises • Firms providing third party financing	• Reducing the energy need for energy transformation and end use • Metering and control of heat and hot water use • Reducing the heat loss of the doors and windows • Reducing the heat loss using additional insulation • Reducing the electricity consumption • Installation of CHP • Installation of heat pump • Use of renewable energy sources and waste	300	25 million
3) Modernisation of Public lighting system	• Local governments and • Their enterprises • Firms providing third party financing	• Modernisation of public lighting • Developing the electricity grid in order to reach the remote farms	150	25 million
4) District heating Supply side	• District heating companies • Owner local government • Firms providing third party financing	• Installation or extension of CHP capacities • Reconstruction of the supply side heat production equipment, measuring	315	50 million
5) Renewable energy	• Flat /house owners • Housing co-operatives • Entrepreneur • Companies • Local governments	• Installation of power plants using renewable energy sources • Increasing the use of biomass • Increasing the use of geothermal energy • Increasing the use wind energy • Increasing the use of organic waste • Installation of solar collectors • Installation of heat pump	350	250 000/flat in case of local governments and firms: 35 million
6) Awareness raising	• Civil Organisations • Educational institutions • Firms, entrepreneurs	• Information supply about the efficient energy use for the consumers • Activities influencing or changing the present energy consumption patterns • Motivation of the consumers for energy efficiency actions • Energy efficiency advising for the population • Linking energy efficiency with environmental protection	50	5 million

7) Audit of the companies	• Companies with energy cost of more than HUF 30 million /year • Entrepreneurs	• Implementing energy audit of the company	25	5 million
8) Audit of local governments	• Local governments • Entreprises	• Preparing the energy saving concepts and plans of local governments • Revealing of energy losses (energy audit)	35	5 million
9) Transport organisation	• Research institutions • Local governments • Civil organisations • Transport Companies	• Reducing the energy need of transport with organisational measures • Investigating the transport energy use of municipalities and transport companies in order to modernise the system • Awareness raising activity aiming to improve the energy efficiency of the transport and to moderate the increase of road transportation and to shift it to railway, waterway and combined ways.	25	5 million
10) SMEs	• Entreprises • Entrepreneurs	• Reducing the energy need of energy transformation and end use • Reducing the energy losses (e.g: modernisation of the boilers etc.) • Metering and control of heat and hot water use • Reducing the heat loss of doors and windows • Reducing the heat loss with additional insulation • Reducing the electricity use • Installation of CHP equipment • Installation of equipment for utilisation of the waste-heat and waste	50	10 million for energy efficient modernisation of SMEs 2.5 million for equipment development

1€ = 267 HUF (April 2001)
Source: Energy Centre, 2001.

In parallel to the National Energy Saving and Energy Efficiency Action Programme, the ***UNDP/GEF Public Sector Energy Efficiency Programme*** aims at helping Hungary to improve energy efficiency in the public sector. The programme seeks to remove barriers to improved energy efficiency in municipal buildings, including schools, hospitals and other public buildings. The main objectives of the programme, which started in 2001 are: (i) to improve the development of energy efficiency policy, increase awareness and improve co-ordination of energy efficiency policy, (ii) the identification, development and financing of energy efficiency projects in municipalities and (iii) to improve the knowledge base on energy management and energy efficiency technologies. The Energy Centre is the implementing agency of the project, under the authority of the Ministry of Economic Affairs. To manage and implement the project - and help to build the capacity of the Energy Centre - the project funds eleven additional staff situated at the Energy Centre (see section 7). The Programme also intends to reach out to municipalities and local advice centres and networks. The National Project Director is nominated by the Energy Department of the Ministry of Economic Affairs. The budget of the Programme is approx. 4.6 million US$.

Another GEF programme is the ***IFC/GEF Efficient Lighting Initiative (ELI)***, which is part of a three-year, US$ 15 million programme designed by IFC and funded by GEF to accelerate the penetration of energy efficient lighting technologies into emerging markets in Argentina, the Czech Republic, Hungary, Latvia, Peru, the Philippines and South Africa. ELI has allocated US$ 1.25 million to lower market barriers to efficient lighting in Hungary. The programme was initiated in 2000.

7. Organisation of energy efficiency activities

Government institutions

The Ministry of Economic Affairs is responsible for the design and formulation of the overall energy policy, including energy efficiency. Responsibility within the Ministry is with the Energy Department.

Regulation of the energy sector (except district heating) has been delegated to the Hungarian Energy Office, which is under the authority of the Ministry of Economic Affairs. Regulation of the district heating sector is shared with municipalities (see Annex 1).

The Hungarian Energy Office regulates the electricity and natural gas sectors through licensing procedures (for the construction, start-up and operation of new and existing

projects), through the approval of purchase agreements and through the setting of prices and tariffs. Since prices and tariffs are actually accepted or rejected by the Ministry of Economic Affairs, regulation is still not free from Government influence.

The Hungarian Energy Office is also responsible for consumer protection and promoting energy efficiency. Although the Office has a department dealing with energy efficiency, it does not appear that energy efficiency is a high priority, taking into consideration the pivotal role of the Energy Centre in this field (see below and section 9).

Other Ministries involved in energy efficiency issues are the Ministry of the Environment, the Ministry of Agriculture and Rural Development, the Ministry of Transport, Telecommunication and Water Management and - as far as district heating is concerned - the Ministry of the Interior.

While the Ministry of the Environment has played a role in shaping energy efficiency and policy, its main concern is environmental regulation in the energy sector (emissions from energy conversion). Environmental policy and its interaction with energy efficiency is discussed in section 8.

The Ministry of Agriculture and Rural Development deals with biomass and biofuels, while the Ministry of Transport, Telecommunication and Water Management deals with energy efficiency aspects within the Framework Policy of Transport (see section 5).

In 1992, the Hungarian Government and the European Union formed the “Hungarian-EU Energy Centre”, which has been one of the first co-operation schemes between the EU and Central Europe in this field. Since 1997, when the financing contract period with the EU ended, the Centre has been a so-called “public interest company”.

Building on the experience of the Hungarian-EU Energy Centre, which has functioned as an institutional background for EU-Hungarian co-operation projects, the “old” Energy Centre continued to operate as a focal point for integrating and adapting experiences from several EU countries in the Hungarian context, focusing mainly on the development of strategies, preparation of decision making, project implementation, awareness raising and coalition building. The Centre has been active in supporting the development of energy efficiency institutions and networks throughout the country, in close co-operation with NGOs and professional organisations (see below).

At present, the Energy Centre is owned by the Ministry of Economic Affairs (60%), the Ministry of Environment (25%) and the Hungarian Energy Office (15%). In 2000, the

Energy Centre was strengthened and merged with the former Energy Information Agency (EIA). It was appointed as the national energy efficiency agency mainly responsible for the implementation of the National Energy Saving and Energy Efficiency Action Programme. Main tasks of the "new" Energy Centre are managing national, bilateral and EU funded energy efficiency programmes and projects, including the Energy Saving Credit Programme.

The Energy Centre in his present form has been established by Government Resolution 1031/2000 under the official name: *"Energy Centre" Energy Efficiency, Environmental Protection and Energy* Information Agency. The same Government Resolution also creates a budget title for the Centre and stipulates the use of 100 million HUF out of the 1 billion HUF budget of the National Energy Saving and Energy Efficiency Action Programme for "project and institutional development and for managing of projects of the Action Programme by the Energy Centre". The staff of the Energy Centre has increased from eight to more than fifty.

Resolution 1031/2000 also orders the establishment of the Energy Saving Inter-ministerial Committee whose task is to "award supports related to energy saving programmes". The Committee is in charge of approving applications for funding under the Energy Saving Action Programme. Taking into consideration the increasing number of applications, this task of the Committee might turn out to be very demanding and might need the development of specific procedures.

It should be mentioned, in this context, that a condition of UNDP for granting funds under the UNDP/GEF Public Sector Energy Efficiency Programme was to fund 10 additional staff to be situated at the Energy Centre, which indicates a strong interaction between UNDP support and strengthening of the institutional base for energy efficiency in Hungary.

After the merger of the former Energy Centre with the Energy Information Agency, the Energy Centre is also responsible for reporting statistical data to the International Energy Agency and to provide information to Eurostat via the Hungarian Statistical Office. While the Energy Information Agency has already developed an excellent record of achievement in providing date in accordance with international requirements, further improvements will be implemented in the framework of the EU accession process.

The role of the "new" Energy Centre is twofold: managing energy efficiency programmes and performing reporting tasks on the one side, and advising the

Government on energy efficiency policies and instruments, on the other. Another key task will be the co-ordination of the various actors and stakeholders in energy efficiency in Hungary, including the effective co-ordination of the various actors receiving public national and international funding and to exploit synergies with purely market driven energy efficiency activities. In general, the diversity of tasks requires a strong and effective organisation of the Centre.

The Energy Centre also prepares to play an active role in Government activities aiming at meeting international environmental commitments, like emission reduction commitments under the Kyoto Protocol (see section 8).

In general, it may be stated that the Centre is in a transition process from a rather small organisation, focusing on technical advice, awareness raising, coalition building and general promotion of energy efficiency and renewable energy, to an executing agency for the implementation of Government policies. The management of the Centre is apparently well aware of the important challenges of this transition process, which do not only involve organisational matters, but also the need to realise its new role at the centre of policy implementation.

Figures 7 and 8 show the organisation charts of the Energy Department of the Ministry of Economic Affairs and of the Energy Centre. It should be noted that the Energy Department currently only involves four staff, including the Director. Taking into consideration the important and comprehensive responsibilities of the Department, this staffing level appears very low.

It should be mentioned that the Energy Centre is also part of the OPET-network of the European Commission (first as a FEM-OPET and at the present as a full member of the Network).

Stakeholders and Non-governmental Organisations

Non-governmental organisations have assumed an important role in developing awareness on energy efficiency and advising consumers throughout the country. This applies also to the less developed eastern part of Hungary.

A particularity in Hungary is the *Energy Efficiency Advisory Network* established by environmental NGOs, some of the county offices of the Enterprise Development Agency (MVA), and some county offices of the Federal Chamber of Technical and Scientific Societies (MTESZ). This means that the network has roots among the “green NGOs”, in the SME sector and in the technical field.

MTESZ is an organisation with a nationwide network of 40 “scientific associations” of engineers and scientists. It operates Houses of Science and Technology in every county centre and larger city. The activities of the “scientific associations” cover two major areas: (i) non-profit oriented activities, e.g. energy efficiency advice and (ii) profit oriented activities, such as conference organisation, commercial advisory services and education.

Activities typically carried out by the Energy Efficiency Advisory Network - in addition to advice and counselling - include exhibitions and similar awareness-raising events, facilitating small credits, meetings with neighbourhood organisations, lectures at schools, etc.

The Energy Efficiency Advisory Network comprises twenty Energy Advice Centres all over the country. Among the strengths of the Energy Efficiency Advisory Network is its proximity to the end-users, both geographically and regarding the responsiveness to the actual needs of the target groups.

The PHARE Programme has supported the establishment of in total seven Energy Advice Centres.

Many of the environmental NGOs involved in the advisory network have their roots in the “ELÉG” Energy Efficiency Programme, which focussed on awareness and capacity building campaigns and was sponsored by NOVEM from the Netherlands. They typically act as energy advice centres to municipalities, private households and SMEs and co-operate with local equipment manufacturers and retailers.

NOVEM also sponsored the SCORE (Supporting Co-operative Organisation of Rational Energy Use) Programme, which is originally an initiative of the Dutch Government to “create a self-sustaining energy efficiency structure of capable actors in Central European countries”, focusing on Hungary, Latvia and Poland.

The first phase of the SCORE Programme in Hungary (SCORE ‘97) built on the results of the “ELÉG” Campaign, focusing on capacity building, raising awareness and demonstration projects, while the second phase (SCORE ‘98-99) aimed at establishing the basis of an autonomous, nation-wide system supporting local energy activities.

The “Energy Club”, an environmental NGO founded in 1991, which has received the status of “highest public interest”, has played a central role in both the “ELÉG” Campaign and the SCORE Programme.

While the Energy Centre has confirmed its intention to continue the co-operation with the Energy Efficiency Advisory Network, concerns have been expressed by representatives of the Network with regard to the level of financial support to the Network from the Government.

In addition to the awareness raising and promotional activities of the Energy Efficiency Advisory Network, commercially driven energy efficiency activities have been gaining importance during the last years.

In 1995, the European Bank for Reconstruction and Development (EBRD) signed a loan agreement with the formerly state-owned Prometheus, of which 97% was owned by Compagnie Général de Chauffe (CGC) of France. After having acquired equity participation in Prometheus, CGC and EBRD decided to set up other ESCOs in the region. Other partners of EBRD are Honeywell and Landis & Gyr. At the moment, there are seven ESCOs operating in Hungary. ESCO activities are also supported by the Hungarian Energy Efficiency Co-finance Programme (HEECP) of IFC/GEF (see section 6).

ESCOs are mainly focusing on heating projects, in particular gas-fired boiler plants and - to a lesser extent - public lighting and thermal insulation.

Distribution companies are also developing ESCO-type activities, with a view to attracting and retaining clients after further market opening. Activities focus in particular on facility management and efficient public lighting.

FIGURE 6: MINISTRY OF ECONOMIC AFFAIRS - ENERGY DEPARTMENT

Source: Ministry of Economic Affairs, 2001

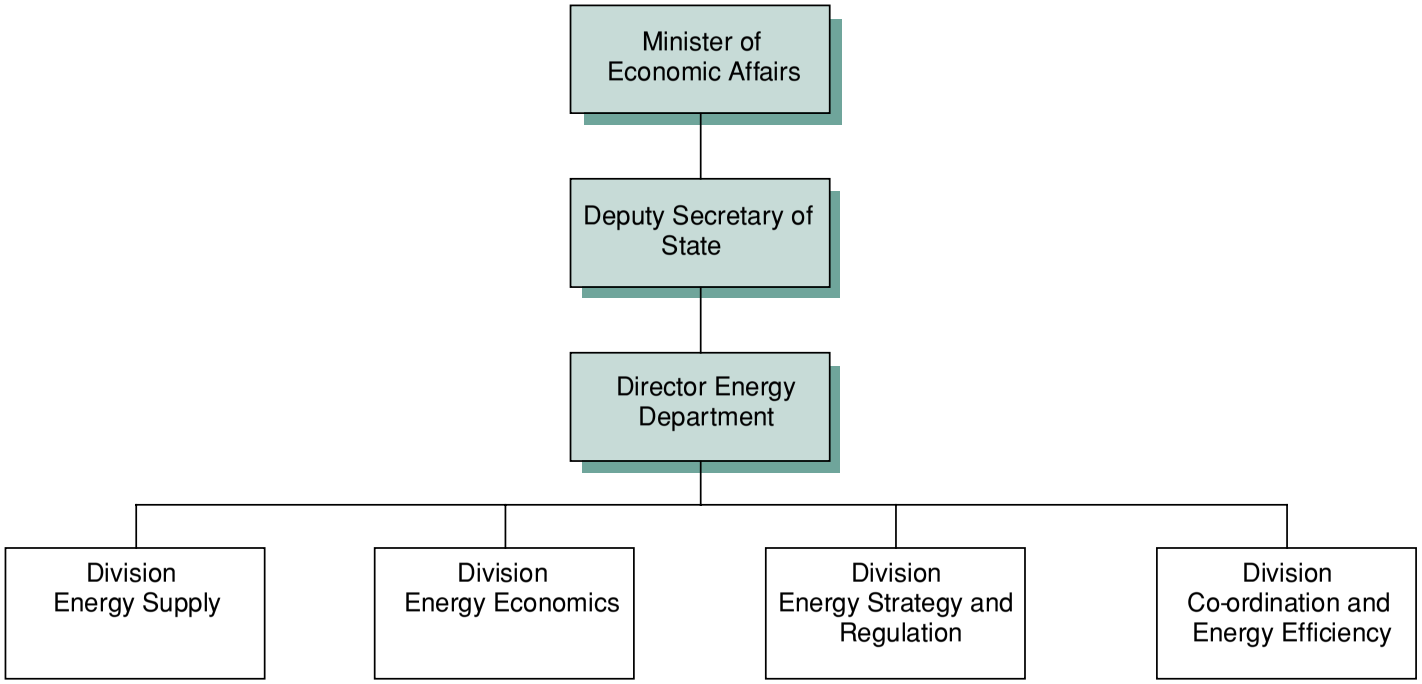
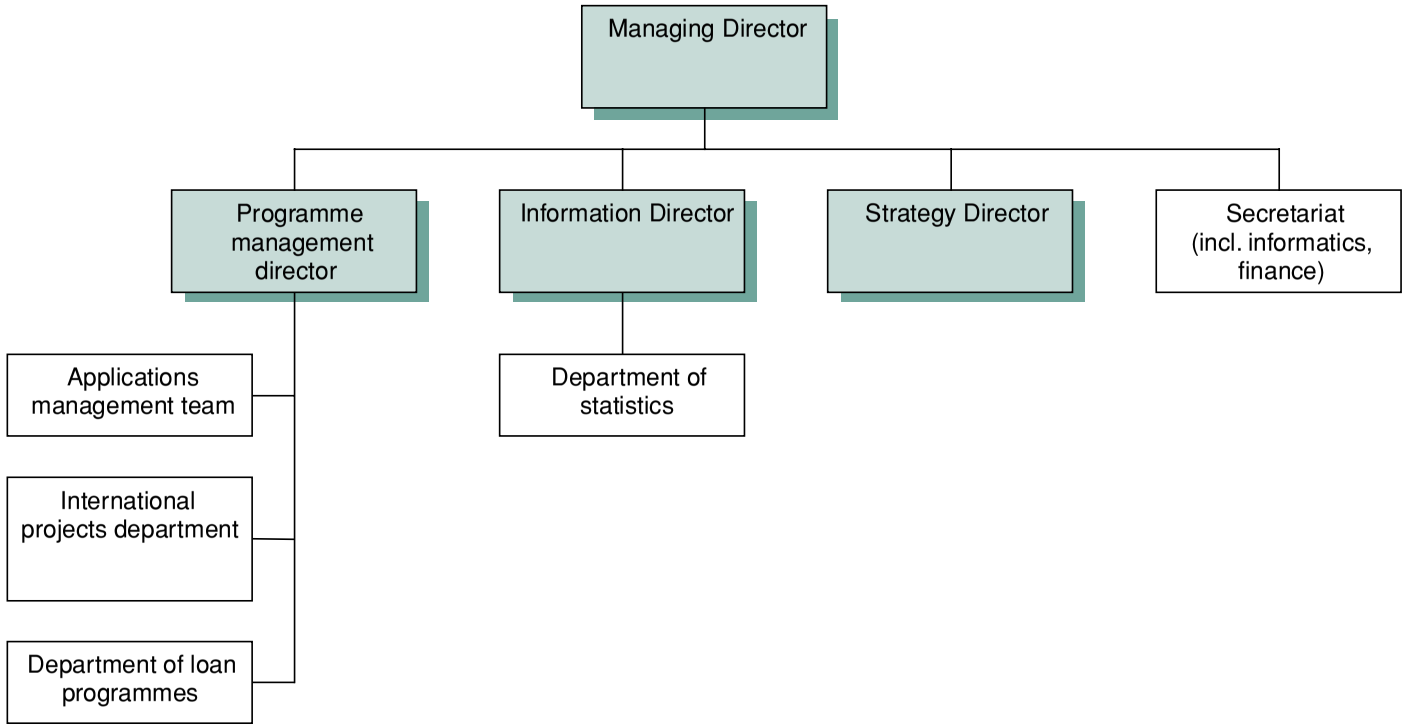


FIGURE 7: "ENERGY CENTRE" ENERGY EFFICIENCY, ENVIRONMENTAL PROTECTION AND ENERGY INFORMATION AGENCY

Source: Energy Centre, 2001



8. Energy efficiency and the environment

The Ministry of Environment is in charge of overall environmental strategic planning in the short, medium and long term, as well as the setting of environmental policy targets and co-ordination of national and international environmental activities. Its main areas of responsibility are environmental protection (air, water), water management and nature conservation. The Ministry is supported by the Institute for Environmental Management and the National Inspectorate for Environment Protection and Nature Conservation.

The main legal foundation of environmental policy in Hungary is the Act on General Rules of Environment Protection, adopted in 1995, which was followed in 1996 by the National Environmental Programme (NEP) 1997 - 2002.

The basic objective of the NEP is to develop the necessary environmental, social and economic conditions for sustainable development. The main aims of the Programme are: (i) to prevent, reduce and stop impacts that damage human health and preserve and improve environmental conditions that contribute to an adequate quality of life; (ii) to protect and preserve natural systems and assets, and biodiversity; (iii) to manage resources in a sustainable way, and (iv) to integrate economic and environmental development in a realistic way, to ensure reasonable use and minimum damage to the environment. “Key sectors” addressed by the NEP are: energy, industry, agriculture and forestry, traffic and transport, services and environmental protection.

Under the headline “energy sector”, the NEP presents nine specific programmes, dealing with subjects like: air quality, development of “environmentally-friendly energy structure”, modernisation of thermal power plants, least cost planning, subsidies for renewable energy sources, incentives for energy savings, energy efficiency labelling of appliances, switching to environmentally friendly fuels, etc. Various programmes proposed in the NEP have already been implemented, like the National Energy Saving and Energy Efficiency Programme (1995).

In general, however, the integration of energy and environmental policy has proved to be difficult in practice: this may be due to the fact that environmental regulations are mainly related to emissions from energy conversion.

An example is the 1998 Ministerial Decree on Air Pollution Limits for combustion units from 50 MW above (22/1998), which imposes the obligation on power plants to comply with EU standards by the year 2005. In the meantime, plants who do not meet the

standards set by the Decree are obliged to pay fines. Fines being paid by the energy sector are substantial and are allocated to the Central Environmental Fund of the Ministry of Environment, which receives about 30 billion HUF per year from fines and product fees.

The environmental product fee (see section 4), is levied from transport fuels, as well as from environmentally unfriendly products like waste tyres, packing material and refrigeration agents.

A proposed "energy penny", a 0.5% tax on energy in order to raise funds for energy efficiency programmes, was rejected by the Ministry of Finance, as was a previous proposal to increase the VAT on energy from its preferential rate of 12% (see section 4). A CO_2-tax is not foreseen for the near future, certainly not before EU accession. Also the introduction of the proposed Environmental Emission Fee is still uncertain.

In general, there are trends to change the main focus of environmental policy from "command-and-control" to a more co-operative and integrated approach. Instruments proposed are e.g. voluntary environmental agreements, developing partnerships with municipalities, more active integration with other policy fields, like energy, agriculture and transport, and - last but not least - raising awareness of citizens. Voluntary agreements are also considered as a future instrument for energy conservation.

Hungary has been a signatory state to the United Nations Framework Convention on Climate Change (UNFCCC) since 1994. Under Annex B of the Kyoto Protocol, Hungary is due to reduce greenhouse gas emissions by 6% in the time period 2008 - 2012, with 1985 - 1987 as baseline period [11].

According to estimates, Hungary will be able to fulfil its commitment with minimal or no emission reduction measures (see table 13). The figures provided in the table should however be taken with some caution, since detailed data on GHG emissions are only available for 1991 and 1995 (data submitted in the Second National Communication on the Implementation of Commitments under the UNFCCC), and likely aggregate effects on GHG emissions of transport policies (national highway development programme) and agriculture policy (adoption of the Common Agricultural Policy of the EU) are not known.

[11] Hungary is not a signatory of the Kyoto Protocol, however, direct ratification is planned for 2001.

TABLE 13: GHG EMISSION ESTIMATES IN GWP EQUIVALENT (KT)

Years	Global Warming Potential (GWP)			
	Actual	Target	Scenario A	Scenario B
1985-87	99 793			
1990	82 133			
1995	73 932			
1998	73 088			
2000			74 200	75 900
2005			77 200	83 300
2008-12		93 805	80 600	91 400

Source: National Climate Strategy 2000
Scenario A: energy efficiency measures are implemented
Scenario B: energy efficiency measures are not implemented

Hungary has participated in a few projects in the pilot phase of Actions Implemented Jointly (AIJ), as a host country. Projects are carried out in co-operation with the Netherlands and deal with subjects like: improvement of energy efficiency in local governments and utilities, the development of natural gas fuelled buses, biogas production and utilisation at a wastewater treatment plant, and the modernisation of glass-houses and of a brewery.

In general, the Hungarian Government is looking for opportunities to implement energy efficiency through flexible mechanisms, but emphasises that they would have to be implemented in well-defined circumstances in line with specific national priorities.

Other international treaties signed by Hungary include the Convention on Long-range Transboundary Air Pollution (1979), the Montreal Protocol on Substances that Deplete the Ozone Layer (1987) and the Energy Charter Treaty.

Hungary has still a major air pollution problem, partly caused by thermal power stations and heating plants: the air over some 3.9% of the country's territory is considered polluted and another 9.3% moderately polluted. The areas concerned are Hungary's most densely populated areas - Budapest and Northern Transdanubia - affecting half of the population.

9. Assessment of Progress

Government Policy and Strategy - Overall Assessment

Since the beginning of the political and economic transformation in 1990, Hungary has taken important steps in the process of adapting its energy economy to market principles. In particular, the energy sector has been subject of restructuring and partial privatisation during the last decade, and further liberalisation and market opening are foreseen in the process of EU accession.

Energy efficiency policies, strategies and programmes have been developed and implemented since the mid-nineties, first with moderate success. Final energy intensities have in general been decreasing, which is largely due, however, to structural impacts. Primary energy intensities have decreased at a lower rate, mainly due to the low average efficiency of energy conversion in the electricity sector. There are still major challenges ahead to improve energy efficiency in all end-use sectors: industry, residential, tertiary, transport; as well as in electricity supply and district heating.

Being aware of these challenges, the Government has intensified its efforts to promote energy efficiency in all sectors of the economy. The new Energy Saving and Energy Efficiency Action Programme, adopted in 1999, is certainly a step in the right direction. The allocation of sufficient funds is a concern of the Government and first substantial steps have been taken in this direction.

An important step has also been taken to strengthen the operational capacity of the Government in the energy efficiency field by creating the *"Energy Centre" Energy Efficiency, Environmental Protection and Energy Information Agency*, building on the experience of the former Energy Centre and the Energy Information Agency.

While there is in general a positive appreciation of progress made, the Team would also like to share some concerns with the Hungarian authorities, as detailed in the following paragraphs.

Energy Efficiency Programmes and Funding

While the establishment of the new Energy Saving and Energy Efficiency Action Programme of 1999 is certainly an important step in the right direction, there are two issues that should be addressed. Firstly, it is not clear in all cases whether the funding allocations are sufficient to reach the targets set for the Programme. A second important issue is that funding from the state budget has so far been secured for seven actions during the first two years of operation of the Programme. Funding for the period

2002 - 2010 is anticipated to come from the Environmental Emission Fee, which is still under discussion and whose eventual introduction is uncertain. It is therefore of paramount importance that either the Environmental Emission Fee be introduced or - in the case of rejection or delay - contingency plans be prepared by the Government to secure the required funding for the Programme as defined over its whole period.

Apart from the planned financing via the Environmental Emission Fee, it might also be worthwhile considering assigning a more prominent role to energy efficiency in the framework of the Széchenyi Plan, a step already taken respectively under further consideration by the Government.

On the other hand, the intention of the Government, to match own funds assigned to energy efficiency with foreign assistance (in particular EU funds) is certainly sensible, as long as the size of national and foreign funds are in proportion. This was not always the case in the past. Institutional strengthening of the Government's energy efficiency activities by the UNDP/GEF Programme is certainly a step into the right direction.

Other instruments to promote energy efficiency

In relation to the promotion of energy efficiency, the Government appears to favour financial incentives, awareness rising and probably voluntary agreements over legislative and regulatory measures. While this choice is in line with current trends in many European countries (and in the EU), it should be noted however that regulation has a specific role in almost all countries, regardless of their socio-economic background and policy preferences.

In Hungary, regulatory measures relating to energy efficiency exist to some extent in the housing sector (regulation concerning insulation of new buildings, regulation concerning metering and accounting in new apartment buildings, energy efficiency labelling and standards for household appliances). As far as the regulations for insulation and heat metering and accounting are concerned, it appears that regular updates and a more effective implementation of these regulations would be appropriate.

In relation to insulation standards, e.g., which reportedly comply with the "average European regulation" in 1991, the following is worth noting. Firstly, the level of standards valid in 1991 probably does not reflect the state-of-the-art in buildings insulation. The corresponding regulations in Germany, e.g., have been updated twice since then. Secondly, there is a general trend in Europe towards integrated standards for the building envelope and heating systems (a trend, which was only in its commencement at the beginning of the nineties). Thirdly, the success of building regulations

largely depends on the ability of architects, builders, plumbers, etc. to implement them, as well as the ability of local authorities to enforce them. There is some doubt, as to whether these conditions are actually in place in Hungary.

Organisation

With the establishment of the Energy Centre in its present form by Resolution 1031/2000, the Government has clearly demonstrated its intention to assume a more active role in the promotion of energy efficiency, renewable energies and environmental protection. This new role of the Energy Centre at the centre of policy implementation brings many opportunities, but also some challenges.

In the view of the Review Team, these challenges mainly relate to:

- Assuming leadership, on the one hand, and maintaining and further developing a culture of co-operation among market actors, NGOs, professional organisations, consumers and the civil society, on the other. There seems to exist some concern among participants in the Energy Advisory Network concerning continued Government support. This may need appropriate consideration at Government level as well as by the management of the Energy Centre. In addition, commercial energy saving activities, like ESCOs should be stimulated and new ways of co-operation with industry - like voluntary agreements - sought, without losing initiative and control.
- Shareholders of the Energy Centre are the Ministry of Economic Affairs, the Ministry of Environment and the Hungarian Energy Office and it is clearly established as the implementing agency of Government. As a "new" agency with significant funds under their control it will be important at the outset to create a firm institutional and financial basis of the Centre, in order to make it as independent as possible from budget decisions and possible changes of Government.

Ongoing energy sector reforms and market opening pose a lot of challenges both to the market actors and to the authorities. It is therefore understandable that much of the attention of the Hungarian Energy Office is focusing on the overall efficiency in the electricity and gas sectors through a new framework for a competitive energy market. It would, however, be of importance that the Energy Centre and the Hungarian Energy Office work together to co-ordinate energy efficiency instruments and regulatory tasks in a new market framework.

Concerning evaluation and monitoring of the various actions under the Energy Saving and Energy Efficiency Action Programme, it seems to be important that adequate

measures and systems be put in place as an instrument to correct and improve ongoing activities. The experience and competence of the former Energy Information Agency (now Information Directorate) will certainly be helpful in further developing indicators to measure improvements in energy efficiency, also in the light of emission reduction commitments.

Energy Pricing and Taxation

Electricity and gas tariffs are still under Government control. The same applies to heat tariffs, where the situation is more complex, due to shared regulatory responsibility between the Hungarian Energy Office (i.e. the Ministry of Economic Affairs) and municipalities. One pending issue appears to be equitable treatment of district heating companies, who represent an important element of the Hungarian energy economy.

On the other hand, it seems that there are still some imperfections in the taxation of energy on the one side, and energy efficient equipment and services on the other. There are also some cross subsidies still in place.

Attempts to adjust the VAT rate for gas and electricity, and to introduce an energy tax (the "energy penny") have failed in the past. Apparently such initiatives need to be part of a more general taxation reform, which hopefully will include ecological elements. Implementation of the proposed Environmental Emission Fee would definitely have a positive impact on the objectives of expanded financing of the Energy Saving and Energy Efficiency Action Programme and on the institutional stability of the Energy Centre.

Environment

Hungary is apparently making good progress in adapting environmental standards to EU regulations. Furthermore, targets to reduce GHG emissions in accordance with the Kyoto Protocol are very likely to be achieved.

Although these developments are of course positive, further strengthening of energy efficiency policies and in particular, of co-ordination with other policy fields, like environment, transport and housing, seems to be very important, in order to further improve energy efficiency, environmental quality and GHG emissions reduction.

It seems that the potentials of energy efficiency and renewable energies to reduce pollution and CO_2 emissions are still far from exhausted.

Recommendations

While the Government should be commended for the active steps taken to develop energy efficiency policies, programmes and institutions, the following recommendations are provided by the review team:

General

Building on the positive steps taken so far, the Government should more clearly define the rationale behind policy aims, objectives and strategies in order to facilitate the effective delivery of energy efficiency programmes to well defined target groups.

The Government should better co-ordinate the tasks and the resources allocated to the institutions responsible for developing and implementing energy efficiency policies and programmes; strengthening the co-ordination capacity of the Ministry of Economic Affairs would be an important step in this process.

The Government should continue the process of market liberalisation and ensure that new opportunities rising in this process for improving energy efficiency are effectively captured and exploited.

Energy efficiency policies, strategies and programmes

In implementing the Energy Saving Action Programme, evaluation and adjustment of actions and measures should be undertaken on an annual basis.

Energy efficiency programmes should be better co-ordinated with strategies developed in other economic sectors, as well as with environmental policies and programmes.

Institutional framework

The Government should build on the positive steps already taken in establishing the Energy Centre, as an implementing agency of Government, by facilitating and strengthening, in a clear way their co-ordinating role in the implementation of the Energy Saving Action Programme.

The Government should further encourage the development of regional and local institutions to have potential to assist in the delivery of energy efficiency programmes.

The Government should also further encourage professional organisations and NGOs to take an active part in developing and implementing energy efficiency activities at regional and local level.

The intended increase in the scale of funding directed towards energy efficiency and renewable energy will require new approaches. The Ministry of Economic Affairs should ensure that the Energy Centre take early action on the development of effective administrative, evaluation and control systems compatible with the scale of funds and which will support independent and transparent decision making.

Energy pricing

Action should be taken by the Government to ensure that remaining cross-subsidies are eliminated.

The regulatory mechanism for establishing energy prices should be more transparent and independent.

Energy efficiency funding and fiscal policies

Energy savings targets and funding allocations should be better defined within the Energy Saving Action Programme taking account of cost effectiveness criteria.

Government funding should encourage in particular those activities which are undertaken to a lesser extent by the private sector.

The Ministry of Economic Affairs should stimulate the successful financing activity of international financial institutions and complement this financing by specifically targeting funding under the energy saving action plan at areas or sectors of market failure.

Both the Ministry of Economic Affairs and the Ministry of Environment should ensure formal, transparent and effective coordination of their grant schemes supporting energy efficiency investment.

Efforts should be continued to make effective information available on all funding schemes, how to apply and the criteria for selection.

Fiscal and taxation policies should take account of the benefits of promoting equipment and services to improve energy efficiency and reduce harmful emissions and to internalise environmental costs of energy production and use.

Implementation of specific programmes and instruments

Programmes developed under the Energy Saving Action Programme should be monitored, evaluated and adapted in line with the evolution of the market conditions.

Building on existing regulations, proper district heating metering should be ensured as a tool to achieve increased efficiency of utilization of energy in existing building stock.

The Government should give more emphasis to the regular update and effective implementation of regulations concerning heat consumption in buildings.

Grant schemes for energy auditing in industry under the Energy Saving Action Programme should focus more on small and medium enterprises and include benchmarking.

In developing voluntary agreements on energy conservation with industry, attention should be paid to clearly define baselines and targets, monitor progress and ensure compliance with commitments.

The Government should further explore the potential for Joint Implementation as a mechanism to attract investment for energy efficiency projects.

Adequate and transparent price regulation should be developed to promote combined heat and power generation (CHP) and to establish a level playing field for district heating within the energy sector.

In developing the new transport policy particular attention should be paid to energy efficiency; in this process co-ordination among the various Ministries involved should be strengthened.

The Government should continue and strengthen efforts in awareness raising and education as a primary policy objective, recognizing the importance that they play in improving energy efficiency.

Promotion of renewable energy

The Government should further develop and introduce instruments and mechanisms, which secure the market penetration of renewable energies in line with the objectives defined in the Energy Saving Action Programme.

Annex 1: Energy Situation in Hungary

The Hungarian energy sector is characterised by a high share of natural gas in TPES (9.91 Mtoe or 39.6% in 1999), a relatively high share of coal and nuclear energy (16.1% and 14.7% of TPES respectively in 1999) and only marginal contributions of combustible renewables and wastes (1.8% in 1997) and hydro-electricity (0.1% in 1999). Net electricity imports (0.4% of TPES in 1997) are also marginal. The relatively high dependence on natural gas is due to (i) substantial own gas reserves and (ii) gas supply contracts with the Soviet Union and subsequently with Russia.

The energy sector has been subject of restructuring and partial privatisation during the last decade.

The Hungarian electricity supply industry consists of twelve generation companies, six distribution and supply companies and the state-owned former monopoly supplier MVM (Hungarian Electricity Board). MVM still owns the transmission network and the Paks nuclear power plant, and owns shares in the Vértes coal power plant and in two generating companies. Generation plants are on average 50% foreign owned, the remainder is owned by Hungarian private owners, the state, MVM, municipalities and other state-owned institutions. Distribution companies are in majority owned by foreign investors. Important foreign shareholders include: AES Corporation, Bayernwerk, EdF, EnBW, Isar Amperwerke, PowerGen, RWE and Tractebel. The Hungarian states still holds a 50% plus one share majority in MVM, other shareholders are private and institutional domestic and foreign investors.

Under the present regulatory regime, defined by the Electricity Act of 1994, the market is dominated by long-term contracts between generators and MVM on the one hand, and between MVM and the distribution and supply companies on the other. A bill for a new Electricity Act has been sent to Parliament and is expected to be enacted during 2001.

According to the proposed new Electricity Act, the sector will be partly unbundled, in the sense that electricity generation, transmission and distribution, as well as system operation will be legally - or in the case of network ownership and public utility service as far as accounting is concerned - separated from each other. There shall be free and non-discriminatory access to the transmission network. The bill foresees maintaining a captive market (with public service obligation), with MVM as sole supplier ("public utility wholesaler"). Electricity generators will however be allowed to sell electricity on the market, as far as not committed to MVM. Consumers may decide themselves whether they want to become so-called authorized (i.e. eligible) consumers.

Authorized consumers will be allowed to perform foreign trading activities in electricity, for their purpose of their own consumption. The new Electricity Act will make it possible to set up a power exchange, at the discretion of interested market actors (no compulsory power pool is foreseen).

Tariffs for transmission and distribution of electricity, as well as tariffs applied in the captive market ("public utility supply") shall be set in accordance with the principles defined in the Act or separate regulation. The bill also contains provisions concerning the prohibition of restricting competition by acts leading to dominant market power. It foresees for gradual opening of the market, at the discretion of the Government, with a view at full market opening and participation in the European internal electricity market between 2005 and 2010 at the latest. An experimental electricity market opening of about 10%, planned for 1 January 2001, has been postponed.

The Hungarian natural gas sector is dominated by MOL, the Hungarian Oil and Gas Company. MOL was privatised by the Government in 1995 and is majority privately owned. MOL is the only gas wholesaler in Hungary, selling to distribution companies, power generators and large industrial consumers. MOL also controls gas imports from Russia (via Panrusgáz, a gas trading company jointly owned with Russian firms like Gazexport and subsidiaries of Gazprom). The Hungarian state retains a 25% plus one "golden" share blocking minority shareholding in MOL. Gas distribution companies have been privatised and are (in minority) owned by foreign companies. They are operating under public utility contracts, with regulated end-user prices, based on the 1994 Gas Supply Act and Gas Pricing Decree. A new Gas Law is under preparation, in line with EU accession requirements.

MOL also dominates the Hungarian oil sector, via its monopoly of production, import, storage and refining of crude oil. On the other hand, the market for refined oil products is fully liberalised, with large international oil companies, MOL and some smaller Hungarian companies acting on the market. Domestic oil production in 1999 was 1.77 Mtoe, compared to a total supply of 6.99 Mtoe.

Hungary produced 3.0 Mtoe of coal in 1999, and imported 1.14 Mtoe. Domestic production, in particular in deep mining has declined for the last two decades. While the market for solid fuels is fully liberalised, Government support for uneconomic mines is phased out.

The district heating sector has traditionally played a prominent role in Hungary. During the early restructuring of the energy sector, the central Government retained owner-

ship of the electricity and gas sectors, while district heating companies were placed under the responsibility of local self-governments (municipalities). As a consequence, the district heating sector was not subject of the subsequent partial privatisations and remained under the political influence of municipalities.

Since 1998, district heating falls under the competence of the Hungarian Energy Office in so far as it involves electricity production. Sharing of regulatory responsibility with municipalities and shared political responsibility between the Ministry of Economic Affairs and Ministry of the Interior do not facilitate an adequate regulatory treatment of this sector, whose installed capacity is roughly twice as large as in the electricity sector. The local and therefore dispersed character of district heating aggravates these problems. The district heating sector presents large potentials for efficiency gains both at the generation and end-user levels. It appears that a stable regulatory framework is required in order to attract investors. A new district heating law is under discussion.

TABLE A1.1
ENERGY BALANCE FOR HUNGARY

		1990	1995	1996	1997	1998	1999 *)
Total Primary Energy Production	Mtoe	14.23	13.30	13.01	12.66	11.85	11.55
Net imports	Mtoe	14.16	12.48	13.66	13.40	14.15	13.45
Total Primary Energy Supply (TPES)	Mtoe	28.46	25.56	26.00	25.44	25.26	25.02
Total Final Consumption	Mtoe	20.93	17.33	17.68	17.00	17.23	17.03
Total Electricity Consumption	TWh	35.55	31.67	32.61	32.81	33.01	33.35

Source: IEA Energy Balances of OECD Countries 1997-1998, *) Hungarian Energy Centre, 2001

TABLE A1.2
BASIC INDICATORS

		1990	1995	1996	1997	1998	1999
Population [1])	Million	10.365	10.229	10.193	10.155	10.114	10.067
GDP [1])	billion 1990 US$	37.94	33.67	34.10	35.68	37.42	39.07
Primary Energy Intensity [2])	TPES/GDP	0.75	0.76	0.76	0.71	0.68	0.64
Final Energy Intensity [2])	TFC/GDP	0.55	0.51	0.52	0.48	0.46	0.44
Electricity Consumption [2])	KWh/capita	3.43	3.10	3.20	3.23	3.26	3.31
Energy-related CO_2 emissions [1])	Mt CO_2	19.66	21.50	21.85	22.28	21.88	n.a.

Sources: [1]) Hungarian Central Statistical Office (HCSO), [2]) Hungarian Energy Centre, 2001

TABLE A1.3
TOTAL PRIMARY ENERGY SUPPLY (TPES)

		1990	1995	1996	1997	1998	1999 *)
Petroleum Products	Mtoe	8.19	7.48	6.83	6.95	7.37	6.99
Gas	Mtoe	8.91	9.18	10.24	9.71	9.78	9.91
Coal	Mtoe	6.39	4.49	4.42	4.38	4.11	4.03
Nuclear	Mtoe	3.58	3.65	3.69	3.64	3.63	3.67
Hydro	Mtoe	0.02	0.01	0.02	0.02	0.01	0.02
Comb. Renewables and Wastes	Mtoe	0.23	0.38	0.35	0.35	0.32	0.33
Electricity Trade	Mtoe	0.96	0.21	0.19	0.19	0.06	0.09
Total Supply	Mtoe	28.27	25.40	25.74	25.23	25.29	25.02
Energy Production	Mtoe	14.68	13.51	13.09	12.91	12.11	11.55
Energy Production / TPES	-	0.52	0.53	0.51	0.51	0.48	0.46
TPES / capita	toe/capita	2.73	2.48	2.52	2.48	2.50	2.49

Source: IEA Energy Balances of OECD Countries 1997-1998, *) Hungarian Energy Centre, 2001

TABLE A1.4
TOTAL FINAL ENERGY CONSUMPTION (TFC) BY END-USE SECTOR

		1990	1995	1996	1997	1998	1999 *)
Residential	Mtoe	6.446	5.962	5.879	5.476	5.081	5.383
Industry	Mtoe	7.521	5.264	4.821	4.589	4.694	4.764
Services	Mtoe	1.890	2.727	2.808	2.726	2.776	2.809
Transport	Mtoe	3.153	2.469	2.716	2.845	3.136	3.170
Agriculture	Mtoe	1.142	0.660	0.712	0.694	0.704	0.758
Non-specified	Mtoe	0.244	0.294	0.230	0.172	0.195	0.149
Total (TFC)	Mtoe	20.930	17.376	17.676	17.000	17.232	17.030
TFC / GDP	toe/1000 US$	0.552	0.516	0.518	0.476	0.461	0.436
TFC /capita	toe/capita	2.019	1.699	1.734	1.674	1.704	1.692

Source: IEA Energy Balances of OECD Countries 1997-1998, *) Hungarian Energy Centre, 2001

ANNEX 2: SELECTED END-USE DATA TABLES

TABLE A2.1
FINAL ENERGY CONSUMPTION OF THE RESIDENTIAL SECTOR BY ENERGY SOURCE

		1990	1995	1996	1997	1998	1999 *)
Total	Mtoe	6.446	5.963	5.879	5.476	5.081	5.382
a. Electricity	Mtoe	0.790	0.842	0.865	0.841	0.858	0.845
b. Heat	Mtoe	0.830	0.805	0.788	0.722	0.757	0.742
c. Oil Products	Mtoe	1.192	0.528	0.381	0.329	0.315	0.296
d. Gas	Mtoe	1.579	2.881	3.158	3.010	2.701	3.030
e. Coal	Mtoe	1.740	0.629	0.443	0.323	0.210	0.224
f. Comb. Renewables and Wastes	Mtoe	0.315	0.278	0.244	0.251	0.240	0.245
g. Others	Mtoe	-	-	-	-	-	-
Floor area	10^6 m^2	262	280	285	289	293	n.a.
Number of dwellings	x 106	3.853	3.971	3.992	4.011	4.032	4.048
Residential use per dwelling	Mtoe/dwelling	1.673	1.502	1.473	1.365	1.260	n.a.
Residential use per surface	Mtoe/1000m^2	0.025	0.021	0.021	0.019	0.017	n.a.

Source: IEA Energy Statistics & Balances of OECD/non-OECD countries 1997-1998, 2000 Edition
*) Hungarian Energy Centre, 2001

TABLE A2.2
FINAL ENERGY CONSUMPTION OF SERVICES
(COMMERCIAL AND NON-COMMERCIAL) BY ENERGY SOURCE

		1990	1995	1996	1997	1998	1999 *)
Total	Mtoe	1.901	2.728	2.808	2.726	2.776	2.809
a. Electricity	Mtoe	0.443	0.611	0.630	0.665	0.697	0.691
b. Heat	Mtoe	0.442	0.377	0.355	0.287	0.304	0.265
c. Oil Products	Mtoe	0.276	0.379	0.165	0.160	0.084	0.069
d. Gas	Mtoe	0.613	1.248	1.567	1.534	1.619	1.710
e. Coal	Mtoe	0.114	0.053	0.033	0.021	0.020	0.023
f. Comb. Renewables and Wastes	Mtoe	0.013	0.060	0.060	0.059	0.052	0.051
g. Others	Mtoe	-	-	-	-	-	-
Floor area	10^6 m^2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Number of employees	x 106	n.a.	2.19	2.16	2.15	2.16	n.a.
Value added	106 US$	n.a.	19.2	17.8	18.1	18.7	n.a.
FC per surface	GJ/ m^2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
FC per employee	GJ / employee	n.a.	1.246	1.300	1.268	1.285	n.a.
FC / value added	GJ / 106 US$	n.a.	0.142	0.158	0.151	0.148	n.a.

Source: Energy Statistics & Balances of OECD/non-OECD Countries 1997-1998, 2000 Edition
*) Hungarian Energy Centre, 2001

TABLE A2.3
FINAL ENERGY CONSUMPTION OF THE INDUSTRY SECTORS BY ENERGY SOURCE (1998)

		Mining	Manufacturing							Constr.	Total
			Iron & steel	Chemical & petrochemical	Non-ferrous metals	Food & tobacco	Pulp & paper, print	Non-metallic minerals	Other		
Coal	Mtoe	-	0.546	0	0.005	0.013	-	0.087	0,019	-	0.670
Crude oil	Mtoe	-	-	-	-	-	-	-	-	-	-
Petroleum products	Mtoe		0	0.188	0.005	0.016	0.008	0.160	0.022	0.009	0.408
Gas	Mtoe	0.001	0.137	0.545	0.088	0.312	0.067	0.353	0.235	0.010	1.748
Nuclear	Mtoe	-	-	-	-	-	-	-	-	-	-
Hydro	Mtoe	-	-	-	-	-	-	-	-	-	-
Geothermal, solar, etc.	Mtoe	-	-	-	-	-	-	-	-	-	-
Comb. Renewables & waste	Mtoe	-	-	-	-	-	-	-	-	-	-
Electricity	Mtoe	0.005	0.051	0.206	0.082	0.102	0.043	0.078	0.142	0.003	0.712
Heat	Mtoe	-	0.023	0.251	0.058	0.042	0.071	0.010	0.044	0.001	0.500
Total	Mtoe	0.006	0.757	1.190	0.238	0.485	0.189	0.688	0.462	0.023	4.038
Value added per sector	1991 US$ * 10^6	0.150	0.299	0.863		1.010	0.522	0.411	7.525	1.761	12.541
FC / value added	Mtoe / US$ 10^6	0.040	2.532	1.379		0.480	0.362	1.674	0.061	0.013	0.322

Source: Hungarian Energy Centre

NB: industry non-energy use is not added to TFC

TABLE A2.4
NUMBER AND STRUCTURE OF HOUSING STOCK

Number of households (in thousands)1998		Age distribution of dwelling stock (%) 1996	
Households	3862	0-10 years	11.9
Dwellings	4031	10-20 years	9.7
Dwellings (permanently occupied)	3805	20-30 years	21.4
-- in family houses	2318	30-40 years	15.1
-- in multi-dwelling houses	1487	40-50 years	12.2
Average surface (m^2)	72.6	50-100 years	21.8
		> 100 years	7.9

Sources: Number and structure of housing stock 1998: HCSO; Age distribution of dwelling stock 1996: HCSO Microcensus 1996

Number of dwellings: 3997 thousands in 1996

TABLE A2.5
TRANSPORT INDICATORS (1999)

	Freight	Travel	Total
FC (Mtoe)	0.479	2.434	2.904
Tonne-km (* 10^9)	22.303		
TFC/10^9 tonne-km	0.134		
Person-km (* 10^9)		86.658	
TFC / 10^9 person-km		0.034	
Number of cars / 10^3 inhabitants	n.a.	n.a.	219.3

Source: HCSO, Hungarian Energy Centre

Annex 3: Energy Prices

TABLE A3.1: ENERGY PRICES END-USE SECTORS, 2000 (US$/UNIT)

	Un-leaded gasoline premium	Light fuel oil	Diesel	Heavy fuel oil	Natural gas	Steam coal	Electricity
	litre	1000 litres	litre	tonne	10^7 kcal GCV	tonne	kWh
Industry	0.855	609.5	0.813	-	124.90	..	0.049
Households	0.855	609.5	0.813	-	163.30	..	0.065
Electricity generation	0.855	609.5	0.813	146.1	99.90	..	

Source: End-use prices in $, IEA, 2000

TABLE A3.2

Tariffs for Electricity in Hungary as of 1 January 2001 (without 12% VAT)				
Tariffs with capacity charge				
	Capacity charges HUF/kW/year		Energy charges HUF/kWh	
	peak	off-peak	peak	off-peak
High voltage No. 1	13344	9000	8.70	5.45
High voltage No. 2	10128	6384	9.55	6.20
Medium voltage No. 1	13260	8772	10.25	6.75
Medium voltage No. 2	10044	6036	11.00	8.00
Low voltage No. 1	12576	8136	11.00	7.50
Low voltage No. 2	9564	5796	12.80	9.00
Tariffs with standing charge				
	Standing charge HUF/A/year	Energy charges HUF/kWh peak	off-peak	all day
High voltage	9024*	10.85	7.30	-
Medium voltage	8820*	14.50	10.30	-
Low voltage, combined (with two time zones)	1740	16.55	12.10	-
Low voltage, single (with one time zone)	1200	-	-	15.75
Low voltage controlled, separately measured [off-peak]	360	-	9.70	-
Public lighting tariff				
Capacity charge, HUF/kW/year		40368		
Energy charge, HUF/kWh		15.40		
Residential tariff, HUF/kWh				
"A" (general)		21.00		
"B" (controlled, separately measured [off-peak])		9.70		
"C" (for employees of electricity industry companies)		5.70		
Wholesale tariff				
Capacity charge (HUF/kW/year)		Energy charges (HUF/kWh) peak		off-peak
24228		9.08		5.66

* HUF/kVA/year – Remark: 1 US$ =290.58 HUF (21. 02. 2001.)
Source: Hungarian Energy Office

TABLE A3.3: AUTHORITY CONTROLLED ELECTRICITY PRICES IN HUNGARY (WITHOUT 12% VAT)

Category	from July 1999	from January 2000	from November 2000	from January 2001	Price changes		
					January 2000	November 2000	January 2001
Electricity (HUF/kWh)							
Producer price (average)	8.01	8.76	9.13	10.40	4.9%	4.2%	14.0%
Wholesale price (average)	8.71	9.05	9.05	10.23	5.9%	0.0%	13.1%
End user price (average)	13.67	14.66	14.66	15.55	6.0%	0.0%	6.0%
Residential tariffs (average)	15.04	16.49	16.49	17.48	5.9%	0.0%	6.0%
Non-residential tariffs (average)	12.97	13.77	13.77	14.61	6.1%	0.0%	6.1%

Remark: 1 US$ = 290.58 HUF (21. 02. 2001)

Remark: 1 US$ = 279.62 HUF (02. 01. 2001)

Remark: 1 US$ = 248.82 HUF (04. 01. 2000)

Remark: 1 US$ = 241.45 HUF (01. 07. 1999)

Source: Hungarian Energy Office

TABLE A3.4: AUTHORITY CONTROLLED NATURAL GAS PRICES IN HUNGARY (WITHOUT 12% VAT)

Category	From January 2000	from July 2000	from November 2000 (5)	from December 2000 (6)	from July 2001	Price changes			
						July 2000	November 2000	December 2000	July 2001
Natural gas (HUF/GJ)									
Wholesale price (average)	542	628				15.8%			
price category 1 (favoured) (1)			628	634	709		0.0%	1.0%	11.8%
price category 2 (non-favoured) (2)			911	916	1054		45.1%	0.5%	15.1%
End user price (average)	720	807				12.0%			
based on published "favoured" prices (3)									
based on published "favoured" prices (3)			807	807	897		0.0%	0.0%	11.2%
based on published "non-favoured" prices (4)			1087	1087	1245		34.7%	0.0%	14.5%
Residential / low consumption (average)	850	952	952	952	1064	12.0%	0.0%	0.0%	11.8%
Medium customers (20-100 m3/h)	805	943	943	943	1055	17.0%	0.0%	0.0%	11.9%
Large customers									
I. with gas meter 100-500 m3/h (average)	705	822	822	822	921	16.6%	0.0%	0.0%	12.0%
II. with gas meter above 500 m3/h (average)	640	706				10.3%			
Favoured customers (average)	643	709	709	709	780	10.3%	0.0%	0.0%	10.0%
Non-favoured customers (average)	639	705	1010	1010	1138	10.3%	43.3%	0.0%	12.7%
III. with direct link (MOL) (average)	584	643				10.1%			
Favoured customers (average) (5)	583	642	642	642	698	10.1%	0.0%	0.0%	8.8%
Non-favoured customers (average) (5)	584	643	930	930	1047	10.1%	44.6%	0.0%	12.6%

(1) Calculations based on price category 1 (favoured).
(2) Calculations based on price category 2 (non-favoured).
(3) In the case of small, medium and large I. consumers the published, in the case of large II. and III. consumers the published “favoured” prices have been taken account of.
(4) In the case of large II. and III.consumers the published “non-favoured” prices, in the case of other consumers the unpublished “non-favoured” prices have been taken account of.
(5) Based on Decree No. 38/2000 (X.31.) of the Minister of Economics (in effect 3 November 2000). This decree originated the “favoured” and “non-favoured” price categories.
(6) Based on Decree No. 41/2000 (XII.8.) of the Minister of Economics (in effect 8 December 2000). The circle of “favoured” consumers has been widened. The new favoured consumers' possibly different average price has not been taken account of.
(7) Assuming that the capacity and gas consuming proportions of the “favoured” and “non-favoured” consumers are the same.
Source: Hungarian Energy Office, 2001

TABLE A3.5: AUTHORITY CONTROLLED HEAT PRICES IN HUNGARY (WITHOUT 12% VAT)

Category	from July 1999	from January 2000	from November 2000	from January 2001	Price changes		
					January 2000	November 2000	January 2001
Heat (average) (HUF/GJ)	**990**	**1048**	n.a	n.a.	**5.8**	n.a.	n.a.
Hot water (average)	954	1014	n.a	n.a.	6.3	n.a.	n.a.
Steam (average)	1022	1077	n.a.	n.a.	5.4	n.a.	n.a.

Source: Hungarian Energy Office

Annex 4: Organisations visited by the Review Team

The review team met representatives of the following organisations:

- Ministry of Economic Affairs (Gazdasági Minisztérium)
- Ministry of Environment Protection (Környezetvédelmi Minsztérium)
- Ministry of Finance (Pénzügyminisztérium)
- Ministry of Transport and Water Management (Közlekedési és Vízügyi Minisztérium)
- Hungarian Energy Office (Magyar Energia Hivatal)
- Energy Centre (Energia Központ)
- Association of Hungarian Electricity Suppliers (Magyar Áramszolgáltatók Szövetsége)
- Association of Hungarian District Heating Suppliers (Magyar Távh_szolgáltatók Szakmai Szövetsége)
- Association of Gas Suppliers (Gázszolgáltatók Egyesülése)
- Hungarian Power Companies Ltd. (Magyar Villamos Müvek)
- Rheinisch Westfälisches Elektrizitätswerk (RWE) / Budapest Electricity Plc.
- Électricité de France (EdF)
- Organisation of Energy Consumers of the Industry (Ipari Energiafogyasztók Fóruma)
- Energy Service Companies (ESCOs):
  - EGI Engineering Ltd. (Energiagazdálkodási Rt. - EGI)
  - KIPCALOR
  - Veiki
- Non-Governmental Organisations (NGOs):
  - Energy Club (Energia Klub)
  - Clean Air Group (Levegö Munkacsoport)
- National Technical Development Committee (Országos Müszaki Fejlesztési Bizottság)
- International Organisations:
- International Finance Corporation (IFC)
- United Nations Development Programme (UNDP)

Glossary

AIJ	Activities Implemented Jointly under the UNFCCC
CGC	Compagnie Général de Chauffe
CHP	Combined heat and power, also known as cogeneration
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DM	German Mark
DSM	Demand-side management
EBRD	European Bank for Reconstruction and Development
EdF	Électricité de France
EE	Energy efficiency
EEFS	Energy Efficiency Co-financing Scheme
EIA	Energy Information Agency
ELÉG	Energy Efficiency Programme
ELI	Efficient Lighting Initiative
EnBW	Energie Baden-Württemberg AG
ESAP	Energy Saving Action Plan
ESCO	Energy Service Company
ESCP	Energy Saving Credit Programme
EU	European Union
Eurostat	Statistical Office of the European Communities
€	Euro
FEM-OPET	Fellow Member - Organisation for the Promotion of Energy Technologies
IEA	International Energy Agency
GCV	Gross Calorific Value
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse gas
GJ	Giga Joule
GWP	Global Warming Potential
HCSO	Hungarian Central Statistical Office
HEECP	Hungarian Energy Efficiency Co-finance Programme
HUF	Hungarian Forint
IFC	International Finance Corporation
kcal	Kilocalorie
kt	Kilotonne
ktoe	Thousand tonne of oil equivalent
kW	Kilowatt
kWh	Kilowatt hour
LPG	Liquified Petroleum Gas
m^2	Square metre

m^3	Cubic metre
MJ	Mega Joule
MOL	Hungarian Oil and Gas Company
Mt	Million tonne
MTESZ	Federal Chamber of Technical and Scientific Societies
Mtoe	Million tonne of oil equivalent
MVA	Enterprise Development Agency
MVM	Hungarian Electricity Board
MW	Megawatt
NEP	National Environmental Programme
NGO	Non Governmental Organisation
NOVEM	Netherlands Agency for Energy and the Environment
NO_x	Nitrous Oxide
OECD	Organisation of Economic Co-operation and Development
OPET	Organisation for the Promotion of Energy Technologies
PEEREA	Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
PHARE	EU assistance programme for economic restructuring in the countries of Central and Eastern Europe
PJ	Peta Joule
PPP	Purchase power parity
R&D	Research and Development
RTPA	Regulated third party access
RWE	Rheinisch-Westfälisches Elektrizitätswerk AG
SAVE	EU programme for the promotion of energy efficiency
SCORE	Supporting Co-operative Organisation of Rational Energy Use Programme
SME	Small and medium size enterprise
SO_2	Sulphur Dioxide
SYNERGY	EU international energy cooperation programme
TFC	Total Final Energy Consumption
THERMIE	EU Programme for the promotion of research, development and demonstration in non-nuclear energy technologies (under the Fourth Framework Programme for Research, Technological Development and Demonstration)
TJ	Tera Joule
TPES	Total Primary Energy Supply
TWh	Terawatt hour
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax