

THE ROAD TOWARDS AN ENERGY-EFFICIENT FUTURE



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*Report to the Ministerial Conference
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PREFACE

Improving the environment and addressing climate change is one of the main driving forces for energy efficiency policies. Because of the link between environment and energy efficiency, the Environment for Europe Conference in Aarhus in 1998 strongly endorsed expanded efforts to develop and support energy efficiency strategies and programmes.

As a follow up to the Aarhus Conference, the Energy Charter Secretariat (ECS) was in 1999 invited by the UN-ECE to prepare a report for the 2003 Kiev Environment Ministerial Conference on the trends in energy efficiency and developments in energy efficiency policies and strategies.

The Energy Charter Secretariat's report, *The Road Towards an Energy Efficient Future*, examines the progress in energy efficiency since the Aarhus Conference and provides background to the Environmental Ministers for an evaluation of actions needed to exploit the potential for energy efficiency improvements. The work was based on the review process under the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), monitoring implementation of both PEEREA and Aarhus energy efficiency related obligations.

As pointed out in the report encouraging progress has been made in the short period since the Aarhus Conference. However, much more progress in energy efficiency is feasible particularly, but not only, in transition economies. There is a need for increasing the political attention to energy efficiency, for a better integration of energy efficiency with environmental policies and for addressing the new challenges arising from energy market liberalisation. The potential for energy efficiency improvements is still high in all sectors.

The Danish Energy Authority and the Finnish Ministry of Industry and Trade funded this report. It has greatly benefited from discussions in the PEEREA Working Group and the inputs from delegations. Rod Janssen, consultant to the ECS, undertook research and drafting while Fridtjof Unander from the IEA contributed to the quantitative analyses. Tudor Constantinescu from the ECS ensured the overall co-ordination of the work.

The report is submitted to the Kiev Ministerial Conference and made publicly available under my authority as Secretary General of the Energy Charter.

Dr. Ria Kemper

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SUMMARY AND CONCLUSIONS

For the first time in the Environment for Europe process, Ministers focused on energy efficiency at their 1998 Aarhus Conference. The declaration from the conference pointed to the link between improved energy efficiency and environmental concerns at the global, regional and national levels.

Ministers were specific in the Aarhus Declaration: “We remain convinced that increased energy efficiency will be a major tool for fulfilling our commitments in the Kyoto Protocol.” Now that the Kyoto Protocol is soon to be implemented, the role of energy efficiency has taken on added importance.

Ministers provided direction to governments on how this “major tool” could be utilised. The Aarhus *Declaration* identifies several areas where both individual countries and the international community must take further action. In particular, it addresses energy market and pricing reform, regulatory and fiscal measures, integration of energy efficiency into other economic and social areas, international financing and international co-operation in monitoring the implementation of energy efficiency policies. Together with its two supporting documents, the *Policy Statement on Energy Efficiency* and the *Guidelines on Energy Conservation*, the *Declaration* forms a framework for governments to develop their approaches to energy efficiency. That framework, as well as the complementary and closely related legal obligations under the Energy Charter’s *Protocol on Energy Efficiency and Related Environmental Aspects* (PEEREA), send a strong signal to governments on why and how to take action.

This report describes the route countries have taken since 1998 and the progress towards implementing their commitments and objectives. The report also identifies areas for further action.

WHAT IS IN THE NUMBERS?

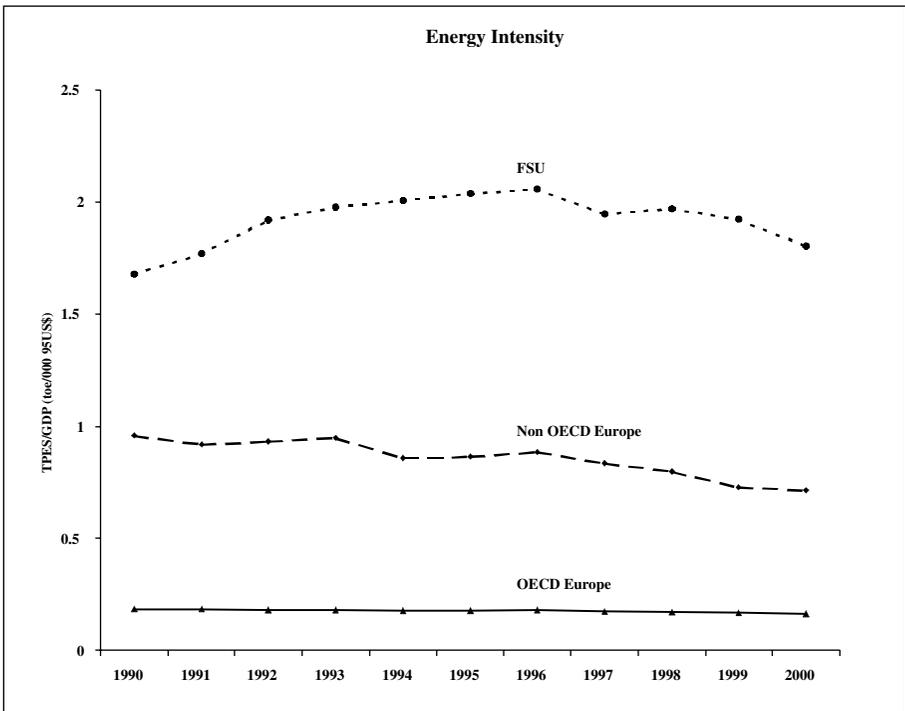
Transition countries experienced dramatic economic difficulties after 1990 but by 1998 economic fortunes had generally started to improve. The effects of the financial crisis in Russia initially reversed progress and slowed growth after 1998.

Some highlights of the trends since 1998 are:

- Primary energy production has continued to drop in non-OECD Europe but increased in the FSU. It grew only marginally in OECD Europe.
- Energy imports dropped in non-OECD Europe and increased in OECD Europe. The FSU continued to export in increasing quantities.

- GDP grew in all three regions. Growth was strongest in the FSU at a rate of 4% p.a. while it was 1.9% p.a. in OECD Europe and 1.2% p.a. in non-OECD Europe.
- Energy intensity (energy consumed per unit of economic output - GDP) decreased in all three regions, although only marginally in OECD Europe, (see chart below).
- Per capita final energy consumption decreased in non-OECD Europe but increased in the other two regions.

Energy intensity is only a proxy for energy efficiency improvements. It is influenced by changes in the industrial structure, climate and many other factors. Nonetheless, it remains a useful overall indicator for the trend in energy efficiency.



Source: IEA database

More detailed analysis of end-use data is required to determine the causes for the changes in energy intensity. Several international organisations are doing work in this area, using detailed end-use indicators. Region-wide data are not available but this report uses a wealth of anecdotal information.

ADDRESSING THE AARHUS DECLARATION - THE MAIN THEMES

• *Increased Energy Efficiency as a Major Policy Tool*

Under *PEEREA*, participating countries are required to prepare an energy efficiency strategy and this is reinforced by the *Declaration*. In 1998, several countries did not have a specific policy on energy efficiency, but generally that situation has changed. Most participating countries have made or revised energy efficiency programmes since 1998. Many of the energy efficiency strategies are incorporated into environmental strategies, often related to climate change. This is particularly the case for industrialised countries. In some countries, energy efficiency policy is integrated within national energy strategies.

Four years after the Aarhus Conference, only Albania, Bosnia and Herzegovina, Georgia, Tajikistan and Turkmenistan had not formulated explicit energy efficiency strategies or energy strategies that give a priority to energy efficiency. Albania and Georgia have drafted energy strategies that are expected to have sections on energy efficiency, but they have not yet been approved by the governments. Bosnia and Herzegovina is still in the process of post-war reconstruction and has not yet focused on an energy efficiency strategy, although many reconstruction projects include energy efficiency improvements.

Improving energy efficiency depends on well-designed programmes and a strong, effective delivery mechanism. Most countries have set up national energy agencies (and many have regional or local ones as well). In the OECD, Germany and Norway have recently established national energy efficiency agencies. In transition countries, many of these agencies were initially provided with multilateral and bilateral support. In many cases, however, there have been inadequate financial resources to staff the agencies or to deliver programmes. This has led, in some cases, to fully staffed organisations being under utilised, or to understaffed groups with too much to do.

Overall, there has been significant progress in programme design and implementation. Transition countries are offering almost the entire range of programmes including information/ awareness, education/training/advisory services, financial incentives, regulations and standards, voluntary measures and research and development. They are weakest on voluntary measures. Some countries are having difficulty developing programmes, in some cases mixing individual projects with programmes. Many transition countries are still not devoting sufficient domestic resources to programme implementation, often relying on the international community. Countries accessing the European Union have shown good progress, also by adopting the *Acquis Communautaire* in the area of energy efficiency.

In the residential sector, the full range of measures is used by most countries. There are many information-related programmes, including awareness creation, training, publication of technical material and advisory services. Financing remains the main problem and financial incentives in transition countries are often dependent on

bilateral and multilateral sources. It seems that a stronger co-operation between the finance, energy and environment ministries may help addressing the issue taking into account the national circumstances of each country.

Building codes are in place in most countries. Several countries (e.g. Poland, Romania and Turkey) have strengthened the requirements and brought them in line with most advanced approaches in the OECD. However, it often remains a problem to enforce the standards. Energy certification of buildings is widely used and expanding in the OECD countries but less so in transition countries. Energy labelling and minimum efficiency standards of appliances are also increasingly used. Voluntary measures are used in industrialised countries but only little in transition countries.

The services sector, which includes the commercial and the institutional sub-sectors (i.e. government sector, including schools, hospitals, etc.,) mirrors the residential sector in terms of instruments used for improving energy efficiency.

Information programmes are widely used in industry. Many of the transition economies that did not have information/awareness programmes in 1998 have started to develop them (e.g. Armenia and Kyrgyzstan). There is also training in financial engineering and energy audits. In several countries industrial energy efficiency funds have been created, mostly relying on international support. Compared to the residential sector there is less use of regulations, except for minimum efficiency standards of boilers and, again, voluntary programmes are widely used in industrialised countries but not in transition economies.

The transport sector has some information programmes, often awareness creation for better driving habits or to encourage the use of public transport. Financial support is going into public transport in many countries. Fuel efficiency labelling of cars is used in industrialised countries, but less so in transition countries. Voluntary agreements are also being used in the transport sector by some OECD countries (e.g. Finland, France and Germany).

• *Market and Price Reform*

Price reform is necessary in order to introduce market rigour instead of a maze of government subsidies and cross-subsidies.

There is progress in reforming pricing systems in transition economies, although at a relatively slow pace in most countries. End-use energy price reform has been one of the most contentious areas of the transition process. Due to the rapidly increasing cost of energy following years of below cost end-use pricing, reform has a strong impact on individuals, businesses or institutions. Social concerns have in a number of cases delayed the reform of energy prices and removal of cross-subsidies between industry and residential sector.

Many transition countries now have independent pricing commissions or regulatory

bodies to either set prices or to establish the methodology for companies to set prices. It is important that these organisations develop a transparent process, independent of government control. Transition countries that have recently set up pricing commissions or regulatory bodies with similar powers include: Albania, Armenia, Bulgaria, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Romania, Slovenia, Ukraine and Tajikistan. Several regulators in transition countries have formed the Energy Regulators Regional Association, based in Budapest to share experience.

In its *Transition Report 2001*, which had a special focus on energy, the EBRD was generally encouraged by the progress in electricity price reform¹, with the exception of countries such as Belarus, Turkmenistan and Tajikistan, which are lagging. Despite the reforms, EBRD analysis indicates that there is still significant under-pricing in the power sector. In only two countries, Poland and Slovenia, did the residential prices meet the long-run marginal cost (LRMC). In most countries, residential prices were less than half of the LRMC. Residential tariffs were lowest in the CIS and South East Europe, with the very lowest in Central Asia (Kyrgyzstan, Tajikistan and Turkmenistan). Even so, there were non-payment problems due to the economic situation. There were comparable problems in the heat sector.

There are many international efforts to promote market oriented pricing policies. The UN-ECE has a project on reforming energy prices for sustainable development. Part of the project aims to elaborating guidelines on energy pricing for policy makers for the 2003 Kiev Environment Ministerial Conference. The IEA and UNEP also have a joint project on subsidy reform in the context of promoting sustainable development.

• *International Financing*

Investment by IFIs, donors and others have multiple advantages, apart from providing the needed finances. Funding by IFIs imposes rigour in business and financial planning. It may mobilise domestic financing requested under a co-financing procedure, and it sets an example to the domestic banking system that risks are manageable.

The EBRD has established an energy efficiency unit to promote investments in energy efficiency. The Bank is currently financing 11 private energy service companies (ESCOs), one state-owned ESCO and indirectly financing an ESCO through the Energy Efficiency and Emissions Reduction Fund. The EBRD finances district heating rehabilitation, public sector energy management measures and industrial energy efficiency. The EBRD is developing guarantees to domestic banks to share the risk they bear in lending to energy efficiency initiatives.

The GEF has 14 projects, managed by the UNDP, which are either planned, approved or being implemented in 13 transition economies. The projects total \$41.36 million.

¹ EBRD, *Transition Report 2001*, London, 2001, pp.12-13.

These projects have a strong emphasis on long-term capacity building in addition to energy efficiency improvements and reductions in GHG emissions. The GEF is also working with UNEP to implement a global project, Promoting Industrial Energy Efficiency through a Cleaner Production/Environmental Management System Framework, which includes three transition economies (Czech Republic, Hungary and Slovak Republic).

The IFC - the private sector arm of the World Bank Group - also with GEF funding, has an energy efficiency co-financing project in Hungary and is expanding this concept to a regional project for five transition countries. The Hungarian project includes a guarantee programme, supporting and sharing in the credit risk of energy efficiency financing undertaken by domestic financial institutions. Financing supported by the guarantees has been provided to both end-users directly and to ESCOs.

The EU, through the PHARE and TACIS programmes, have supported the development of funding facilities in several countries, including revolving funds for energy efficiency investments. The European Investment Bank also provides financing for infrastructure, including district heating rehabilitation, in EU and accession countries (e.g. in Romania).

The UNECE has certified seven demonstration zones set up in Russia within the framework of the UNECE EE 21 programme. Several other zones are being prepared for certification. Under a 1995 decision of the Russian Federation, there are federal guarantees available for investments in energy efficiency in these zones with the possibility of some federal funding.

• *International Efforts to Monitor Energy Efficiency*

Monitoring is developing on several fronts: to actually monitor the progress of countries in implementing their own energy efficiency strategies and programmes, and to help countries develop monitoring and evaluation skills.

The process of creating end-use energy indicators is still at an early stage in most transition countries and is more advanced in market economies. Both the IEA and EU have been developing energy indicators for many years, but even in these countries their use is far from widespread. The IEA is working with the ECS to build an energy efficiency indicator database containing the most relevant energy and economic activity data needed to support the monitoring under *PEEREA*.

Separately, the EU is working with candidate countries to help develop their own more disaggregated indicators, following the work it has been undertaking for its own member states.

In a less quantitative form, the Kiev Conference represents a milestone in monitoring progress in policy and programme development of participating countries (including

the present report). On a more regular basis, the Energy Charter Secretariat monitors its participating countries and their obligations under the Protocol on Energy Efficiency and Related Environmental Aspects (*PEEREA*). This includes regular questionnaires followed up by a series of in-depth reviews. To date, eight in-depth energy efficiency policy and programme reviews have been undertaken.

The IEA reviews the energy efficiency policies and programmes of its member countries through in-depth and regular energy policy reviews. The European Commission also periodically monitors the energy efficiency measures of its member states.

• *The Special Case of Transport*

The Aarhus *Declaration* pays specific attention to energy efficiency in transport, a sector which is particularly important because of its high share of total GHG emissions.

In road transport, recent IEA analysis estimates that a particular package of measures can save about 10% of oil consumption and the resulting carbon dioxide emissions². These initiatives include technical change; promotion of on-board technologies, including diagnostic equipment and information systems; toll rings and high occupancy/toll lanes; a parking tax; low greenhouse gas alcohol fuels; and telematic systems for freight.

Currently, the only fuel efficiency standards for vehicles are in Australia, Canada, Japan and the United States, countries which also have car labelling requirements.

The EU has no fuel efficiency standards, but is addressing the issue primarily through a voluntary programme with manufacturers to reduce CO₂ emissions of cars. The EU is active in addressing environmental and energy issues in transport and a car labelling directive was approved in 1999. There are several other EU directives such as on fuel quality that have an impact on emissions and fuel efficiency. An EC White Paper on transport in 2001 recommended measures to reduce congestion, to promote less polluting modes of transport and improve the quality of public transportation services.

Public transportation is a priority for transition economies. Even though private car ownership has increased considerably over the last decade, the use of rail and urban transport is still relatively important and governments aim at maintaining this situation. Congestion and air quality are causing increasing problems in urban areas. Some railway systems, such as the national railway in Hungary, have identified significant potential for energy savings and used ESCOs to finance and implement the efficiency measures.

The Aarhus *Declaration* raised a particular concern about air transport - calling for energy technology improvements that would improve energy efficiency, lower aircraft

² IEA, *Saving Oil and Reducing CO₂ Emissions in Transport, Options and Strategies*, OECD, Paris, 2001.

noise and air emissions. The International Civil Aviation Organisation (ICAO), a UN agency has addressed the issue over the past 30 years. In June 2001, more stringent noise standards were adopted, with further strengthening due in 2006. The noise reductions are obtained by technical changes, noise abatement operational procedures, operating restrictions and noise charges. According to the ICAO, aircrafts produced today are about 70% more fuel efficient per passenger-kilometre than 40 years ago and a further 20% in improvements could be achieved by 2015.

MAIN CONCLUSIONS

The main conclusions of this report are:

- Progress has been made in all countries towards meeting obligations under the *Aarhus Declaration* and its *Policy Statement on Energy Efficiency* and the *Guidelines on Energy Conservation*. Progress has varied from considerable to minimal. The majority of countries view international obligations as an important factor for improving energy efficiency, indicating that the Aarhus Declaration and PEEREA are proving useful in establishing national energy efficiency policies and programmes.
- Improvement in energy efficiency is below its potential, notably on the demand side, due in part to an apparent weakening priority for energy efficiency policies. Without a higher political priority the potential benefits of energy efficiency over the next decade will not be fully realised.
- There is still a need in many transition economies for reform of energy pricing to motivate consumers to save energy. Energy and environmental taxes may provide an additional incentive for improving energy efficiency.
- The development of energy efficiency strategies is progressing reasonably well. Still more effort is needed in setting targets and establishing realistic action plans. A few participating countries have achieved very little in policy development. Also, more strategy development is needed at regional and local levels.
- The link between energy efficiency strategies and environmental issues - especially climate change - is well established in western countries but less so in transition countries. One of the reasons is the less immediate concern in transition countries about meeting the Kyoto Protocol obligations.
- The flexible mechanisms under the Kyoto Protocol offer an important opportunity for mutual benefits and cooperation between countries; foreign investments in new energy-efficient and renewable energy technologies would complement domestic measures in transition countries.
- Energy efficiency policy needs to be better integrated with other economic, social

and environmental areas of government responsibility. The integration process should be closely monitored at both the national and international levels.

- Programme design and delivery are hampered because of insufficient human and financial resources. Transition countries should increase their own financing of programmes, rather than relying on international sources. Financing can be supported by environmental protection funds as well as through taxes or levies.
- Monitoring and evaluation of policies and programmes is essential. There is insufficient understanding of monitoring and evaluation capability in most countries. The effort of international organisations, such as the IEA, to improve evaluation methodology is welcome.
- Certain instruments, such as fiscal policies, voluntary agreements, labels and standards for improving energy efficiency may become more important in the context of the energy market liberalisation and this potential is not yet sufficiently tapped.
- Reliable data and energy efficiency indicators are necessary to evaluate the effects of policies and programmes. However, setting up an energy indicator system may be resource demanding, and the cost-benefits should be evaluated.

International efforts play an important role in the endorsements by Ministers at Aarhus:

- International obligations such as the Aarhus *Policy Statement on Energy Efficiency* and the Energy Charter's *PEEREA* serve to maintain international focus on and momentum of energy efficiency policies.
- The *PEEREA* in-depth reviews of energy efficiency policies and programmes are important in providing a peer evaluation of a country's approach, in exchanging experience amongst participants and for informing a wider audience within the country. The recommendations concluding the reviews are important in the policy formulation process.
- International exchange of experience and best practice for energy efficiency policies and programmes has proven fundamental. The use of websites and other media has proven useful.
- International efforts on capacity building have proven to be extremely important, but the support for capacity building at regional and local levels needs to be strengthened.
- International financing by the GEF, the EBRD, the EIB and the World Bank has increased. More effort has gone into innovative forms of financing to meet the specific needs of transition countries. However, difficult access to finance is still a major barrier to investments in energy efficiency.

THE ROAD TOWARDS AN ENERGY-EFFICIENT FUTURE

PART I HEADING DOWN THE ROAD

1. Introduction

1998 was a momentous year for energy efficiency because it was brought onto the global stage at both the Environment for Europe Conference and the meeting of environment ministers at Aarhus, Denmark. 1998 was also the year the Protocol on Energy Efficiency and Related Environmental Aspects (*PEEREA*) entered into force. Energy efficiency received prominence at the Aarhus Conference. This was arguably the first time that energy efficiency achieved such a high profile at a major environmental ministerial and in recognition of its potential contribution to environmental concerns.

At Aarhus, Ministers were presented with the *Energy Efficiency Initiative (EEI)*, a major study on energy efficiency prepared jointly by the International Energy Agency, the Energy Charter Secretariat and the Danish Energy Agency (now renamed the Danish Energy Authority). The report was the first comprehensive analysis of energy efficiency of Europe and the non-European countries that are members of the United Nations Economic Commission for Europe: it brought together the countries of the western industrialised world and the economies in transition. The *EEI* was a landmark report because it provided a comprehensive examination of energy efficiency policies by sector and by country but it also laid the foundation for developing an energy efficiency strategy. The report introduced many basic concepts, looked at current trends and assessed what were the drivers of energy demand. The *EEI* was also one of the first energy efficiency reports to cover both the OECD countries and the transition economies together.

Environment Ministers at Aarhus challenged participating countries by making energy efficiency a major component of the Ministerial *Declaration* (see Annex 9) directed towards energy efficiency and endorsing the accompanying *Policy Statement on Energy Efficiency* (referred to as the *Policy Statement* throughout this report), together with *Guidelines on Energy Conservation* (the *Guidelines*), placing obligations on the part of the participating countries to undertake specific actions regarding energy efficiency. Ministers at Aarhus did so, recognising that energy efficiency addresses many man-made environmental issues and realising that to meet environmental goals a more aggressive, ambitious and structured approach to energy efficiency is needed.

The Aarhus Conference endorsed many policies and guidelines concerning energy efficiency. If looked at in their entirety, these policy recommendations and guidelines started what effectively can be seen as an energy efficiency strategy for all Europe.

This report assesses the progress that has been made during the intervening five years and considers where energy efficiency policy is going in the future.

Importance of Energy Efficiency

Energy efficiency has become increasingly more important as it is considered one of the major elements of a comprehensive energy policy. Energy policy cannot be developed in isolation from the rest of society and the economy. The same is true for energy efficiency. Improved energy efficiency brings important benefits to all sectors. In recent years, a major emphasis has been on improving energy efficiency in order to tackle environmental concerns (especially global climate change), many of which have been exacerbated because of emissions resulting from the energy sector. But improving energy efficiency also is important for, inter alia, energy security, industrial competitiveness, job creation and other economic and social areas.

Article 1 of *PEEREA* states that one of the main objectives of the Protocol is “the promotion of energy efficiency policies consistent with sustainable development”. All Contracting Parties of *PEEREA* have embraced the importance of sustainable development and most are developing strategies towards that end. Energy efficiency is a major component of such a strategy.

The *Guidelines for Energy Conservation in Europe* endorsed at Aarhus firmly expressed the importance of energy efficiency:

- Improved energy efficiency will not guarantee that fewer resources will be used in the future but it does guarantee that the resources will be utilised more efficiently. This will have indispensable economic, environmental and energy security benefits.
- Energy efficiency is a driving force in economic development and thus of substantial importance to competitiveness in the international market.
- In countries with substantial indigenous energy resources energy efficiency will increase export opportunities and income. In net energy importing countries the import bill will decrease and security of energy supply improve.
- ... enhanced energy efficiency will delay the need for new energy supply capacity. The result may be overall economic savings for consumers, industry and governments and a shift in investments from supply to demand side.
- A reduction of 30% in energy consumption in the industrialised countries will correspond to an equivalent annual reduction of approx. 6.000 Mt carbon dioxide and become one of the major contributors in our efforts to challenge climate change. Simultaneously, emissions of sulphur dioxide, nitrogen oxides and other air pollutants will be reduced.
- ... clear and targeted energy efficiency policies are necessary to create a sustainable development in the industrialised world, and there is a need for reinforcement and

implementation of the energy efficiency policies in all sectors of the industrialised countries. This will in the first instance imply a 'win-win' situation, in which economic potentials are utilised at the same time leading to environmental improvements and stretching the world's resources both to the developing world and to comply with future needs. In this context it is important that the industrialised countries set an example for the rest of the world.

It is important to expand further on the importance of improved energy efficiency in addressing environmental concerns. These are discussed in the following section.

Where are we along the road?

More than two decades of experience has shown that effectively improving energy efficiency requires a structured, disciplined, comprehensive approach. It cannot be done piece-meal. The Aarhus *Declaration*, together with the *Policy Statement on Energy Efficiency* and the *Guidelines on Energy Conservation*, provides an important framework for governments to benefit from, in terms of developing or revising their own national, regional or local approaches. That framework, together with the complementary legal obligations under the Energy Charter *Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA)*, represent powerful signals to governments on both to take action and how to take action.

Yet, governments are confronted with a multitude of issues to deal with simultaneously and energy efficiency is often not given sufficient attention. This problem has been amplified for transition countries because they are confronted with the complexities of completely rebuilding their political, economic and social structures to reflect modern, market based approaches. An effective energy efficiency strategy must be integrated into these reforms at the earliest point possible.

PEEREA and Aarhus commitments obviously lean towards helping the transition countries but there is also an important need to sharpen and build upon existing energy efficiency policies and programmes in the industrialised countries as well. The next section on the environmental benefits highlights those needs, but there are also other important reasons discussed in chapters 3 and 4.

This report focuses on where countries are and where they are headed. The Aarhus *Declaration* provides an important roadmap.

2. Linking Energy Efficiency, the Environment and Sustainable Development

The energy sector is linked with many of the major environmental problems countries are confronted with - from deforestation to water pollution, from air quality to health problems. There are environmental impacts at all points of the energy cycle from extraction through to usage. This report emphasises the end-use sectors (residential, commercial/institutional, industry and transport), how and where energy is used,

where many of the local, regional and global environmental problems stem from. Improved energy use, leading to either actual lower energy consumption or lower consumption compared to expectations, has a beneficial knock-on effect throughout the entire energy cycle.

Improved energy efficiency is not about doing without: it means obtaining a given level of energy service for fewer energy inputs. Modern economies demand energy services (heat, lighting, transport) for the day-to-day lifestyle that has evolved and for businesses to function effectively. For example, the penetration of computers and all the other power-driven appliances and office equipment has grown exponentially in recent years. The range of new products is increasing yearly. There is also a trend towards more (and often larger) vehicles and more and larger dwellings in most countries.

These trends and the rapidly increasing growth in car ownership, for example, have implications for GHG emissions and for energy supply that, even if the new equipment and vehicles are increasingly efficient, can put strains on our environmental systems.

Without suppressing the demand for new services, energy and environment policies working in tandem lead to energy policies moving in two complementary paths: cleaner energy production and improved efficiency of energy use. Realistically they should move together.

For more than a decade, energy efficiency has been closely linked to climate change policies, since global climate change is one of the most important environmental areas that is impacted by energy use. In 1989, the Dutch Government was one of the first to explicitly develop an energy efficiency strategy to address climate change. Most other OECD countries soon followed. Particularly after the 1992 Conference on Sustainable Development in Rio de Janeiro, the awareness of climate change issues went global. Yet, Agenda 21, the work programme approved at the 1992 Conference, did not include a specific chapter on energy. Nevertheless, the importance of energy efficiency was recognised and at the present time, it can be argued that climate change is probably the most important driver for energy efficiency policies in OECD countries, at least.

Participating countries in the Environment for Europe process became supportive of the efforts to address global climate change through the 1992 United Nations Framework Convention on Climate Change (UNFCCC), which came into effect in March 1994. The Convention was the first global attempt at internalising some environmental costs into energy planning and decision-making. The objective of the UNFCCC is to stabilise greenhouse gas emissions. Most *PEEREA* Contracting Parties are signatories to the UNFCCC.

It is important to consider the environment in general, before the discussion continues on climate change. One can start with *PEEREA*, the Protocol on Energy Efficiency

and Related Environmental Aspects. *PEEREA* came into force just two months before the Aarhus Conference. In its preamble, the Protocol states that it was developed “Recognizing that improvements in energy efficiency reducing negative environmental consequences of the energy cycle including global warming and acidification.” And Article 1 (1) states that the Protocol “defines principles for the promotion of energy efficiency as a considerable source of energy and for consequently reducing adverse Environmental Impacts of energy systems”.

The *Policy Statement on Energy Efficiency* from the Environment for Europe Conference in Aarhus in June 1998 states:

Continued improvements in the entire energy cycle from production to distribution and consumption have many environmental benefits because they help to reduce greenhouse gas emissions and to relieve local and regional air pollution, acidification and water pollution, land degradation, health problems and other environmental impacts.

The International Energy Agency (IEA) first published a major report on energy efficiency and the environment in 1991, stating that “the most immediate and direct environmental benefit of improving the efficiency of energy use is a reduction in the use of resources and in the emission of many air pollutants, as well as of CO₂”³. The report provided an analysis of the effectiveness of the policy measures to determine what energy efficiency improvements could contribute to addressing environmental concerns. Experience since then has shown that energy efficiency improvements have an important cost-effective role in environment policy. The IEA later published another study, *Energy and Climate Change*, in advance of the Kyoto discussions in 1997, which led to the Kyoto Protocol⁴.

Under the UNFCCC the Kyoto Protocol was negotiated in 1997. That Protocol places quantified GHG emission limitation and reduction commitments on Annex 1 countries once the Protocol comes into effect⁵. The Kyoto Protocol under the UN Framework Convention on Climate Change gives energy efficiency high importance, including through the flexible mechanisms of Joint Implementation (JI) and the Clean Development Mechanism (CDM). All participating countries that are signatories to the UNFCCC can participate in either JI or CDM. Energy efficiency projects for end use and for supply side projects (such as cogeneration) qualify as eligible projects under these mechanisms.

In November 2001, Parties to the UN Climate Change Convention finalised the operational details of the Kyoto Protocol, opening the way to ratification by governments. The 1997 Kyoto Protocol will enter into force and become legally binding after it has been ratified by at least 55 Parties to the Convention, including

³ IEA, *Energy Efficiency and the Environment*, OECD, Paris, 1991, p.10.

⁴ IEA, *Energy and Climate Change, an IEA Source-Book for Kyoto and Beyond*, OECD, Paris, 1997.

⁵ The United States has opted out of the Kyoto Protocol.

industrialised countries representing at least 55% of the total 1990 carbon dioxide emissions from this group. As of 28 January 2003, 104 countries had ratified, including 31 countries participating in the Environment for Europe process⁶. The Kyoto Protocol is expected to come into force in 2003.

Most of the economies in transition, which are Annex 1 countries, are not expected to have major problems meeting their Kyoto obligations. In fact, many have a “hot air” credit because, with the economies collapsing following the agreed upon baseline year, most projections show that greenhouse gas emissions will have no problem reaching the Kyoto target, especially in the business-as-usual scenario. This provides a good opportunity for these countries to take advantage of JI which is available to Annex I countries⁷. Emission reduction units (ERUs) will only be issued from JI projects for a crediting period starting after 2008. JI is seen as one of the most effective tools for financing and transferring know-how and technologies to transition countries to undertake necessary investments. JI is also seen as a low-cost means for investing countries to obtain credits through the initiatives. Energy efficiency projects will be a high priority for funding under JI because there is a high potential for cost-effective measures.

For non-Annex 1 countries participating in the Environment for Europe process, the Clean Development Mechanism (CDM), another of the flexible mechanisms, is available for financing similar projects in those countries. A recent report by the Danish Energy Authority provides some information on CDM⁸:

The CDM is the only mechanism in the Kyoto Protocol under which developing countries can engage in emissions reduction activities.

As defined by the Protocol, the purpose of the CDM is twofold:

- (a) Help non-Annex I countries achieve sustainable development; and
- (b) Help Annex I countries to achieve emission reductions that can be used towards their commitments to mitigate their GHG emissions.

Non-Annex I countries are supposed to gain the economic, developmental and environmental benefits from implemented CDM projects that generate Certified Emission Reductions (CERs) for export.

⁶ See www.unfccc.int.

⁷ Includes most transition countries as well as OECD countries. Non-Annex 1 countries do not have specific GHG emissions reduction targets. PEEREA countries that are non-Annex 1 countries include Azerbaijan, Cyprus, Georgia, Kazakhstan, Malta, Mongolia, Turkmenistan and Uzbekistan. PEEREA countries that are not signatories to the Kyoto Protocol include Albania, Armenia, Belarus, Bosnia and Herzegovina, Kyrgyzstan, Tajikistan and Turkey. Some of those countries are planning to participate in the future. For more information, see www.unfccc.int.

⁸ Danish Energy Authority, *Joint Implementation and Clean Development Mechanism Projects, Manual for Project Developers, Version 1*, May 2002, p. 4.

Also, under the UNFCCC, countries prepare regular National Communications outlining their emissions data, their strategies for meeting their obligations and the progress that is being achieved. A review of National Communications shows that countries refer to energy efficiency as one of the major ways of meeting their obligations ⁹.

Energy Efficiency and Sustainable Development

An energy efficiency strategy is not just a slight adjustment to an energy policy but a new concept of economic policy which takes into account the costs of environmental degradation and which seeks to reduce hazards and to bring about efficient national and international economies. National energy efficiency strategies must form an integral part of economic strategies for a healthy environment and sustainable development.

Laponche et al., *Energy Efficiency for a Sustainable World*, p. 19.

Article 1 of *PEEREA* states that one of the main objectives of the Protocol is “the promotion of energy efficiency policies consistent with sustainable development.” Contracting Parties have embraced the importance of sustainable development and are developing strategies towards that end. Energy efficiency is a major component of such a strategy.

Energy efficiency and sustainable development have much in common with respect to the concept of integration. Particularly since the Conference on Sustainable Development in Rio in 1992, sustainable development has gained world attention and governments are regularly analysing their policies, programmes and practices to see how sustainable they are and to determine whether their new policies, programmes and practices are moving in a sustainable manner. With respect to sustainable development in the energy sector, energy efficiency figures prominently because it means using resources as effectively as possible. This is consistent with and supporting the objectives of sustainable development.

Pertinent is an excerpt from a European Commission staff paper ¹⁰:

The achievement of sustainable development requires a balanced integration of environment, economic and social objectives, taking into account the needs and concerns of both present and future generations. But the links between the economic, environmental and social dimensions are complex, sometimes involving difficult trade-offs between them, which might seem contradictory in the short term though they should be mutually reinforcing in the long term.

⁹ See www.unfccc.int.

¹⁰ EC, *Commission Staff Working Paper on Sustainable Industrial Development*, Brussels, 25.10.1999, SEC(1999)1729, page 4.

The IEA *Statement on Sustainable Development* states ¹¹, “Policymakers must look to the long term, taking action today to avoid longer-term social, economic or environmental disruptions, while retaining flexibility to alter course when the existing path proves to be unsustainable”. The IEA has further elaborated on what it takes to work towards sustainability ¹²:

Deciding that action is needed is easy; taking actions and properly linking them is much harder. The first step is defining the areas where action is needed. From the perspective of IEA and member countries, these areas include:

- energy security;
- improving energy efficiency;
- using more renewable energy;
- making markets work;
- technology, including research, development and deployment;
- access to energy;
- transportation; and
- environment, health and safety.

IEA Member countries will seek to create conditions in which the energy sectors of our economies can make the fullest possible contribution to sustainable development.

In light of these considerations, Member Governments of the IEA affirm:

- that further improvements in energy efficiency should be promoted;
- that strategies such as the elimination of import fees, the development of common standards and codes, and other mechanisms that remove market barriers and improve market efficiency should be pursued;
- that minimum energy performance standards and comparative energy efficiency labeling should be adopted for all major energy end-uses, such as residential appliances and commercial and industrial equipment.

More recently, at the September 2002 World Summit on Sustainable Development, the approved Plan of Implementation included two paragraphs that referred to improving energy efficiency, showing its importance in meeting sustainable development goals. The Plan calls upon governments to: “Integrate energy considerations, including energy efficiency ... into planning, operation and maintenance of long-lived energy consuming infrastructures, such as the public sector, transport, industry, agriculture, urban land use, tourism and construction sectors” [(paragraph 20 (b))]. Most relevant references on energy efficiency from the Plan of Implementation are in Annex 10.

What is important is the priority that is given to energy efficiency by bodies such as the Energy Charter and its energy efficiency protocol, the IEA and the European Union. And that priority continues with many others.

¹¹ See www.iea.org.

¹² IEA, *Toward Solutions, Sustainable Development in the Energy Sector*, Paris, 2002. See www.iea.org.

3. Energy Demand, Energy Prices and Carbon Emissions

Introduction

Ultimately, progress in meeting the commitments endorsed at the Aarhus Conference comes down to improvements in energy efficiency for the economy as a whole and by end-use sector as well as by the reductions or slowing down in growth of GHG emissions. It is straightforward to show the policies and programmes that are in place in countries and regions. It is less straightforward to show the quantitative progress made.

The *EEI* provided an important starting point because it stressed the need for a disaggregated approach to monitoring energy use. To identify the elements that make energy use more efficient, changes in past energy use resulting from changes in structure and economic activity need to be separated from those related to improved energy efficiency. This is done through a series of indicators.

For the IEA and the EU and many of their member countries, the use of end-use energy indicators is well established. This is less well established in transition economies, in part because collecting and analysing the data is complex and expensive. However, as shown below in Chapter 6, work is underway to improve data collection and analysis that will improve monitoring in the future. One of the problems with monitoring the progress since Aarhus is that detailed energy statistics in most cases only are available up to the year 2000.

This chapter first provides some of the basic energy indicators, followed by examples of more detailed end-use energy indicators. Subsequently a review of the evolution of end-use energy prices. The chapter ends with a review of environmental indicators.

Basic Energy Indicators

The following three tables provide a broad overview of basic trends in energy. In both the Non-OECD European countries and FSU countries, energy production and Total Primary Energy Supply (TPES) dropped drastically after 1990, with the economic decline of the transition economies.

TABLE 1
BASIC ENERGY INDICATORS
NON-OECD EUROPE COUNTRIES

	1990	1992	1995	1998	2000
Energy Production (ktoe)	78174.39	69275.43	64898.68	63795.72	60795.44
Net Imports (ktoe)	69299.84	45279.51	50319.49	47666.89	44110.99
TPES (ktoe)	141031.30	106952.00	103510.20	102460.00	95284.65
Oil Product Consumption (000 bls/day)	933.37	630.32	623.64	684.04	630.37
Electricity Output (GWh)	195709.00	167202.00	177818.00	183935.00	176379.00
GDP (billion 95 US\$ using exch. Rates)	147.33	114.99	119.75	128.54	133.36
GDP (billion 95 US\$ using PPPs)	387.23	308.88	322.43	334.20	342.94
Population (million)	59.93	59.28	58.05	58.06	58.20
Energy Production/TPES	0.55	0.65	0.63	0.62	0.64
Net oil Imp/GDP (toe/000 95 US\$)	0.24	0.18	0.20	0.18	0.16
TPES/GDP (toe/000 95 US\$)	0.96	0.93	0.86	0.80	0.71
TPES/GDP (toe/000 95 US\$ PPP)	0.36	0.35	0.32	0.31	0.28
TPES/Pop. (toe/capita)	2.35	1.80	1.78	1.77	1.64
Oil Supply/GDP (toe/000 95 US\$)	0.32	0.26	0.27	0.25	0.22
Oil Supply/Pop (toe/capita)	0.80	0.51	0.56	0.56	0.51
Elect. Cons./GDP (kWh/95 US\$)	1.28	1.34	1.33	1.24	1.16
Elect. Cons./Pop. (kWh/capita)	3150.51	2606.02	2738.61	2737.33	2661.36

Source: IEA database

TABLE 2
BASIC ENERGY INDICATORS
FSU COUNTRIES

	1990	1992	1995	1998	2000
Energy Production (ktoe)	1624614.00	1443520.00	1208793.00	1177943.00	1261902.00
Net Imports (ktoe)	14655.00	305018.00	179797.00	152848.00	154584.00
TPES (ktoe)	1347800.00	1240920.00	969093.20	893697.40	921142.70
Oil Product Consumption (000 bls/day)	8402.03	6859.79	4187.42	3708.71	3592.66
Electricity Output (GWh)	1727000.00	1557728.00	1290605.00	1221314.00	1270565.00
GDP (billion 95 US\$ using exch. Rates)	802.10	646.24	475.72	453.68	510.51
GDP (billion 95 US\$ using PPPs)	2608.29	2093.02	1526.55	1451.29	1630.35
Population (million)	289.01	291.62	292.22	291.25	289.56
Energy Production/TPES	1.21	1.16	1.25	1.32	1.37
Net oil Imp/GDP (toe/000 95 US\$)	-0.20	-0.15	-0.27	-0.39	-0.42
TPES/GDP (toe/000 95 US\$)	1.68	1.92	2.04	1.97	1.80
TPES/GDP (toe/000 95 US\$ PPP)	0.52	0.59	0.64	0.62	0.57
TPES/Pop. (toe/capita)	4.66	4.26	3.32	3.07	3.18
Oil Supply/GDP (toe/000 95 US\$)	0.51	0.54	0.46	0.42	0.36
Oil Supply/Pop (toe/capita)	1.41	1.20	0.76	0.65	0.63
Elect. Cons./GDP (kWh/95 US\$)	1.93	2.18	2.40	2.33	2.15
	5363.14	4819.46	3906.58	3627.01	3791.67

Source: IEA database

TABLE 3
BASIC ENERGY INDICATORS
OECD EUROPE COUNTRIES

	1990	1992	1995	1998	2000
Energy Production (ktoe)	1024670.00	1043544.00	1119441.00	1141121.00	1159018.00
Net Imports (ktoe)	1071460.00	1102615.00	1119064.00	1237271.00	1296543.00
TPES (ktoe)	1621381.00	1627856.00	1673035.00	1747086.00	1765637.00
Oil Product Consumption (000 bls/day)	41587.00	42919.00	44946.00	46829.00	47790.00
Electricity Output (GWh)	2628796.00	2699821.00	2846744.00	3036518.00	3194778.00
GDP (billion 95 US\$ using exch. Rates)	8831.78	9037.89	9485.96	10200.64	10800.91
GDP (billion 95 US\$ using PPPs)	7853.75	7996.69	8435.23	9129.36	9665.70
Population (million)	497.35	503.38	511.13	517.26	521.61
Energy Production/TPES	0.63	0.64	0.67	0.65	0.66
Net oil Imp/GDP (toe/000 95 US\$)	0.05	0.05	0.04	0.04	0.04
TPES/GDP (toe/000 95 US\$)	0.18	0.18	0.18	0.17	0.16
TPES/GDP (toe/000 95 US\$ PPP)	0.21	0.20	0.20	0.19	0.18
TPES/Pop. (toe/capita)	3.26	3.23	3.27	3.38	3.39
Oil Supply/GDP (toe/000 95 US\$)	0.07	0.07	0.07	0.07	0.06
Oil Supply/Pop(toe/capita)	1.27	1.29	1.30	1.34	1.31
Elect. Cons./GDP (kWh/95 US\$)	0.28	0.28	0.28	0.28	0.28
Elect. Cons./Pop. (kWh/capita)	5021.24	5077.59	5215.79	5518.84	5755.05

Source: IEA database

Data for the tables 1, 2 and 3 are provided by the IEA. Units are those which are widely used for the various indicators and items. For definitions and conversion factors please see IEA Energy Balances and IEA Statistics 2002 edition or consult the IEA website: www.iea.org

In both the non-OECD European countries and the former Soviet Union (FSU), energy production has dropped since 1990, although in the case of the FSU, energy exports have continued to grow significantly. The non-OECD European countries have reduced their import dependence, but it is still high.

TPES, oil product consumption and electricity consumption have also decreased significantly in both the FSU and non-OECD Europe, reflecting the major collapse of their economies after 1990. There is, however, a trend upwards in the most recent period, as the economies start to recover. The FSU, in particular, was hit by the financial crisis of 1997, which only added to the problems.

The following graph compares the three regions in terms of trends in primary energy intensity, TPES/GDP. It is difficult to compare regions because there are so many factors that affect this intensity. The FSU is understandably the most energy intensive, in part because of the industrial structure, the climate, geography, the poor state of energy consuming technology, the high transformation and distribution losses, end-use energy prices, and so on. Major energy producing countries tend to have more energy-intensive industry. Yet, such variations raise concern. It is possible in Figure 1 to see the changes within regions throughout the 1990s. A general decrease in TPES per GDP is also evident in non-OECD Europe. In the FSU, the primary energy intensity continued to grow throughout the early 1990s, but has been on a downward trend since 1996. The energy intensity level is relatively flat in OECD Europe where most of the region is made up of the European Union. There is an indicative target for the Community as a whole of a one percentage point per year reduction in TPES/GDP to the year 2010 over and above that which would otherwise be attained (generally expected to be 1% reduction per year). But, as shown in the chart, progress is slow.

FIGURE 1: REGIONAL ENERGY INTENSITY

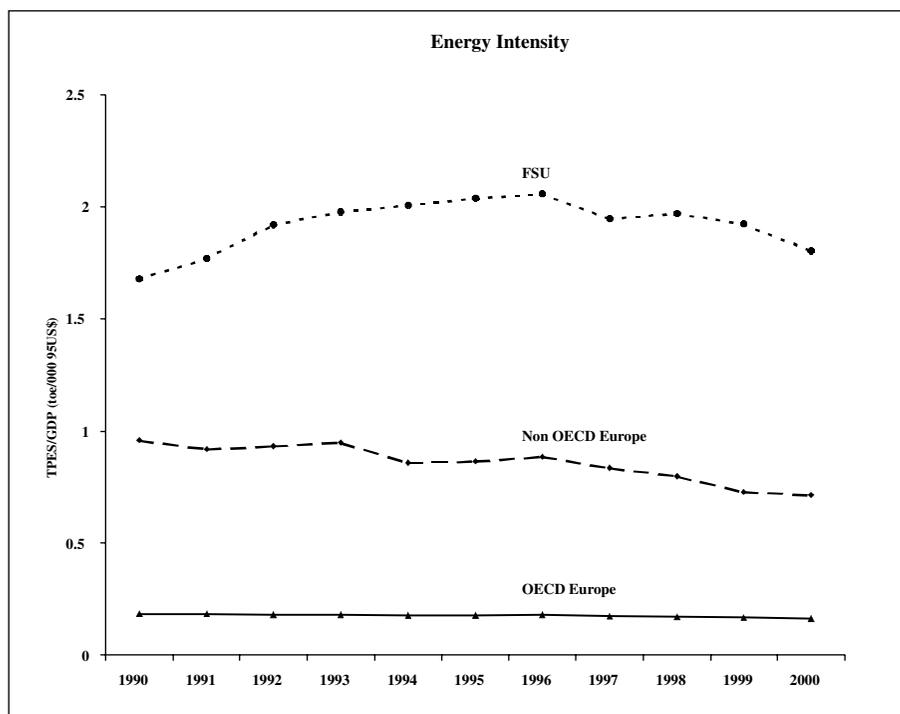
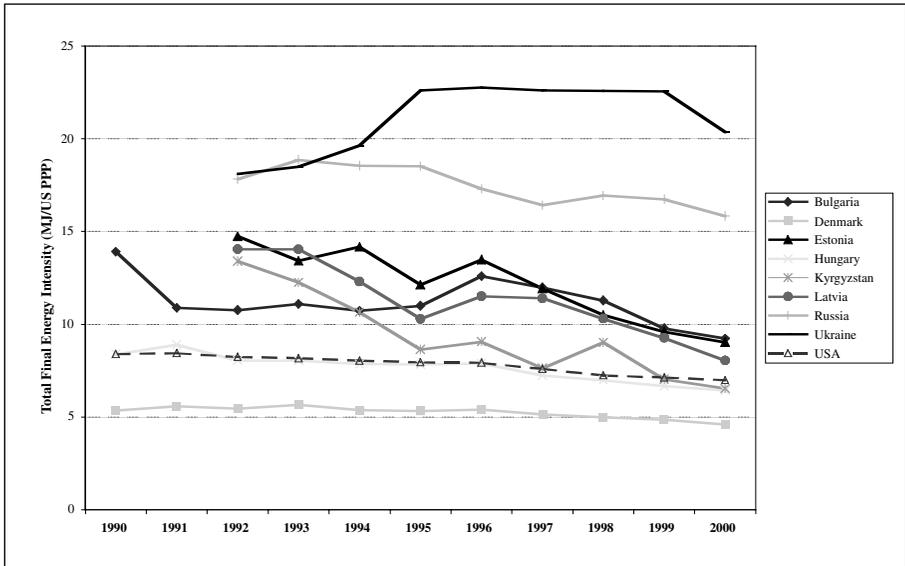


Figure 2 provides Total Final Consumption (TFC) per GDP, calculated using purchasing power parity (PPP) for selected countries. There is a downward trend for most countries, except the Ukraine. Furthermore, using this approach, Russia has seen this intensity deteriorate since 1997.

Tables 1 to 3 provide an incomplete understanding of the factors that drive changes in energy consumption. While the tables include TPES/GDP, which many use as a rough indicator of changes in energy efficiency, that indicator provides little information about the factors that impact energy consumption and, in particular, gives no clear indication of the role of energy efficiency. In transition economies, there were radical changes in the economic structure that lowered energy per GDP, even though the ratio remained extremely high. But, lower energy consumption per GDP, while normally considered positive in stable economies, was actually a reflection of crippled economies.

FIGURE 2: TOTAL FINAL ENERGY CONSUMPTION (TFC) PER GDP USING PPP IN SELECTED COUNTRIES



Source: IEA database

The use of energy per GDP to analyse energy use, and in particular energy efficiency developments, can often lead to misleading conclusions. Little can be said, on the basis of that ratio, about why energy use for any sector has reached a certain level, how efficient that use is, or why use varies so much among otherwise similar countries.

One problem with using the ratio of energy to GDP is that the denominator, GDP, represents many diverse activities. Since the energy intensities of these activities differ widely, changes in the mix of activities can cause significant variations in the ratio of energy to GDP over time, regardless of changes in specific intensities. In order to better understand factors affecting energy use, different kinds of more detailed energy indicators can be developed.

End-Use Energy Indicators

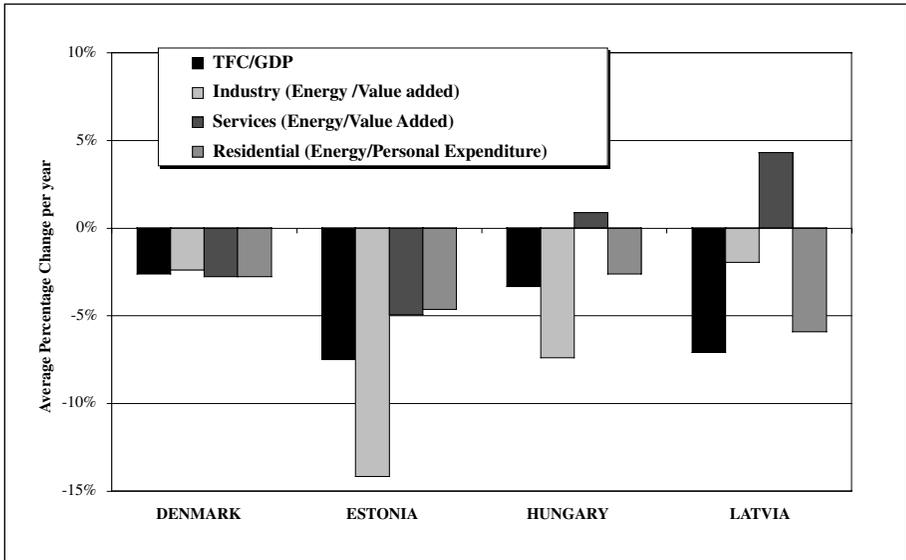
To gain a better understanding of the factors that affect energy use, it is important to analyse energy demand by sector and sub-sector, using a series of detailed end-use energy indicators. Energy indicators describe the links between energy use and human activity in a disaggregated framework. They are essentially measures of energy consumption and the underlying factors driving that consumption. Energy indicators can be divided into two groups:

- Structural indicators give measures of how changes in sectoral activity levels and/or the mix of activities within one sector affect energy use. Examples are building floor area per capita, passenger-kilometre by various transport modes, and shares of industrial output.
- Intensity indicators (such as energy per value added of steel produced, fuel use per vehicle-kilometre driven or heating demand per square metre of floor area) relate energy use to activity measures in matching categories at matching levels of disaggregation.

Intensity indicators are related, but not equivalent, to the inverse of energy efficiencies because an increase in energy efficiency helps reduce energy intensity. Generally, the more disaggregated data that are used to construct the intensities the better picture they give of energy efficiency developments.

Figure 3 shows the economy-wide indicator TFC/GDP together with aggregate indicators for the industry, residential and services sectors in three transition countries and Denmark. In all the three transition economies the sectoral intensities show a very different development from the aggregated TFC/GDP indicator. The energy intensity of the service sector even increased in Hungary and Latvia during this period, despite a significant reduction in TFC/GDP. This is puzzling given the important contribution from service sector to total GDP. It is difficult to conclude that energy efficiency in service buildings in these two countries has deteriorated without having more detailed information on energy use in this sector, e.g. space heating energy use per unit of building area. For all three transition economies, industrial energy intensity fell significantly over these six years. In Estonia the intensity decline cut industrial energy consumption per unit of economic output by a factor of more than two between 1994 and 2000. This result is most likely influenced by structural changes that took place within Estonian industry during this period. However, to estimate how much the influence from structural changes was and how much energy efficiency improvements have contributed more disaggregated information is needed.

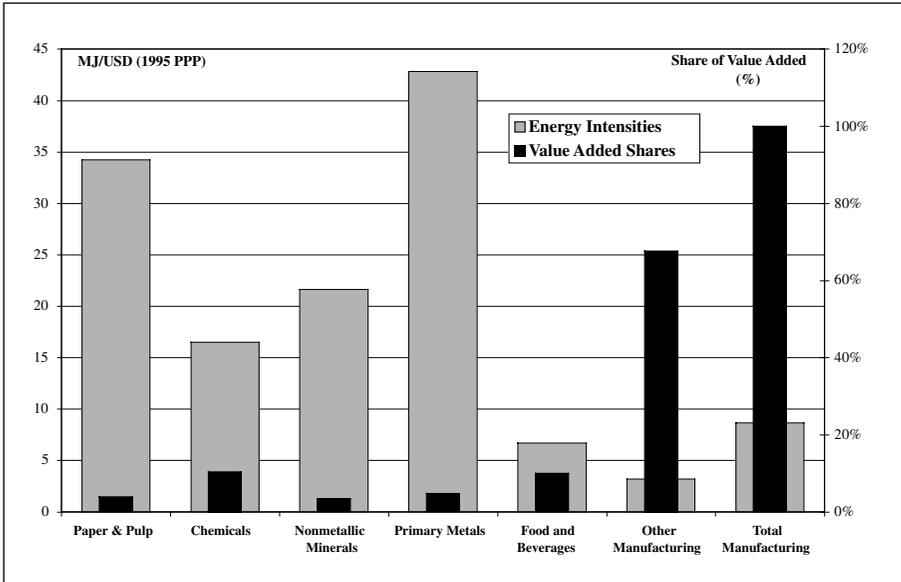
FIGURE 3: CHANGES IN AGGREGATE SECTORAL INDICATORS FOR SELECTED COUNTRIES, 1994-2000



Source: IEA database

Figure 4 demonstrates the importance of disaggregated information when analysing energy use in manufacturing industries. In this sector energy use is concentrated in a few energy intensive branches. These branches are typically only responsible for a small fraction of total value added. The most energy-intensive branch based on data for 13 IEA countries included in Figure 4 is the production of primary metals. The energy intensity in this branch was more than ten times higher than the category “other manufacturing” in 1998. The output from the primary metals subsector, however, constituted only 4% of total manufacturing value added, compared to more than 65% from “other manufacturing”. In fact, these two subsectors each accounted for about the same share of 1998 manufacturing energy use despite the large differences in their shares of total output.

FIGURE 4: MANUFACTURING ENERGY INTENSITIES AND VALUE ADDED SHARES BY BRANCH IN THE IEA-13, 1998



Source: IEA database

Over time, shifts in output shares can have large impacts on manufacturing energy use, even if energy intensities remain unchanged. The larger the gap in energy intensities among different branches, the greater the impact of shifts in output on energy use. Consider what happens when value added from “other manufacturing” grows faster than that from primary metals. Since each dollar generated in the former sector requires one-tenth or less of the energy input required for metals (see Figure 4), a small reduction in the share of metal production will yield a significant reduction in the aggregate manufacturing energy intensity.

Many transition economies, which traditionally had a large share of energy intensive raw materials in their industrial mix, saw significant declines in the production of these materials as their economies restructured throughout the 1990s. When a smaller share of the GDP generated comes from the production of energy intensive products this should, all else being equal, lead to a decline in aggregated industrial intensity (energy per value added) and in energy consumption per unit of GDP. Unfortunately, good quality data that are detailed enough to capture the energy impact of these structural changes are not available for most transition economies.

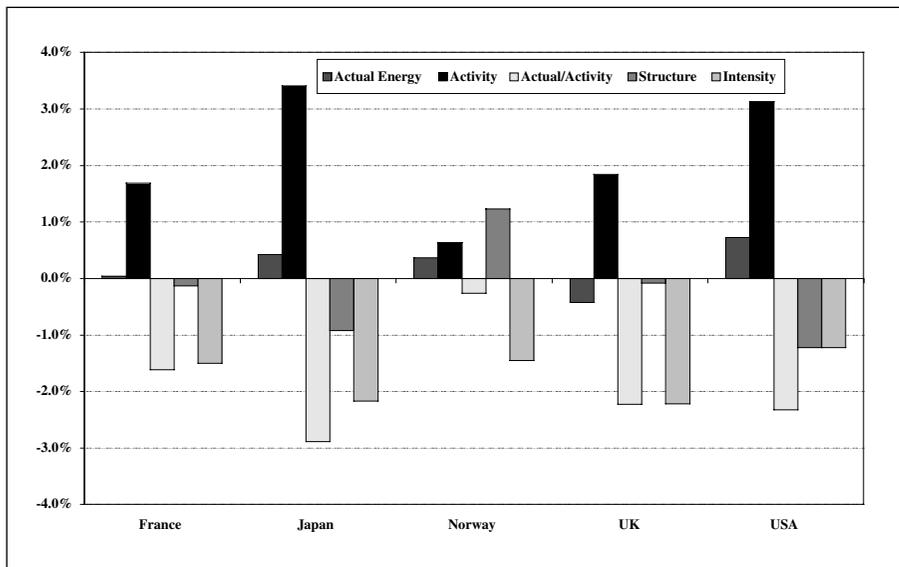
To demonstrate the impact of structural changes in manufacturing industry and the insights from using more disaggregated information, consider instead the example for selected IEA countries shown in Figure 5.

The first two bars in the figure show average annual percentage changes in actual energy use and real value added between 1981 and 1998. All countries experienced growth in total value added during this period. Except for the UK, all countries also saw growth energy use in manufacturing, although at a slower rate than growth in output. This means that aggregate energy use per real manufacturing value added fell in all countries. In some countries the decline in this indicator was significant, Japan, the US and the UK all achieved between 2 and 3% reduction per year. To what extent is this development driven by energy efficiency improvements and to what extent is it a result of structural changes? To better separate between these two elements more disaggregated data were analysed. The fourth bar in Figure 5 represents the impact of structural changes on manufacturing energy use, expressed as annual percentage change. To calculate the structural change effect, energy intensities for each subsector as shown in Figure 4 are held constant and only the shares of value added among subsectors are varied. Similarly, the effect of changes in energy intensities, adjusted for these structural changes, can be calculated by holding the subsectoral shares of output constant and while varying the subsectoral intensities (fifth bar in Figure 5).

The results show that indeed, structural changes have had an important impact on manufacturing energy use especially in Japan, the United States and Norway. In the two former countries structural changes reduced energy use by around 1% per year. In Norway the industry moved towards a more energy intensive structure, driving up energy demand by 1.3% per year. If the structural changes are accounted for, the disaggregated energy intensity effect reduced manufacturing energy use by a little more than 2% per year in Japan, 1.3% per year in Norway and 1.2% in the US. In other words, the entire difference in the development of the aggregate intensity between Norway and the US (0.2% annual decline vs. 2.3%), can be explained from differences in structural changes. This demonstrates how misleading aggregated data can be when analysing energy efficiency developments.

The strong structural changes that have taken place over the last decade in many transition economies can be expected to have significantly impacted the development of both the TFC/GDP ratio and the aggregated industrial intensity shown in Figure 3. In most cases the structural impact has reduced energy use in these countries. It should thus be expected that aggregated intensity indicators would overestimate energy savings. However, as mentioned, it is difficult to calculate this without having access to consistent time series with more disaggregated data.

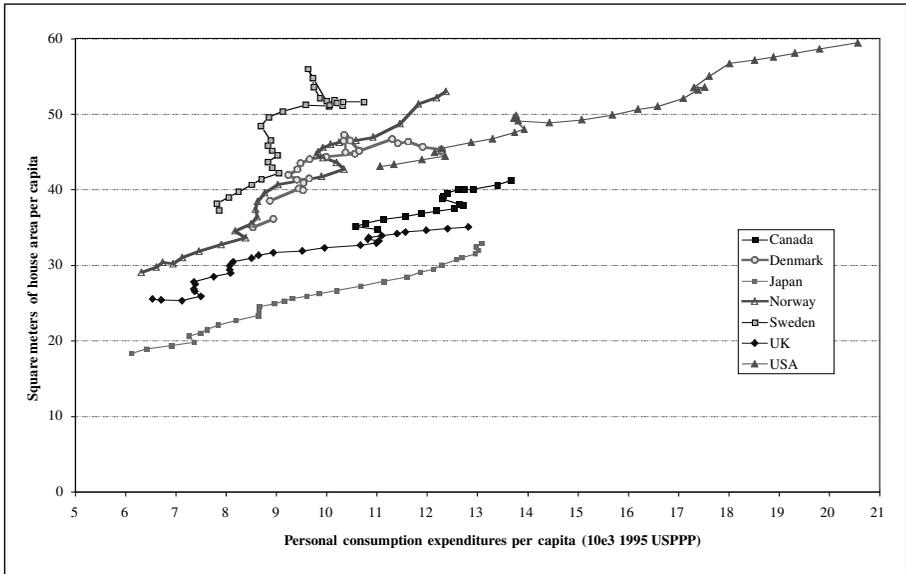
**FIGURE 5: CHANGES IN MANUFACTURING ENERGY USE 1981-1998
(IMPACT OF CHANGES IN STRUCTURE AND ENERGY INTENSITIES)**



Source: IEA database

In the residential sector, structural change is also an important driver of energy demand. Space heating accounts for the highest share of household energy use and is driven in large part by the size of homes. Figure 6 shows how average house area has grown with per capita incomes in a number of OECD countries. The continued growth, even when incomes fell during recession periods, is striking, and has put pressure on energy demand in this sector.

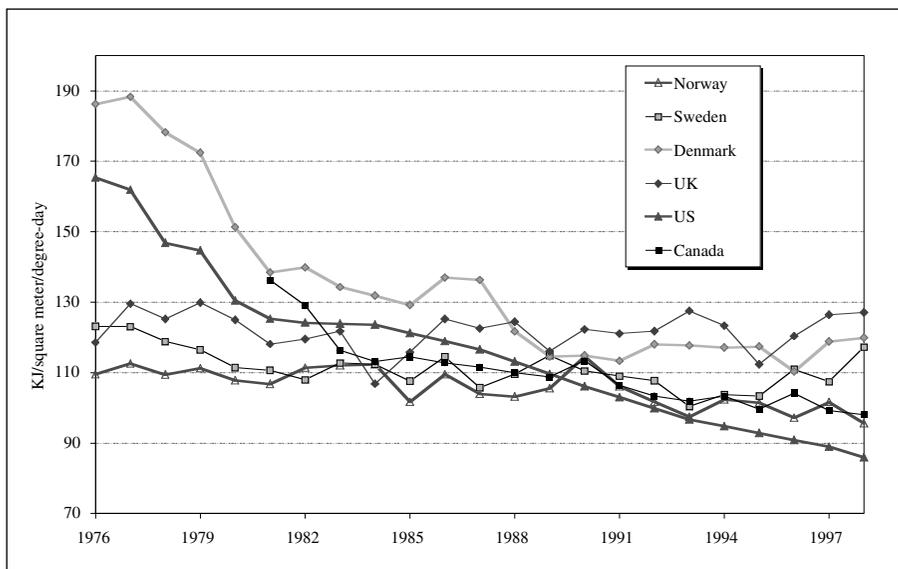
FIGURE 6: HOUSE AREA VS. INCOME FOR SELECTED OECD COUNTRIES (1973-1995)



Source: IEA database

To work against this pressure most OECD countries have promulgated policies to reduce energy use for heating. A number of countries have instituted regular, detailed household heating surveys to follow the progress of energy-saving efforts focused on space heating. Figure 7 portrays a key indicator of space heating that captures the changes in heating demand adjusted to take into account the approximate efficiencies of combustion equipment. The intensity shown is also normalised to house area and to climate variations using degree-days so that the heating figures are comparable both year-to-year within a country and among countries. The data in the figure suggest that many countries made significant progress towards improving space-heating efficiency. In some cases the reductions shown in the figure may actually underestimate savings as many countries experienced increases in the standard of indoor comfort through heating larger parts of buildings, heating longer hours and to higher indoor temperatures.

**FIGURE 7: SPACE HEATING INTENSITY
(USEFUL ENERGY PER SQ. M, PER DEGREE-DAY)**



Source: IEA database

These examples from the manufacturing and residential sectors point to an important message from a policy perspective, as it is intensity and not structure that energy efficiency policies are directed towards. Moreover, being able to make informed policy decisions or to follow progress of implemented energy and climate policies requires detailed data of reliable quality.

End-Use Energy Pricing Trends

The following table shows electricity prices for both the residential and industrial sectors in 2000. On the whole, transition countries have much lower prices, although this is particularly true for CIS countries. The EBRD states that most transition countries are pricing electricity well below the long-run marginal cost (LRMC), which the bank believes is the optimal pricing rule applied to transition countries. The EBRD estimates that the ratio of residential tariffs to LRMC across the region is 0.5, with the lowest being in Central Asia where the ratio of residential tariffs to LRMC is about 0.1¹³.

In OECD countries, taxes on electricity in 2000 ranged from 4.8% in Portugal and the United States to 59.9% in Denmark¹⁴. No comparable survey has been done for transition countries.

¹³ EBRD, *Transition Report 2001*, EBRD, London, 2001, p. 95.

¹⁴ IEA, *Energy Prices & Taxes, Quarterly Statistics, Fourth Quarter, 2001*, OECD, Paris, 2002, p. 324.

TABLE 4
POWER PRICES IN SELECTED COUNTRIES IN 2000

Country	Residential Price (US¢/kWh)	Industrial Price
Albania	0.028	0.026
Armenia	0.046	0.032
Austria	0.121	0.059*
Azerbaijan	0.013	0.037
Belarus	0.014	0.052
Bosnia and Herzegovina	0.043	0.064
Bulgaria	0.034	0.039
Croatia	0.073	0.067
Czech Republic	0.054	0.043
Denmark	0.197	0.058
Estonia	0.067	0.057
Finland	0.078	0.039
France	0.104	0.036
Georgia	0.044	0.043
Germany	0.121	0.057*
Greece	0.090*	0.049*
Hungary	0.065	0.049
Ireland	0.101	0.049
Italy	0.135	0.089
Japan	0.214	0.143*
Kazakhstan	0.027	0.028
Kyrgyzstan	0.004	0.013
Latvia	0.064	0.053
Lithuania	0.061	0.047
Luxembourg	0.099	n.a.
Moldova	0.040	n.a.
Netherlands	0.131	0.057
Norway	0.057	n.a.
Poland	0.065	0.037
Romania	0.049	0.039
Russia	0.009	0.016
Slovak Republic	0.050	0.042
Slovenia	0.076	0.070
Spain	0.035*	0.056*
Switzerland	0.111	0.069
Tajikistan	0.000	0.001
The FYRO Macedonia	0.053	0.053
Turkey	0.085	0.080
Turkmenistan	0.005	0.005
Ukraine	0.020	0.023
United Kingdom	0.107	0.055
United States	0.082	0.045
Uzbekistan	0.007	0.007

Source: EBRD, *Transition Report 2001*, London, 2001; IEA, *Energy Prices & Taxes*, 4th Quarter 2001.

* 1999

The following table shows heat prices in selected transition countries. Heat prices are also below LRMC. End-use heat prices range from zero in Azerbaijan to 3.0 US¢ per kWh in Latvia (which the EBRD estimates is about the LRMC for the residential sector).

TABLE 5
HEAT PRICES IN SELECTED COUNTRIES IN 2000

Country	Residential Price (US¢/kWh)	Industrial Price (US¢/kWh)
Azerbaijan	0.0	0.0
Belarus	0.1	1.4
Bulgaria	1.7	2.0
Croatia	1.6	2.7
Czech Republic	2.8	Na
Kazakhstan	1.0	1.3
Latvia	3.0	3.0
Moldova	1.6	1.6
Poland	2.8	2.8
Romania	1.6	1.6
Russia	0.2	0.4
Ukraine	0.5	0.8

Source: EBRD, *Transition Report 2001*, London, 2001, p. 97.

Environmental Indicators

Energy efficiency is influenced by environmental trends and also affects such trends. Because of the importance in improving energy efficiency to meet such environmental concerns as global climate change, it is important to track the developments in carbon dioxide emissions (as a proxy for all greenhouse gas emissions). The following table provides a summary of the main environmental indicators related to carbon dioxide emissions. It shows that for both non-OECD Europe countries and CIS countries carbon dioxide emissions dropped significantly throughout the 1990s, reflecting, in large part, the decline of their economies. For the same period, carbon dioxide emissions increased only marginally for OECD Europe, although there were improvements in CO₂/GDP and per capita.

TABLE 6
ENERGY-RELATED CO₂ EMISSIONS AND SELECTED INDICATORS

Region	1990	1995	1999	Change 1999/90 %
Non-OECD Europe				
CO ₂ Reference Approach* (Mt of CO ₂)	397.79	278.89	241.49	-39.3
CO ₂ /GDP (kg CO ₂ per 1995 US\$)	2.62	2.21	1.80	-31.3
CO ₂ /capita	6.45	4.56	4.13	-36.0
Former USSR				
CO ₂ Reference Approach (Mt of CO ₂)	3544.09	2483.71	2292.4	-35.3
CO ₂ /GDP (kg CO ₂ per 1995 US\$)	4.17	5.11	4.35	4.3
CO ₂ /capita	11.57	8.32	7.66	-33.8
OECD Europe				
CO ₂ Reference Approach (Mt of CO ₂)	3970.09	3882.7	3934.91	-0.9
CO ₂ /GDP (kg CO ₂ per 1995 US\$)	0.45	0.41	0.37	-17.8
CO ₂ /capita	7.92	7.58	7.57	-4.4

* The reference approach relies primarily on aggregated energy production and trade for the whole of the country.

Source: IEA

The indicators presented earlier in this chapter are examples of disaggregated energy indicators aimed at following energy efficiency developments. IEA has developed similar energy indicators for other sectors and end-uses and has also extended the use of these indicators to analyse factors behind changes in CO₂ emissions. The CO₂ analysis can be performed on a sector level or on an economy-wide level. In both cases disaggregated indicators are used to, on the one hand, analyse driving forces, measured by the activity and structure indicators, and technology related improvements, measured by energy intensity indicators and fuel mix changes on the other. The driving forces behind increasing emissions are related to growth in economic activity and more consumer comfort and convenience, all driving up demand for energy services, while technology related improvements provide opportunities for reducing emissions per unit of energy service.

The impacts of technology related improvements can be defined as changes in carbon intensity. Broadly speaking three components affect the carbon intensity:

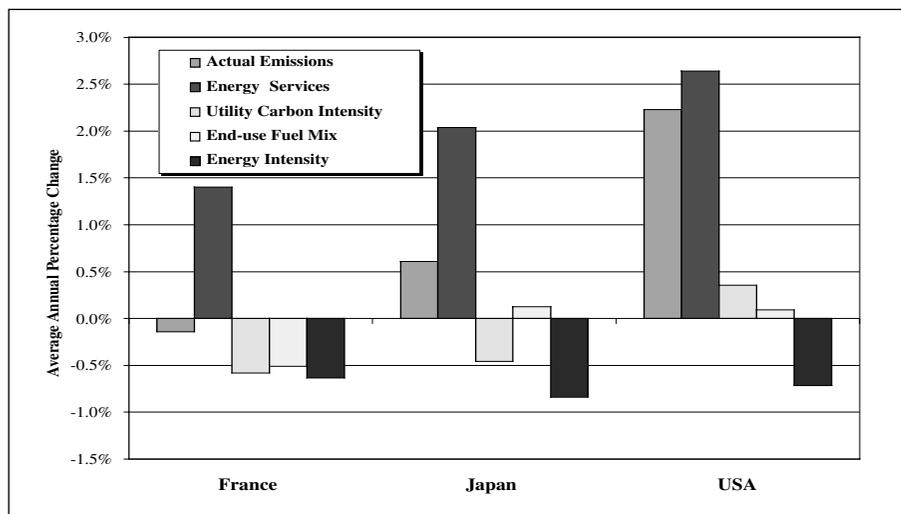
1. end-use energy intensities,
2. fuel mix in the end-use sectors, and
3. utility carbon intensity representing emissions per unit electricity or district heat generated.

Figure 8 shows how carbon emissions from three IEA countries varied between 1990 and 1998 due to changes in the three carbon intensity factors and the energy services

component (the combined effect of changes in the activity and structure indicators). Each bar represents the evolution of emissions that would have taken place if the component the bar represents alone affected total emissions. The figure shows results for the entire economy based on aggregation of sector-level indicators using 1990 carbon emissions as weights.

With the close link between increasing levels of energy service demand and economic growth it is no surprise that this component raised emission levels everywhere. Changes in sectoral *energy intensities* and in some cases, the *utility carbon intensity*, have however, restrained emissions considerably. In some countries studied by the IEA this curbed emission by almost enough to offset the effects of greater energy services. Changes in final fuel mix usually have a smaller impact on emissions. In most countries IEA has studied, “energy services” grew less rapidly than GDP itself, an indication that those economies were becoming less carbon intensive. But the overall emissions increased after the mid-1980s, because the factors restraining them were weaker than the overall growth in energy service. This illustrates a dilemma for policy makers today: How to accelerate the fall in carbon intensity and take more advantage of forces leading to *de-carbonisation* of the economic structure while ensuring stable conditions for economic growth?

FIGURE 8: CHANGES IN CARBON EMISSIONS IN SELECTED COUNTRIES 1990-1998



Source: IEA Database

4. Other Factors Influencing Energy Efficiency Policy Today

While the environment is a major driver in energy efficiency policy, there are several other important reasons influencing the development of energy efficiency policies and programmes today in the region. The following are two of the most important factors.

- *EU Influence in Promoting Energy Efficiency*

The role of the EU in terms of energy efficiency policies and programmes has evolved since the first oil crisis, in part because the EU, itself, has evolved politically and institutionally. Going back to the 1970s, there were a number of directives (for example, on appliance labelling) that were poorly implemented by member states. There were also programmes to develop new technologies, through both research and demonstrations, starting in the late 1970s. There was a major change in 1989 with the creation of the THERMIE programme, a high profile, high budget demonstration programme that put a high priority on energy efficiency. THERMIE's goal was to promote energy technologies (not only related to energy efficiency) and over the years it has become a part of the Commission's research programme. The original SAVE programme was not approved until October 1991. SAVE was designed to focus on the non-technical measures needed to promote energy efficiency, complementing the earlier technology focus, and was the only EU programme solely dedicated to energy efficiency.

Energy efficiency policies and programmes at the Community level have significantly evolved over recent years. In 1998 a Communication on Energy Efficiency set out the broad objectives of a European Energy Efficiency Strategy ¹⁵. It called for an objective of an improvement in energy intensity of 1% per year above that which was already occurring. The Communication was followed by an Action Plan in 2000 ¹⁶. The Action Plan stated that if energy intensity of final consumption can be improved by an additional 1% per year above the baseline expectations, then two-thirds of the available cost-effective savings potential would be achieved by 2010. If it achieved its objectives, this would contribute about 40% of the EU's commitment to meeting the Kyoto target.

The Action Plan focused on three types of measures:

- measures to enhance the integration of energy efficiency into other Community non-energy policy and programme areas (e.g. regional and urban policy);
- measures for re-focusing and reinforcing existing successful Community energy efficiency measures; and

¹⁵ European Commission, *Energy Efficiency in the European Community - Towards a Strategy for the Rational Use of Energy, Communication from the Commission*, Brussels, 29.04.1998 [COM (1998)246 final].

¹⁶ EC, Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, *Action Plan to Improve Energy Efficiency in the European Community*, Brussels, 26.04.2000, COM (2000)247 final.

- new common and co-ordinated policies and measures.

The European Climate Change Programme, which was established in 2000 to identify the most environmentally and cost-effective measures to help the EU meet its Kyoto Protocol obligations, gave considerable emphasis to energy efficiency. The programme recommended measures in all end-use sectors: increased use of combined heat and power generation; improvement of energy efficiency standards for electrical equipment; improvement of efficiency standards for industrial process; improved energy efficiency limiting carbon dioxide emissions (for boilers, construction products, etc.); increased energy services for small and medium enterprises (SMEs); development of a framework for voluntary agreements; public procurement of energy-efficient end-use technologies; energy audits and heating performance certificates; improvement of building/lighting performances; building design and infrastructure planning; transport pricing; and a European campaign for more fuel-efficient driver behaviour. These measures have all been introduced before, but clearly now they are broadly accepted in the climate change strategy.

The Communication and Action Plan, together with the European Climate Change Programme, represent the main thrust of the EU's approach to energy efficiency for its member states and now for the accession countries. It is important to review the main approach, together with the major proposals currently under consideration. Before the short review, it should be added that the EU has taken a major role in supporting the transition process, through the PHARE, TACIS and SYNERGY programmes.

LEGISLATION

There are several legal obligations on member states and there are programmes that promote energy efficiency policy and technology development. The importance of the EU is that the obligations are not only on the part of the member states but also on the accession countries ¹⁷.

The *acquis communautaire* includes a package of directives on energy efficiency. The Community's main energy efficiency programme, SAVE, supports the Commission's energy efficiency legislative programme. Directives cover:

- Appliance labelling for a wide range of products;
- Appliance efficiency standards;
- Boiler efficiency; and
- Measures to limit carbon dioxide emissions by improving energy efficiency (Council Directive 93/76) (in six areas including energy certification of buildings; the billing of heating, air-conditioning and hot water costs on the

¹⁷ These countries include Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia and Turkey.

basis of actual consumption; third-party financing in the public sector; thermal insulation of new buildings; regular inspection of boilers; and energy audits of undertakings with high energy consumption.)

- Energy Performance of Buildings.

The directive on Energy Performance of Buildings is to promote the energy performance of buildings in member states by introducing a framework for an integrated methodology for measuring energy performance; application of minimum standards in new buildings and certain renovated buildings, and regular updating of these; energy certification and advice for new and existing buildings; and inspection and assessment of boilers and heating/cooling systems. The directive entered into force on 4 January 2003 and compliance is foreseen at the latest by 4 January 2006.

Many transition economies, that are not accession countries, are influenced by the legislation, since many of the countries are considering adopting for example labelling schemes.

PROGRAMMES

The main programme for EU member states is the SAVE programme, part of the Energy Framework Programme (1998-2002)¹⁸, which is the only Community programme dedicated to the non-technical issues related to energy efficiency. The legislative programme, with its directives, is related but separate to SAVE. There are five main elements of SAVE. They are:

- studies and other related actions aimed at the implementation and completion of EU measures, studies concerning the effects of energy pricing on energy efficiency, and studies with a view to establishing energy efficiency as a criterion within European Union programmes;
- sectoral targeted pilot actions;
- measures to foster the exchange of experience;
- monitoring of energy efficiency progress; and
- specific actions in favour of energy management at regional and urban level.

The Commission has been expanding its efforts with such initiatives as the Energy Star Programme (see box).

¹⁸ In 2003, SAVE will be integrated within the framework programme, Intelligent Energy for Europe.

The European Energy Star Programme

The new Community voluntary energy labelling programme for office equipment

Energy Star is a label that helps consumers identify office equipment products that save them money and help protect the environment by saving energy. Manufacturers, assemblers, exporters, importers and retailers are invited to register with the EC allowing them to place the Energy Star label on products that meet or exceed energy-efficiency guidelines - i.e. computers, monitors, printers, fax machines, copiers, scanners and multifunction devices.

As office equipment is traded world-wide, an Agreement which was signed December 2000 between the Government of the USA and the European Community intended to co-ordinate energy-efficient labelling programmes for office equipment in two of the major global markets for office products. The Agreement is intended to stimulate international trade of office equipment, by facilitating the procedures for economic operators to participate in the Energy Star programme. The Agreement is managed by the US Environmental Protection Agency and the European Commission and it will remain in force for an initial period of five years.

The basic objectives underlying the new EC programme are firstly, to introduce in the Community the Energy Star logo as a sign or marking as defined in the Agreement with the United States, secondly, to set the rules for its use and to prohibit its misuse and, thirdly, to establish the general rules and procedures for the implementation in the Community of the provisions of the Agreement. The participation in the programme is voluntary.

Office information and communication technology equipment is responsible for a large share of electricity consumption in the tertiary sector within the EU. The Energy Star programme is expected to account for electricity savings of about 10 TWh per year by the year 2015 in a very cost-effective way and it shall maximise consumer and environmental benefits, by stimulating the supply of, and the demand for, energy efficient office equipment.

Accession countries participate in the SAVE programme, allowing them to be involved in pilot projects as well as learning how to participate in the management of the programme. SAVE also includes funding local "SAVE" agencies and many CEECs have taken advantage of that possibility. The SAVE programme has also been active in developing energy indicators in both EU countries and accession countries. Besides SAVE, there are also demonstration and research and development programmes which give significant attention to energy efficient technologies.

There is a separate EU programme for the promotion of renewable energy, ALTENER, which is also integrated within the same framework programme as SAVE.

The process of closer integration with (or membership to) the European Union is having an important impact on accession countries, in particular. The EU has used a

few programmes with significant funds available - primarily PHARE, TACIS and SYNERGY - to help in the transition process through capacity building, analysis, demonstrations, exchange of EU know-how, support in restructuring, and so on. While SYNERGY was the one programme dedicated only to energy, both PHARE and TACIS gave high priority to energy and energy efficiency. These programmes have been important in helping develop energy efficiency strategies, set up energy agencies, undertake policy analysis, establish databases, set up financial mechanisms and so on.

Most transition economies have had EU funding to open various types of energy centres/agencies, through different EU programmes. Many of these are OPETs, Organisations for the Promotion of Energy Technologies (see Chapter 8), which form a network with participating countries.

OTHER RELATED ACTIONS

On 10 May 2001 the European Commission adopted a proposal for a Directive on the promotion of electricity from renewable energy sources in the EU's internal electricity market. The strategic objective of the proposal is to create a framework for the medium-term significant increase of renewable-sourced electricity in the EU and to facilitate its access to the internal electricity market. The 1997 White paper on renewable energy proposed a 12% share of total renewable energy sources in total primary energy consumption. This has been translated into a specific share for consumption of electricity of 22.1% produced from renewable energy sources and it is this specific share to which the promotion of electricity produced from renewable energy must contribute. Member states will be required to set their own specific targets.

Deregulation in the electricity and gas sectors in the European Union are also impacting on energy efficiency within the European Union itself and Central and East European countries.

PROPOSALS

Recently, the Commission has proposed a multi-annual programme for action in the field of energy entitled, Intelligent Energy for Europe (2003-2006), which is expected to be approved by mid-2003. The SAVE and ALTENER programmes would be absorbed within this framework programme.

In 2002, the Commission published a draft cogeneration directive to promote wider use of cogeneration ¹⁹:

The overriding objective of this proposal is to create a framework, which can support and facilitate the installation and proper functioning of electrical

¹⁹ Directive of the European Parliament and of the Council on the promotion of cogeneration based on a useful heat demand in the internal energy market [COM (2002) 415 final]

cogeneration plants where a useful heat demand exists or is foreseen. This overall objective translates into two specific aims:

- In the short term, a cogeneration Directive should serve as an instrument to consolidate existing and, where feasible, promote new high-efficiency cogeneration installations in the internal energy market. In order to create a level playing field, regulatory certainty and in some cases financial support are vital for cogeneration. This applies to the current transitional phase of the liberalisation process, where the internal energy market is not fully completed and where internalisation of external costs is not reflected in energy prices.
- In the medium to long term, a cogeneration Directive should serve as a means to create the necessary framework that will ensure that high-efficiency cogeneration, alongside other environmentally friendly supply options, constitutes a key element when decisions on investment in new production capacity are made. By creating a supportive framework, such cogeneration can contribute to the establishment of more diversified and energy efficient supply systems in the Community.

In energy supply companies, integrating supply and demand elements, known as integrated resource planning, became an important concept, developed in the 1980s. This concept is less in fashion, in part because of the trend towards liberalisation of electricity and gas markets, which in theory, would drive down costs²⁰. However, integrated resource planning is implemented in several countries and is still being proposed or discussed in others. The EC had a proposal for years on integrated resource planning (IRP), which was never adopted. The recently proposed Energy Services Directive, which replaces the IRP proposal, is described as²¹:

The objective of this proposal is to complete the internal market for energy by developing and encouraging energy efficiency on the demand side, especially as it is provided by utilities and service companies in the form of energy services. It is envisaged that Member States will set targets to promote and support energy efficiency services, (e.g., third party financing) and programmes, especially for smaller energy consumers such as households and SMEs. This includes a supportive framework for implementation and financing of energy services, adapted to each Member States' liberalised market. A minimum energy efficiency target to be reached through energy services each year is proposed for Member States that corresponds to 1% of the total electricity and gas sales. This proposal is in lieu of additional public service

²⁰ As defined in the ECS publication, *Advice on Developing an Energy Efficiency Strategy*, an integrated resource plan is "a plan in which there is a socio-economic balance between the endeavours of the supply side as regards energy production and distribution on the one hand and on the other the investments made by the supply side and the consumers with a view to energy efficiency. The measures on the demand side can be information, campaigns, consultancy and other types of assistance - concerning energy conservation activities about more efficient use of energy and concerning private electricity production". [Source: Integrated Resource Planning in the Danish Electricity Utilities, *Integrated Resource Planning: From Concept to Practice*, October 1994.]

²¹ European Commission, *European Climate Change Programme, Report June 2001*, p 19.

obligations in the Amended Internal Market Directives and the Commission's Amended Rational Planning Techniques Directive proposal from March 1997. With compliance by 2006, this measure may save between 40 and 55 Mt CO₂/year by 2010.

• *The Transition process*

The structural changes resulting from the political, economic, social reforms with the aim of achieving democratic structures and a market based economy got the generic name of "transition". The state of the transition process is important in influencing the effectiveness of energy efficiency policies and programmes. The transition process includes pricing reform, industrial restructuring, institution and capacity building, amongst many other economic, social and legal reforms. Where countries initiated strong reforms early on, the benefits are showing much earlier. But undertaking those reforms has proven difficult politically and many countries had great difficulties accelerating the pace. There had been no prior experience and the first attempts highlighted many risks. The short-term impacts on the economy and the citizens led many countries to delay reforms but, it appeared obvious to almost all analysts, that the reforms needed to take place, and the sooner the better. Institutions such as the World Bank, EBRD, EU, UN and many bilateral and private initiatives provided support and encouragement. The EU accession process also provided a framework for transition.

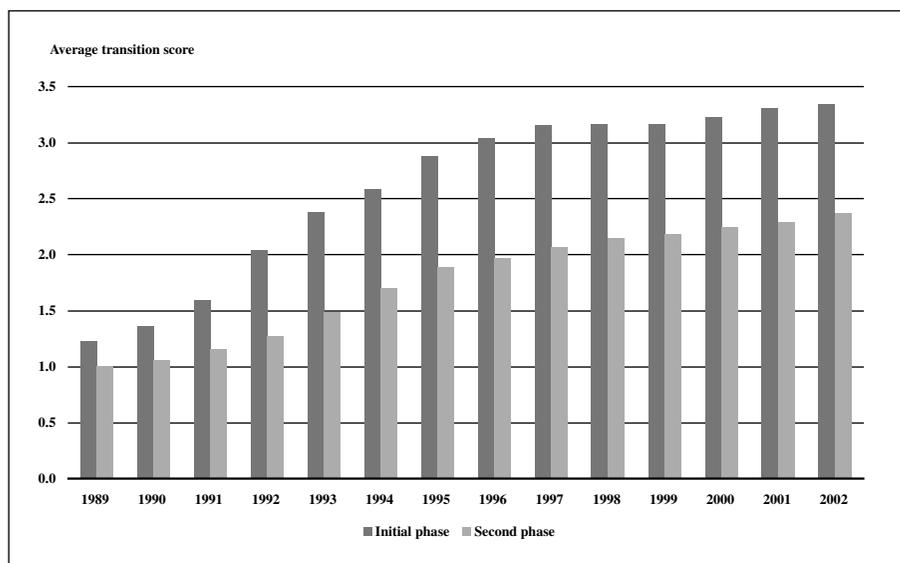
It is understandable that the reforms cannot equally progress in all areas, given that governments have limited financial and human resources and lack practical experience in undertaking reforms. If price liberalisation constituted a priority together with the liberalisation of trade and foreign exchange systems, it is understandable that the reform of the electricity sector was next on the agenda.

An important area of reform is also the civil society and public participation in environmental decision-making. Most of the CEE/CIS countries have signed and are in the process of ratification or accession to the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. The implementation of the Aarhus Convention is expected to add to the modern procedures related to environmental impact assessment, adopted after 1990. In this way, NGOs and other environmentalists may increase awareness and improve commitment of governments to promote environmentally-friendly solutions, such as cost-effective energy efficiency measures.

The EBRD monitors the progress that is underway. From the *2002 Transition Report*, were some encouraging indications (see Figure 8). At this point in time it is useful to just review a few of the major findings. Overall, the EBRD found that reform momentum in the transition countries was sustained in 2002. Countries that made strong gains were Bosnia and Herzegovina, Latvia and Russia²².

²² EBRD, *Transition Report 2002*, EBRD, London, p. 19.

FIGURE 9 : REFORM PROGRESS SINCE 1989



Source: EBRD, Transition Report 2002, London, 2002, p. 22.

Note: Initial Phase refers to reforms including price and trade liberalisation as well as small-scale privatisation. Second phase reforms focus on institution-building, comprising competition policy, enterprise restructuring, the development of market-based financial institutions and the reform of infrastructure.

Price liberalisation is occurring, with good progress in Georgia, Hungary, Moldova, Poland, Romania and Slovenia. Countries with the weakest progress included Belarus, Turkmenistan and Uzbekistan.

In terms of reforming the power sector infrastructure, the poorest developments were in Belarus, Tajikistan and Turkmenistan. Hungary and the Slovak Republic are considered to have made the most progress followed by Armenia, Bulgaria, Georgia, Moldova, Poland and the Ukraine.

Banking reforms were poorest in Turkmenistan followed by Belarus, Tajikistan and Uzbekistan. The best reforms were in Hungary, followed by Croatia, the Czech Republic, Estonia and Latvia. The domestic bank sector is important in providing finances for energy efficiency investments.

Ten transition countries are also in the process of accession to the EU and that provides an important impetus for improvements within the country. The previous section showed what is requested under the *acquis communautaire* with respect to energy efficiency. The Commission has assessed the candidate countries and overall the progress is considered reasonable although the Czech Republic, Poland, Romania and Slovakia were shown to have made unsatisfactory progress in improving energy

efficiency. Many candidate countries were also criticised for not devoting sufficient resources for institutions and programmes to implement energy efficiency.

Overall, progress in the transition process is good but it is complex and relatively slow.

Finally, the EBRD's 2002 Transition Report makes a strong comment on transition and sustainable development ²³:

... while transition has put pressure on living standards, it has not necessarily involved a departure from the broad principle of sustainable development or a decline in well-being if this is defined in terms of expanding human potential. This perspective places political issues, such as freedoms and rights, at the centre of the sustainability debate. These include the right to support policies that promote environmental sustainability and fairness. In many countries, transition has brought marked increases in political freedoms and civil rights. Political and democratic transition, however, is only one aspect of sustainability. Democratic and market systems also require sound economic and corporate governance to help ensure sustainable development.

²³ *Ibid.*, p. v.

PART II MAKING HEADWAY - ADDRESSING AARHUS

5. Meeting the Energy Efficiency Policy Obligations from the Aarhus Conference - An Introduction

Environment Ministers at the Aarhus Conference agreed to promote action in energy efficiency since energy efficiency was recognised as “one of the most important elements in achieving our national and international goals in economy, environment, energy supply security, and technology, which all influence the quality of life”. This chapter addresses the specific topics that Ministers endorsed in the Aarhus *Declaration*, together with its accompanying *Policy Statement on Energy Efficiency*. The energy efficiency section of the *Declaration*, together with the *Policy Statement*, provide the political commitment on the broad elements of a comprehensive energy efficiency strategy. This section of the report integrates the obligations under the *Declaration* itself, the *Policy Statement on Energy Efficiency* and the *Guidelines for Energy Conservation* that were appended to the *Policy Statement*.

The *Declaration* included five paragraphs on energy efficiency. They covered topics concerning endorsing the *Policy Statement* and *Guidelines*, the need for increased energy efficiency to meet, for example, the Kyoto Protocol targets; market reforms and pricing; international financing; monitoring energy efficiency internationally; and sectoral issues, such as transport efficiency and air emission concerns.

The *Policy Statement on Energy Efficiency* included the following areas for participating countries to address:

- Reviewing, revising and invigorating, as necessary, national approaches to energy efficiency;
- Better integration of energy efficiency into other government priority areas;
- Promoting implementation of energy efficiency policies;
- Promoting energy markets and pricing reforms to ensure less distorted prices and incentive;
- Promoting energy-efficient and cleaner technologies by transforming domestic and international markets;
- Promoting investments in energy efficiency by encouraging IFIs, donors and other relevant parties to increase investments;
- Promoting international exchange of experiences;
- Developing improved data and indicators; and
- Strengthening international co-operation.

These categories represent the broad framework for a successful approach to energy efficiency. It is only a framework and the detailed approach by individual countries can vary significantly. Notice that four of the nine areas include increased international activity and co-operation. There is a firm belief that multilateral and bilateral co-operation bring significant benefits.

The *Guidelines on Energy Efficiency in Europe* were included in the Aarhus Declaration and referred to in the *Policy Statement on Energy Efficiency*. In the *Policy Statement*, Ministers welcomed the *Guidelines*, “appreciating that its findings are important and should be considered, as appropriate, in the further elaboration and implementation of our national, regional and local energy efficiency policies and for setting ambitious targets for energy efficiency.” The *Guidelines* are an important list of actions that participating countries should take to support the broad themes outlined in the *Policy Statement*. The *Guidelines* provide more of the roadmap that governments should use to develop their energy efficiency strategies and action plans. The *Guidelines* are divided into five categories:

- strategic
- organisational
- economic
- regulatory
- technological.

The *Guidelines* also have a separate area discussing international co-operation, but, in effect, international co-operation is addressed in all five categories.

After more than four years since the Aarhus Conference, it is important to assess how successful countries have been in fulfilling their obligations. The remaining chapters of Part II discuss the obligations using the main themes from the *Declaration*, the *Policy Statement* and the *Guidelines*.

6. Energy Efficiency Policies

Energy efficiency policies need an overall strategy which provides the broad objectives, argues why improved energy efficiency is important, analyses the potential for energy efficiency improvements and provides a clear, transparent long-term framework for all stakeholders to understand and participate within.

Three of the *Policy Statement* commitments relate to strategy development and policy analysis. There are a further seven recommendations under the *Guidelines* that relate to strategy, two of which relate specifically to the transport sector.

From the *Policy Statement*:

- **Reviewing, revising and invigorating, as necessary, national approaches to energy efficiency**
- **Better integration of energy efficiency into other government priority areas**
- **Developing improved data and indicators**

From the *Guidelines*:

- **that governments develop their energy efficiency policies**
- **that governments emphasise the link between energy efficiency and environment**
- **that energy efficiency policies are integrated in government as a long term stable function**
- **that bilateral and international organisations assist governments in conducting strategic work**
- **that the instruments for energy efficiency policies are developed and made compatible through international co-operation**
- **to improve energy efficiency in transportation.**
- **to stimulate efficiency and environmentally friendly measures in all modes of transport (road, rail, air, sea) by implementing voluntarily or mandatory standards and targets**

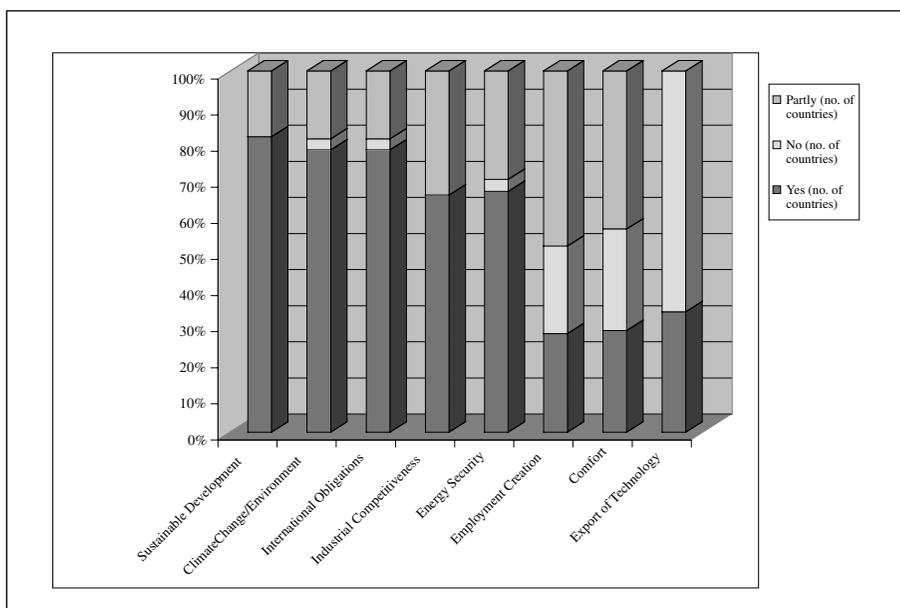
• *Strategy Development*

Most participating countries have prepared or revised energy efficiency plans since 1998. Under *PEEREA*, participating countries are required to prepare an energy efficiency strategy. In 1998, several countries did not have a specific policy on energy efficiency. For the most part, that has changed. Many energy efficiency strategies are incorporated into environmental strategies, often related to climate change. This is particularly true for industrialised countries. This shows the importance that energy efficiency is given to combat some of the current major environmental concerns. In several other countries (e.g. Bulgaria, Lithuania and Romania), energy efficiency policy is integrated within their national energy strategies.

It is important to have a better understanding of how energy efficiency is being integrated into other government priority areas. The following chart (Figure 10) provides the results of a questionnaire filled in by the majority of *PEEREA* contracting parties to determine what are the driving forces for energy efficiency policy²⁴. These reflect, to a certain extent, the importance of integrating energy efficiency into other economic, environmental and social areas.

²⁴ The source is *PEEREA* country questionnaires submitted to the Energy Charter Secretariat.

FIGURE 10: DRIVING FORCES FOR ENERGY EFFICIENCY



Source: PEEREA Questionnaires

Four years after the Aarhus Ministerial, only Albania, Bosnia and Herzegovina, Georgia, Tajikistan and Turkmenistan do not have energy efficiency strategies or energy strategies that clearly give a priority to energy efficiency. In Albania and Georgia, their energy strategies, which are expected to have sections on energy efficiency, are in draft form, but have not yet been approved by their governments. Bosnia and Herzegovina is still in the throes of post-war reconstruction and has not focused on an energy efficiency strategy so far, although many of the reconstruction projects include efficiency improvements.

In the past four years, several countries have updated existing strategies or action plans. In some cases, these new policies or strategies are included in overall energy strategies, while in others, the policies are incorporated within environment/climate change strategies. Countries that have significantly revamped their strategies include Bulgaria, Croatia, France, Greece, Hungary, Italy, Lithuania, the Netherlands, Norway, Poland, Romania, Russia, Slovenia and Switzerland and The FYRO Macedonia.

From Poland:

The “Assumptions of the Poland’s energy Policy until year 2020” approved by the Council of Ministers on 22nd February 2000 refers to energy efficiency as one of the priority tasks. In the chapter “Strategy for improvement of energy efficiency” the Government states that lowering energy intensity of the Polish economy requires a comprehensive action in all sectors of the economy, public services and households. The governmental activity would have an affect in:

- improvement of energy and ecological security, mainly due to the elimination of huge energy losses in most ineffective, environmentally harmful processes of energy and fuels production;
- increase of competitiveness by domestic companies, due to a lowering of the energy component in final prices of products and services; and
- increase of overall economy management efficiency and improvement of quality of life of the Polish society as a permanent basis of sustainable development.

Some countries have set quantitative targets for energy efficiency, although almost all countries have targets for GHG emissions reductions, in large part because of the Kyoto Protocol (see Annex 3). Those with quantitative targets include Denmark, Finland, Hungary, the Netherlands, Poland, Russia, Slovenia, Spain and Switzerland and The FYRO Macedonia.

From Hungary:

The new Energy Saving Action Programme (Government Resolution 1107/1999) includes the following Goals until 2010:

- Energy intensity has to be reduced by 3.5% per year
- Saving of 75 PJ/y (thermal equivalent) primary energy sources
- 50 kt/y SO₂ reduction
- 5 Mt/CO₂ reduction;
- 50 PJ/y renewable production.

From the Russian Federation:

According to the Energy Strategy of Russia, approved in November 2000, the goal is to ensure energy saving by 300-420 million tons of coal equivalent (m.t.c.e) Correspondingly, energy intensity of the economy for this period of time should be decreased to 40-50 %, including heat capacity by 44-56 %, and electric capacity by 28-37 %.

The main goal of the Federal Programme “Energy efficient economy” is to save 143-156 m.t.c.e for the period of 2002-2005, and 152-169 m.t.c.e for 2006-2010, and thus decrease GDP’s energy intensity of Russia in 2005 by 13.4% and in 2010 by 26% in comparison with year of 2000.

At the level of the European Union, the European Commission published its *Action Plan for Energy Efficiency* in 2000. Significantly, much of the EU's energy efficiency strategy is incorporated within the European Climate Change Programme. Increasingly, the EU's energy efficiency strategy is linked to improved energy security, as seen by the recent Green Paper *Towards a European Strategy for the Security of Energy Supply* (COM(2000)769 final).

As previously seen, it is not sufficient to have an energy efficiency strategy. It is also necessary to put the objectives into action.

One of the first publications of the Energy Charter Secretariat after *PEEREA* was ratified was on advice in developing an energy efficiency strategy²⁵. This publication stated that, while there are various driving forces in starting to prepare a strategy, including obligations such as Aarhus, "the main motivation must come from within the country". But motivation can only be achieved if energy efficiency is perceived as a priority within the government as a whole. This is not always the case.

Policy development must be an on-going process, even if the actual strategy document may only be published periodically. The context is dynamic, with changes in imported fuel prices, industrial structure, energy security and liberalisation/deregulation. Those must be constantly monitored and analysed to determine their impact on energy efficiency. Policy development depends on good analysis and good analysis depends on good data as well as the capacity to undertake the analysis.

There has been multilateral and bilateral support to help develop national strategies. The EU, through its PHARE and TACIS programmes, has been particularly active in supporting either the development of the strategies, background studies for the strategies or framework legislation on energy efficiency. However, transition countries have also received support from the World Bank, the UN and bilateral programmes.

There is also a need for energy efficiency strategies at the regional and municipal levels. Good examples of municipal strategy development in transition economies are in Bulgaria, Hungary, Poland and Romania, although this is far from complete. Both Poland and Romania have energy cities networks, in part modelled after *Energie-Cités* in the European Union. There have also been efforts by other organisations to promote local strategies. This is achieved through, for example, the International Council for Local Environmental Initiatives (ICLEI). ICLEI stresses the link between environmental and energy efficiency goals. Bilaterally, the US aid agency, USAID, has promoted a municipal network (see below). Furthermore, the Centre for Energy Efficiency, EnEffect, a non-profit organisation established in 1992 in Sofia, Bulgaria, acts as the secretariat of the municipal energy efficiency network, EcoEnergy, which includes 31 municipalities and 19 regional centres (municipal energy offices) located

²⁵ ECS, *Advice on Developing an Energy Efficiency Strategy*, Brussels, 1999.

at the municipalities. The network is currently supported by the UNDP/GEF. Baltic 21 has set up the Baltic Sustainable Energy Cities (BASEC) network with 12 municipalities participating in developing sustainable energy futures.

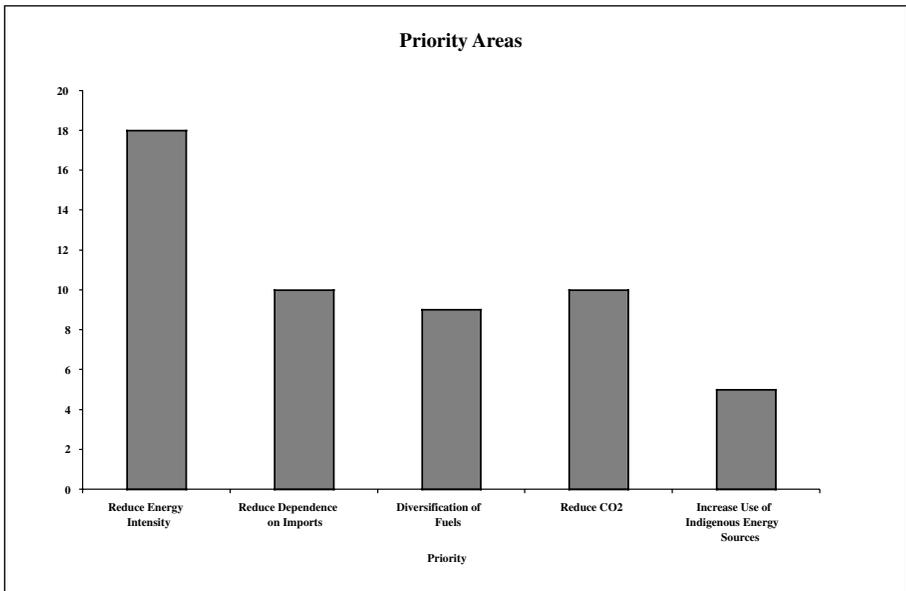
- *Integrating energy efficiency into other government areas of responsibility*

Energy efficiency is one of the few policy areas that impact on virtually all government activities. Being so omnipresent has many benefits but it can also create many organisational issues, requiring a significant effort to ensure all areas are adequately participating and that they are sufficiently convinced about the importance of energy efficiency to integrate into their own work. The *Energy Efficiency Initiative* states that an “effective energy efficiency policy must be well integrated with the overall aims of other policies, e.g. to improve peoples’ welfare in employment, housing and transport. Energy efficiency policy and other policies should not only be compatible, but mutually reinforcing”²⁶. Yet, effective integration means having others understand and appreciate what energy efficiency has to offer others. This is no simple task.

Improved energy efficiency provides many other benefits other than reducing energy consumption. Effective energy efficiency actions can improve industrial competitiveness, reduce energy imports, reduce energy bills, create jobs and so on. Therefore improving energy efficiency and reducing energy intensity are perceived as the top priority by PEEREA countries (Figure 11). The other policy area that has a similar need to “integrate” is the environment, as seen above in Chapter 2. Integrating energy efficiency into other economic spheres is not new and the process has been underway since energy efficiency became a distinct energy policy area in the 1970s.

²⁶ ECS, the IEA and the Danish Energy Agency, *Energy Efficiency Initiative*, OECD, Paris, 1998, p. 168.

FIGURE 11: PRIORITY AREAS FOR ENERGY POLICY



There is widespread agreement on the importance of integration and that is one reason why it was included in the *Policy Statement on Energy Efficiency*. Yet, the process is far from complete. The importance is that integration should take place at the earliest steps in policy development in all the policy areas. This means in both the development of policies and programmes. This is not as simple as it sounds. It appears reasonably straightforward for an energy ministry to prepare an energy efficiency strategy that includes the other areas but, even there, it is necessary for the ministry to effectively consult with all the other relevant groups and organisations. It is more complex to get a company, an industrial sub-sector or housing ministry to integrate energy efficiency into its own individual policies.

Integration ideally takes place at the point of policy formulation and should be reflected in the objectives, strategies and programmes. While developing energy efficiency strategies and policies that include integration with other economic areas as an objective does not necessarily mean that integration will actually take place. Integration must be included in the policies and strategies within those other areas. Sectoral policies need to incorporate energy efficiency into their own objectives and action plans. An integrated approach is better than an “add on.” Where equipment or a building already exists and will continue to for a given period of time, an “add on” is often appropriate. But where there are investments in new equipment or processes, a more integrated approach is generally the most cost effective.

Integration, however, occurs without it being a direct objective. For example, taxes on gasoline can effectively reduce consumption. However, often the taxes are levied

solely for revenue raising, with energy efficiency being a side benefit. Yet, even in those cases, the taxes can and are often later used to effect energy efficiency improvements.

Lessons Learned from PEEREA study on Integrating Energy Efficiency into Economic and Environmental Policies, June 2002:

- *Organisational structures that promote integration, co-ordination and dialogue are essential*
- *Integration is a slow process*
- *Need to have convincing argument of the benefits of energy efficiency*
- *There is a need to build credibility of the strategy, the organisation, the priority*
- *It is a process that never ends*
- *There are integration “problems” in all countries*
- *There is a need to analyse the barriers to energy efficiency because the analysis gives insight into the effectiveness and importance of integration*
- *There is a need for transparency*

Progress in integration is also seen in terms of the structures that are created to facilitate organisations (ministries, energy agencies, etc.) to work together. These can be in the form of consultative procedures, co-ordinating committees and ad hoc working groups. For example, the United Kingdom set up the Inter-Ministerial Group on Fuel Poverty to take a strategic overview of the relevant policies and initiatives with a bearing on fuel poverty, and to develop and publish a UK Fuel Poverty Strategy setting out fuel poverty objectives, targets, and policies to deliver those objectives. Much of the Fuel Poverty Strategy relates to improved energy efficiency. Portugal has the National Committee for the Rational Use of Energy to promote energy efficiency. The committee is co-ordinated by the Ministry of Industry. In Turkey, co-ordination amongst ministries is handled by the Energy Conservation Co-ordination Board, which is under the Ministry of Energy. The Board is also responsible for public energy savings campaigns.

Separately, there is a different form of interaction amongst ministries through executive agencies. In some cases, there is a structural relationship. For example, the French energy management agency ADEME is supported by three separate ministries and has a mandate in energy efficiency, renewables, environment and research. NOVEM in the Netherlands, which is now integrated within the Ministry of Economic Affairs, plays a comparable role between the energy directorate and other ministries responsible for environment and housing. KAPE, the Polish National Energy Conservation Agency in Poland, has a supervisory board of eight stakeholders, out of which three represent various ministries. Lithuania has the Energy Conservation Commission, headed by the Minister of Economy (the ministry responsible for energy). The Commission supervises and co-ordinates the implementation of the National Energy Efficiency Programme. There are 10 members of other relevant

ministries and utilities on the Commission. The Commission is separate from the Lithuanian Energy Agency which also has a major role in co-ordinating with other relevant ministries.

Until recently, the Danish Energy Authority (DEA) had an involvement in both energy and environment. With the change in government, energy and environmental responsibilities were separated and energy has now moved to the ministry responsible for industry. Energy and environmental policies and programmes had already been well integrated (as were other areas such as housing) and the organisational changes are unlikely to impact negatively in the short term on the integration that has occurred to date.

Federal systems have to look at integration differently, depending on constitutional responsibilities. In Austria, the 15a Agreement between the federal level and the Länder (provinces), defines the specific roles. The Energy Efficiency Agency (Energieverwertungsagentur - E.V.A.) is an independent executive agency at the national level which is jointly funded by the federal government, some provinces and other institutions. Many of the provinces have separate energy agencies.

In Belgium there is a working group between the two levels of government on energy called the Cellule CONCERE/ENOVER (Concertation Etat-Régions pour l'Energie). It is administered at the federal level by the Energy Administration of the Ministry of Economic Affairs. There are separate working groups on various areas including cogeneration.

In Germany, co-ordination is done through the Ministry of Economics because the provinces (Länder) have significant powers in the area of energy. The newly-created Deutsche Energie Agentur (Dena), the German Energy Agency, is also involved in networking with agencies at the Länder level. There is a forum for discussion and dialogue between the two levels of government. This is important because, for example, the EU appliance label has a federal ordinance but it must be applied at the Länder level. This also holds true for the building code, boiler efficiency standards, and others. The Länder have varying degrees of capacity, depending on their specific conditions and the federal level must ensure that there is acceptable coverage throughout the country.

Integration is most effective if undertaken at the stage of policy formulation. It is useful to review “integration” in the various economic and social areas ²⁷.

Concerning integration of energy efficiency into **energy pricing**, transition economies have struggled to find the right balance between reaching market-driven prices, social needs and industrial development. The process to reform prices is one of the most difficult that transition governments have

²⁷ See Chapter 2 for the discussion of energy efficiency and environmental issues.

experienced. These will be described further below but for transition countries, by and large, the progress has been slow, but the European Bank for Reconstruction and Development, in its monitoring of the transition process, stated that there is very good progress in about six countries and very poor progress in only three countries ²⁸. The rest are still in the midst of reforms.

Energy efficiency is now almost always included in **overall energy policy** and that was not the case before the oil crises of the 1970s. Very few energy policies today, whether national or international, would not include improved energy efficiency amongst the major objectives. All OECD countries now include energy efficiency as a priority in energy policies and strategies. This started after the oil crises of the 1970s. The IEA Shared Goals also state that energy efficiency “can promote environmental protection and energy security in a cost-effective manner” ²⁹. As seen above, for transition economies, most have separate energy efficiency policies and strategies but many have incorporated them within their national energy strategies.

Improved energy efficiency can improve **industrial competitiveness** through reducing costs and improving production. Improvements have come through a combination of investments in new technologies and better management techniques, not all of which are in the sole domain of energy specialists. In fact, much of the investment in the sector is not for energy saving technologies *per se* but for process equipment or lighting or computers and other related equipment. Thus, in order to maximise the potential energy savings, it is essential that any equipment that is purchased and installed be as energy efficient as is deemed cost effective.

Energy efficiency has proven to be particularly important in supporting government priorities in the areas of social policy. Two areas deserve attention: **employment and poverty**. Energy efficiency measures have proven beneficial in creating jobs and in reducing the energy cost burden on the needy or in improving comfort for those who have done without rather than spend on heat. A study for the EU’s SAVE programme showed that almost all programmes analysed had positive net employment effects and the “jobs are often in sectors, locations and skill groups that are prioritised in employment policies. However, the number of jobs created is typically small compared to the size of the investments. Therefore creation of employment will be a desirable side effect of the programmes, but should not be the primary objective” ³⁰.

²⁸ EBRD, *Transition Report 2002*, EBRD, London, 2002.

²⁹ See www.iea.org.

³⁰ Association for the Conservation of Energy, *National and Local Employment Impacts of Energy Efficiency Investment Programmes, Final Report to the Commission, Volume 1: Summary Report*, London, April 2000, p.6.

In recent years, integrating energy efficiency in **transport policy** has been closely linked to sustainable transport policies. The transport sector consumes a high share of petroleum products and there are few fuel switching possibilities. This means that the sector is a major contributor to greenhouse gas emissions. With few cost-effective fuel switching opportunities, energy efficiency improvements have proven highly successful in reducing overall consumption growth and reducing the rate of growth of greenhouse gas emissions. Transport is further discussed below.

The **buildings sector** has been one of the major sectors for government policies and programmes related to energy efficiency. There is also a wide spectrum of buildings from single and multi-family dwellings to schools, hospitals, stores, commercial buildings and industrial buildings. Buildings are complex systems because they combine technical components from lighting to heating with behavioural aspects. Policies have to be directed to existing infrastructure as well as to new buildings and equipment. Norms, standards and more recently labelling are the most used instruments for integrating energy efficiency concerns into the buildings policy.

Housing policy in many countries, particularly transition countries, is heavily involved in refurbishment of buildings that are in a poor condition, both physically and in their thermal qualities. Transition countries have had to face major problems with district heating systems, deteriorating buildings and so on. One of the challenges is to set priorities and long-term plans for modernisation and/or replacement. Energy efficiency needs to be included as a component of long-term modernisation or development plans.

From Poland:

The “Act on Support for Thermo-Modernisation Investment in Buildings” (1998) defines (i) the principles of support for thermo-modernisation investment projects as well as (ii) the principles for establishing the Thermo-Modernisation Fund and its application. Projects eligible for support include end-use improvements in residential buildings, reduction of energy losses in heat distribution networks and the substitution of conventional energy sources by non-conventional sources, including renewables.

Under the “Thermo-Modernisation Programme”, investors receive a premium of 25% of the loan used for implementing an eligible project upon completion of the project and after payment of 75% of the loan. To be eligible, projects should fulfil technical (minimum energy savings in physical terms) and financial criteria (positive net present value-NPV; payment in less than 7 years and no less than 10% of the savings per year; the loan should not exceed 80% of the value of the project). Loan agreements are concluded between the investor and a commercial bank, which submits the project to the National Economy Bank (*Bank Gospodarstwa Krajowego*) for approval of the premium, based on an obligatory energy audit report ³¹. The “Thermo-Modernisation Fund” is established at the National Economy Bank.

The Thermo-Modernisation Fund has been in operation since July 1999.

• Energy Efficiency in Transport

The Aarhus *Declaration* pays particular attention to energy efficiency in transport. Transportation is a particularly important area because, in large part, of the high share of GHG emissions due to the high usage of petroleum products.

For road transport, a recent IEA book states that a package of measures can save about 10% of oil consumption and the resulting carbon dioxide emissions ³². These initiatives include improving fuel economy through technical change; promotion of on-board technologies that improve fuel economy, including diagnostic equipment and information systems; toll rings and high occupancy/toll roads; a national parking tax; low GHG alcohol fuels; and telematic systems for freight. At this point in time the only fuel efficiency standards for vehicles are in Australia, Canada, Japan and the United States. The EU has no standards; however, they are addressing the issue primarily through a voluntary programme with manufacturers to reduce CO₂ emissions in cars. Yet, the EU is active in addressing environmental and energy issues in transport. A car labelling directive was approved in 1999 and Australia, Canada, Japan and the United States also have labelling requirements. There are also several

³¹ Guidelines for energy audits are defined by Ordinance of the Ministry of Internal Affairs and Administration of April 30, 1999.

³² IEA, *Saving Oil and Reducing CO₂ Emissions in Transport, Options and Strategies*, OECD, Paris, 2001.

EU directives on fuel quality that have an impact on emissions and fuel efficiency. The 2000 EU Action Plan for energy efficiency stated:

Transport policy is a priority area for energy efficiency as transport absorbs over 30% of total final energy consumption. Road traffic is of particular importance as it accounts for about 85% of overall transport CO₂. Policy priorities of a non-technological nature include incentives for optimal occupancy of vehicles, public and private, the promotion of new and alternative infrastructure and subsequently modal shifting and modal integration, management alternatives to air transport, completion of the internal market in rail transport and changing behaviour regarding mobility. A clearer mandate is sought to accelerate and broaden these developments through incentive programmes, pilot actions and greater Member State involvement.

In September 2001, the EC published a White Paper entitled *European Transport Policy for 2010: Time to Decide* which recommended actions to reduce congestion, promote less polluting modes of transport and improve the quality of transportation services such as public transport. Public transportation has been a priority for transition countries, even though the rate of car ownership has increased dramatically over the past decade. Congestion and air quality are causing problems in urban areas. The use of rail and urban transport is still quite high. Railways, such as the national railway in Hungary, have identified significant potentials for energy savings and used ESCOs to finance and implement the measures.

The Aarhus *Declaration* raised a particular concern about energy efficiency improvements lowering aircraft noise and air emissions. The International Civil Aviation Organisation (ICAO), under the UN and headquartered in Montreal³³, has looked into the area of aircraft noise over the past 30 years. In June 2001, more stringent standards were adopted, with further strengthening due in 2006. The reductions are obtained by technical changes, land-use planning changes, noise abatement operational procedures, operating restrictions and noise charges. According to the ICAO, subsonic aircraft being produced today are about 70% more fuel efficient per passenger-kilometre than 40 years ago and a further 20% in improvements are due by 2015. These efficiency improvements will have great impact on noise reduction and emission reductions.

- *Developing improved data and indicators*

Chapter 3 demonstrated the importance of using disaggregated indicators when assessing progress in energy efficiency and CO₂ emission reduction. These detailed indicators are needed to enable policy makers to follow the factors behind changes in energy use and emissions that energy and environmental policies are directed towards. This is important for several reasons:

³³ See www.icao.int.

- to better inform the policy formulation process;
- to measure progress towards these targets;
- to provide input to energy demand forecasting; and
- to allow for more meaningful cross-country comparison.

As pointed out in Chapter 3, time series with consistent data that are disaggregated enough to construct the policy relevant indicators are seldom available in most transition economies, and consequently the process of developing end-use energy indicators is still at an early stage in these countries. Many IEA and EU countries have been developing disaggregated energy indicators for several years and both the IEA and EU are supporting these efforts through organising international collaboration in this field.

The IEA Secretariat started its project on energy indicators in 1996 and has worked with many of its Member countries to develop energy indicator data (see also the *EEI*). The IEA is in the process of completing a large database with energy indicators for most of its member countries. In addition the IEA has been working with the Energy Charter Secretariat to develop an energy indicator database containing the energy and economic activity data needed for the main indicators used by the Energy Charter. However, some of the data for transition economies in this database are lacking due to limited availability for many countries. The current version of the database, covering data from 1990 to 2000, was used in the preparation of Chapter 3.

Under the EU's SAVE programme, member states and Norway are collaborating in the ODYSSEE project to develop a set of detailed energy efficiency indicators. This work has also been extended to cover accession countries. The statistical office of the European Union (EUROSTAT) is also to collect data that are used to establish an official set of core energy efficiency indicators for the European Union. In addition, also the European Environment Agency (EEA) has also initiated activities to analyse energy indicators. The EU efforts are similar to those of the IEA and the two organisations are collaborating closely in harmonising data collection and reporting of energy indicators.

Other international energy indicator activities include the project of the International Atomic Energy Agency (IAEA) to develop "Indicators for Sustainable Energy Development" (ISED). This project is co-ordinated with the UN Committee on Sustainable Energy (CSE) and the United Nations Work Programme on Indicators of Sustainable Development (WPISD), and also collaborates with the IEA, the United Nations Department of Economic and Social Affairs (UN-DESA), the European Commission (EC), the Nuclear Energy Agency (NEA/OECD), UNESCO, and some member states of the IAEA. The goal of this project is to derive a set of energy-related indicators that could present energy, economic, environmental and social data to policy makers in a coherent and consistent form, showing their inter-linkages, and capable of being used for making comparisons, trend analyses and internal policy assessments as required.

Common for all these efforts is the need for consistent and good quality data that are detailed enough to develop policy relevant indicators. Scarce resources for data collection, which has often been the case in many transition economies, may result in the lack of disaggregated data or data that are not consistent over time or with international practices. To improve the capability of addressing progress of energy efficiency and emission reduction a priority area for many governments in transition economies should be to improve and to expand routines for collecting data needed to develop energy indicators.

7. Implementation

Providing the policy framework is an important step but the policies themselves do not improve energy efficiency. What is needed is a structured, comprehensive approach to implementing the policies through the development of effective instruments and bringing in all the stakeholders to participate.

One of the obligations from the *Policy Statement* and six recommendations from the *Guidelines* pertain specifically to various aspects of implementation:

From the *Policy Statement*:

- **promoting implementation of energy efficiency policies**

From the *Guidelines*:

- **to promote initiatives to increase and support the end-users awareness on energy savings in a wider scale**
- **to ensure dynamism to energy efficiency policies in the design of funds, trusts, etc**

• Implementation of energy efficiency policies

There is a need to design and implement programmes to achieve the policy objectives. There are six categories of energy efficiency measures used in this report: information/awareness, education/training/advisory, financial incentives, regulations and standards, voluntary measures and research & development. A comprehensive energy efficiency plan will use a combination of all the measures, although priorities need to be made since it is impossible to introduce them all at once, particularly when starting. The choice of instrument depends on a variety of factors, including:

- Cost and ease of delivery;
- “Strength” and “durability” of effectiveness in overcoming barriers and providing energy efficiency improvements in the short term and long term;
- Public, political and administrative acceptability; and
- Effectiveness in improving energy efficiency.

Since the Aarhus Conference of Environment Ministers in 1998, there have been changes in programme implementation in most participating countries. Many

countries have expanded or are expanding the range of programmes. For many of the Central and East European countries, this is largely as a result of preparing for the *acquis communautaire* of the European Union (see Chapter 4). Industrialised countries have revised or expanded programmes, in large part in response to their climate change strategies.

A review of the measures that countries have put in place shows that good progress has been made since the *Energy Efficiency Initiative* in 1998. The accession countries to the EU have particularly been active in developing programmes to meet the requirements under the *acquis communautaire*. There are still a number of participating countries that have weak or a very limited range of programmes available, in part because their strategies and legal framework are not in place and in part because of problems of adequate resources.

Countries that have made big progress in programme implementation in recent years include Croatia, Hungary, Lithuania and Slovenia. Both Bulgaria and Poland have good plans developed but they have not been fully realised.

The following is a short summary of the use of the various policy instruments. Annex 7 provides summary tables of the measures in place in participating countries and Annex 8 has a summary of financial incentives.

- *Information/Awareness*

Appropriate information to consumers, decision-makers, the energy service sector, architects, distributors and others in the energy efficiency field ensures that more of the cost-effective potential is achieved. There is a wide range of information programmes throughout the region and the number of programmes has expanded significantly in recent years. Information programmes cover a wide spectrum from mass media campaigns, information centres, technical manuals and brochures, labelling and energy audits. They can be used for awareness creation or for providing detailed technical information to various actors: consumers, energy managers, decision-makers or technicians.

Awareness creation is a key consideration because many consumers in all end-use sectors have little understanding of the cost-effective potential for improvements for energy efficiency or of the techniques to make such improvements. Awareness creation is also important for service providers (e.g. auditors) to show the market potential available.

From the Slovak Republic:

The Slovak power company, Slovenské elektrárne (SE) has the Energy Advisory Department and demand-side management (DSM) as one of its responsibilities. Besides information, advice and consultancy in energy efficiency, renewables, financing possibilities, electricity, lighting and space heating, the department also provides energy audits and it also implements various pilot projects.

Information programmes are often combined with other measures such as financial incentives. For example, a UNDP/GEF-funded municipal energy efficiency project in Hungary combines a fund for energy audits (itself an information programme) and for feasibility studies with training of municipal decision-makers (together with technical training material), auditors and technical staff, as well as an information component. The project also includes a plan to certify energy auditors to improve the quality of auditors throughout the country.

In the past four years, there is more evidence of targeted information programmes to specific sub-sectors such as municipalities, schools or hospitals or to decision-makers such as mayors or senior managers of industry.

Countries also use existing (and sometimes specially-created) organisations to help disseminate information. These include, for example, professional organisations such as engineering societies, energy city networks or non-governmental organisations (NGOs). They can also include local energy agencies funded through the EU's SAVE programme. In Hungary, for example, the Energy Efficiency Advisory Network, comprising 20 Energy Advice Centres, provides advice, counselling, lectures, organises exhibitions, facilitates small credits, meets with neighbourhood organisations and so on. Some of the advice centres were supported through the EU's PHARE programme.

From Japan:

To promote conservation as a nation-wide movement, the Government has established:

- The *Energy Conservation Day* on the first day of every month to create greater opportunities to review energy conservation activities and ensure their results.
- The *Energy Conservation Month* in February as a nation-wide movement involving general consumers and public institutions, implementing energy conservation programmes in industry, holding exhibitions and various campaign events on energy efficiency.
- The *General Check-Up Day for Energy Conservation* on 1 August and 1 December, for a check-up and review of daily energy conservation activities and habits.

- *Education/Training/Advisory*

Training and education services are available in all participating countries - industrialised and transition countries. Training is very important because it is necessary to ensure that specialists or would-be specialists in energy efficiency have access to the most recent material on techniques and technologies to improve energy efficiency. The speed of technology shifts is increasing and technologies are becoming more complex.

Considerable attention has been given to training for the development of business plans, energy auditing and energy management in order to improve the capacity to develop energy efficiency projects and management systems. Some countries provide training or education support (often at university level) for architects, planners and energy service companies. There has been focus on promoting the concept of third-party financing. There has also been training for improving the capacity of administrations to implement measures or initiatives such as Joint Implementation under the Kyoto Protocol.

In transition countries, many of the training initiatives have been sponsored and funded by multilateral and bilateral sources. Often it entails “twinning” arrangements between companies, administrations (e.g. energy agencies) and associations (e.g. energy cities networks).

From Poland:

The Danish Energy Authority offered the Polish government bilateral programmes in the sector of rational heat production, distribution and use. Based on a Danish experience, the Polish Energy Conservation agency, KAPE, developed a national training programme for building energy consultants. After four years of operation, more than 2500 Polish engineers and architects were trained on energy auditing, being a solid foundation for the Thermodernisation Act.

From Austria:

Austria has a network of energy auditors covering all Länder. In order to facilitate access to this service, the Energy Efficiency Agency (EVA) published a brochure listing all the energy auditors. To ensure minimum qualification standards, the ARGE Energie-beraterausbildung developed a multi-level training programme, including the possibility of a university degree (post-graduate). In addition, in order to improve the communication skills of auditors, EVA holds seminars entitled *Energy Auditing -Train the Trainer*.

In 1998 and 1999, the Federal Ministry for Economic Affairs and Labour supported the following actions:

- A conference on energy efficiency in industry focusing on the exchange of information and experience on “success stories”,
- Preparation of a guideline on third party financing/contracting addressed to municipal administration, and a project, partly supported by the SAVE programme, on third party financing in industry,
- A project, partly supported by the SAVE programme, on third party financing in industry.

• *Financial Incentives*

Access to capital has been identified as a major barrier to achieving the full cost-effective potential of energy efficiency. Financial incentives have been developed to improve the access to capital but they have also been developed to break the inertia to motivate consumers to take energy efficiency actions and they have also been used to improve the cost-effectiveness of innovative energy-efficient technologies.

Financial incentives are well established measures used by both industrialised and transition countries. They are more widely used in IEA countries, although less so than in the 1980s. The incentives are generally well targeted to meet specific objectives or to promote specific technologies (e.g. insulation). The financial instruments normally include subsidy/grant schemes, soft loans, and funds. Separately there are fiscal measures such as taxes. Annex 6 provides the status of consumption and carbon taxes and Annex 8 provides a summary of financial measures from selected countries.

In economies in transition, several funds that have been established either domestically financed, or through bilateral or multilateral support. Many countries state that they would implement more financial incentives but they are handicapped by government budget constraints. It is a positive sign of integration of energy efficiency that some of the financial incentives are linked to other government priorities, such as housing modernisation.

There are many financial schemes available now, although undoubtedly some countries have few or none. While many of the financial schemes are funded domestically, a large number of those in transition countries are funded through

international support. The Alliance to Save Energy lists 20 such funds in transition economies ³⁴. These include:

- Bulgaria Municipal Energy Efficiency Programme
- Central/Eastern Europe Dexia-Fondelec Energy Efficiency and Emissions Reduction Fund
- Czech Republic PHARE Energy Saving Fund
- E & E Regional Municipal Energy Efficiency Facility in the Balkans
- FE Polska Energy Efficiency Loan Facility
- Hungary Energy Efficiency Co-Financing Programme (HEECP)
- Hungary Energy Efficiency Co-Financing Scheme/PHARE Revolving Fund
- Hungary Energy Efficiency Credit Fund /German Coal Aid Fund
- Hungary Energy Saving Credit Programme
- Hungary Public Sector Energy Efficiency Programme
- Latvia Energy Efficiency Fund I
- Latvia Energy Efficiency Fund II
- Lithuania Energy Efficiency Housing Pilot Project (EEHPP)
- Lithuania Municipal Infrastructure Development Programme
- Lithuania Special Programme for Implementation of Energy Saving Measures
- Moldova Cleaner Production and Energy Efficiency Revolving Fund
- Romania GEF Energy Efficiency Financing Facility Project
- Slovakia Energy Efficiency Fund
- Slovenia Energy Saving Fund.

³⁴ Alliance to Save Energy, *Funds for Energy Efficiency Projects*, Washington, D.C., April 23, 2002. Note that these are funds specifically for energy efficiency and there may be some modernisation and environmental funds that can also be used for energy efficiency.

From Hungary:

The Hungary Energy Efficiency Co-Financing Programme (HEECP) began operation in its pilot phase in March 1997 with a total of US\$5.0 million in GEF funding. The programme was designed to overcome barriers to energy efficiency financing and development. The HEECP has two tools:

- A guarantee programme, supporting and sharing in the credit risk of energy efficiency financing undertaken by domestic financial institutions; and
- A technical assistance programme, to help prepare projects for investment and aid general energy efficiency market development.

The Guarantee Programme: Under this programme, participating domestic financial institutions (FIs) execute Guarantee Facility Agreements (GFAs) with the IFC, the private sector agency of the World Bank. Subsequently, pursuant to the GFAs, Transaction Guarantee Agreements are executed individually for specific transactions as they are originated, according to the procedures defined by the GFA. Participating FIs propose qualified energy efficiency project transactions by providing summary information on the transaction to the IFC. The IFC then reviews the transaction for approval under the guarantee. The programme gives participating FIs a risk management tool to create credit worthy financing and allows projects to be funded that otherwise might not be funded because of credit concerns. Projects are funded with the FI's own resources, but with HEECP guarantee support.

Until the end of 2000, there were three FI partners and it is expected there will be more partners if the programme is expanded and extended. Up until the end of 2000, guarantees were given for nine projects totalling over US\$3.5 million. The projects represent a range of end-users: industrial, municipal, institutional, multi-family housing and single family housing. Financing supported by the guarantees has been provided to both end-users directly and to ESCOs, which in turn have used the finances to make investments in end-use facilities. The primary type of equipment funded are efficient gas-fired boilers, reflecting the large backlog of investment in Hungary for basic energy system upgrades. These projects have included other types of end-use measures, but more need to be done to expand the type and depth of energy efficiency measures being funded. Projects currently in the pipeline include public lighting and district heating.

Technical Assistance Programme: The programme provides small grants for:

- Marketing of energy efficiency finance services by participating FIs;
- Energy efficiency project identification by support of initial energy audits;
- Energy efficiency project development and investment preparation;
- General energy efficiency market promotion activities; and
- Programme evaluation activities.

Technical assistance funds are provided to participating FIs and other energy efficiency businesses including ESCOs. By the end of 2000, 40 grants had been dispersed. HEECP retains flexibility in its use of the technical assistance funds and continues to seek ways to promote expanded energy efficiency markets in Hungary in co-operation with other commercial, governmental and NGO agencies.

There are also such funds in some OECD countries. Most recent is the Climate Change Levy in the United Kingdom, introduced 1 April 2001, on the use of energy by business and the public sector. Climate Change Levy revenue is recycled to business through a 0.3 percentage point cut in employers National Insurance Contributions, the Enhanced Capital Allowances (ECA) and provides £50 million per year for supporting business energy efficiency through the Carbon Trust. The Carbon Trust was formed in April 2001 to take the lead on energy efficiency for business and the public sector and encourage the creation of a low carbon economy in the country.

From the United Kingdom:

The **Climate Change Levy** introduced in April 2001 is a tax on the use of energy in industry, commerce and the public sector, with offsetting cuts in employers' National Insurance Contributions and additional support for energy efficiency schemes and renewable sources of energy. The levy does *not* apply to fuels used by the domestic or transport sector, or fuels used for the production of other forms of energy (e.g. electricity generation) or for non-energy purposes. Rates of levy are:

- 0.15p/kWh for gas
- 1.17p/kg (equivalent to 0.15p/kWh) for coal
- 0.96p/kg (equivalent to 0.07p/kWh) for liquefied petroleum gas (LPG),
- 0.43p/kWh for electricity.

There are also several exemptions from the levy, including:

- Electricity supplies from new renewable energy (e.g. solar and wind power)
- Fuel used by Good Quality CHP, as Good Quality CHP certified under the CHP Quality Assurance Programme (CHPQA)
- Good Quality CHP electricity exports
- Fuels used as a feedstock
- Electricity used in electrolysis processes, for example, the chlor-alkali process, or primary aluminium smelting.

The exemptions for renewable energy and CHP are intended to encourage the take up of these technologies by industry.

• *Regulations and Standards*

Regulations and standards provide long-term signals and can be used in all end-use sectors. Regulations and standards can apply not only to specific technologies or systems (e.g. building codes) but also to regulate the availability and quality of information (e.g. for energy labelling of appliances or vehicles). They can also be used to require energy managers in industry or to require industry to monitor and report their energy use to government. Regulations can also be used, for example, to require utilities to establish demand-side management programmes. Regulations and standards are generally thought of as mandatory but they can be voluntary as well.

Regulations and standards are used widely throughout the region in all sectors. They are led by the European Union with its range of labelling and efficiency Directives (see Chapter 4) covering a variety of sub-sectors. The EU Directives will cover about half of the participating countries soon. More directives are planned in the near future.

There are several efforts underway to promote efficiency standards and labelling at the international level. As stated, best known in Europe are the directives through the European Union, but there are other initiatives. The IEA published a study on *Energy Labels & Standards* in order to provide a step-by-step guide on programme development and implementation, describing their use in other OECD countries³⁵. The IEA's analysis is useful for all participating countries.

Some economies in transition that are not in EU accession process are also considering the EU standards, in part as a means of facilitating trade in energy efficient equipment. However, for those that are not, there are other options, including standards being developed through the UNECE.

Building codes are available in most countries. The EU has a requirement for their regular updating to take into consideration recent developments in technologies and techniques that affect the cost-effectiveness of improved thermal efficiency. There is growing interest in energy certification of buildings, which is required under EU Directive (93/76) and further strengthened under the new Directive on Energy Performance of Buildings (see Chapter 4). Candidate countries to the EU are required to adopt such measures.

Energy certification of buildings is also important. EU countries are obliged to establish some form of certification programme under Council Directive 93/76 and that obligation is being strengthened through the new Directive on Energy Performance of Buildings.

³⁵ IEA, *Energy Labels & Standards*, OECD, Paris, 2000.

From Denmark:

Labelling of Smaller Buildings

Every house-owner may have an audit of his building, describing the present energy conditions with recommendations for possible energy saving measures in the building shell and heating equipment. When dealing in real estate, an audit is required if the building has an area of 1 500 m² or less.

The result of the audit is an Energy Label describing the energy condition on a scale from A1 to C5 (A1 is best). Heating, electricity and water consumption are rated on the basis of a standard calculation - not actual consumption because it is linked to the particular seller's household (number of persons and behaviour). Another part of the audit is an Energy Plan informing the buyer which measures could be worthwhile carrying out in the short or long run to save energy.

The scheme was evaluated in 2000 and the conclusions were that there is a large energy saving potential in existing buildings. 45% of the owners of labelled houses actually invested in heat saving measures. Even though the scheme is mandatory, only 60% of the traded houses were covered by an energy certification. On the basis of other conclusions about the set-up of the scheme, changes were made in mid-2001 to empower the steering committee of the scheme to take over more responsibilities for the success of the scheme.

Energy Labelling of Larger Buildings (Eco-scheme)

The annual supervision of larger buildings (more than 1 500 m²) is carried out by 5-700 specially trained consultants. About 25 000 buildings are concerned. Every month all buildings, except industrial buildings, with a surface of more than 1 500 m² must register their consumption of heat, electricity and water.

Annually, a consultant makes an audit comprising an Energy Label and an Energy Plan. The Energy Label evaluates the consumption of heat, electricity and water on scales from A to M (A is best) in comparison with average figures for comparable buildings. The Energy Plan informs the building owner about relevant measures for energy saving in the short and long run. This new scheme runs parallel to the above-mentioned scheme concerning smaller buildings.

This scheme was evaluated in 2000 and the major conclusions were that the scheme works very well for those who participate in it, but around half of the buildings still do not fulfil the requirements. The energy savings in the buildings following the scheme are larger than in those outside the scheme. Furthermore, the investments in energy savings are more focused in buildings participating in the scheme and those responsible for energy are more aware of the results of investments.

From PEEREA in-depth review of Romania:

Energy efficiency standards for new buildings in Romania are close to relevant European standards. While further improvements of these standards are certainly possible and taken into consideration, the main problem is the poor enforcement of these standards. It seems to be necessary to raise the awareness of these standards not only among building owners, but in particular among building professionals like architects and craftsmen and local authorities.

Regulations are common in the transport sector for either labelling of fuel efficiency or for minimum efficiency levels. There are also regulations for regular inspection of vehicles for emissions, which also have an effect on fuel efficiency.

While there are fewer regulations in industry, they do exist with respect in the field of environment concerning emissions, for requiring regular audits, boiler inspections or preparing energy efficiency plans or for requiring the appointment of energy managers. Regulations also exist for regular reporting of energy use.

Some countries have legislation requiring energy companies to undertake integrated resource planning and DSM programmes.

• *Voluntary Agreements*

Voluntary agreements (VAs) were widely used in the 1970s. While many remained throughout the 1980s, they have increased in popularity since the early 1990s. Voluntary agreements are an effective mechanism for encouraging energy efficiency and reductions in GHG emissions, particularly in the industrial sector and its sub-sectors, but increasingly in all end-use sectors. One of their main benefits is that they can be implemented at low cost and relatively quickly to achieve results. They are often compared to mandatory regulations which can often take years to be approved and implemented.

There is a wide range of voluntary actions used, including industrial covenants, negotiated agreements, self-regulation, codes of conduct and eco-contracts. There have been some creative approaches with participation encouraged through possible tax concessions or other forms of financial support, offers of audits, good public relations and assistance in obtaining environmental licenses.

The Netherlands has been one of the pioneers in their recent use. Since 1991 30 Long Term Agreements (LTA's) have been made with industry associations. Altogether, about 850 industrial companies participate in LTA's. The average target of LTA's is a 20% increase in energy efficiency by the year 2000 from 1989 levels. Over 90% of industrial primary energy consumption is covered. The second generation of LTA's, which run from 2000 until 2010, cover new energy efficiency issues, in addition to further optimisation of production, including technological breakthroughs,

optimisation of industrial estates, reduced use of materials, integrated chain management, energy efficient product development, transport logistics and use of renewable energy.

From Switzerland:

The Energy 2000 Action Plan and its successor, the SwissEnergy Action Programme, which began in 2001, have relied heavily on voluntary measures. While the voluntary initiatives were successful in the Energy 2000 Action Plan, the SwissEnergy Action Programme was created with the realisation that voluntary measures alone will not be able to cope with the further increasing consumption of energy and carbon dioxide emissions. Thus, the new Programme has added some incentives and strengthened the voluntary measures through increased co-operation with private energy agencies based on public mandates and commitments, tied financial contributions to specific promotion programmes and increased public awareness campaigns, education, marketing, consulting and quality management.

From Finland:

VAs were signed with the Association of Finnish Local Authorities, the city of Helsinki and with the Real Estate Units in 1997. At the end of 2000 municipal agreements covered 50% of the municipal building population. The target is to have 80% of the public buildings audited by the year 2010. The objective of the sector is to achieve 10 % savings by 2005 compared to 1990.

While VAs are common in OECD countries, they are seldom used in transition economies. There has been little analysis undertaken but it may reflect that there is a natural evolution of measures. VAs require a level of commitment and understanding of both partners and possibly there is not enough of a track record in most transition economies for such undertakings. Also VAs still require actions by governments because there is a need to negotiate, monitor and assist the partners in terms of information. Sometimes there is also the need to provide energy audits, create databases, target subsidy programmes to participants and monitor progress.

The IEA has recently been promoting specific policies such as reducing standby power through voluntary approaches, as shown in the following box.

IEA's initiative on standby power

Standby power for electrical equipment is the electricity consumed by appliances when they are switched off or not performing their primary function. Standby power consumption is an increasing fraction of the world's energy use. For example, it may represent 5 - 15% of electricity use in homes of IEA Member countries.

Inefficient standby power is a global problem, so any policy to reduce standby losses will require a global perspective. The IEA is uniquely positioned to assist in the development of an international strategy to reduce standby losses resulting in the greatest savings to consumers, the lowest costs to manufacturers, and the greatest reduction in CO₂ emissions.

Several features of standby power and the manufacture and marketing of the equipment that consumes it argue for an international effort to reduce the losses attributable to it:

- Standby power consumption by electrical equipment is a uniquely international issue because the manufacture of many of the appliances that use standby power [TVs, video cassette recorders (VCRs), mobile phones, computers, etc.] typically involves many countries. A computer, for example, may be designed in the U.S., assembled in China using parts from Japan and Korea, and sold in Europe.
- Electronic devices are marketed internationally, so setting standby power use limits country by country would be unnecessarily difficult and costly.
- New electronic equipment will continue to proliferate at an increasing rate, so the share of energy use attributable to standby power consumption will rapidly increase.
- Governments worldwide are trying to find ways to cost effectively reduce CO₂ emissions; eliminating unnecessary electricity losses from standby consumption is an attractive strategy. Reducing standby power use may be one of the first opportunities for coordinated international action under the rubric of global climate protection.

Several policy instruments can be used to tackle the international problem of standby power consumption, ranging from labelling to imposing minimum performance standards, and from voluntary schemes to regulation; individual countries can select the approaches that best fit their circumstances. However, an open, co-ordinated international initiative help transform the entire electronics market by stimulating manufacturers of products and components to use low-loss components and designs.

International collaboration improves the cost-effectiveness of policy efforts by:

- reducing the number of disparate regulations and commitments according to which manufacturers must design and test their products,
- increasing the economies of scale for manufacturing advanced standby technologies,
- minimising interference with industrial competitiveness and trade, and
- reducing the costs of developing, operating, and evaluating government programmes to address standby power consumption.

The IEA's proposed 1 Watt target formally gained legitimacy when Australia formally endorsed the concept and more recently, in July 2001, when US President Bush issued an Executive Order requiring the federal government to purchase products with low standby, and preferably below 1-Watt. In Europe, several codes-of-conduct are proposed by the European Commission to the electronic industry to bring to the market only the equipment with a standby power lower than 1 Watt. Even China recently has imposed a 1-Watt target for the standby power on the TV sets brought to the Chinese market.

• *Research & Development*

Promoting R&D and demonstrations of more energy-efficient technologies is important and widely undertaken. The research is generally conducted in government laboratories or is supported by governments through financial incentives or forms of partnerships. OECD countries have had comprehensive R&D programmes for which the IEA monitors the funding provided. For energy conservation, IEA countries allocated \$1288.60 million US dollars in 1999, up from \$965.8 million in 1997 and \$1171.1 million in 1998 ³⁶. In 1998, the R&D budget for renewables in IEA countries was \$629.0 million. The EU, through its framework research programme, has given strong emphasis over the years to R&D and demonstrations related to energy-efficient technologies ³⁷.

Many transition countries also identify R&D programmes, although there has been no detailed analysis of them. Few countries have given details on their initiatives.

8. *Organising Energy Efficiency*

Implementing effective energy efficiency measures and ensuring that the stakeholders are contributing to the national, regional or local efforts are key to long-term success. The Policy Statement does not directly refer to organisational issues, although they are implicit throughout. The Guidelines has several recommendations related to organisation.

From the *Guidelines*:

- **to establish a well co-ordinated partnership between actors at all levels, nationally and internationally**
- **to continue and stimulate co-operation and exchange of ideas between experts, agencies, municipalities and other organisations**
- **to encourage private sector initiatives**
- **to put special efforts in capacity building for energy efficiency instruments**

³⁶ In 2000 US dollars. IEA, *Energy Policies of IEA Countries, 2000 Review*, OECD, Paris, 2000, pp. 316, 335.

³⁷ See www.cordis.lu.

Energy efficiency policies and programmes must draw on many groups and organisations in order to mobilise as many actors as possible. There are many different types, including the organisation of governments' activities at all levels. However, organisational efforts also include gaining the support of the energy efficiency industry, end-users, energy supply companies, community organisations and so on. An effective energy efficiency strategy depends on the actions of millions of consumers, manufacturers, distributors, installers and so on. How effective bringing these actors together will affect the long-term benefits.

• *Development of Institutions for Energy Efficiency*

Ensuring that energy efficiency is integrated in government as a long-term stable function includes building institutions within the government framework. The creation of energy efficiency units within ministries responsible for energy and executive energy agencies is important. Annex 4 shows that much progress has been made in developing such bodies. Since 1998, Albania, Azerbaijan, Germany, Hungary, Norway and the Slovak Republic have created new agencies. In the case of Hungary, it was a merger of existing organisations to form one central body. In Romania in 2002, the energy conservation agency, ARCE, obtained departmental status within the Ministry. Creating such executive agencies is only part of institution building. It is also necessary to work with other government institutions/ministries (i.e. housing, education, industry, transport) to ensure that energy efficiency is integrated in other government areas.

From Germany:

The German Energy Agency - Deutsche Energie Agentur (Dena) - was founded in 2000. It is the first national energy agency in Germany, owned 50% by three federal ministries and 50% by the financial institution, Kreditanstalt für Wiederaufbau.

Dena's role is to provide support for efficient and environmentally sound energy production and consumption, and renewables, by dissemination of information to the general public and experts; developing, implementing and evaluating programmes and projects; providing advice for decision makers and the administration on the national and regional level as well as for the private business and scientific institutions; and international co-operation. The three main business fields are renewable energy, climate change/energy efficiency and energy efficiency in buildings.

Dena depends on project based financing and 40% of its turnover in 2002 came from private business. The agency currently has a staff of 39.

Even though the institutions may exist, there are many concerns that they are not adequately funded or staffed to fulfill their functions effectively. This has been identified in some of the in-depth reviews that PEEREA has undertaken. The Working Group of PEEREA has recently taken an active interest in organisational aspects, holding a special panel discussion on the topic, followed by an in-depth analysis of the

evolution and role of energy efficiency institutions in developing and implementing policies and programmes ³⁸.

The report concluded that the fundamental requirements for an (ideal) effective energy efficiency institution are ³⁹:

- *Legitimacy and authority to act*
The organisation must have sufficient legitimacy and authority to mobilise public and private sector energy users, which requires a clear mandate and government support at the highest level within the framework of a clearly defined policy.
- *Broad management authority*
It must have broad management authority and the ability to act rapidly. The focus of an energy efficiency institution should be promotion and persuasion, rather than command and control, which is a very different objective than that of traditional government structures. This implies that if the institution is located inside the government (as a department of a Ministry for example) then it should have sufficient autonomy in management and in activities.
- *Sufficient funding*
It must have sufficient financial resources to meet the running costs of the organisation (staff, equipment, communication and information, training) and the necessary programme funding to carry out its activities within the framework of the relevant government policy.
- *Human resources*
It should have the necessary human resources - the skilled staff capable of undertaking the wide ranging tasks implied by an energy efficiency promotion institution - staff need skills in such areas as communication, motivation, technological competence, and economic competence. This requires staff with different skills and motivations than those of a classical state administration. State energy efficiency organisations in Central and Eastern Europe have tended to be strongly 'engineering led' with a focus on technologies at the expense of communication, promotion, and awareness raising. The research and technology focus of energy (supply) engineers in Central and Eastern Europe has led to this aspect of the work of energy efficiency institutions being consistently underestimated and unappreciated.

The *PEEREA* report on institutions also stated that there were other factors and conditions that needed to ensure an effective energy efficiency organisation. These included:

³⁸ *Evolution and role of Energy Efficiency institutions in developing and implementing policies and programmes*, *PEEREA* Document No. 26, 21 May 2001.

³⁹ *Ibid.*, p. 58.

- responsibilities between government and energy efficiency institution must be clear; responsibilities between different energy efficiency institutions must be clear;
- energy efficiency policies must be integrated with other sectoral policies;
- energy efficiency institutions need closer involvement in the market and less of a 'command and control' approach;
- there is need for a continuity of action and funding;
- the development of effective monitoring, evaluation, and feedback systems is needed; and
- there is a need to strengthen international collaboration.

Many participating countries have offices to promote energy technologies, funded through the European Union. These offices, called OPETS or Organisations for the Promotion of Energy Technologies are both within the EU member states and in transition economies.

Organisations for the Promotion of Energy Technologies (OPETs)

The OPET was established by the European Commission in order to promote the results of new energy technologies, and promote their adoption on the market. The network was first established in 1990 in the EU Member States. Members of the network were energy efficiency agencies - national and regional, and private energy efficiency or renewable technology consulting companies. This EU network was contracted by the THERMIE programme to establish a network of EC Energy Centres for the promotion of energy technologies in Central and Eastern Europe - such centres were established under this programme in Prague, Warsaw, Bratislava, Budapest (which joined to the existing Hungary-EU Energy Centre), Sofia, Moscow, St. Petersburg and Siberia.

The OPET network was reorganised in 1996. The new network was made up of 41 OPETS in the EU Member States and Norway, Iceland, and Israel, and 14 'FEMOPETS' in the accession countries. Some of the OPETs are single organisations, while many others are consortia of several organisations, generally covering different regions, but under a single country co-ordinating OPET. A small number of OPETs cover more than one country (e.g. a cross border OPET covering the neighbouring regions of Upper Austria and Bavaria in Germany).

When the FEMOPETs joined the network at the beginning of 1998, the EC recognised that they could benefit from the experience of the existing members of the network, and therefore EU OPETs were assigned to the FEMOPETs to help them in their development and to assist in the implementation of their work programmes.

The OPET network changed again in 2000. The network now comprises over 100 partner organisations in 44 countries of the EU, the accession countries, as well as Norway, Iceland and Israel. A further change was the opening of the programme to 'OPET Associates', which have been established in Latin America, China, India, and the former CIS to help identify local needs and to help promote the use of relevant European energy technologies.

There are also international information centres or clearing houses that provide a wide range of technical information (see Chapter 12).

- *Participation of Stakeholders*

The *Guidelines* relating to organisational issues stress the need for wide participation in the development and execution of energy efficiency policies and programmes because improvements in energy efficiency depend on the initiatives of a wide range of stakeholders. Partnerships and improved dialogue are developed in many ways, through committees, round-table discussions, conferences, websites and the like.

In terms of the government co-ordinating with non-government individuals and organisations, there are several examples. In Hungary, the UNDP/GEF project includes a consultative forum to bring together stakeholders to discuss the broader aspects of the project and to seek feedback on the progress of the project from a wide range of stakeholders and beneficiaries, including NGOs. In Romania, the Romanian Energy Policy Association (APER)⁴⁰ brings together wide interests, both governmental and non-governmental, to discuss various aspects of energy policy, including energy efficiency. The European Bank for Reconstruction and Development (EBRD), which was created in 1991 to help finance the transition to a market economy, has a wide and structured approach to soliciting the views of NGOs. There is now a co-ordinator of NGO relations to ensure that NGOs get information and responses efficiently, there is an NGO area of its website and there are frequent interactions with groups of NGOs. For example, a programme for NGOs to meet EBRD officials is run in parallel to the EBRD annual meeting on topics such as natural resource development, environmental surveillance and energy efficiency. At the 2002 annual meeting in Bucharest, energy efficiency also featured as a seminar topic in the annual meeting business forum for investors. The President of the EBRD met with a broad group of NGOs in Bucharest and again at the Johannesburg World Summit on Sustainable Development in September 2002.

As discussed above, there are several organisations bringing municipalities together on energy issues. These include specialised energy cities networks in the EU, Bulgaria, Romania and Poland. There are also municipal associations that include energy matters amongst their functions. Also see Chapter 12.

Partnerships can be developed through the use of voluntary agreements but, as seen above under the review of policy instruments, they are widely used in OECD countries but much less so in transition countries.

There are increasing activities to promote the use of the private sector. One of the broadest examples is the promotion of third-party financing. Many of the energy service companies (ESCOs) operating throughout Central and Eastern Europe have been financed through the EBRD. Many organisations have undertaken training to

⁴⁰ See www.aper.ro.

promote third-party financing, explaining the complexities of offering such services. There have also been projects, such as through the IFC/GEF in Hungary and Poland, to encourage market transformation. Governments have also supported technology fairs to promote the expansion of energy efficient technologies.

Capacity building is crucial and there are many important examples. There are many multilateral and bilateral examples. Several UN and EU programmes have been important in capacity building. The Climate Technology Initiative has also a structured approach to capacity building⁴¹. There are many effective regional and bilateral efforts. Notably is the SCORE programme from the Netherlands in countries such as Hungary and Latvia and the BASREC programme in the Baltic region. Several of these initiatives are described in Chapter 12.

9. Economic Issues

Economic issues tend to dominate discussions related to energy efficiency policies and programmes and yet they need to be seen in context of the entire policy framework. There are a number of issues that are addressed by the recommendations from the *Guidelines* as seen below. These recommendations pertain to correct end-use pricing, reducing subsidies, market transformation to promote energy efficient technologies, incentives to promote energy efficient technologies and international co-operation.

All participating countries face the dilemma of how to effectively promote and finance energy efficiency initiatives. The key is to provide correct price signals that adequately motivate energy consumers to take energy efficiency actions themselves. Yet, the price signal is not sufficient and many countries have opted for targeted financial incentives (see Chapter 7). The *Policy Statement* provides two obligations related to economic issues and the *Guidelines* provide a further 11 recommendations.

From the *Policy Statement*:

- **promoting energy markets and pricing reforms to ensure less distorted prices and incentive;**
- **promoting investments in energy efficiency by encouraging IFIs, donors and other relevant parties to increase investments;**

From the *Guidelines*:

- **to stimulate economic dynamics through real cost pricing, first of all by phasing out subsidies**
- **promote support mechanisms during the transition**
- **to ensure that energy consumers receive the effective price signals to motivate them to take action**

⁴¹ See www.climatetech.net.

- **to stimulate the market transformation towards an increased demand for more energy efficient technology**
- **to exchange experiences on models of energy/carbon taxes and promote their development**
- **to consider a small tax of 1-2% of the energy price for CEEC/CIS countries**
- **to take effective legal and economic actions to abandon non-payment for energy services in transition economies**
- **to promote energy efficiency investments which are essential to the success of an environmentally benign effort**
- **to develop an international standardised code-of-conduct for energy efficiency investments and liability**
- **that international co-operation in order to comply with the international instruments of the Energy Charter and Kyoto protocols is effectively organised**
- **to co-operate internationally in the field of job creation**

• *Promoting energy markets and pricing reforms*

Progress is being made in reforming pricing systems in transition economies, although it is understandably a slow process. Price reform has been one of the most contentious areas of the transition process because there has been a great impact on individuals, businesses or institutions because of the rapidly increasing cost of energy in transition economies following decades of below cost end-use pricing.

The issues were well described in the *PEEREA* in-depth review of the Slovak Republic. These were and, in some cases, still are representative of many transition countries ⁴²:

Energy pricing to remove distortions is of paramount importance. There are significant subsidies that exist, primarily as a safety net for low-income households. Other end-use sectors are not subsidised. The Government is fully aware of conflicting social and economic considerations involved here, and there is a more determined effort on its part to achieve full market pricing. Prices are moving up significantly about every six months, reducing the gap between the consumer price and the real market price. It is encouraging that the government now has the intention to protect low-income households through social programmes and not through direct state subsidies for end-use heat prices. Every care must be given to ensure this process does not stall.

The network of cross-subsidies in electricity and gas, in effect, penalises industry and commerce. This is particularly a problem for a country such as the Slovak Republic which bases much of its economy on foreign trade, and thus needs a competitive industrial sector.

⁴² ECS, *In-depth Review of Energy Efficiency Policies and Programmes of Slovak Republic*, ECS, Brussels, 2001, p. 19.

It was frequently stated that there is a low awareness about energy efficiency. This is understandable in the residential sector, given the level of subsidies keeping end-use prices artificially low. Once the subsidies are removed, the Government will almost certainly see a change in consumer attitudes. To this end, the Government should be ready when the consumer demands more help (technical and financial).

There is general agreement that reform is needed in order to have the user pay and thus reduce the burden on the state or other consumers where there are subsidies or cross-subsidies. These are political realities that often make governments reluctant to pursue price reform. This report cannot fully address the issue of pricing reform because of its complexity. However, what can be expressed is how pricing reform is being addressed.

There is enormous confusion about what is meant by an energy subsidy. The narrowest and perhaps most commonly used definition is a direct cash payment by a government to an energy producer or consumer. But this is just one way in which governments can stimulate the production or use of a particular fuel or form of energy. Broader definitions attempt to capture other types of government interventions that affect prices or costs, either directly or indirectly. For example, a recent OECD study defined a subsidy in general terms as any measure that keeps prices for consumers below market levels, or for producers above market levels or that reduces costs for consumers and producers. In a similar way, the IEA defines energy subsidies as any government action that concerns primarily the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers.

IEA and UNEP, *Reforming Energy Subsidies*, Paris, 2002, p. 9

Many transition countries now have independent pricing commissions or regulatory bodies to either set prices or to establish the methodology to companies for price setting, leaving the pricing commission with the role of final approval. What is important about these organisations is that they develop a transparent process, independent of government control.

Transition countries that have recently set up pricing commissions or regulatory bodies with similar powers include: Albania, Armenia, Bulgaria, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Romania, Slovenia, the Ukraine and Tajikistan.

Progress in Lithuania:

According to Article 15 of the Lithuanian Energy Law, tariffs are designed to cover costs and investments. Energy companies set their own prices following methodologies set by the National Control Commission for Prices and Energy. The prices are then submitted to the Commission for approval. Following the Commission's analysis (for example, the Commission will determine what company costs are eligible), an open meeting is held to allow all interested parties to voice their concerns. If there is no agreement, the Commission unilaterally sets the price.

Several energy regulators in transition countries have formed the Energy Regulators Regional Association⁴³, based in Budapest. The association includes national regulatory bodies from 18 transition economies and Turkey. They have published recent studies on low-income customers and meeting their needs and Development of Tariffs for Efficient and Reliable Electricity Supply at Least Cost. The Association has a Tariff/Pricing Committee to address specific pricing issues⁴⁴.

There are many international efforts currently underway to analyse pricing and subsidies and develop guidelines for correct pricing. The UNECE has a project on reforming energy prices for sustainable development. Part of the project entails reviewing and assessing energy pricing in economies in transition with the aim of elaborating guidelines on energy pricing for policy makers in time for the 2003 Kiev Environment Ministerial Conference. The IEA and UNEP also have a joint project on subsidy reform in terms of promoting sustainable development.

The EBRD is very direct in its views on price reform⁴⁵:

Price reform is the key to improved energy efficiency. However, if they are to be politically and socially acceptable, price increases need to be accompanied by explicit support for poor households. The current policy of across-the-board subsidisation should be replaced with targeted support, which costs less and enhances incentives to reduce waste. Price reforms also need to be complemented by institutional changes. This should involve the progressive introduction of the private sector alongside steps to improve the regulatory and competitive environment. The order in which these reforms are introduced is critical.

In its *Transition Report 2001*, the EBRD was generally pleased with the progress being made in electricity price reform⁴⁶. Those countries lagging behind in reforms

⁴³ In the EU there is the Council of European Energy Regulators.

⁴⁴ See <http://www.erranet.org>.

⁴⁵ EBRD, *Transition Report 2001 Update*, www.ebrd.com.

⁴⁶ EBRD, *Transition Report 2001, London, 2001*, pp.12-13.

included Belarus, Turkmenistan and Tajikistan. In the Transition Report 2001 Update, the EBRD stated that Albania raised electricity prices by 100% in December 2001 “in an effort to encourage greater energy efficiency,” yet cautioned that Estonia had raised tariffs less than previously announced “after intervention by the government, thereby threatening the independence of the power sector regulator”⁴⁷.

While there are reforms, EBRD analysis showed that there was still significant underpricing in the power sector. In only two countries (Poland and Slovenia) did the residential price meet the long-run marginal cost (LRMC). Most countries had residential prices less than half the LRMC. Residential tariffs were lowest in the CIS and South East Europe, with the lowest being in Central Asia (Kyrgyzstan, Tajikistan and Turkmenistan)⁴⁸.

Non-payment for energy services has been a major problem in many transition economies. In the CIS, cash collection for electricity averages about 50% and 65% in South East Europe. It is over 80% in Armenia, Bulgaria and Russia.⁴⁹ The EBRD states that the same holds true for heating, although there are no systematic data available. The EBRD provides some useful insights⁵⁰:

The analysis highlights a number of key policy challenges. They include the need to increase prices, to reduce the cross-subsidy between customer categories and to improve payments discipline. Raising prices and reducing cross-subsidies is reasonably straightforward from a technical viewpoint but may be politically difficult. However, improving payments discipline typically requires the introduction of the private sector, which in term will require far-reaching institutional reform. Meeting these challenges will make investments more economically viable.... Residents will have incentives to regulate heat and power consumption. Industry will have incentives to improve energy efficiency and to move away from energy-intensive production methods.”

The Komi Republic in Russia has a novel approach by publishing the names of non-payers in the local press, as shown next page.

⁴⁷ EBRD, *Transition Report 2001 Update*, London, 2002, p. 35.

⁴⁸ EBRD, *Transition Report 2001*, London, 2001, pp.95.

⁴⁹ *Ibid.*, p. 96.

⁵⁰ *Ibid.*, pp.96-97.

СПИСОК ДОЛЖНИКОВ
ПО ОПЛАТЕ ЖИЛИЩНО-КОММУНАЛЬНЫХ УСЛУГ
НА 1 АВГУСТА 2002 Г.
(ДОЛГ СВЫШЕ 10 000 РУБ.).

ФИО владельца квартиры/комнаты	улица	дом	задол- женность (руб., коп.)
Володина Татьяна Викторовна	Свободы	10а	15744,30
Волков Петр Александрович	Свободы	10а	12280,67
Волгина Ирина Александровна	Свободы	10а	10220,44
Волкова Елена Борисовна	Свободы	10а	12582,68
Глишнев Валерий Михайлович	Свободы	10а	19073,89
Карлова Анна Сергеевна	Свободы	10а	10410,62
Карпов Алексей Борисович	Свободы	10а	10255,40
Коршунов Анатолий Васильевич	Свободы	10а	17327,27
Кутцова Александра Григорьевна	Свободы	10а	11643,70
Максимов Василий Александрович	Свободы	10а	10304,86
Машков Валерий Дмитриевич	Свободы	10а	12008,58
Минусин Александр Валентинович	Свободы	10а	10826,31
Набока Ирина Юрьевна	Свободы	10а	10214,42
Николаев Вячеслав Владимирович	Свободы	10а	11663,04
Николаев Николай Михайлович	Свободы	10а	22081,72
Лазунов Владимир Николаевич	Свободы	10а	10702,81
Рогозина Ирина Владимировна	Свободы	10а	12291,44
Сурова Елена Константиновна	Свободы	10а	11041,88
Трубачев Илья Владимирович	Свободы	10а	16671,62
Усольцев Алексей Александрович	Свободы	10а	12027,34
Чернов Александр Валерьевич	Свободы	10а	11221,22
Чистякова Надежда Александровна	Свободы	10а	11126,00
Чурновский Александр Григорьевич	Свободы	10а	14512,82
Юрин Александр Михайлович	Свободы	10а	12021,22
Яковлев Макс Игорьевич	Свободы	10а	10402,20
Долгачев Юрий Николаевич	Сорвичина	9	11781,29
Полуприказ Мария Яковлевна	Сорвичина	9	10827,00
Полуприказ Ольга Петровна	Сорвичина	9	11606,15
Красавцев Сергей Николаевич	Сорвичина	11	16927,26
Витченко Нина Аркадьевна	Сорвичина	15	16475,66
Кобелев Алексей Михайлович	Сорвичина	22	12994,14
Васильков Валентин Григорьевич	Сорвичина	24	16157,47
Вуйлова Людмила Александровна	Тельтовская	69	19203,00
Колосов Людмила Ивановна	Чкалова	20	10161,26
Турова Илья Леонидович	Чкалова	23	21549,54
Кузнецова Василий Анатольевич	Чкалова	22	14620,14
Рогова Галина Владимировна	Чкалова	22	20202,01
Ситникова Светлана Васильевна	Чкалова	24	11187,10
Шарова Юрий Васильевич	Чкалова	24	28726,93
Володина Владимир Борисович	Чкалова	25	10640,78
Иван Владимирович Николаевич	Чкалова	25	15409,60
Корова Раиса Михайловна	Чкалова	25	12126,22
Герасимов Александр Николаевич	Чкалова	26	10426,97
Лисицкий Алексей Федорович	Чкалова	26	19626,96
Юсупов Леонид Васильевич	Чкалова	26	12023,29
Иван Ирина Юрьевна	Чкалова	27	10206,00
Брилликов Александр Степанович	Чкалова	27	14111,14
Кувшинов Елена Владимировна	Чкалова	27	17202,52
Мартин Олег Александрович	Чкалова	27	14227,84
Насоновский Алексей Михайлович	Чкалова	27	20741,23
Филова Ольга Павловна	Чкалова	27	11297,27
Чумиков Сергей Александрович	Чкалова	27	16662,60
Чумикова Марина Александровна	Чкалова	27	11984,10
Александрова Светлана Ильяновна	Чкалова	33	19264,47
Белая Надежда Андреевна	Чкалова	33	11619,58
Кривошеина Галина Зосимовна	Чкалова	33	21302,82
Мещеряков Вера Николаевна	Чкалова	33	20173,14
Солова Людмила Николаевна	Чкалова	33	12442,97
Сорокин Петр Александрович	Чкалова	33	24285,13
Чиркова Надежда Михайловна	Чкалова	33	17286,94
Иванов Николай Анатольевич	Юнгера	2	12374,22
Шаймуратов Нина Егоровна	Юнгера	2	26959,16
Даркина Фаня Викторовна	Юнгера	6	21319,27
Шенников Анатолий Павлович	Юнгера	6	16026,57
Антонова Татьяна Кудрявцевна	Юнгера	8	10517,17
Левин Андрей Геннадьевич	20 Невельской division	19	17624,90
Горюхова Галина Григорьевна	20 Невельской division	23	11271,50
Николаев Елена Павловна	20 Невельской division	29	17549,50
Борисова Ольга Марковна	20 Невельской division	35	13322,48
Пархоменко Евгений Александрович	20 Невельской division	35	10821,28
Чусовая Наталья Феофановна	Громова	57	11872,18
Турова Илья Романович	Карла Маркса	165	20224,45
Сидорин Павел Викторович	Карла Маркса	172	19443,90
Григорьева Светлана Анатольевна	Карла Маркса	176	14271,86
Дроздова Татьяна Юрьевна	Карла Маркса	176	12182,67
Милославская Ирина Васильевна	Карла Маркса	178	10222,61
Тарасов Сергей Михайлович	Карла Маркса	178	12195,41
Туркин Сергей Степанович	Карла Маркса	178	11195,57
Гурова Валентина Леонидовна	Карла Маркса	180	20119,02
Солова Нина Аркадьевна	Карла Маркса	180	12020,27
Челпан Илья Сергеевич	Карла Маркса	180	20273,29
Ленина Ирина Александровна	Карла Маркса	184	10626,70
Царь Раиса Николаевна	Карла Маркса	184	10751,52
Вуйлова Наталья Александровна	Карла Маркса	201	11113,26
Венгер Светлана Владимировна	Карла Маркса	201	14482,99

See Annex 5 for more details on the status on energy pricing in the region.

- *Promoting investments in energy efficiency*

Analysis undertaken in transition economies has reinforced the need for increased funding for energy efficiency. As the 1998 *Energy Efficiency Initiative* stated, “The vast potential for energy efficiency improvements requires huge investments. As budgetary resources are scarce, public investment may not be sufficient to undertake large energy efficiency initiatives. The full potential will not be exploited if private investment does not materialise.” Because of the business and market climate, investments can be risky. National banking institutions are often either reluctant to invest in energy efficient projects or have more profitable, less risky investments in other areas.

Promoting investments by IFIs, donors and other relevant parties can serve several purposes. First, they can provide the necessary finances. Second, it depends on a certain rigour in business plans and financial planning, ensuring that the applicant has improved the quality of his submission for financing. Third, it sets an example to the domestic banking system that, while there is some risk, there is money to be made in this sector.

The EBRD⁵¹, which was established to help financially support the transition process, set up an energy efficiency unit within its headquarters to promote investments in energy efficiency. The bank was responsible for funding several ESCOs over the past five or more years. It is currently directly financing 11 private ESCOs, one state-owned ESCO and indirectly financing one ESCO through the Energy Efficiency and Emissions Reduction Fund. The EBRD is financing district heating rehabilitation. It is also focusing on public sector energy management programmes and industrial energy efficiency. The bank is moving towards guarantees to domestic banks to help share the risk.

The GEF has 14 projects, managed by the UNDP, which are either planned, approved or under implementation in 13 transition economies. The projects total \$41.36 million. These projects give a strong emphasis to long-term capacity building as well as immediate energy efficiency improvements and reductions in GHG emissions.

The UNEP, with GEF financing, is implementing a global project, Promoting Industrial Energy Efficiency through a Cleaner Production/Environmental Management System Framework, that includes three transition economies (Czech Republic, Hungary and Slovak Republic)⁵². The project objective is to reduce the emission of carbon dioxide by improving energy management practices and identifying investments in SMEs through a structured approach.

⁵¹ See www.ebrd.com.

⁵² See www.gefonline.org.

The World Bank's International Finance Corporation (IFC), which is the private sector banking arm of the World Bank Group, with GEF funding, has an energy efficiency co-financing project in Hungary and it is expanding this concept to a regional project for five transition countries. The Hungarian project includes a guarantee programme, supporting and sharing in the credit risk of energy efficiency financing undertaken by domestic financial institutions. Financing supported by the guarantees has been provided to both end-users directly and to ESCOs, which in turn have used the finances to make investments in end-use facilities.

The EU, through the PHARE and TACIS programmes, has supported the development of funding facilities in several countries. A list of funds, which includes EU-supported projects, was shown above in the section on promoting implementation.

The UNECE has certified seven demonstration zones set up in Russia within the framework of the UNECE EE 21 programme. Several other zones are being prepared for certification. Under a 1995 decision of the Russian federal government, guarantees for investments in energy efficiency are possible in these zones with the possibility of some federal funding.

Bilaterally, there have been some efforts to bring investment into the region. These are sometimes done in conjunction with other programmes, such as the UNECE demonstration zones. Often bilateral efforts relate to improving the market conditions to encourage future investments.

• *Energy Taxes*

Eleven participating countries, including six transition countries, have carbon taxes although only three transition countries have taxes on energy consumption. In a survey done of participating countries, only two (one transition and one industrialised) feel that they have fully internalised the costs of the environment, although 15 state that they have partly done so.

Carbon taxes are seen as an important instrument, especially given the importance of climate change and meeting the obligations under the Kyoto Protocol. There are many efforts to exchange experiences on energy/carbon tax systems. The Energy Charter Secretariat published *Fiscal Policies for Improving Energy Efficiency: Taxation, Grants and Subsidies*, which is important for sharing experiences on the use of fiscal policies designed to improve energy efficiency⁵³. The IEA and OECD have explained the use of tax systems in a variety of publications and countries with carbon taxes have often bilaterally explained their own approaches.

Concerning a small tax on energy prices to be for energy efficiency, there are few examples. The most recent is the Climate Change Levy in the United Kingdom.

⁵³ ECS, *Fiscal Policies for Improving Energy Efficiency: Taxation, Grants and Subsidies*, Brussels, 2001.

Romania has a Special Fund for the Development of the Energy System financed from a share of the development tax included in the tariffs of electricity and thermal energy of all consumers except households. The fund is used for energy efficiency and renewable projects as well as energy production and distribution projects⁵⁴. In Hungary, the proposal for such a tax was rejected by the Ministry of Finance.

• *Other Initiatives*

The *Policy Statement* and *Guidelines* include initiatives related to investments and economic instruments.

To date there is no known efforts to develop an **international standardised code-of-conduct** for energy efficiency investments and liability that would be separate from any World Trade Organisation (WTO) effort⁵⁵. There has also been no international efforts on job creation, other than an EU-wide analysis for the SAVE programme on the impact on employment of energy efficiency measures⁵⁶.

The Working Group of *PEEREA* was established in part to help participating countries comply with obligations under *PEEREA*. In terms of the Kyoto Protocol, there are many bilateral efforts to improve **capacity building for countries to implement JI projects**. A manual on JI/CDM was recently prepared by the Danish Energy Authority⁵⁷.

In 1999, the World Bank approved the **Prototype Carbon Fund (PCF)**. The Fund invests contributions made by companies and governments in JI and CDM projects designed to produce emission reductions fully consistent with the Kyoto Protocol. Contributors in the PCF will receive a pro rata share of the emission reductions, verified and certified in accordance with agreements reached with the respective countries “hosting” the projects⁵⁸. The Fund is restricted to US\$180 million and is scheduled to terminate in 2012.

There is no evidence on international efforts to support **green job creation**, although energy efficiency has been promoted because it is relatively labour-intensive and jobs can be created widely throughout the country.

⁵⁴ ECS, *In-depth Review of Energy Efficiency Policies and Programmes of Romania*.

⁵⁵ Many participating countries are not members of the WTO.

⁵⁶ Association for the Conservation of Energy, *National and Local Employment Impacts of Energy Efficiency Investment Programmes, Final Report to the Commission, Volume 1: Summary Report*, London, April 2000.

⁵⁷ Danish Energy Authority, *Joint Implementation and Clean Development Mechanism Projects, Manual for Project Developers, Version 1*, May 2002.

⁵⁸ See www.worldbank.org.

10. Regulatory Initiatives

A clear, transparent regulatory system is important for the proper functioning of the market. Far from being anti-market, a strong regulatory regime allows for market actors to participate fairly, while ensuring that energy efficiency objectives are maintained. Regulations provide long-term signals that often pricing or other measures cannot. Regulations also allow for an independent approach, avoiding “political” or ad hoc decisions that can bring confused signals to the market.

The *Policy Statement* indirectly refers to regulatory matters through energy pricing reforms and through implementing energy efficiency policies. However, the *Guidelines* are more explicit, providing several recommended actions:

- **that governments scrutinise whether their market structure and utilities are regulated in a way that may ensure a consistent focus on demand side energy services**
- **that energy efficiency should be thoroughly built into regulation and legislation from the very beginning**
- **that governments establish appropriate regulation to promote combined heat and power and district heating as well as small scale and renewable energy**
- **to ensure that best practices in the field of regulation are developed and disseminated**
- **that governments build dynamic elements into regulation.**

• *Market Structure*

As shown in the previous chapter, several transition countries have regulatory bodies that are playing an increasing role in price reform by establishing the conditions for setting energy tariffs. In Poland, for example, the regulator has established three conditions for energy tariffs: to allow energy companies to cover their justified costs of production, storage, transmission and distribution as well as trade of electricity, heat and gas; to protect the customers’ interests against an unjustified price level; and to enable elimination of cross-subsidies⁵⁹. Other countries are doing similarly.

Encouragingly, as shown in Chapter 9, energy regulators from different transition countries are working together to share experiences and do common analysis to solve some of their regulatory issues. This type of transnational co-operation should bring real benefits over the long-term, and probably even in the short-term.

Some countries have legislation requiring energy companies to undertake integrated resource planning on demand-side management, as shown by the two examples below.

⁵⁹ ECS, *In-depth Review of Energy Efficiency Policies and Programmes of Poland*, ECS, Brussels, 2001, p. 15.

From Poland:

According to the Energy Law, development plans prepared by energy companies have to include non-conventional energy and demand-side energy efficiency projects. In addition to environmental costs, energy tariffs (which have to be approved by ERA (the regulator)) may include costs of co-financing of energy companies of DSM projects and development of non-conventional energy sources.

From the United Kingdom:

Both gas and electricity suppliers have a statutory responsibility to provide energy advice to consumers. Under the Energy Efficiency Commitment, gas and electricity suppliers are required to encourage or assist domestic customers to take up energy efficiency measures.

The Utilities Act 2000 transfers responsibility for this programme from the Regulator to the Government. The Government will implement an Energy Efficiency Commitment (EEC) from April 2002 and proposes to increase the scale of the scheme, but continuing its focus on disadvantaged consumers.

The overall target for the Commitment is 62 TWh, with 50% of the energy savings being targeted at customers receiving benefits or tax credit. The EEC expects to cut greenhouse gas emissions by around 0.4 MTC a year by 2005. The Regulator's role will be to administer the Commitment, apportion the overall target to each supplier, determine which energy efficiency measures qualify and the savings attributable, and monitor suppliers' performance against their targets. The Commitment for future years will be reviewed in the light of experience with this first tranche.

• Promotion of CHP and Renewables

The European Union has embarked on a phased in approach to liberalise the electricity and gas markets. There have been concerns that this could adversely affect other areas such as energy efficiency, CHP and renewables. To redress some of these concerns, the EU has given a higher priority to its energy efficiency legislation (see Chapter 4) and programmes. Also, it has approved a renewables directive (Directive 2001/77/EC) on the promotion of electricity produced from renewable energy sources in the internal energy market. The Directive obliges member states to set national indicative targets, to ensure guarantees of origin for electricity from renewable energy sources, and to create conditions for swift administrative procedures. As shown in Chapter 4, there is also a proposed cogeneration directive. Once approved, the Directive would create a framework for promoting CHP based on useful heat demand in the internal energy market. EU legislation also pertains to candidate countries under the *acquis communautaire*.

Several countries use certification programmes to promote renewables. For example, in Denmark, Parliament approved under the Electricity Reform Agreement to implement a national renewable energy quota system for electricity generation using green certificates. “Under the new system, feed-in prices would be used and a minimum fixed price would be guaranteed for renewable electricity. Green certificates would be issued to producers of electricity and consumers would be required to buy 20% of their electricity from renewable energy suppliers by 2003”⁶⁰.

The Netherlands also has a green certificates scheme, whereby all ultimate gas and electricity consumers would acquire a certain number of green certificates, depending on their total consumption. This is a voluntary programme. The certificates could be used to finance energy-efficient technologies and renewable energy projects⁶¹.

• *The Regulatory Process*

The IEA states that the “most important attribute of effective regulation is independence”⁶². It continues:

This, at the very least, means independence from the companies that are being regulated. The regulator should also be independent from day-to-day political control of government ... However, this does raise some potentially difficult issues about accountability of the independent regulator. But at the same time it removes difficult issues about direct political interference and lack of neutrality and transparency, which can discourage investment in the sector as well as economically efficient behaviour.

... an independent regulator provides some assurance to market participants, especially new entrants, that regulatory rules will be oriented towards the efficiency and performance of the sector. It also engenders confidence that rules will be applied and enforced in a way which is non-discriminatory, transparent, consistent, stable and without day-to-day interference from government. In particular, “the same rules for everyone” is an objective which is best applied from a position of independence.

The IEA study concludes⁶³:

Reform and market liberalisation is an ongoing process and it is in its early days. There is a long period of transition from regulated monopolies to properly functioning markets. It is important to be aware of the various elements of a transition regime and to frame good policies for this. These elements include the role of general competition law, the issue of stranded costs and pricing issues, among others. The basic framework for regulatory reform

⁶⁰ IEA, *Energy Policies of Denmark, 2002 Review*, OECD, Paris, 2002, p. 59.

⁶¹ IEA, *Energy Policies of the Netherlands, 2000 Review*, OECD, Paris, 2000, pp.42-43.

⁶² IEA, *Electricity Market Reform, An IEA Handbook*, OECD, Paris, 1999, p. 57.

⁶³ *Ibid.*, p. 98.

must meet the needs of transition, establishing non-discriminatory and transparent adjustment mechanisms, as well as having the capacity to adapt and evolve to deal with the longer term, when market liberalisation has settled down.

In this sense, both the industrialised countries and the CEE and CIS countries are all in the regulatory transition process.

11. Development and Deployment of Energy-Efficient Technologies

The accelerated deployment of energy-efficient technologies is necessary for achieving the cost-effective potential for energy efficiency. While there are many energy-efficient technologies available in the market, there is a continuing need for increased diffusion of the available technologies, together with the continued improvement of such technologies. There is one obligation from the *Policy Statement* and 10 recommendations from the *Guidelines* that pertain to technology development and deployment.

From the *Policy Statement*:

- **Promoting energy-efficient and cleaner technologies by transforming domestic and international markets**

From the *Guidelines*:

- **that governments support the efforts in technology development and market penetration**
- **that governments establish and increase funds for research, development and demonstration in energy efficient technologies**
- **that energy labelling and standards regarding minimum energy efficiency, targets for advanced technologies, etc. should be settled internationally**
- **to develop international technical standards and norms**
- **to develop guidelines and requirements internationally to motivate action opportunities for installing advanced technology on the basis of 'best practice' projecting in the industrial sector, and promote the implementation of energy audit schemes in all countries**
- **that utilisation of technology procurement schemes as i.e. 'golden carrot' and the Swedish programme should be forwarded on an international scale**
- **that the use of building codes and building energy performance certificates should be implemented widely in all countries**
- **to promote technology transfer from more advanced manufacturers to markets with more traditional products, e.g. by creating joint venture production in the new markets**
- **to promote dissemination internationally of information on best experience with district heating and cooling infrastructure and**

combined heat and power (CHP) stations, and of small scale and renewable energy.

- **to strengthen international co-operation on combined heat and power and district heating and cooling**

The range of commercially-available energy-efficient technologies is expanding in all end-use sectors and the transformation sector. Throughout this report, initiatives, including energy price reform, have been described as encouraging end-users to invest in more efficient technologies. However, some technologies have been on the market for years - such as compact fluorescent lights (CFLs) and still have not achieved the expected market penetration. There has been an emphasis at looking at market dynamics to give a “boost” to transform markets to make the technologies more “acceptable”.

Many technologies are still in the R&D and demonstration stages. Much of the activity is in improving existing technologies. There are very few “new” devices, although the heat pump clothes dryer, described below, may be considered as one.

There is a growing interest, led by the IEA, in reducing stand-by power, since standby energy use is responsible for about 1.5% of residential energy use in OECD countries ⁶⁴. There are also efforts underway to more widely deploy high efficiency distribution transformers, because more efficient transformers can save 100 - 150 TWh/year of electricity in OECD countries, equivalent to more than 70 million tonnes of CO₂ emissions, according to the IEA ⁶⁵. The existing stock of distribution transformers is ageing, with many transformers over 40 years old and it is probably even higher in transition countries. In several OECD countries, the age profile of the power transformer stock is widely regarded as a cause for concern. High-efficiency transformers are available and already used by the utility industry. Producing energy-efficient transformers is not a technical challenge and the technology is available in all OECD countries. Despite the benefits of energy-efficient distribution transformers, it is a challenge to convince customers that, although the initial price associated with these transformers is higher, the overall cost using them can be lower. The IEA is considering an international initiative to promote such transformers.

- *Promoting energy-efficient and cleaner technologies by transforming domestic and international markets*

An efficient market is one of the most effective instruments in promoting energy efficiency. However, there are obstacles affecting the market from properly functioning ⁶⁶. This is a problem in industrialised countries but it is particularly true in

⁶⁴ Also see IEA, *Things That Go Blip in the Night, Standby Power and How to Limit It*, OECD, Paris, 2001.

⁶⁵ Communication with Mr. B. Lebot of IEA, October 5, 2002.

⁶⁶ For a good discussion on barriers, see Steve Sorrel et al., *Barriers to Energy Efficiency in Public and Private Organisations (Barriers)*, SPRU, Environment and Energy, University of Sussex, September 2000.

transition economies where market principles and practice are less mature. Effective energy efficiency strategies often must go in tandem with market creation and reform within the economy as a whole and they are linked to pricing reform. There are a number of elements that help the market develop. This includes supporting market actions through training, information and various other forms of support. However, there are several specific steps that government energy efficiency plans can do to help. There have been some innovative initiatives developed both nationally and internationally that are important to discuss here, since many other initiatives are discussed elsewhere in this report.

Market transformation can include many components. The European Commission's *Action Plan to Improve Energy Efficiency* has one of its objectives:

To establish the foundation for a continuous and long-term improvement in energy efficiency through the use of market forces and market transformation, with accelerated development and diffusion of new energy-efficient technologies.

Two points are important: developing energy-efficient technologies and diffusing them.

One of the most innovative initiatives over the past decade has been technology procurement, developed in Sweden. This was highlighted in the *Energy Efficiency Initiative* in 1998. However, what is important is that there is an interest in expanding this to an international initiative. In 1999, the European Commission and *UNIPEDE/EURELECTRIC* sponsored a European-wide initiative to promote, in conjunction with national energy agencies and lamp manufacturers, compact fluorescent light bulbs (CFLs). More recently, the European Commission launched its Public Procurement Initiative. The Action Plan calls for the European Commission to take the lead launching a large EU-wide pilot project to develop harmonised public sector guidelines for constructing, purchasing, leasing and maintaining energy-efficient and environmentally sustainable buildings and equipment by launching its own public buildings initiative for energy-efficient Commission buildings, soon to be followed by suggestions for similar initiatives for the buildings of the European Parliament and the Council. The *Action Plan* also calls for co-operative technology procurement by a competitive tendering process to specify and develop new energy-efficient technology.

NOVEM in the Netherlands is currently promoting the Heat Pump (HP) Clothes dryers. NOVEM is giving a rebate of 160 Euros to consumers purchasing HP clothes dryers (the only dryer to be labelled "A" under the European labelling scheme). There are two manufacturers of this very advanced energy efficient technology. But the dryers remain quite costly.

In the Baltic Region, Joint Action 5 of Baltic 21 on the "Procurement of Technologies for a Sustainable Development" is aiming towards transfer knowledge of procurement

of technologies and actual performance of large-scale procurement of sustainable technologies in the Baltic Sea Region. The work is carried out in a working group with representatives from seven countries - Estonia, Latvia, Lithuania, Poland, Russia, Sweden and Denmark. So far the working group has explored the potential of successful international procurements in the bio-energy field (for example biomass boilers, combined heat and power production (CHP) and vehicles for alternative fuels). The choice of bio-energy technologies was based on the result from an initial screening of technologies suitable for procurement previously performed in the countries where the demand on such technologies was obvious.

The development of energy-efficient technologies has mainly taken place in recent years in the industrialised countries. There have been major efforts to increase R&D in OECD countries (see Chapter 7). The EU has a major framework programme to promote R&D and demonstration. The OPET network provides a range of services to assist companies, organisations and individuals adopt new technologies and applications and introduce proven best practices. The OPET network, funded through the EU's research programme, includes more than 100 organisations within the EU, the accession countries, as well as Norway and Iceland.

The Global Environment Facility (GEF) has taken an important role in market transformation in several transition economies. One project described in the *EEI* was the Poland Efficient Lighting Project (PELP) that promoted energy-efficient lighting and accelerated the development of the energy-efficient lighting market in Poland. Since 1998, the GEF funded the Efficient Lighting Initiative (ELI) in several transition economies, including the Czech Republic, Hungary and Latvia. The programme was designed to accelerate the penetration of energy efficient lighting technologies. GEF has funded several other energy efficiency projects in transition economies. Currently, there are 14 such projects that are either planned, approved or being implemented.

One of the innovative initiatives in EU countries since 1998 is the creation of the Carbon Trust in the United Kingdom and its programmes to support energy efficiency for business and the public sector ⁶⁷. The Carbon Trust ⁶⁸, with the revenue from the Climate Change Levy, provides support to business and the public sector. It implements Action Energy (the former Best Practice Programme) and the Low Carbon Innovation Programme. Action Energy provides information, advice, practical help and financial support to help businesses (including SMEs) reduce energy costs. The Low Carbon Innovative Programme provides support to accelerate the development of clean technologies, including energy-efficient technologies.

The **Climate Technology Initiative** (CTI), created in 1995, helps strengthen the indigenous capacity of transition economies (and developing countries) to employ

⁶⁷ Note that there were several before Aarhus (see *Energy Efficiency Initiative*). Of particular note are the Energy Saving Trust in the UK and the Electricity Saving Trust, established in 1997, in Denmark.

⁶⁸ See www.thecarbontrust.co.uk.

clean technologies and best practices. It accomplishes this primarily by acting as a facilitator between governments, industry, NGOs and other stakeholders. 23 OECD countries and the European Commission created it to help meet their commitment to technology transfer under Article 4.5 of the Convention ⁶⁹.

The Clean Technology Initiative's main activities

- Assist transition countries design and implement Co-operative Technology Implementation Plans and technology needs assessments;
- Collaborate with the UNFCCC, UNDP, and others on effective methods for technology transfer;
- Support training and capacity building programmes;
- Accelerate collaborative R&D programmes through the establishment of world-wide frameworks and expert networks;
- Recognise leaders in technology transfer through the CTI Awards Programme.

In recent years the CTI has sponsored several workshops focusing on transition economies. Relevant topics include capacity building for CEE/FSU countries on climate technologies and energy efficiency, effective means of transferring climate technologies and practices, regulatory framework for energy third party financing in Central Europe and climate-friendly technologies and the IEA Finance Forum.

• *Technology Development*

Technology development receives a high priority in western countries but there is little evidence of much activity in transition countries. Nevertheless, transition countries can benefit from western advances. The European Union is particularly active through its Fifth (1998-2002) and Sixth (2002-2006) Framework Programmes on R&D. Energy efficiency is one of the priority areas under the theme of sustainable energy systems. The Fifth Framework Programme had the theme of energy, environment and sustainable development. Accession countries can participate.

The objectives of EU funding in energy efficiency R&D are ⁷⁰:

- **Buildings** - reducing EU energy requirements by 30% by 2010 and 50% in the longer term are the research aims. Currently, the built environment in the EU accounts for about 40% of the total energy requirements.
- **Transport** - improving the energy and environmental performance of vehicles and the related infrastructure.

⁶⁹ See www.climatetech.net.

⁷⁰ <http://europa.eu.int/research/energy/>

- **Industry** - developing and demonstrating processes and process control technologies aimed at securing a reduction in energy demand in the manufacturing and agriculture sectors.

The IEA is also active in promoting technology development through its Implementing Agreement Programme, many of which pertain to either developing energy efficient technologies or disseminating information on energy-efficient technologies and techniques ⁷¹. There are also several implementing agreements related to renewables.

There is further discussion on R&D for technology development in Chapter 7.

- *Cogeneration and District Heating*

District heating is a major issue in transition countries because of the high penetration in the heat market. District heating has also been of growing interest in industrialised countries, although the high penetration is mainly in Scandinavia. The problems in transition economies are well documented but not sufficiently solved. Distribution losses in transition countries are in the range of 18-20%, while the best practice in Nordic countries has losses of 6-7%. Reliability of supply is often a major problem and can have devastating impacts in cold climates such as in northern Russia. In transition countries, tariffs are often still below cost recovery, meaning that there is little cash for modernisation. Regardless of the level of tariffs, the rate of non-payment is often very high. There is growing interest by many householders in switching individual boilers because of their frustrations with the DH systems.

From Germany:

Electricity produced in combined heat and power plants (CHP) accounts for about 12% of total electricity supply. The Cogeneration Act of May 2000 guaranteed a minimum feed-in price for electricity produced by CHP plants operated by public utilities. This act was replaced by the Cogeneration Act that came into force in April 2001. It allows CHP operators, who are feeding electricity into the public transmission network, to receive bonus payments in addition to the revenue at market prices, provided that requirements for the power-to-heat ratio are fulfilled. No direct subsidies are given to CHP. Whatever financial support to CHP is needed should be on a declining rate and eventually phased out. Furthermore, possibilities for connecting more consumers to existing district heating networks should be explored to improve their competitiveness.

Source: IEA, *Energy Policies of Germany, 2002 Review*, OECD, Paris, 2002

⁷¹ The IEA has end-use implementing agreements on advanced fuel cells, advanced motor fuels, building and commercial systems, emission reduction in combustion, demand-side management, district heating and cooling, hybrid and electric vehicles, energy storage, heat pumping technologies, heat transfer and exchangers, advance materials for transportation, process integration, pulp and paper and superconductivity. There are also a number of information centres related to energy efficiency. See www.iea.org.

CHP has also been promoted because of its high efficiency improvements and low emissions. The potential for the expanded use of CHP in most participating countries is high and the EU is developing a new directive to promote CHP.

The *Guidelines* focussed on distribution of information on best practice and on strengthening international co-operation. In both cases, much has happened. PHARE, TACIS, the IFIs and many bilateral projects have undertaken analyses and provided funding to help modernise the technical and management systems. The EBRD has the district heating sector as one of its priority funding areas. There is also international co-operation, as seen above, through such regional bodies as Baltic 21.

Europe-wide industry associations such as Cogen-Europe and European Heat and Power are playing an increasing role and many companies in transition countries are members.

Nevertheless, given the state of much of the existing infrastructures, the cost of modernisation and the need for more management reform, much more needs to be done.

12. International Initiatives

The *Policy Statement* and the *Guidelines* make several references to international co-operation. As shown throughout this report, the international dimension is significant - if not fundamental - to the development of national and regional approaches to energy efficiency.

The Aarhus Conference of Environment Ministers was an important milestone in bringing energy efficiency to a large international stage. Since then, international co-operation has expanded immeasurably. Whether it is the Aarhus Initiative, the Energy Charter's *PEEREA*, the UNFCCC process, the UNECE, the other UN bodies, the IEA, the European Union or regional efforts such as Baltic 21, the international dimension has grown in importance.

What is obvious is that the international co-operation is extremely important for all parties. The international co-operation is not east-west. It is also west-west and east-east. Co-operation is not one-way. The situation in transition economies has made OECD countries analyse more carefully what has worked for them and why. Also, market liberalisation is taking place now in many OECD countries. This is itself a bold experiment that is requiring a sharing of know-how and experience.

While many obligations under the *Policy Statement* have an international focus, there are two obligations specific to international initiatives. The *Guidelines* also has a detailed annex listing possible actions that reflect the recommendations throughout the *Policy Statement* and *Guidelines*.

From the *Policy Statement*:

- **Promoting international exchange of experiences**
- **Strengthening international co-operation**

Exchange of experience amongst countries has proven valuable. One of the main fora, over more than two decades, has been the IEA that provided a structured approach for its member countries to share their experiences and lessons learned. Throughout the 1980s, in particular, the UNECE organised several conferences for industrialised and former planned economies to meet on specialised topics. Since the early 1990s, these exchanges have expanded and have become more influential on national energy efficiency policies and programmes. At the beginning of the transition process, many of the exchanges centred around what it means to have an energy efficiency policy that is driven by market conditions. For transition countries this was a new concept. For industrialised countries, who are trying to provide lessons from their own experiences, it often meant a complete reassessment of their own approaches to better understand what worked and why. Plus, in industrialised countries, the 1990s meant a greater acceleration of deregulation of the energy sector that meant that their own energy efficiency policies were evolving in a dynamic situation. Thus, it was a complex period for all, given them even more reason to share experiences, in order to find more optimal solutions.

Exchange of experiences can occur in many ways. Since the implementation of PEEREA, a working group has provided an important forum for discussion. There is the possibility of direct contact through meetings, workshops, seminars and conferences. The exchange can take place through publishing studies on specific topics. Increasingly, the Internet is used, giving analysts in the far reaches of the region the same access to information as those in the centre of Europe. Also, there is the growth of networks of information centres (such as the OPETs described above) or specialised institutions such as the Baltic Clearinghouse. The exchange can also be targeted to specific audiences such as municipalities or on specialised areas such as cogeneration.

It is useful to mention a few of the major initiatives that have started or substantially changed since 1998 ⁷².

- **WORKING GROUP OF PEEREA**

Since its creation in 1998, the Working Group of *PEEREA* has actively promoted an exchange of experiences amongst its participating countries. There are many ways this has happened. First, there are both standard and in-depth reviews of energy efficiency policies together with energy and environmental policies and programmes. Altogether there have been seven in-depth reviews ⁷³. These are peer reviews with the

⁷² Several others are cited throughout the report.

⁷³ There have been in-depth reviews of energy efficiency policies and programmes of Bulgaria, Estonia, Hungary, Lithuania, Poland, Romania, Slovak Republic and Turkey. See www.encharter.org.

reviewing teams made up of representatives from selected participating countries. Recommendations are endorsed by all participating countries at the Working Group of *PEEREA* and then at the Energy Charter Conference, the most senior body within the Energy Charter.

Since its creation, the Working Group has had an ambitious work programme to deal with many of the pressing issues related to promoting energy efficiency. In particular, over the past two years, the Working Group addressed a number of these issues through the following studies, all four of which have been published by the ECS:

- Advice on Developing an Energy Efficiency Strategy
- Financing Energy Efficiency - An Application Manual
- Impacts of market liberalisation on energy efficiency policies and programmes.
- Fiscal Policies for Improving Energy Efficiency

The Working Group has also undertaken work on other issues such as the role of energy agencies, third-party financing/energy contract management, integration of energy efficiency into other economic areas, district heating and cogeneration. Some of these will be published in the future. The Working Group has also invited representatives of NGOs, industry groups/associations, international organisations and IFIs to discuss energy efficiency issues with the WG.

• **EUROPEAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY (ECEEE)**

The ECEEE ⁷⁴ is active in promoting energy efficiency in Europe. It meets every two years for a study session on aspects of energy efficiency. For the 2003 ECEEE Summer Study there will be one panel on energy efficiency: a strategic choice for Europe. This panel also looks into the stakes and priorities of energy efficiency in an enlarged EU and international co-operation with developing countries and countries in transition.

• **CLIMATE TECHNOLOGY INITIATIVE (CTI)**

As shown in Chapter 11, the CTI is active in promoting energy efficient technologies through studies, workshops, its website ⁷⁵. The CTI is a global initiative but has targeted many of its initiatives to CEE and CIS countries.

• **UNEP AND IEA**

Recognising the importance of energy subsidy reform to achieve sustainable development, UNEP's Division of Technology, Industry and Economics and the International Energy Agency have jointly conducted a series of regional workshops.

⁷⁴ See www.ecee.org.

⁷⁵ See www.climatetech.net.

- **USAID**

Through its new Municipal Network for Energy Efficiency (MUNEE) programme the United States Agency for International Development (USAID) has created a new programme to improve a city's energy efficiency. MUNEE seeks a relatively low-cost way to disseminate positive energy efficiency experiences around the region so cities can learn from each other how best to improve their infrastructure and encourage their citizens to use energy more wisely. The goal of MUNEE is to design and implement innovative energy efficiency policies and identify barriers to their successful adoption. MUNEE is strengthening the capacity of regional and municipal stakeholders to develop and attract financing for energy efficiency projects in the countries of Central and Southeastern Europe, the Balkans, and the former Soviet Union ⁷⁶.

- **THE COUNCIL OF THE BALTIC SEA STATES**

The Council of the Baltic Sea States has been active in the field of energy efficiency. The Council set up the Baltic Sea Region Co-operation (BASREC) in 1999. The Baltic Energy Efficiency Group (BEEG) is one of four working groups established by the energy ministers. The group consists of governmental officials from all countries in the Baltic Sea Region, including the EC ⁷⁷. The Baltic 21 Energy Sector action plan was set up following the Ministerial Meeting in Helsinki in 1999. There is also the Baltic Sustainable Energy Cities network, consisting of 12 cities in the region. These cities are developing sustainable energy futures.

The group has assessed energy efficiency options and potentials with a focus on cogeneration and district heating. BEEG prepared a number of country studies and, in parallel, the IEA has elaborated a comprehensive report on energy efficiency in the Baltic Sea Region. In 1999, representatives from all regional countries discussed energy efficiency options, also identifying possible conclusions and recommendations.

BASREC published a review of activities of all international organisations involved in the region in order to avoid duplication and to improve co-operation ⁷⁸.

- **UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE)**

The UNECE has undertaken 12 in-depth environmental performance reviews of transition countries since 1998 ⁷⁹. Energy issues are included in the reviews. Reforming energy pricing is an important area for the UNECE and it set up a Task Force on Environment and Energy for the period 2002-2005 that will develop non-legally binding guidelines on reforming energy prices to support sustainable energy development.

⁷⁶ See www.ase.org/programs/international/munee/index.html

⁷⁷ See www.cbss.st/basrec

⁷⁸ Solpros, *Review of Activities of International Organizations in the Baltic Sea Region in Energy Efficiency and CHP*, Draft Final Report, November 2000.

⁷⁹ Plus a follow-up report on another country that was reviewed in 1997.

The UNECE's current work programme related to energy efficiency includes:

- of guidelines for improving energy conservation and efficiency, in particular, in countries with economies in transition;
- networking and information exchange, including through world-wide web ⁸⁰;
- development and implementation of energy efficiency demonstration zones in economies in transition;
- institutional capacity building and training activities in business planning, financial engineering and project development;
- assistance in securing financing for energy efficiency projects;
- rational use of energy and water resources in Central Asia under the auspices of the Special Programme for Economies of Central Asia - SPECA; and
- exchange of views and technical information on the efficiency of gas equipment and appliances.

⁸⁰ See www.ee-21.net.

PART III TOWARDS AN ENERGY-EFFICIENT FUTURE: THE RIGHT DIRECTION

13. Critique

Part II of this report documented the progress that has been made in addressing the 1998 Aarhus Declaration together with its accompanying *Policy Statement on Energy Efficiency* and *Guidelines on Energy Conservation*. Good progress is being made; however, there is no room for complacency. Some of the first steps have been taken but there are many more ahead. It is important to assess what this implies.

Overall, progress is relatively modest. Recent analysis by the European Environment Agency (EEA) stated ⁸¹:

The energy intensity of the EU economy decreased by 0.9% per year during 1990-99, with little apparent influence from policies on energy efficiency and energy saving. The slow pace with which energy intensity decreased is due to a combination of a generally low priority for such policies, abundant energy supplies and low fossil fuel prices. Only the substantial reduction in Germany, helped by energy efficiency improvements, prevented an increase in overall energy intensity.

This was reinforced in the EC Green Paper *Towards a European Strategy for the Security of Energy Supply* ⁸², which noted strong progress throughout the 1970s and 1980s but mediocre results in the 1990s.

Now, however, improved energy efficiency is arguably more important than ever because of the obligations under the Kyoto Protocol and the need to find every cost-effective option available to reduce GHG emissions. That is the impetus that energy efficiency policies need at the present time. But, as shown in the improvements in energy intensity as shown by the EEA analysis and Chapter 3, achieving the improvements is not simple and straightforward.

This report has documented what countries are doing to meet their Aarhus obligations. From the examination several issues come forward.

- *Priority for Energy Efficiency*

Receiving effective priority and commitment for energy efficiency at government or political levels is a constant concern in all countries at various times, as the perception for the need for improved energy efficiency varies. Integrating energy efficiency into other economic and social areas, however, can bolster the priority for energy efficiency as its benefits for other policy areas become better understood. Yet setting

⁸¹ European Environment Agency, *Energy and Environment in the European Union, Environmental Issue Report No. 31*, EEA, Copenhagen, 2002, p. 15.

⁸² COM (2000)769 final

the priority can be difficult, particularly in many transition countries, where there is a myriad of complex issues for governments to deal with simultaneously.

The level of priority can manifest itself in many ways. For example, several transition countries stated that they have had many difficulties obtaining an effective legal basis for energy efficiency. Often the draft laws or strategies remain unapproved for years and even when approved, the necessary funding is lacking. The Polish Energy Agency (KAPE) took five years to finally be approved, including three years in parliament. This severely affected programme development and implementation in Poland throughout the 1990s.

There are often problems convincing other ministries to make energy efficiency much of a priority. There are many reasons for that and policymakers in ministries responsible for energy efficiency need to more convincingly articulate the benefits that derive from improved energy efficiency. There is also a need to improve dialogue amongst ministries that have involvement in energy matters. Some countries have established inter-ministerial committees to help overcome some of these problems. Such institutions can prove invaluable to the integration process in the long term.

Often there is a lack of awareness in the general public and the business community of the benefits of improved energy efficiency and so they do not pressure governments for such initiatives. It is often argued that industry has higher priorities but it has been found that energy efficiency is one of the most effective ways of reducing costs, improving quality of their product and becoming more competitive, nationally and internationally. This is often a complaint made by small and medium sized companies which have little in-house technical expertise and where energy costs represent a relatively small percentage of overall costs.

• *End-use Energy Pricing and Subsidies*

Overall there has been much progress in price reform throughout transition countries. Almost all countries have price reform but the process is far from complete. In few cases does the EBRD see utility pricing reflecting long-run marginal costs so far, even though several are moving in that direction. On the whole, the record is poor, particularly with respect to heat prices. Independent regulators and/or price commissions are playing an important role in “de-politicising” price setting. A review of the national questionnaires for PEEREA shows that there are now fewer subsidies and cross-subsidies even though too many still exist. The EBRD raised a concern that there appears to be backtracking in countries such as Estonia (see Chapter 6).

Financing subsidies can create difficulties for government treasuries, where the funds could be used for more productive purposes. It is a particular problem in countries where national governments have put the burden on local authorities to provide the subsidies, as is the case in Hungary for heat supply. Subsidies often arise by using the price mechanism to achieve social goals (i.e. provide affordable heat and electricity to the poor and elderly), thus leaving the utilities often cash strapped. Yet, there are effective alternative solutions to deal with social concerns.

It is heartening to see major international efforts to help on price and subsidy reform. Of note are the studies by the IEA/UNEP on subsidies and the UNECE non-binding guidelines for decision-makers on reforming energy prices to support sustainable energy development.

• *Policy Development*

There has been significant progress since 1998 in developing energy efficiency policies. In western countries, the energy efficiency strategies are often identified with climate change and sustainable development strategies. The environment is less a driver in transition countries compared to concerns about energy security, reducing energy bills, improving energy services and sometimes keeping donor countries satisfied. Meeting the *acquis communautaire* is an important motivator for EU candidate countries.

Several countries have energy efficiency policies integrated into their overall energy strategies. This can be beneficial if energy efficiency is given adequate priority.

Few countries have quantitative objectives for energy efficiency. Some refer to the potential for energy efficiency, although that should not be considered the target. Some countries refer to reductions in energy intensity which can be a useful target, although it has to be understood that it is also not a target for energy efficiency. Most countries have targets for GHG emissions reductions because of the UNFCCC and the Kyoto Protocol. Most climate change strategies to address the Kyoto targets include, or at least refer to, energy efficiency improvements.

Encouragingly, there is a growing interest in having regional and local energy strategies. More effort needs to be made to help local authorities prepare their plans. There are several multilateral and bilateral projects to help in their development. This should be expanded.

• *Implementation*

A successful approach to energy efficiency depends on well-designed programmes and a strong, effective delivery mechanism. Most countries have set up national energy agencies (and many have regional or local ones as well) to help deliver programmes. Many of these were initially supported by multilateral and bilateral support. However, in many cases in transition countries, in particular, there have been inadequate financial resources to properly staff the agencies or to deliver programmes. This has led, in some cases, to fully staffed organisations underutilised. Conversely, in other cases, there have been understaffed groups with too much to do. Understandably, long-term base financing is the most effective, but that has often been difficult even in western countries.

Eventually, there needs to be a flexible approach with core services ready to adapt to new funding, new international projects or new government priorities and programmes. For example, Hungary has had an energy centre for about a decade. It

merged a few years ago with an energy statistics group to form a larger agency, although still fairly small. Then, unexpectedly, the Government announced a major new subsidy scheme and the centre had to more than quadruple in size. In 2001, the centre had to administer more than 5000 applications - a task difficult for any organisation. While this may be an extreme case, what this shows is the need for effective administrative procedures to be able to cope with changing circumstances.

Some countries have difficulty developing programmes, often considering that individual projects are programmes. There is a need for a greater sharing of ideas and experiences in programme development and delivery. This could include exchange programmes for staff to work in a partner country for a limited period of time in order to broaden their understanding of programme delivery.

Good implementation also needs an effective monitoring and evaluation system built into the strategy. This is, by and large, poorly done so far.

- *Institutional Capability and Capacity Building*

To be effective, energy efficiency requires a broad-based effort throughout all parts of the economy, and not only being the responsibility of national governments. Improvement of energy efficiency requires individual energy users (such as individual households, schools, hospitals, local authorities, and industries) to take action, through behaviour changes and/or investing in energy-efficient technology.

National energy efficiency agencies have a clear role to play in providing those initiatives to consumers to overcome their lack of awareness or their inertia to take action. Such agencies are important in policy development and analysis (together with governments), and in national programme implementation. Nation-wide action should also be accompanied by regional and local action, regardless whether the country is a centralised or federal. Furthermore as seen in the United Kingdom, energy companies can also play a key role.

In many countries, while general policy frameworks and objectives are defined at national level, many of the areas of competence of an energy efficiency institution are devolved to the states/provinces (in federal systems of government, such as in Germany, Austria or Russia) or to the regions (as in Spain or Italy). In these cases the state or the region is an appropriate body to organise programmes for the promotion of energy efficiency and renewable energy, and thus require an energy efficiency institution in order to develop and implement programmes. Just as at the national level, where national institutions play a key role in the effectiveness of national energy efficiency policy, so at the regional level the existence, and the effectiveness, of a regional energy efficiency agency is a key element in the effectiveness of the energy efficiency policy in the region.

Cities or sub-regions are the other scale at which energy efficiency actions can be effectively implemented, and at which energy efficiency institutions can make an important impact on energy use at the local level. Often, local authorities do not have adequate capacity and financing to design programmes.

Agencies should have the necessary human resources - the skilled staff capable of undertaking the wide ranging tasks implied by an energy efficiency promotion institution - staff needs skills in such areas as communication, motivation, technological competence, and economic competence. This requires staff with different skills and motivations than those of a classical state administration. State energy efficiency organisations in transition countries have tended to be strongly 'engineering led' with a focus on the technology side and often weaker in communication, promotion, and awareness-raising.

The Commission was quite critical of many EU candidate countries for the inadequate capacity within their administrations to deliver programmes. Yet, there are encouraging signs. Many of the multilateral and bilateral programmes have supported capacity building through twinning and other forms of training and exchanges of experience.

• *Financing Energy Efficiency - Projects and Programmes*

Of the market barriers identified in transition countries in particular, the one that raises the most concern is the lack of finances for undertaking energy efficiency measures. There are inadequate funds for consumers to take individual actions and there is a lack of resources for governments to finance various types of programmes.

Many transition countries state that domestic banks are often reluctant to invest in energy efficiency projects due to concerns about perceived risk. There are a variety of reasons for this reluctance. Restructuring policies often had to be implemented before financial institutions were willing to invest. In some cases, the banking sector itself is still in a state of reform and thus reluctant to venture into lending for energy efficiency projects. Foreign investment laws had to be created or modified in order to be more attractive to foreign investors. These were issues related to all investments and not simply related to energy efficiency. Yet, there are solutions such as revolving funds, using domestic banks, or guarantees from IFIs such as the EBRD and IFC. There are some good examples, but they need wider application.

In many cases, domestic banks had little experience in energy efficiency investments and were more interested in investing in business capacity expansion rather than cost reduction. In many other cases, the projects brought to the banks did not have good business plans and the banks were probably right in not funding the proposals. The ECS published a financing manual to help overcome some of those concerns⁸³. There have also been, and continue to be, many bilateral and multilateral training projects in financial engineering. The EBRD can also mobilise technical assistance from donors to help develop plans.

⁸³ ECS, *Financing Energy Efficiency, Application Manual*, ECS, Brussels, 2000.

Even when business plans were prepared, often projects such as for modernising district heating systems had very long payback periods that concerned banking institutions. There are several related problems that need addressing including the low end-use price for the heat and the high rate of non-payment, making the financial viability of the district heating company and its projects in question.

Another concern is that energy efficiency projects are normally too small for traditional funding from international financial institutions such as the World Bank or the EBRD. In these cases, often there is a need for bundling or innovative approaches. Project bundling is a way of exploiting economies of scale in the transaction costs of projects. The IFIs have developed a range of products. The EBRD has been particularly active in financing ESCOs, which in turn invest in energy efficiency projects. However, it has other options. For example, it can finance public sector projects through sovereign or non-sovereign financing and can mobilise technical assistance from donor funds for audits. For industry, there can be corporate loans, off balance-sheet financing, full or partial guarantees of commercial bank lending and leasing. For DH systems there can be debt, equity or guarantees as well as technical assistance.

Yet, the EBRD, for example, is concerned because they cannot raise enough interest in their products, especially in the public sector. The bank knows there is a need for financing but, obviously, having it available through such as IFIs is not sufficient.

Another financing issue concerns the need for governments to fund national energy efficiency programmes. There are too many examples of funding shortfalls hindering the full implementation of programmes. As for funding for national programmes, it is encouraging to see the Szechenyi Plan in Hungary that provided significant increases in funding for energy efficiency investments in 2000. This is important because it is important for countries to find their own domestic sources of financing of core programmes, supplemented by multilateral sources.

• *Effects of Liberalisation*

A recent study undertaken by the Energy Charter Secretariat on the effects of liberalisation on energy efficiency ⁸⁴ found that, from a macroeconomic point of view, the advantages of liberalisation are mainly attributable to improved utilisation of fixed assets (such as generation plants and grids) which lead to economically correct investment decisions, and to reduced consumption of resources within the overall system.

⁸⁴ ECS, *Impacts of Market Liberalisation on Energy Efficiency Policies and Programmes*, ECS, Brussels, 2001.

Introduction of competition and consumer choice will immediately transfer value from monopoly suppliers to the consumers through reduced end user prices. Lower prices are associated with higher demand in spite of a short-term inelasticity of demand. When energy prices fall, consumers are less likely to initiate energy efficiency investments due to poorer project economics. Understandably, fewer new technologies are economical when energy prices are low. As well, lower energy prices fuel demand for energy.

A potential challenge to energy efficiency is the uncertain price environment caused by liberalisation. Price risk may deter consumers from investing in energy efficiency technologies until the general understanding of markets and market mechanisms mature. This transitional challenge is exacerbated by consumer expectations, which, in a normal case of liberalisation, are biased towards the prospects of immediate price reductions. Without adequate information about the long term effects of market liberalisation on prices, this may shift consumer behaviour and focus away from the long-term savings potential of energy efficiency investments.

At the retail end of electricity business, some suppliers view energy efficiency information and services as a means of developing customer loyalty and electricity is bundled with energy efficiency services to add value to the customer. These efforts are commercially driven, although there can be obligations to provide such services. The basic opposite incentives of industry cause some credibility challenges for such marketing measures. It remains to be seen if these efforts are transitional or sustainable marketing strategies in an increasingly competitive electricity market.

On balance, several factors point to important opportunities for cogeneration in liberalised markets, especially following a transition marked by weak electricity prices. However, these opportunities are predominantly present for industrial and small-scale cogeneration. Prospects of environmental policy instruments would provide further support to CHP and distributed generation. As the expansion of cogeneration in the EU has been severely affected by liberalisation, there is a proposed Directive to redress this situation (as seen in Chapter 4).

Undoubtedly, there needs to be continuous monitoring to ensure that energy efficiency objectives are not adversely affected by the liberalisation process.

• *Market Transformation*

Market transformation is a process to increase the share of more energy-efficient technologies and eliminate energy inefficient products. The process is far from complete but it is well underway. Sweden was one of the most innovative countries with its technology procurement programme and this is being broadened throughout the EU. There have been and continue to be many good examples of market transformation projects financed, in large part, through the GEF. More of these projects are needed.

Martinot and Borg state that it is difficult to measure changes in the market “because markets are complex phenomena”⁸⁵. They classify the impacts as⁸⁶:

- Changes in market sales and structure
- Changes in product prices and costs
- Changes in the characteristics of products and services
- Aggregate markets move along a theoretical S-shaped technology-diffusion curve
- Particular consumer groups or classes progress through known diffusion stages (knowledge, persuasion, decision, implementation, evaluation)
- Changes in communication networks among market participants
- Organisational transformations of market participants
- Changes in macro-economic and regulatory framework

If markets are complex nationally, they are more so internationally, yet technology procurement programmes that are international or regional in scope could prove useful. For example, a group of municipalities could get together or it could be a group of hospitals or schools.

Market transformation is also enhanced through such as labelling programmes that allow consumers to make more informed choices.

In some transition countries, markets are still poorly functioning and such market transformation efforts will be needed for some time.

14. Conclusions and Recommendations

There is no simple answer about how participating countries have met the obligations endorsed by Environment Ministers at Aarhus in 1998. The chapters in Section II and accompanying annexes document where countries are at the present time. Overall, there has been good improvement since the Aarhus Conference but there is potential to do so much more. And some countries have barely begun.

The true test of the commitment to energy efficiency is now only a few years before the first Kyoto commitment needs to be met. The Kyoto Protocol changes so much because it gives a new impetus for improved energy efficiency. For one thing, there is now an important quantitative target (albeit for GHG emissions, and not directly for energy efficiency). Yet, for the first time, improvements in energy efficiency are expected to contribute to an absolute decrease in GHG emissions and not simply to a relative decrease in an energy intensity ratio.

⁸⁵ Eric Martinot and Nils Borg, “Energy-efficient lighting programs, Experience and lessons from eight countries,” in *Energy Policy*, Vol. 26, No. 14, 1998, p. 1071.

⁸⁶ *Ibid.*, p. 1071.

For most transition countries, the Kyoto Protocol is considered a lower priority because most of them will easily meet their target. However, they are aware that the Protocol offers the opportunity for needed financing through JI because of the expected credits because of the GHG emissions bubble.

Concerns are being raised from various sources, including the European Parliament, that the EU member states are not achieving enough in improving energy efficiency. The array of legislation is comprehensive. The framework is essentially there. Now there needs to be an acceleration if energy efficiency is to achieve its potential role in meeting the EU's Kyoto obligations.

In transition countries, the policy and implementation framework is not complete, although there are definite improvements. International obligations from the Aarhus *Declaration* and *PEEREA* are essential in continuing to flag the importance of energy efficiency and, more importantly, in monitoring the progress.

There are some important conclusions from the findings of this report:

- Progress has been made in all countries towards meeting obligations under the Aarhus *Declaration* and its *Policy Statement on Energy Efficiency* and the *Guidelines on Energy Conservation*. Progress has varied from considerable to minimal. The majority of countries view international obligations as an important factor for improving energy efficiency, indicating that the Aarhus *Declaration* and *PEEREA* are proving useful in establishing national energy efficiency policies and programmes.
- Improvement in energy efficiency is below its potential, notably on the demand side, due in part to an apparent weakening priority for energy efficiency policies. Without a higher political priority the potential benefits of energy efficiency over the next decade will not be fully realised.
- There is still a need in many transition economies for reform of energy pricing to motivate consumers to save energy. Energy and environmental taxes may provide an additional incentive for improving energy efficiency.
- The development of energy efficiency strategies is progressing reasonably well. Still more effort is needed in setting targets and establishing realistic action plans. A few participating countries have achieved very little in policy development. Also, more strategy development is needed at regional and local levels.
- The link between energy efficiency strategies and environmental issues - especially climate change - is well established in western countries but less so in transition countries. One of the reasons is the less immediate concern in transition countries about meeting the Kyoto Protocol obligations.
- The flexible mechanisms under the Kyoto Protocol offer an important opportunity for mutual benefits and co-operation between countries; foreign investments in

new energy-efficient and renewable energy technologies would complement domestic measures in transition countries.

- Energy efficiency policy needs to be better integrated with other economic, social and environmental areas of government responsibility. The integration process should be closely monitored at both the national and international levels.
- Programme design and delivery are hampered because of insufficient human and financial resources. Transition countries should increase their own financing of programmes, rather than relying on international sources. Financing can be supported by environmental protection funds as well as through taxes or levies.
- Monitoring and evaluation of policies and programmes is essential. There is insufficient understanding of monitoring and evaluation capability in most countries. The effort of international organisations, such as the IEA, to improve evaluation methodology is welcome.
- Certain instruments, such as fiscal policies, voluntary agreements, labels and standards for improving energy efficiency may become more important in the context of the energy market liberalisation and this potential is not yet sufficiently tapped.
- Reliable data and energy efficiency indicators are necessary to evaluate the effects of policies and programmes. However, setting up an energy indicator system may be resource demanding, and the cost-benefits should be evaluated.

International efforts play an important role in the endorsements by Ministers at Aarhus:

- International obligations such as the Aarhus *Policy Statement on Energy Efficiency* and the Energy Charter's *PEEREA* serve to maintain international focus on and momentum of energy efficiency policies.
- The *PEEREA* in-depth reviews of energy efficiency policies and programmes are important in providing a peer evaluation of a country's approach, in exchanging experience amongst participants and for informing a wider audience within the country. The recommendations concluding the reviews are important in the policy formulation process.
- International exchange of experience and best practice for energy efficiency policies and programmes has proven fundamental. The use of websites and other media has proven useful.
- International efforts on capacity building have proven to be extremely important, but the support for capacity building at regional and local levels needs to be strengthened.

- International financing by the GEF, the EBRD, the EIB and the World Bank has increased. More effort has gone into innovative forms of financing to meet the specific needs of transition countries. However, difficult access to finance is still a major barrier to investments in energy efficiency.

ANNEXES

ANNEX 1

Energy Efficiency Policy Monitoring: Status of Energy Efficiency Strategies

Albania	There is a draft Energy Strategy that includes energy efficiency. The draft strategy has not yet been approved by the Government.
Armenia	An energy efficiency strategy was originally approved in 1996; however, the Government plans to prepare a new “National Strategy on Energy Efficiency, Renewable Energy and Environmental Protection.” The Government wants this strategy to be the legislative basis for energy efficiency programmes.
Australia	Energy efficiency is a major component of the national climate change strategy.
Austria	The Energy Action Programme was created in 1993. Goals were re-affirmed in the 1996 Energy Report. An agreement between the Federal Government and the Länder, came into force on 15 June 1995. Such an agreement was necessary to ensure a common approach because the Länder are responsible for energy efficiency measures. The constitutional basis for agreements of this type (between the Federal and the Länder levels) is Article 15a of the Federal Constitution.
Azerbaijan	There is the State Energy Efficiency Policy with principles set out in the 1996 Law “On the Use of Energy Resources.”
Belarus	The 1998 law allowed for energy efficiency policies and programmes to be developed. The programme has an inter-branch character, identifying potential, developing programmes in all sectors and co-ordinating efforts of all participants.
Belgium	In 1994, a national programme for reducing carbon dioxide emissions was approved by the Council of Ministers and the regional governments. The programme includes measures in 14 categories, primarily related to improving energy efficiency. A new National Climate Plan is expected.
Bosnia and Herzegovina	There is no energy efficiency strategy. Priority now is for reconstruction of energy supply system (including DH system) which was destroyed in the war. The reconstruction is also to improve system efficiency.

Bulgaria	National Strategy for the development of energy and energy efficiency by the year 2010 adopted by Parliament in 1998.
Canada	Canada's current energy efficiency strategy is a major component of the National Climate Change Strategy. The Federal Energy Efficiency and Alternative Energy Programme started in 1991.
Croatia	A new energy policy which includes goals and strategy for energy efficiency prepared in January 1999. Energy efficiency is considered one of the "basic guidelines" of the strategy.
Cyprus	Energy efficiency is a major component of energy policy. The main objective is the reduction in energy consumption in all sectors.
Czech Republic	Energy efficiency policy is outlined in the National Energy Policy which was approved in 2000. The Energy management Act sets out the obligation to formulate the state's energy policy as well as the elaboration of the National Programme for Energy Efficiency and the Use of Renewable and Secondary Energy Sources.
Denmark	Energy 21, the Danish Government's Action Plan for Energy, was published in 1996. In May 2001, there was the Natural Gas Supply and Energy Savings Agreement that set out a new action plan for promoting energy savings to 2005.
Estonia	In 2000, Energy Efficiency Target Programme was approved. Implementation Plan for Energy Efficiency Target programme was approved in March 2001. Transport Development Programme, which handled energy efficiency issues in transport sector, was approved in March 1999.
Finland	The most recent energy policy was sent to the Finnish Parliament in June 1997. There was the Government Decision on December 21, 1995 on the Implementation of Energy Conservation. The third energy efficiency programme was made in 2000 and is a part of the National Climate Strategy. The most recent National Climate Strategy was submitted to Parliament in March 2001.
France	In December 2000, a new national energy efficiency plan was announced. Its goal is to reduce GHG emissions, reduce consumers' energy bills and develop renewable energy.

Georgia	<p>A draft “Energy Policy Concept of Georgia” includes energy efficiency as a major priority and establishing the preconditions for confronting the energy efficiency problems. It is to soon be discussed in Parliament.</p> <p>Following the Georgia Electricity and Natural Gas Law (adopted 1999), the State Programme on Energy Efficiency Improvement is being prepared.</p>
Germany	<p>Energy efficiency is a priority of the German energy policy published in the Energy Report of the Federal Ministry of Economics and Technology, published in October 2001 and in the Report of the Federal Government on a National Strategy for Sustainable Development, published in April 2002.</p>
Greece	<p>Energy efficiency is being promoted through the Global Action Plan, entitled Energy 2001, and the energy conservation sub-programme of the National Environmental and Energy Programme submitted to and approved by the European Union. Energy 2001, which came into force in 1998, is the national action plan for energy conservation in the built environment.</p>
Hungary	<p>In October 1999, a Government act [1107/1999(X.8)] was approved. It concerns energy saving and energy efficiency strategy until 2010. It sets a target limiting energy consumption growth to 1.5% p.a., assuming GDP grows 5% p.a.</p>
Iceland	<p>1993 environment policy stressed energy efficiency for the fishing fleet. The 1993 environment policy was followed by the National Sustainable Development Action Plan in 1997. The 1997 Energy Act allowed for certain financial measures for energy efficiency.</p>
Ireland	<p>In April 1997, the government published its sustainable development strategy that considers sustainability in all sectors, including energy and transport. A Green Paper on Sustainable Energy was launched September 1999. Its implementation is a priority for the Government. In October 2000, the Government published its National Climate Change Strategy which includes measures to improve energy efficiency in all sectors.</p>
Italy	<p>The 1988 National Energy Plan (NEP’88) includes the improvement of energy efficiency and conservation as a primary objective of general energy policy. CIPE Deliberation 137/98 published in February 1999 provides guidelines and actions for containment and reductions of GHG emissions. It includes increased energy efficiency in the productive sectors and among consumers.</p>

Japan	December 1997 “Headquarters of Measures to Arrest Global Warming” and 1998 Energy Conservation Law provide the basis of the energy efficiency policy framework.
Kazakhstan	Special State Programme of Energy Saving elaborated in 1996 through a Special Resolution of the Government (N 474 of 19.04.96). There is also an energy saving component in the “Hydrocarbon Initiative” of 1997.
Kyrgyzstan	The Law on Energy Savings, adopted in 1998, provides the legal basis for the introduction of effective energy savings measures in all sectors. The revised National Energy Programme, soon to be approved by Government, takes into account energy efficiency measures and the extended use of local, renewable and secondary energy sources.
Latvia	The National Energy Efficiency Strategy was approved in November 2000. Energy policy stresses energy efficiency as a priority.
Liechtenstein	Energy efficiency law passed in 1996 to promote efficient and environmentally friendly use of energy.
Lithuania	National Energy Strategy of 1999 gave energy efficiency high priority. 1996 Energy Efficiency Programme covering to 2000. A new programme was developed in 2000.
Luxembourg	Parliament adopted the general Energy Efficiency Law of August 5, 1993. The law authorises implementation of several energy efficiency measures.
Malta	As accession state to EU, Malta is obliged to implement the <i>acquis communautaire</i> .
Moldova	The Energy Strategy of the Republic of Moldova up to 2010 was adopted by the Government in 2000. It stresses improved energy efficiency. The Energy Conservation Programme requested a budget of \$6 million annually. The Energy Conservation Law establishes a National Fund for Energy Efficiency - about 12000 Euros in 2002 and about 28000 Euros in 2003. The fund should grow up to 0.2 % of the budget.
Mongolia	The Government of Mongolia has developed the “Mongolia Sustainable Energy Sector Development Strategy Plan (2002-2010), and it reflects two major goals set in the Government agenda, namely economic growth and reducing poverty. Main principles are: Financial stability, restructuring, capacity building, energy access and affordability and energy efficiency.

Netherlands	There have been the Second Memorandum on Energy Conservation (1993), the White Paper on Energy (1995) and the Action Programme on Energy Conservation (1998).
Norway	In March 1999 a White Paper on energy was submitted to the Parliament. It supports the Government's environmental policy and emphasises reducing energy needs. The Government is looking at a package of measures that would total up to NOK 5 billion over a ten-year period.
Poland	"Assumptions of Poland's Energy Policy until year 2020" prepared by Ministry of Economy and approved by Council of Ministers in February 2000.
Portugal	For the period 2000-2006 the Operational Economy Programme (POE) is in force and includes measures regarding the improvement of the energy domestic potential and the rationalisation of energy consumption. In May 2001 the Government approved the "Strategy for Climate Change" under which a national programme for climate change should be established. In September 2001 the Government also approved a major programme called "E4 Programme, Energy Efficiency and Domestic Sources of Energy".
Romania	<p>In Romania the national policy for the efficient use of energy is part of the energy policy of the state (according to the Law 199/2000 concerning the efficient use of energy). The main objective of the policy is to increase the efficiency of energy utilisation in the whole chain of production through to consumption.</p> <p>The National Strategy for Energy Development for medium term 2001 - 2004, approved by Governmental Decision 647/ July 2001 includes important aspects regarding energy efficiency and consider the energy efficiency policy as a priority.</p>
Russian Federation	Energy efficiency and energy consumption are considered priorities of the Strategy of Energy Policy, Russian Federation till 2010 in accordance with the Presidential Decree from 1995 (Government Resolution #1006, 13.10.1995) In 1998, the Federal Programme, "Energy conservation in Russia," was approved. A new Federal Programme, "Energy efficiency economy" was approved in November 2001. It is designed as the main mechanism in the Energy Strategy to improve energy efficiency.
Slovak Republic	The Government prepared a programme for reduction of energy intensity.

Slovenia	The Strategy of energy use and supply for Slovenia was adopted on January 11, 1996. A new energy act of September 16, 1999 sets out the legal, regulatory and institutional framework of the power and gas sector. It also has provisions on energy efficiency, giving a role to the state and other actors and presenting a legal basis for secondary legislation, like labelling and minimum efficiency standards. The strategy for energy efficiency calls for overall energy efficiency improvements of 2% p.a. over the next 10-15 years.
Spain	Energy Efficiency and Saving Plan is within the National Energy Plan (1991-2000).
Sweden	The 1997 Bill on Sustainable Energy Supply placed a strong emphasis on energy efficiency.
Switzerland	The SwissEnergy Action Programme, launched in January 2001, replaced the Energy 2000 Action Plan which came into effect in 1991. The Energy 2000 Action Plan gave high priority to energy efficiency and the new programme has continued with that emphasis. There is more emphasis on incentives and regulations to strengthen the voluntary measures from the Energy 2000 Action Plan.
Tajikistan	Improving the efficiency of operation of the fuel and energy complex is one of the principal aims of the state energy policy.
The FYRO Macedonia	The National Energy Efficiency Programme 2000 was adopted by Government in 1998. The programme calls for a reduction in energy consumption of 8% between 1998 and 2000.
Turkey	No specific energy efficiency strategy but the objectives are integrated within national five-year plans.
Turkmenistan	There is no energy efficiency strategy/policy to date.
Ukraine	On the basis of the National Energy Programme (1996), a comprehensive State Energy Saving Programme was prepared in 1996 and adopted in 1997. In view of the difficult economic situation during the CESP effective time, developed in 1996-1999 amendments thereto and additional measures seeking to introduce energy saving technologies on a mass scale, were approved by Cabinet of Ministers Decree No. 1040 of June 27, 2000, Urgent Actions to Implement the Ukrainian Comprehensive State Energy Saving Programme.

<p>United Kingdom</p>	<p>A new White Paper on energy was published 24 February 2002. There are four main objectives, including the ambition of reducing carbon dioxide emissions by 60 % by 2050. Energy efficiency is considered the cheapest, safest way of meeting all four objectives. Energy efficiency policy has been a major element of energy policy since the 1970s and is now closely tied to the UK Climate Change Programme, published in November 2000.</p>
<p>United States</p>	<p>Energy efficiency is considered in the May 2001 National Energy Policy report as a necessary complement to expanding energy supply.</p>
<p>Uzbekistan</p>	<p>There is the State Energy Saving Programme for 2000-2005 which provides for the development of the legal and regulatory framework of energy savings through the revision of laws currently in force and putting into force supplementary regulations and implementing organisational measures. The Energy Saving Programme is inter-sectoral.</p>

ANNEX 2

Energy Efficiency Policy Monitoring: Status of Energy Efficiency Laws

Albania	Energy efficiency will be part of the energy law which is in draft form and not yet approved.
Armenia	Draft law is under review by the Parliamentary Energy Commission.
Australia	There is no specific energy efficiency law.
Austria	There is no overall energy efficiency law but there are many legal regulations with relevance to energy efficiency both at the Federal and the Länder levels. In order to ensure a common approach in those areas which fall under the responsibility of the Länder (i.e. building codes, inspection of boilers) an agreement between the Federal Government and the Länder on energy conservation was concluded which defines the framework that has to be respected.
Azerbaijan	Law on Energy (adopted 1998) has as objective to ensure increased energy efficiency throughout the energy cycle. There is a Law "On the Use of Energy Resources" adopted in 1996 to promote energy saving and establishes the foundations of the State Regulation in the field of energy use.
Belarus	The Law on Energy Conservation was adopted in 1998. It is a framework law providing for policies and programmes to be supported.
Belgium	Much done through Federal/regional agreement and various regional measures.
Bosnia and Herzegovina	Energy efficiency is not a priority until reconstruction of the energy system is further advanced.
Bulgaria	Energy and Energy Efficiency Act, adopted in 1999, implements the regulation of energy efficiency and lays down the fundamentals for the legal regulation of the State policy on energy efficiency.
Canada	The Energy Efficiency Act was passed in 1992. The act regulates energy performance levels of energy-using products that are imported or shipped between provinces, energy labelling of these products, and collection of statistics and information on energy use and alternative energy.

Croatia	<p>There is no specific energy efficiency law.</p> <p>The draft Energy Law includes provisions for energy efficiency and the utilisation of renewables</p> <p>The Environmental Protection Law (1994) states that energy is to be used rationally.</p>
Cyprus	<p>There is no specific energy efficiency law. Law 97(I)/2001 introduced compulsory scheme for energy labelling and provision of other energy related information for household appliances. There is other legislation planned in order to meet obligations of EU accession.</p>
Czech Republic	<p>The utilisation of energy is governed by the Energy Management Act (Act No. 406/2000) that came into force on January 1, 2001.</p>
Denmark	<p>An Energy Conservation Act (Act No. 450), approved by the Parliament in May 2000, determines the overall framework for co-ordination and priority given to savings initiatives both centralised and decentralised. The new Act also contains regulations concerning appointment of a local energy conservation committee, which should be involved in co-ordinating and securing efficiency in the work of various local players to save energy, including supporting local Agenda 21 work.</p>
Estonia	<p>No overall energy efficiency law. The Energy Efficiency of Equipment Act establishes requirements for the consumption and labelling of certain appliances. New regulations to achieve compliance with EU requirements were adopted in 2002.</p>
Finland	<p>No specific overall energy conservation law. In 1997 came into force an act on the energy efficiency of appliances. Minimum efficiency requirements for hot-water boilers (according to the EU directive) were implemented in 1998 and for refrigerators and freezers (EU directive) in 2000.</p>
France	<p>Law 96-1236 of 30 December 1996 on Air and Rational Use of Energy was adopted to replace the existing legislation on energy efficiency.</p>
Georgia	<p>Energy efficiency law is being prepared and was expected to be adopted in 2002. The Georgian Electricity and Natural Gas Law, adopted in 1999, has a component to promote improvement of efficiency “in the areas of electricity generation, transmission, dispatch, distribution, important, export and consumption as well as in the areas of natural gas supply, transportation, distribution and consumption.”</p>

Germany	No specific overall energy conservation law but new federal laws planned or adopted on cogeneration and Energy Conservation Ordinance to have low-energy-house standard as the norm.
Greece	There is a general energy efficiency law from 1975 which is a framework law for undertaking energy efficiency measures. There are also other laws related to incentives, planning and so on. For example, there is Development Law 2601/98 which provides for subsidies in the industrial and tertiary sectors and mechanisms for energy saving. Also, there is Law 2208/97 for the Sustainable Development of Towns.
Hungary	In October 1999, a Government act [1107/1999(X.8)] was approved. It concerns energy saving and energy efficiency strategy until 2010. It sets a target limiting energy consumption growth to 1.5% p.a., assuming GDP grows 5% p.a.
Iceland	The 1997 Energy Act allowed for certain financial measures for energy efficiency.
Ireland	There is no specific overall energy conservation law.
Italy	The basic law on energy efficiency is Law No. 10/1991, entitled "Regulations for the implementation of the National Energy Plan with regard to the rational use of energy, energy savings and the development of renewable energy sources". It is a framework law to introduce regulations aimed at the efficient use of energy sources in all end-use sectors including the specific reduction of energy consumption in production processes and in the building sector especially for heating plants. The law provides for tax relief and the payment by local authorities of incentives to support the adoption of the most efficient technological solutions.
Japan	There is the Energy Conservation Law, revised June 1998.
Kazakhstan	Law on Energy Saving in the Republic of Kazakhstan came into force in December 1997.
Kyrgyzstan	A law on 'Energy Saving' was adopted by Parliament in 1998. The law introduces administrative, organisational and economic elements supporting energy efficiency.

Latvia	Law on Energy was approved in 1998. It has a chapter on energy efficiency. In order to implement the 2000 National Energy Efficiency Strategy, the Government adopted a package of legislation in January 2001 which included transposing the <i>acquis communautaire</i> in the area of labelling.
Liechtenstein	An energy efficiency law does not exist in Liechtenstein. However, the legal foundation for the goal of conserving energy was laid within the energy regulations in 1993 and expanded in 1996.
Lithuania	Draft law prepared in 1998. It has been revised and will be presented to Parliament.
Luxembourg	Parliament adopted the general Energy Efficiency Law of August 5, 1993. The law authorises implementation of several energy efficiency measures.
Malta	Malta adopted the Product Safety Act in February 2001 in order to align with the <i>acquis communautaire</i> , in particular concerning energy labelling and efficiency requirements.
Moldova	The Law on Energy Conservation was adopted at 13 July 2000. There are also laws on energy, electricity, gas, petroleum products. A draft heat law is now under discussion in Parliament.
Mongolia	The Energy Law was enacted in 2001. The law is based on economic principles, commercial relationships and on rights and obligations for both the industry and the consumers.
Netherlands	No specific overall energy conservation law.
Norway	No specific overall energy conservation law but one article from the 1991 energy law covers energy efficiency.
Poland	Energy Law of 10 April 1997 creates conditions to provide sustainable development of Poland. Act of 18 December 1998 on Support for Thermo-Modernisation Investment in Buildings created Thermomodernisation Fund.
Portugal	No specific overall energy conservation law. There is the RGCE-“Management Regulation for Energy Consumption (Decree Law n.º 58/82 of February 1982) focusing on energy intensive industries and which is currently being updated.

Romania	The energy efficiency law was approved in 2000 (law 199/2000). Governmental Ordinance 78/2001 amended the Law 199. The law establishes the national policy for the efficient use of energy as an integral part of energy policy.
Russian Federation	Federal Law on Energy Saving - 1996; various regional energy conservation laws also approved. The 1996 law divides the responsibility between the federal and regional governments. To support the Federal law on Energy Saving many subjects of the Russian Federation adopted regional laws on energy efficiency.
Slovak Republic	Draft law on energy conservation under preparation.
Slovenia	The new energy act of September 16, 1999 sets out the legal, regulatory and institutional framework of the power and gas sector. It also has provisions on energy efficiency, giving a role of state and other actors and presenting a legal basis for secondary legislation, like labelling and minimum efficiency standards.
Spain	No specific overall energy conservation law.
Sweden	The 1997 Bill on Sustainable Energy Supply placed a strong emphasis on energy efficiency.
Switzerland	A new Federal Energy Law was adopted by Parliament in 1998. The law includes measures relating to: regulations on fuel consumption of vehicles, cantonal legislation in the building sector, financial incentives for energy efficiency, guidelines for the energy supply industry. The 1998 law replaced the Decree of May 1991 on the Efficient Use of Energy.
Tajikistan	Energy saving law of 1996 provides basis for energy saving policy.
The FYRO Macedonia	The Law of Energy (Official Gazette No 47/97 and Amendments to the Law on Energy O.G. No 40/99 and 98/2000) is the main law that covers issues related to energy efficiency.
Turkey	Turkey does not yet have any energy conservation laws, but a draft energy conservation law is being considered by the Ministry of Energy and Natural Resources (MENR).
Turkmenistan	There is no specific law on energy efficiency.
Ukraine	The Law on Energy Conservation was adopted in 1994.

<p>United Kingdom</p>	<p>There is no overall energy efficiency law. In 1995 the Home Energy Conservation Act was introduced, requiring all UK local authorities with housing responsibilities to prepare, publish and submit to the Secretary of State an energy conservation report, and to provide updates as requested on progress with implementing their report.</p>
<p>United States</p>	<p>The 1992 Energy Policy Act had several provisions for energy efficiency. There are also specific laws on fuel efficiency standards, etc.</p>
<p>Uzbekistan</p>	<p>Law on Rational Use of Energy adopted in 1998. The framework law covers efficiency of both energy supply and demand, comprises articles related to the definition and application of energy efficiency standards, energy certification, metrology and monitoring, energy audits and review, under energy efficiency criteria for new projects. According to the law, the policy of energy saving is implemented on the basis of the realisation of specific programmes.</p>

ANNEX 3

Energy Efficiency Policy Monitoring: Status of Energy Efficiency Targets

Albania	No quantitative target for energy efficiency, but target for GHG emissions.
Armenia	No quantitative target for energy efficiency, but target for GHG emissions.
Australia	No quantitative target for energy efficiency, but target for GHG emissions.
Austria	No quantitative target for energy efficiency at the national level, but target for GHG emissions.
Azerbaijan	No quantitative target for energy efficiency, but target for GHG emissions.
Belarus	The strategic objective is to have GDP power intensity to the level of the EU by 2010.
Belgium	No quantitative target for energy efficiency, but target for GHG emissions.
Bosnia and Herzegovina	No quantitative target for energy efficiency.
Bulgaria	No quantitative target for energy efficiency, but target for GHG emissions.
Canada	No quantitative target for energy efficiency, but target for GHG emissions.
Croatia	No quantitative target for energy efficiency, but target for GHG emissions.
Cyprus	No quantitative target for energy efficiency, but target for GHG emissions.
Czech Republic	No quantitative target for energy efficiency, but target for GHG emissions. There are targets for renewable energy.
Denmark	20% improvement in energy intensity between 1994 and 2005. The Kyoto commitment is to reduce GHG emissions by 21% in the first budget period 2008-2012, compared to 1990.
Estonia	The current Energy Efficiency Target Programme aims for energy consumption growth to be no more than half GDP growth and CO ₂ emissions to be reduced by 8% against 1990 levels, through energy efficiency and fuel switching.

Finland	The energy efficiency target in Finland is to bring down total energy consumption by 4 to 5%, which corresponds to a reduction of about 1.5 Mtoe in 2010 compared to a situation in which new energy efficiency activities would not be implemented. CO ₂ emissions would be reduced by around 4 million tonnes. The energy efficiency targets for the end-use sectors in 2010 are: industry 3%, transport 6%, heating of buildings 9%, electricity for residences 2% and electricity for services 3%.
France	No quantitative target for energy efficiency, but target for GHG emissions.
Georgia	Programme is being prepared but no targets to date.
Germany	No quantitative target for energy efficiency, but target for GHG emissions.
Greece	No quantitative target for energy efficiency, but target for GHG emissions.
Hungary	Increase energy efficiency by 3.5% per year; achieve energy savings at end of 2010 of 75 PJ per year.
Iceland	No quantitative target for energy efficiency, but target for GHG emissions.
Ireland	No quantitative target for energy efficiency, but target for GHG emissions.
Italy	No quantitative target for energy efficiency, but target for GHG emissions.
Japan	No quantitative target for energy efficiency, but target for GHG emissions.
Kazakhstan	Various objectives but no specific quantified target.
Kyrgyzstan	No quantitative target for energy efficiency.
Latvia	The objective of the strategy is to achieve a 25% decrease of the primary energy consumption per gross national product unit by 2010, reaching the average level in OECD in 1997.
Liechtenstein	No quantitative target for energy efficiency.
Lithuania	No quantitative target for energy efficiency, but target for GHG emissions.
Luxembourg	No quantitative target for energy efficiency, but target for GHG emissions.

Malta	No quantitative target for energy efficiency, but target for GHG emissions.
Moldova	Proposed quantitative target for energy efficiency is annual reduction by 2-3 % of the energy intensity up to year 2010. Expected benefit - savings of energy resources annually up to \$12 million.
Mongolia	No specific quantifiable targets other than for quantifiable targets to reduce technical and non-technical losses by 40-50% in the provinces and to decrease them two times in Ulaanbaatar. Now the losses are 20-40% in the provinces and 30% in Ulaanbaatar.
Netherlands	Action Programme calls for increasing the energy conservation from 1.6% to 2% improvements per annum.
Norway	No quantitative target for energy efficiency, but target for GHG emissions.
Poland	No specific target. Draft new environmental policy calls for lowering energy intensity in industry by 50% until 2008-2012 from 1990 base.
Portugal	No quantitative target for energy efficiency, but target for GHG emissions. There is also a target for energy intensive industrial plants to reduce their specific energy consumption by 1% per year.
Romania	According to the National Strategy for Energy Development for medium term 2001-2004, the energy intensity should be reduced by 3%/year. Romania has a target for GHG emissions under the Kyoto Protocol.
Russian Federation	According to the Energy Strategy of Russia, approved in November 2000, there are energy efficiency targets (see Ch 6). The main task of the Federal Programme "Energy efficient economy" is to decrease GDP's power-intensity of Russia in 2005 by 13.4% and in 2010 by 26% in comparison with year of 2000. There is a target for GHG emissions.
Slovak Republic	No quantitative target for energy efficiency, but target for GHG emissions.
Slovenia	Target to improve overall energy efficiency by 2% p.a. over the next 10-15 years (20% over next ten years).
Spain	The target was to reduce final energy demand by 7.6% in 2000 compared to 1991.

Sweden	No quantitative target for energy efficiency, but target for GHG emissions; support for closing of nuclear plants.
Switzerland	For the period of 2001 to 2010, the following targets have been specified: A reduction of consumption of fossil fuels and of CO ₂ emissions by 10%; the increase of the consumption of electricity should not exceed 5%; the share of hydro-based electricity generation should not decrease - despite the liberalisation in the electricity market; the contribution of renewable energies should increase by 0.5 TWh (i.e. a 1% increase of the share) with regard to electricity generation), and by 3 TWh (a 3% increase of the share) with regard to the heat production, respectively.
Tajikistan	No quantitative target for energy efficiency, but target for GHG emissions.
The FYRO Macedonia	The National Energy Efficiency Programme 2000 called for a reduction in energy consumption of 8% between 1998 and 2000.
Turkey	No quantitative target for energy efficiency, but target for GHG emissions.
Turkmenistan	No quantitative target for energy efficiency, but target for GHG emissions.
Ukraine	There was a target to achieve fuel and energy resource savings at the level of 33 million t.o.e. during 1996-1999, including 6.5 million t.o.e. in 1999. This target was not achieved. By the end of 2010 versus 2000, the plan is to reduce annual energy consumption by 50-60 million t.o.e., or approximately by 40-45% of the 2000 primary energy resource consumption level. There is a target for GHG emissions.
United Kingdom	No quantitative target for energy efficiency, but target for GHG emissions.
United States	No quantitative target for energy efficiency.
Uzbekistan	The policy calls for an improvement of the efficiency of electricity and heat generation with utilisation of organic fuels and, in the first place, of natural gas by 2010. No quantitative target for energy efficiency.

ANNEX 4

Energy Efficiency Policy Monitoring: Status of Energy Efficiency Organisations/Agencies

Albania	National Agency of Energy of Albania (NAE) was created in May 1998. The Agency has been established on the basis of a decision of the Council of Ministers, which outlines the transfer of responsibility for technical and administrative functions from existing institutions to the new Energy Agency. The National Agency of Energy created by merging the National Committee and the Executive Household Energy Agency.
Armenia	The Ministry of Energy represents the state authorities, which are carrying out the energy efficiency policy.
Australia	The Department of Industry, Science and Resources is responsible for energy policy at the federal level. State governments have responsibilities that impact on energy efficiency. The Australian Greenhouse Office (AGO) deals with many energy efficiency issues.
Austria	The Federal Ministry of Economic Affairs and Labour is responsible for energy matters at the federal level. Its counterparts at the Länder level are corresponding units of the administrations of the Länder Governments. E.V.A - The Austrian Energy Agency is the national implementation agency. In addition there are energy agencies or comparable organisations in most Länder.
Azerbaijan	Department of Fuel and Energy Industry within the Ministry of Economy is responsible for implementing energy efficiency. There is the Energy Saving and Management Centre, created in 1999, which is the executive agency under the Ministry.
Belarus	Belenergo is responsible for energy conservation.
Belgium	Federal government's role is to co-ordinate, through CONCERE. Agencies in each region with federal co-ordination. Federal responsibility is with the Ministry of Economic Affairs, Federal Administration for Energy.
Bosnia and Herzegovina	The Federal Ministry of Energy, Mining and Industry is responsible for energy matters at the federal level.
Bulgaria	State Energy Efficiency Agency (SEEA) has been made the state authority for the elaboration and conducting of state policy for rational use of energy resources and renewable (RES).

Canada	The Office of Energy Efficiency is a branch within the ministry responsible for energy, the federal Department of Natural Resources Canada.
Croatia	Ministry of Economy is responsible, although a number of other ministries are also involved. The “Hrvoje Po_ar” energy institute has been appointed by the Government as the national agency for carrying through of the national energy programmes, as well as statistical reports.
Cyprus	The Ministry of Commerce, Industry and Tourism is responsible for energy policy. The Applied Energy Centre (AEC) within the Ministry promotes energy efficiency and renewables. The Cyprus Organisation for Standards and Control of Quality is also involved in preparing the Cyprus Standards in Thermal Insulation and the use of it in the domestic sector. The Cyprus Institute of Energy is heavily involved in the harmonisation process for accession to the EU.
Czech Republic	Ministry of Industry and Trade and Ministry of Environment are responsible for the fulfilment of targets of the National Programme of the efficient use of energy and increase of renewable and secondary energy sources. Within the Ministry of Industry and Trade is the Czech Energy Agency which is entrusted with the preparation, declaration and execution of government programmes.
Denmark	Ministry of Economy and Business Affairs is responsible. The Danish Energy Authority, within the Ministry, is the executive agency.
Estonia	Energy Department within the Ministry of Economy is responsible for energy efficiency.
Finland	The Ministry of Trade and Industry (MTI) is responsible for the energy efficiency policy. The Ministry also has specific implementing functions in the areas where there is no other suitable agency available. MOTIVA, the Information Centre for Energy Efficiency was created to implement the energy efficiency programme. It is an independent non-profit agency.
France	Responsibility of Ministère de l’Economie, de Finances et de l’Industrie. Executive agency is ADEME (The Agency for the Environment and Energy Management).

Georgia	Ministry of Fuel and Energy is responsible for energy efficiency policy, planning and coordination of implementation. There are a number of institutions involved in energy efficiency, including, inter alia, an Energy Efficiency Centre. The institutional setting for implementing energy efficiency will be determined by the forthcoming energy efficiency law.
Germany	Responsibility is Ministry of Economics and Labour at federal level. A new national energy agency, the Deutsche Energieagentur (Dena) was created recently. Many Länder have regional agencies. Dena is creating a networked information system, working closely with energy agencies in federal states or municipalities and other similar agencies.
Greece	Responsibility is with Ministry of Development and its Energy Department. The Ministries of Transport and of Environment, Physical Planning and Public Works are also strongly involved in energy efficiency matters. Centre for Renewable Energy Sources (CRES), a research organisation under the auspices of the Ministry of Development, plays an important role as the national energy centre in providing consultancy to the Government on energy efficiency and RES issues, in implementing energy efficiency programmes and in collecting data relating to energy.
Hungary	Ministry of Economic Affairs is responsible for overall energy policy, including energy efficiency. The Energy Centre, which was created in 2000 out of two energy agencies (the Energy Information Agency and the EU-Hungarian Energy Centre), was formally appointed as the national co-ordinator for energy efficiency programmes in Hungary. The National Energy Efficiency Programme is co-ordinated by the Interministerial Energy Efficiency Steering Committee.
Iceland	Special Committee established in 1995 by Ministry of Industry and Commerce to promote energy efficiency in residential heating.
Ireland	Department of Communications, Marine and Natural Resources is responsible for energy matters, since June 2002. The Irish Energy Agency, now named Sustainable Energy Ireland, is the executive agency.
Italy	The Ministry of Industry, Trade and Handicraft (MICA) is the main body responsible for energy efficiency matters. The National Agency for New Technology, Energy and the Environment (ENEA), responsible for research and dissemination of new technologies covering energy efficiency, renewables and environmental technology.

Japan	Responsibility of Ministry of Trade and Industry. Agency is Japan Energy Conservation Centre.
Kazakhstan	Ministry of Energy, Industry and Trade is responsible for implementing the state energy saving policy.
Kyrgyzstan	Ministry of Foreign Trade and Industry is responsible for energy efficiency implementation. The State Energy Agency is involved in the implementation of energy efficiency measures and programmes.
Latvia	Latvian Energy Agency was integrated into Latvian Development Agency as its Energy Department in 1997. The Energy Inspectorate was recently established to perform energy efficiency controls, according to the Energy Law.
Liechtenstein	Ministry for National Economy is responsible for energy policy and programmes. The Ministries of Transport, for Environment and for Public Construction are also involved.
Lithuania	Lithuanian Energy Agency within Ministry of Economy is responsible. Various other agencies develop and implement various programmes.
Luxembourg	Conseil National de l'Énergie is advisory body on energy issues. Executive agency is Agence de l'Énergie, which is a company under private law whose shareholders are government and two electricity companies.
Malta	The Malta Resources Authority (including an Energy Directorate) was established in February 2001 to regulate, monitor and keep under review all practices, operations and activities related to energy. It covers also issues related to environmental protection in the energy sector. The Ministry for Economic Services is the competent authority implementing legislation on general product safety and subsidiary legislation relating to energy efficiency. The Department responsible for consumer affairs deals with enforcement.
Moldova	Ministry of Energy has overall responsibility. National Agency for Energy Conservation was created in January 1995, as a state enterprise under the Ministry of Energy.
Mongolia	Ministry of Infrastructure (which is responsible for energy policy), Ministry of Finance and Economy, Ministry of Agriculture and Industry, Ministry of Environment and some main agencies involved in energy efficiency.

Netherlands	Ministry of Economic Affairs is responsible for energy efficiency policy. Executive agency is NOVEM which is an agency of the Ministry.
Norway	Responsibility of Ministry of Petroleum and Energy. The Norwegian Water Resources and Energy Administration (NVE) is responsible for administration in the field of energy efficiency. There are regional energy efficiency centres. The Government created a new central agency, ENOVA, responsible for implementing energy efficiency policies and programmes in 2001.
Poland	Many ministries involved, including Ministry of Economy. The Polish National Energy Conservation Agency (KAPE) is responsible for development of national and sectoral energy efficiency policies. There are also regional agencies.
Portugal	Responsibility is with Directorate General of Energy of the Ministry of Economy. AGENE is executive agency.
Romania	Responsible ministry is Ministry of Industry and Resources. Executive agency is ARCE, the Romanian Energy Conservation Agency, was restructured and reorganised following the 2000 Energy efficiency law.
Russian Federation	Ministry of Energy responsible at the federal level. Most regional entities have ministries or organisations responsible for energy efficiency.
Slovak Republic	Ministry of Economy is responsible. The Slovak Energy Agency, formed in 1999, is the main executive body.
Slovenia	Ministry of Environment, Spatial Planning and Energy is responsible. Implementation is the responsibility of the Agency for the Efficient Use of Energy, created in 1995 and operationalised in 1996.
Spain	Responsibility is with Ministry of Industry and Energy. IDAE is executive agency. There are also provincial agencies.
Sweden	Ministry of Industry and Trade is responsible. Executive agency is STEM, the Swedish Energy Agency.

Switzerland	Federal Department for Transport, Communication and Energy is responsible. Within the Department, the Federal Office of Energy is responsible for implementing energy efficiency policies. There are other agencies involved in implementation, including the Energy Agency of Swiss Economy, the Agency for Renewable Energies and Energy Efficiency, the Energy Agency for Electrical Appliances and the Swiss Agency for Energy Efficiency.
Tajikistan	Energy policy is the responsibility of Ministry of Energy.
The FYRO Macedonia	The Ministry of Economy, (the Energy Department) is responsible for all issues in the field of energy, including the energy efficiency.
Turkey	The Department of Natural Resources and Energy is responsible. The General Directorate of Electrical Power Resources Survey and Development Administration (EIEI) is responsible for energy efficiency implementation and has the National Energy Conservation Centre within it.
Turkmenistan	Responsibility under Ministry of Energy and Industry.
Ukraine	National energy policy development is the responsibility of the Ukrainian State Energy Saving Committee. The Government Energy Saving Inspectorate performs regular checks on business entities for compliance with the requirements regarding rational fuel and energy resource utilisation.
United Kingdom	The Department for Environment, Food and Rural Affairs (DEFRA) has overall responsibility for energy efficiency policy and provides funding to two organisations to promote energy efficiency. The Energy Saving Trust works to promote, through partnership, the sustainable and efficient use of energy in the domestic and small business sectors, spreading the message of energy efficiency through advertising programmes, a network of advice centres and the endorsement of energy efficient products. The Carbon Trust, which was set up in April 2001, supports businesses and the public sector in the take up of existing, new and emerging low carbon technologies and measures.
United States	The Office of Energy Efficiency and Renewable Energy is within the Department of Energy.
Uzbekistan	The State Committee for Energy Saving and Energy Inspection (Goskomenergonadsor) is the authorised state body responsible for energy saving.

ANNEX 5

Energy Efficiency Policy Monitoring: Status of Energy Pricing Systems

<p>Albania</p>	<p>Price reform has been quite effective and evolving over the entire period. The impact of the law “For the privatisation of the electric sector” will have on prices is direct because ERE has in the centre of the regulatory activity the tariffs application in accordance with the defined aims of the strategy. All energy prices have covered the economic cost and have been compared with the EU countries level, the electricity excluded.</p>
<p>Armenia</p>	<p>There is regulatory body for price setting. Principle is full cost recovery. There are no subsidies or cross-subsidies. Prices will not finance the full rehabilitation programme without substantial efficiency gains, according to the EBRD.</p>
<p>Australia</p>	<p>The Australian Competition and Consumer Commission (ACCC) was formed in 1995 by the merger of the Trade Practices Commission and the Prices Surveillance Authority. It is an independent statutory authority responsible for competition matters in general, and administers the 1974 Trade Practices Act and the 1983 Prices Surveillance Act. Since the release in 1993 of the National Competition Report, Australia has been engaged in energy market reform to promote increased competition and increased efficiency of energy production.</p> <p>Taxation is not explicitly used to internalise environmental costs, with the exception of differential excise rates on unleaded gasoline and the excise exemption for alternative fuels such as LPG.</p>
<p>Austria</p>	<p>There is price monitoring but no regulation. There are energy taxes on electricity and gas, with renewables exempted, providing some means of addressing environmental externalities.</p>
<p>Azerbaijan</p>	<p>There are no subsidies or cross-subsidies. Prices for electricity and thermal energy are regulated by the State.</p>
<p>Belarus</p>	<p>Some price reforms, with taxes on oil production and marketing. Tariffs for heat and gas have been revised to increase cost recovery.</p>

Belgium	<p>VAT and excise taxes for oil products. Special tax on gasoline, light heating oil, natural gas, LPG and electricity. Natural gas and electricity prices are regulated by Control Committee for Electricity and Gas.</p> <p>There are currently no environmental taxes in Belgium.</p>
Bosnia and Herzegovina	No information available.
Bulgaria	Gradual price changes to achieve real costs and improve transparency. Price and tariff policy is implemented by the State Energy Regulatory Commission (SERC) according to the 1999 Energy and Energy Efficiency Law.
Canada	End-use electricity prices are regulated by the provinces. Fuels such as motor gasoline, diesel fuel, aviation and jet fuels are subject to federal excise taxes and provincial sales taxes. There is a federal Goods and Service Tax, currently at 7 per cent. There has been gas de-regulation which has lowered the price of natural gas.
Croatia	Energy prices are generally based on costs. There are cross-subsidies which are to be phased out. There is a tariff system for electricity but not for natural gas. The prices for oil derivatives are liberalised and set by the Government according to price formula. Changes in the price policy of Croatia started in mid 1993 with the electric energy system, and later with the oil and gas systems, whereby Croatia moved closer toward the market economy.
Cyprus	<p>Maximum retail prices of some oil products are controlled by the government. There is some cross-subsidisation. New electric tariffs are under preparation, based on marginal cost.</p> <p>There are no environmental levies or taxes.</p>
Czech Republic	Adjustment of energy prices to be completed by end of 2002. Full liberalisation of the energy market is not envisaged before 2007, although it was planned that large consumers would be able to freely choose suppliers by 2002.

<p>Denmark</p>	<p>The Government regulates the Danish electricity and heat industry. In June 1999 an Act was passed by the Parliament on the future of the liberalisation of the electricity market, as required by an EU directive. From 1996, all non-industrial energy users pay a carbon tax of DKK 100 per tonne of CO₂. Also from 1996, a number of taxes on energy consumed by industry were introduced, together with a subsidy scheme to promote energy conservation in business enterprises. The industry taxation package was reviewed in 1998.</p>
<p>Estonia</p>	<p>Electricity and gas prices are regulated. The Energy Market Inspectorate reviews and approves the prices of fuel and energy sold by enterprises dominating the market. The gas and electricity markets will achieve full harmonisation with relevant EU directives by the end of 2002. There are no subsidies or cross-subsidies. General orientation of the Government is to preserve free price formation in the energy market and changing energy enterprises into optimal profit making enterprises.</p>
<p>Finland</p>	<p>Finland was the first country to introduce a CO₂ tax in 1990. Since its introduction the tax system has been modified and tax rates adjusted several times in the 1990s. The present tax structure on energy has remained the same since the beginning of 1997. The tax rates in force since September 1998 were planned to apply at least until the end of 2001. The present energy taxation consists of three tax components: a fiscal basic excise tax is levied on oil products, a CO₂ based additional excise tax is levied on transport and heating fuels and a differentiated (industrial and other use) additional excise tax is levied on electricity consumption.</p>
<p>France</p>	<p>Taxation used to re-balance automotive fuels (prior taxes favoured diesel fuels). There is also a new general tax on polluting activities, which initially did not include energy products.</p>
<p>Georgia</p>	<p>Independent regulation of prices since 1997. Process is almost complete in having prices reflect costs. Subsidies to the population and public facilities are gradually being reduced. There are some environmental taxes.</p>
<p>Germany</p>	<p>The energy tax, introduced in 1999, is levied on electricity, gas, oil and petrol, for all consumers. The revenues are offset as lower social security contributions and for financing a comprehensive support programme for renewable energies.</p>

Greece	Oil products subject to both excise taxes and VAT. There are no environmental taxes. There are no subsidies.
Hungary	Administered prices for electricity and gas went up 6% in 2000. The 2000 budget plan suggested that the government intends to put price liberalisation on hold in the energy sectors and to let the utilities bear the costs of higher energy prices, according to the EBRD.
Iceland	Taxation policy was developed without taking environmental issues into full account.
Ireland	<p>Electricity tariffs are being amended to reflect costs of supply. The Department of Public Enterprise has no responsibility for the consumer price of oil products and pricing policy is a matter for the oil companies.</p> <p>Taxes on excisable energy products in Ireland include excise and VAT components. Taxes are levied for revenue raising purposes, although environmental, social and competitiveness considerations influence tax levels on particular fuels. Generally, heating fuel (which also enjoys a lower VAT rate) and heavy fuel oil used in industry have lower excise duty rates compared with road fuels.</p>
Italy	<p>The final step towards complete deregulation of prices for oil products was taken about seven years ago.</p> <p>General criteria for defining electricity tariffs for consumers not entitled to freely choose their supplier, are set up by the Regulatory Authority for Electricity and Gas established by Act 481/95.</p> <p>Market liberalisation for natural gas is taking place according to legislative decree n° 164/2000, issued on May 23th, 2000. The reform will be based on regulated third party access and should be implemented very soon to complement the reform in the electricity sector.</p>
Japan	Various consumption taxes, excise taxes and electricity power development taxes.
Kazakhstan	Partial liberalisation. Wholesale electricity prices are determined by the market and transmission prices by the State Committee for Price and Antimonopoly policy but end-use prices are set by local government committees. There are no reported subsidies for energy, oil and liquefied gas.

<p>Kyrgyzstan</p>	<p>The State Energy Agency is responsible for controlling energy prices. It defines the principles of fixing the prices for electricity, district heating, hot water supply and natural gas. It also approves the methods of price and tariff calculation. While prices are regulated, it is expected that the laws on energy, electrical power engineering and the programme of restructuring of monopolistic sectors of the fuel and energy complex will create competitive market conditions.</p> <p>Prices are to cover costs and there should be no cross-subsidisation. There are cross subsidies covering the costs of thermal energy production at CHP plants by sales of electric power. There are subsidies for pensioners, disabled, veterans of war, etc.</p>
<p>Latvia</p>	<p>Energy Regulation Board approves tariffs for electricity, heat and gas.</p>
<p>Liechtenstein</p>	<p>In the near future a liberalisation of the market will take place. It is envisaged to have a complete market liberalisation in the year 2005.</p> <p>There are no energy or environmental levies.</p>
<p>Lithuania</p>	<p>There is an independent regulatory body for price setting. There are no subsidies or cross-subsidies.</p>
<p>Luxembourg</p>	<p>There is price competition due to the opening of the electricity and gas markets. For liquid and solid fuels the maximum prices fixed by Ministry of Economy based on marked evolution. For electricity prices for domestic sector fixed by agreement between the government and the distributions. For natural gas there is no official mechanism. There are various environmental taxes including the planned special prices for renewable electricity production.</p>
<p>Malta</p>	<p>Gradual liberalisation of energy prices started in 2001, also with the objective of phasing out cross subsidies. The Malta Resources Corporation is the regulatory body.</p>
<p>Moldova</p>	<p>Tariffs are determined by National Energy Regulatory Agency (www.anre.moldpac.md) Tariff calculation is based on reasonable expenses and 5% profit margin, determined by the energy law.</p>
<p>Mongolia</p>	<p>Energy prices have continued to increase but below the rate of inflation. Tariffs have never covered real production costs. The government provides cross-subsidies. The Energy Regulatory Authority is responsible for energy prices.</p>

Netherlands	Netherlands uses environmental taxes as part of its energy policy strategy. There is an environmental tax on fuels that came into force in January 1995.
Norway	Electricity prices are controlled through the Energy Act. CO ₂ taxes on fossil fuels were introduced in 1991.
Poland	There is a regulatory body for price setting. There are no subsidies but prices for natural gas are below cost recovery. Price increases set by the regulator, the Energy Regulatory Authority, at 12.5% a year do not match international gas price increases, according to EBRD.
Portugal	Various taxes plus price ceilings for premium leaded gasoline, diesel fuel and high sulphur fuel oil.
Romania	There is an independent regulatory body for price setting. There are still some consumer price subsidies in socially sensitive areas but no cross-subsidies remaining. In electricity there is a National Unified Tariff for regulated consumers across the country. Prices for heat are established on a local basis but the heat delivered by Termoelectrica SA to heat distributors has a national unified tariff. For natural gas, prices are set by the regulator based on the price of gas, transportation, storage and distribution. There is a social tariff for low-income consumers.
Russian Federation	<p>The prices for fuel and energy resources are defined by market supply and demand, moreover demand is affected by the low income of the population.</p> <p>Tariffs for natural gas, electricity and heating, as products and services of natural monopoly, are settled by State, moreover in certain cases there can be cross subsidies. 2002 prices for gas in domestic markets do not cover all expenses for exploration and transportation (for simple production), as tariffs for electricity and heating do not cover the expenses for the development of producing companies (expenses for extended production). Although, tariffs for heating are subsidised from regional budgets.</p> <p>Federal Energy Commission is responsible for the tariffs of natural monopoly products and defines maximum of electricity and heating tariffs. In sub federal units of Russian Federation tariffs are regulated by the regional energy commissions. Nowadays, the amounts of these tariffs are different in all territories: the difference between minimum and maximum amount of tariffs are 30 times.</p>

	<p>Such conditions with prices for energy resources don't stimulate energy savings and energy efficiency. The Energy Strategy of Russia for period of 2005-2007 includes liberalisation of price and tariffs of natural monopoly products, which will stimulate energy savings in economy and create favourable conditions for foreign investment in this field. Cross subsidies shall be abolished by the end of the restructuring of municipal housing services. Details of formation of price differences in natural gas, electricity and heating are in the process of studying.</p>
Slovak Republic	<p>Prices for electricity, gas, heat, and transport fuel are regulated by the Act No.18/96 on Prices. This Act defines two possible methods of price regulation. It is the setting of maximum price, and cost-plus method. The government has successfully declined the subsidies in electricity and gas sector. Since January 1, 2000 also the subsidies for households for heat supply were planned to be removed. Therefore there will be no state subsidies in energy prices. A cross-subsidising system is in function, which means that large consumers pay for the costs of small consumers. For the 18 months ending October 2000, household electricity prices rose 135%, heating prices increased by 112%. By comparison, rents increased 70%.</p>
Slovenia	<p>On January 1, 2003 the electricity market was completely opened for all electricity from abroad, as was the natural gas market for users with an annual consumption of over 25 million cubic metres and for producers of electricity from natural gas, regardless of consumption. Electricity prices for franchise customers (up to 41 kW) are laid down by the Government. The disparities in electricity prices for franchise customers have still not entirely been removed. Petrol prices are formed on the basis of a fixed system; the prices of all other petroleum derivatives, with the exception of LPG in high-pressure tanks for general use, are formed freely on the market.</p>
Spain	<p>The price of LPG and natural gas is provisionally subject to a system of ceiling prices, regulated by the Ministry of Industry and Energy according to the evolution of international prices. The rest of oil products has free pricing.</p> <p>Electricity prices are set by a pool. Consumers are also allowed to conclude contracts with suppliers. Electricity tariffs are maintained for all categories of consumers, and qualified consumers are allowed to choose between the tariff system and the pool system.</p> <p>There are no environmental levies and taxes in Spain.</p>

<p>Sweden</p>	<p>There are no subsidies or cross-substitution in Sweden. There are market-based prices on all fuels, district heating and electricity. Energy tax is levied on most fuels, and is independent of their energy content. Carbon dioxide tax, which was introduced in 1991, is levied on the amount of carbon dioxide emitted by all fuels except biofuels and peat. A sulphur tax was introduced in 1991. An environmental levy on the emission of NO_x was introduced in 1992. The electricity tax varies, depending on where, and for what, the electricity is used.</p>
<p>Switzerland</p>	<p>Electricity prices for large industries are set by utilities, are confidential and are not subject to price controls. Electricity prices for other consumers are set by the utilities or by local authorities. When prices are set by utilities, in most cases formal approval by local authorities is needed. In some municipalities, electricity prices are approved by popular referendum. Municipalities and cantons also influence price setting through their shareholdings. In the gas sector each distributor sets its own tariff structure and price, based on the structure of its market. At federal level, the Price Surveillance Authority is in charge of price monitoring in sectors with little competition.</p> <p>There are a number of environmental taxes, including provision for a carbon dioxide tax by 2004 at the earliest if voluntary measures to reduce carbon dioxide emissions are not effective.</p>
<p>Tajikistan</p>	<p>Industrial tariffs stood at 1.35 US cents per kWh and 0.34 US cents for households, in October 2000. According to the Asian Development Bank, the cost recovery level is around 2.1 cents/kWh. Collection rates for industry stand around 20%. There is an independent regulator of energy prices and there are no subsidies or cross-subsidies reported.</p>
<p>The FYRO Macedonia</p>	<p>The Law on Energy (Official Gazette 47/97) stipulates that prices of electricity, natural gas, heat energy, geothermal energy, and oil derivatives are set in accordance with the Methodology for pricing of certain forms of energy. This Methodology was adopted in August 1998 (Official Gazette 43/98). The price structure consists of normalized costs (depreciation of, equipment, insurance, maintenance, cost for materials and energy, gross salary, services from others, concessions, other costs, etc.) taxes and contributions and profit.</p> <p>There are no subsidies on energy prices. There are no environmental levies and taxes in the Republic of Macedonia.</p>

Turkey	<p>The Prime Minister, MENR, Ministry of Finance and Treasury were responsible for price setting/regulatory mechanisms. A new independent regulatory agency became operational in 2002. Small amounts of subsidies and cross subsidies exist in electricity pricing and is envisaged to be phased out. There is no direct tax related with the air quality.</p>
Turkmenistan	No information available.
Ukraine	<p>Ukraine has introduced market-based pricing mechanisms for all fuel and energy markets. At same time, government authorities balance between the objective need to raise electricity and heat prices, from the prospective of the energy sector of the national economy, and the need to maintain prices at the minimum levels avoiding any large leaps, from the standpoint of other economic sectors and the population.</p>
United Kingdom	<p>The Climate Change Levy was introduced on April 1, 2001 on the use of energy by business and the public sector.</p> <p>The government's general policy is to encourage competition in the energy market and allow energy prices to be determined largely by market forces. Energy prices are affected by government actions to internalise costs of regulation, however, and to include costs related to environmental objectives or diversity of supply.</p> <p>The opening up of the gas and electricity supply market has seen a large number of households switching supplier to benefit from the associated cost savings. Energy prices are dictated by free market mechanism, with the industry regulator, Competition Commission and consumer councils in place to ensure competitive practices are maintained.</p>
United States	<p>Energy prices mainly deregulated. The US has amongst the lowest end-use prices within the IEA, mainly due to low taxes.</p>
Uzbekistan	<p>Energy prices are gradually being raised towards world market prices.</p>

ANNEX 6

Status of Energy Consumption and Carbon Taxes

Country	Energy Consumption Related Tax	CO ₂ Tax
Albania	N	N
Armenia	N	N
Australia	P	N
Austria	Y	N
Azerbaijan	N	N
Belarus	n.a.	n.a.
Belgium	N	N
Bosnia and Herzegovina	n.a.	n.a.
Bulgaria	N	N
Canada	Y	N
Croatia	N	Y
Cyprus	N	N
Czech Republic	N	N
Denmark	Y	Y
Estonia	N	Y
Finland	Y	Y
France	Y	N
Georgia	N	Y
Germany	Y	N
Greece	N	N
Hungary	N	N
Iceland	N	N
Ireland	P	P
Italy	N	Y
Japan	Y	N
Kazakhstan	Y	N
Kyrgyzstan	N	P
Latvia	N	N
Liechtenstein	N	N
Lithuania	Y	N
Luxembourg	P	N
The FYR Macedonia	N	N
Malta	n.a.	n.a.
Moldova	P	P
Mongolia	N	N
Netherlands	Y	Y
Norway	Y	Y

Poland	N	N
Portugal	Y	N
Romania	Y	N
Russian Federation	Y	N
Slovak Republic	N	N
Slovenia	N	Y
Spain	P	N
Sweden	Y	Y
Switzerland	Y	P
Tajikistan	n.a.	n.a.
Turkey	Y	N
Turkmenistan	n.a.	n.a.
Ukraine	N	N
United Kingdom	Y	Y
United States	Y	N
Uzbekistan	n.a.	n.a.

Y = yes; N=no; P=planned

Source: Country Questionnaires to *PEEREA*

ANNEX 7 SUMMARY TABLES — PROGRAMMES

Summary of Energy Efficiency Measures — Central and Eastern European and CIS Countries

Country/ Sectoral Measures	AL	ARM	AZ	BEL	BOS	BG	CRO	CYP	CZ	EST	GEO	HU	KAZ	KYR	LAT	LIT	FYM	MAL	MD	MOG	PL	RO	RU	SK	SLO	TAJ	TUR	UA	UZB
Residential																													
Info/Educ/ Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	NM	Y	P	Y	NM	Y	NM	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	Y	P	Y	Y	N	Y	Y	Y	NM	Y	Y	Y
Regulations	P	Y	P	Y	NM	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	Y	Y	Y	NM	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vol. Agreements	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Commercial/ Services																													
Info/Educ/ Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	Y	Y	NM	Y	NM	Y	NM	Y	Y	Y	NM	Y	NM	Y	Y	Y	Y	Y	P	NM	Y	Y	Y	Y	Y	NM	Y	Y	Y
Regulations	P	NM	NM	NM	NM	Y	Y	Y	P	NM	Y	Y	Y	Y	Y	Y	Y	Y	NM	NM	Y	P	Y	Y	Y	NM	Y	Y	P
Vol. Agreements	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Y	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Y	NM	NM	NM	NM	NM	NM	NM
Industry																													
Info/Educ/ Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	NM	P	NM	P	Y	Y	Y	Y	Y	NM	Y	Y
Regulations	P	NM	NM	NM	Y	Y	Y	Y	P	NM	Y	Y	Y	NM	NM	Y	Y	NM	NM	NM	NM	Y	Y	Y	Y	Y	Y	Y	P
Vol. Agreements	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Y	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Transport																													
Info/Educ/ Awareness	P	Y	Y	NM	NM	Y	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM
Financial Incentives	P	Y	Y	NM	NM	?	NM	Y	Y	NM	Y	Y	Y	Y	Y	Y	NM	NM	P	NM	NM	NM	NM	Y	Y	NM	NM	Y	Y
Regulations	Y	NM	Y	NM	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	NM	Y	Y	Y	Y	Y	NM	Y	Y	NM
Vol. Agreements	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Y	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Y	NM	NM	NM	NM	NM	NM	NM

Legend: Y= Measure Exists; NM = No Measure; P = Measure Planned; ? = Measure Not Known

Summary of Energy Efficiency Measures — Other Countries

Country/ Measures Sectoral	AUS	AT	BEL	CAN	DK	FI	FR	GER	GR	ICE	IRE	IT	JAP	LIEC	LU	NL	NO	PT	SP	SW	SWIT	TURK	UK	USA
Residential																								
Info/Educ/Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	N	Y	Y	Y	Y	Y	NM	Y	Y	Y	NM	Y	Y
Regulations	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vol. Agreements	Y	Y	P	Y	NM	Y	Y	Y	NM	NM	Y	Y	NM	NM	NM	NM	Y	P	NM	Y	Y	NM	Y	Y
Commercial/ Services																								
Info/Educ/Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y
Regulations	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y
Vol. Agreements	Y	NM	NM	Y	NM	Y	NM	Y	Y	NM	Y	Y	Y	NM	Y	Y	Y	P	Y	NM	Y	NM	Y	Y
Industry																								
Info/Educ/Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y
Regulations	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	Y	Y	NM	Y	Y	NM	Y	NM	Y	Y
Vol. Agreements	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	NM	Y	Y	Y	NM	Y	Y	Y	Y	Y	Y
Transport																								
Info/Educ/Awareness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y
Financial Incentives	NM	Y	Y	Y	Y	Y	Y	Y	Y	?	NM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NM	Y	Y
Regulations	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	NM	Y	NM	?	NM	Y	NM	Y	Y	Y
Vol. Agreements	NM	NM	Y	Y	NM	Y	Y	NM	NM	NM	NM	Y	Y	NM	NM	Y	NM	NM	NM	Y	Y	NM	Y	Y

Legend: Y = Measure Exists; NM = No Measure; P = Measure Planned; ? = Measure Not Known

ANNEX 8:

Summary of Financial Incentives

Generic Measure	Sector	Country	Description
Tax Allowances and exemptions	General	Czech Republic	A lower rate of VAT is charged on the purchase of “Environmentally Friendly” technologies. This includes energy efficient technologies.
	Households	France	Income tax credits are given for installing insulation, heating regulation, and efficient boilers.
	Industry	France	Accelerated depreciation over the first year for energy efficient technologies and a subsequent reduction in business tax. Also companies approved for financing energy savings (SOFERGIE) may be granted a tax exemption on profits and capital gains made on the leasing or rental of equipment used to save energy.
	Household	Germany	Relief of excise duty on energy efficient lamps. This levels the cost of convention lamps compared to CFLs
	Industry, Transport	Netherlands	Tax credit: a percentage of the investment cost of approved technologies can be used to offset corporate profit taxes.
	Industry	Netherlands	The greenhouse gas sector is exempt from energy tax.
	Industry, Transport	Netherlands	Accelerated depreciation for listed technologies, including buildings, and for innovative technologies in processes, renewable energy and transportation.
	Households	Slovenia	Income tax reduction for energy efficient appliances expenditures.
Grants	District Heating	Austria	A subsidy is paid to operators of district heating plants to encourage continued deployment, and focus the fuel choice on renewable sources. The subsidy is raised by a levy of EURO 0.044/m ³ on natural gas, and EURO 0.0073/m ³ on electricity
	Households	Austria	All provinces offer subsidies for insulation as part of housing promotion and housing improvement laws
	Industry	Austria	Several provinces offer a variety of grants for the industry sector
	Households	Belgium	Walloon region has subsidy for low income households to improve energy efficiency

	Industry	Belgium	Walloon Region subsidises audits, bearing 75 % of costs. Flanders region provinces grants of 10 % for energy audits in general and additional support for small companies.
	Household	Czech Republic	A research, development and demonstration programme is run by the Czech Energy Agency. It aims to provide subsidies to support energy efficiency.
	Household	Czech Republic	A programme to subsidise the use of Compact Fluorescent lamps.
	Renewable Energy	Czech Republic	Subsidy and loan support to power generation utilising renewable sources of energy.
	Industry	Czech Republic	State subsidy programme to promote energy efficiency and lower energy intensity was developed in 1996.
	General	Denmark	Grant provisions totalling EURO 135 million are made each year to improve energy efficiency. There are subsidies for pensioners with low income. There are other grants to promote central heating.
	Industry, Service	Denmark	A subsidy scheme to promote energy savings in the industry. It has existed since 1993, but substantial changes were made in 1996 as part of the introduction of new CO ₂ taxes within business and industry. In 2000 it was changed again as a result of the evaluation of the "Green Tax System".
	General	Finland	Grants made to cover R&D or pilot projects for energy saving technologies. Total funding input is around EURO 252 million.
	Industry, Services	Finland	Energy audit programme subsidised by MTI by 40/50 %. Since 1992, with new phase starting in 1997.
	Households	France	Energy efficiency subsidies given to: <ul style="list-style-type: none"> • low income dwellers whose houses are older than 20 years; • rented accommodation dwellers, whose houses are older than 15 years; • rental and social housing improvement to assist organisations in improving their • rental housing units, over 15 years old.
	Industry	France	Research, Development and Demonstration of energy efficient technologies.
	General	Germany	Research, Development and Demonstration grants for energy generation and efficient technologies in a variety of sectors including housing and industry.

	CHP	Germany	Subsidy offered to improve CHP plants. Investments are particularly directed at modernising district heating plants, local heat distribution networks, and deploying energy measurement technologies. Subsidies covered up to 35% of eligible costs.
	Households	Germany	Householders can receive a payment of EURO 255.65 per year for eight years for the installation of certain heat pumps, solar systems or heat recovery boilers, or by purchasing a low energy home. Further support can be given if energy requirements are 25% lower than the standards established by the Heat Insulation Ordinance.
	Households	Hungary	Grant for additional insulation of the residential buildings, EE reconstruction of the heating system, changing the windows, started in 2000.
	Households	Hungary	Grant for reconstruction of the consumer side district heating
	Households, Industry, Services	Hungary	Grant for using renewable energy sources e.g. solar collectors.
	General	Hungary	Grant for reconstruction of the District heating as well as for consumer-side of district heating.
	Households	Ireland	Energy action programme provided grants to low income and elderly households to insulate homes.
	Industry, Services	Ireland	The Energy Audit Grant Scheme for industrial, commercial and institutional sector. Audits undertaken by consultants are subsidised by 40% up to a maximum of IR£ 5000.
	Industry	Ireland	Energy Efficiency Investment Support Scheme: Support (40% of costs) for selective implementation of energy audit recommendations and the introduction of targeted energy efficiency technologies (e.g. cogeneration).
	Industry	Ireland	Support to the competitive development of Combined Heat and Power.
	General	Netherlands	Total support for energy efficient technologies through R&D and other subsidies totals EURO 168 million in 1996.
	Household	Netherlands	EPR and EPA (beginning 2001) will provide subsidies for households which apply for listed energy efficient household equipment and building improvement. The energy distribution companies provide the subsidy and partially recover the cost as a tax allowance.

	Household	Netherlands	Grant towards the cost of double glazing and insulation, up to a maximum of 25% of total cost. Grant paid only to rented properties. (This scheme no longer operates).
	Industry	Netherlands	Subsidies for small industries are available through utilities within the framework of the MAP-2000.
	Industry	Netherlands	Through the Tender Scheme Publicity and Short Scans (SP/V&D) intermediaries are stimulated to start projects aimed at small and medium-sized businesses. A project has to be focused at least two themes: It's up to the intermediate to choose between several environmental care themes or to add the theme energy conservation in the proposed project. Budget for this scheme is Dfl 4.5 million in the year 2000. The maximum subsidy is 66,6%, or Dfl 0,25 million per project.
	Industry	Netherlands	Through the Energy Conservation and Environmental Consultancy subsidy scheme (SP/EMA), which forms part of the Cleaner Production programme (SP), companies may receive a subsidy for engaging external consultants to audit and advise on their operations and products with regard to energy conservation and environmental care. The budget for EMA will be Dfl 1.5 million in the year 2000. The maximum subsidy is 50% of the costs or Dfl 7 500 - 15 000.
	Industry	Netherlands	Other subsidy programmes to stimulate the introduction of new technologies through demonstrations, etc.
	General	Norway	Grant for R&D into innovative and efficient energy technologies.
	Households	Poland	A programme on Energy Efficiency and thermo-refurbishment of buildings in communal housing sector covering 2.4 million flats. This Act was approved by Parliament on 28 December 1998.
	Household	Portugal	Incentive scheme for the promotion and deployment of energy efficient technologies. Grant includes energy measurement, investments and demonstration of prototypes.
	Households	Slovak Republic	Financial assistance for the investment in energy efficiency in apartments (M and R and renewables).
	Households	Slovenia	Energy advice free of charge. Grants for replacement of windows and loft insulation. Energy audit programme for multi apartment buildings subsidised up to 50%.

	Industry, Public Sector	Slovenia	Energy audits and feasibility studies subsidies up to 50%.
	Industry	Slovenia	Investment project preparation support, up to 50% of their cost.
	Public Sector	Slovenia	Energy concepts of municipalities subsidies up to 50 %.
	General	Spain	Demonstration projects subsidies within the Energy Efficiency and Saving Plan (PAAE). The programme was between 1991 and 2000.
	Households	Sweden	Grants for reduced use of electricity for heating and grants for enlargement of district heating networks. There are 165 million dollars (for a five-year period).
	General	Sweden	The Technology Procurement Programme aims to improve the energy efficiency of products by using companies' competitive abilities to make better products. The process brings together the requirements of potential buyers that are prepared to place an order if specified conditions are met. Suppliers then compete on the basis of design and price.
	CHP	Sweden	Investment support is given to CHP fired using biomass. A grant of EURO 460.56 per kW of capacity is given to new plants, a grant of 35% of the rebuild costs are given to existing plant or where plant are converted from fossil fuels.
	Household	UK	<p>The Homes Energy Efficiency Scheme provides grants of up to EURO 491.75 to assist low income households install basic insulation. This grant includes payment for draught proofing, loft insulation, and other energy advice.</p> <p>Under the Energy Efficiency Commitment, electricity and gas suppliers must meet targets for the promotion of improvements in energy efficiency. They may contribute to the cost of energy efficiency measures taken up by consumers.</p>
Loan Support	Households	Austria	Some provinces and utilities offer soft loans for thermal improvement of houses
	General	Finland	Loan credits given to Finnish companies investing in plants and technologies in neighbouring countries to improve finish environment. Examples include energy efficiency and power generation plant refurbishment.

	Industry	Germany	Through the provision of low interest rate loans, the investment programme seeks to support the installation, expansion and modernisation of machinery that save energy, are energy efficient, use renewable technologies, improve air quality or handle/treat waste water. Loans of up to EURO 1 million, or no more than 50% of total investment cost are available. The loan is disbursed through a commercial bank.
	Public sector, SMEs, Households	Germany	A range of low interest rate loans for investment in municipal infrastructure, SMEs and households, including energy efficient technologies. Support is provided up to 50% of total project costs. Loans are disbursed through a range of private banks.
	Industry	Hungary	Preferential credit for energy efficiency.
	Households	Lithuania	Long term loans for energy efficiency improvements
	Households	Netherlands	Green mortgage can be given to house owners and building projects, if these are sustainable buildings (including energy savings). The interest is lower (about 1.5%) than normal, as the banks uses for this mortgage money from green funds. People invest in green funds, as the interests from these funds are excluded from the income taxes.
	Households	Slovak Republic	Subsidy for insulation of flats and houses with a subsidy of up to 70% of the interest charges, short term three-year loans or 75% of the loan value as bank guarantee.

Summary of Fiscal Measures

Generic Measure	Sector	Country	Description
Environmental Taxes NO_x	General	Czech Republic	Tax levied on motor fuels and other energy products. The tax is levied at a rate of EURO 23.3/t. No further information is available.
	General	Estonia	General pollution tax on NO _x . The tax rate is set at EURO 0.1/tonne of NO _x (1994).
	General	France	Tax levied on motor fuels and other energy products. No further information is available.
	General	Lithuania	Law on Environmental Pollution Charges (1999) sets rates for all air-polluting substances, including NO _x
	General	Norway	Charge made on the emission on NO _x from fuel used in domestic aviation, furnaces and gas turbines used for electricity and heat production. The tax is EURO 1.4 per kg of NO _x on aviation fuels, and EURO 4.6 per kg of NO _x for furnaces and gas turbines. The tax on furnaces and gas turbines is recycled to be tax neutral
	General	Poland	The tax is on emissions of sulphur dioxide and nitrogen oxides (calculated as nitrogen dioxide). The tax rate is set at EURO 80/t. The fine is taken out of the profits so that the enterprise cannot pass the costs to the consumers.
	General General	Slovak Republic Sweden	Fees for pollutants, including NO _x A charge of EURO 4.6 per kg of NO _x from boilers, gas turbines and stationary combustion plants producing at least 25 GWh per year, is levied. Revenues recycled based on total energy output and energy efficiency
	Environmental Taxes CO₂	General	Denmark
General		Finland	Tax levied at the rate of EURO 3.7 per tonne of CO ₂ on coal, natural gas, peat, heavy fuel oil, and light fuel oil, but not automotive fuels. There are no exemption provisions
General		Georgia	0.05 USD/tonne of CO ₂
General		Italy	As of 1998, CO ₂ tax applies to all energy products. It is progressively being introduced and will be fully operational by 2004.

	General	Netherlands	Fuel tax (BSB) is levied on mineral oils, coals and natural gas. Rates are based on carbon content and energy content of the different fuels. A similar tax is levied on uranium.
	General	Norway	Charge levied on mineral oils, natural gas and petroleum combusted during production on the continental shelf developed in 1991. Also a charge on coal and coke used for energy purposes has been in effect since 1992. Charge is also levied on automotive fuels at the rate of EURO 0.099 per litre for petroleum and EURO 0.049 per litre for diesel (1994 data).
	General	Poland	Tax on motor fuels and other energy products. Charge is levied at EURO 0.035 per ton of CO ₂ . The revenues are used in the general budget
	General	Slovenia	The CO ₂ tax introduced in 1996 and revised in 2002. It amounts to 13 Euro/t CO ₂ . There are tax exemptions to encourage investments in energy efficiency, cogeneration and renewables.
	General	Sweden	CO ₂ tax is levied on fuel oils (including Petrol and Diesel), coal, coke, natural gas and liquefied petroleum gas (LPG) used for energy purposes, and on domestic aviation fuels. The rate is equivalent to EURO 0.037 per kg of CO ₂ released. This is differentiated with payments in industry being 25% of the headline rate (or EURO 0.0092 per kg of CO ₂). Further deductions can be made where fuel is used in production, not as energy source.
Environmental Taxes SO₂	General	Belgium	Tax on non-motor fuel energy products. No further details available
	General	Czech Republic	Tax levied on motor fuels and other energy products. The tax is levied at a rate of EURO 29.1/t of SO ₂ . No further information is available.
	General	Denmark	The tax is levied on the sulphur content of fossil fuels which contain more than 0.05% sulphur. A tax is also levied on the sulphur content of biomass combusted in plants with an output of more than 1000 kW. The tax is set at DKK 20/kg sulphur. From 1996-1999 fuels for electricity production are exempt. while electricity is subject to an average sulphur tax rate per kWh.
	General	Estonia	General tax on pollution including SO ₂ . The tax rate is set at EURO 0.05/tonne.
	General	France	Tax on non-motor fuel energy products. No details available yet

	General	Italy	Fiscal charge for the period 1998/2005 will increase as to follow: - from 46 to 129 EURO/t of high sulphur oil - from 23 to 62 EURO/t of low sulphur oil
	General	Lithuania	Law on Environmental Pollution Charges (1999) sets rates for all air-polluting substances, including SO ₂
	General	Norway	Charge on SO ₂ has been made since 1970. The charge covers mineral oils such as diesel, bunker oils, and light and heavy heating oils. The charge is made as a percentage on fuels with a sulphur content greater than 0.25%.
	General	Sweden	Charge levied on coal, fuel oils, aviation fuels and peat. Charge rate for coal, coke, oils and peat equivalent to EURO 3.45 per kg of SO ₂ , EURO 1.38 per kg of SO ₂ for aviation fuels. Oil with a sulphur content less than 0.1% is exempt, and if sulphur control measures are used the tax is rebated.
Energy Tax	General	Austria	A tax of EURO 0.0436/m ³ and EURO 0.007/kWh was placed in 1996 on natural gas and electricity respectively. Part of the revenue raised through these taxes is allocated to regions (Länder) and cities for energy saving and environment protection measures (together 11,835 %) and local public transport (2.5 %). The tax level for electricity increased in 2000 to Euro 0.015/kWh. It is a policy and a practice to use funds collected through these taxes for financing energy savings and environmental protection measures. In 2000 EUROS 66.6 mil were used for energy saving/environment measures and EUROS 14.1 mil for local public transport. There are also taxes on mineral oil products. There are certain exemptions from the taxes.
	General	Belgium	The energy tax is levied per energy unit, using the taxation level for heating oil as the baseline. The tax rates are as follows: • Leaded/unleaded petrol/kerosene: 550 BEF/1000 litres; • Heating oil: 340 BEF / 1000 litres • paraffin oil: 520 BEF / 1000 litres • Liquid petroleum gas: 690 to 700 BEF/ 1000 Kg • Natural gas: 0.01367 BEF/m ³ • Electricity (low voltage tariff): 55 BEF/MWh

	General	Denmark	<p>The energy tax is levied per energy unit using a level of DKK 47/GJ as the baseline except for motor fuels. The tax rates are as follows (2000) on the most widely used fuels:</p> <ul style="list-style-type: none"> • unleaded petrol: DKK 3.808/litre • diesel/kerosene (motor fuel): DKK 2.286/litre - 2.565/litre • heating oil: DKK 1.719/litre • natural gas: DKK 1.60/Sm³ • coal: DKK 47/GJ • electricity: DKK 0.536/kWh • electricity for heating: DKK 0.471/kWh <p>The tax on electricity is levied on electricity supplied and not on the fuels used for generation.</p>
	General	France	<p>The main energy tax in France is a domestic tax on petroleum production (TIPP).</p>
	General	Germany	<p>The energy tax, introduced in 1999, is levied on electricity, gas, oil and petrol, for all consumers. The revenues are offset as lower social security contributions. CHP is exempt if it has more than 70% efficient. Electricity used for trains and trams is also exempt. There will be a reduced tax rate for natural gas powered vehicles until 2009. All manufacturing sectors pay 20% of the standard tax rates. Those that are highly energy intensive, who do not receive sufficient rebates, have 80% of the shortfall refunded.</p>
	General	Netherlands	<p>The regulatory energy tax (REB) is levied on a few energy products: natural gas, electricity and some mineral oils used by households and small firms. An upper limit of 1 million m³ of gas and 10 million kWh electricity per year is liable to the tax. Natural gas used for the production of electricity is exempt.</p> <p>The tax revenues are offset by lower taxes on income and corporate profits.</p>
	General	Romania	<p>10% tax on electricity and 2% tax on thermal energy to be used for Special Fund for Energy Systems Development. Since 1994.</p>
Levies	General	Denmark	<p>Increase of energy taxes of DKK 0.006 per kWh sold to fund the Electricity Saving Fund</p>

	General	UK	<p>A Climate Change Levy (CCL) was introduced on energy use in the non-domestic sector (industry, commerce, agriculture and the public sector) with effect from 1 April 2001. Its aim is to encourage energy efficiency, and help meet the United Kingdom's legally binding target for reducing greenhouse gas emissions set under the Kyoto Protocol. It will entail no increase in the tax burden on the non-domestic sector, taken as a whole, as the revenues will be recycled in full.</p> <p>As announced on 2 November 1999, the rates of the levy are based on the energy content of the different energy products. They are equivalent to 0.07 pence/kWh for LPG, 0.15 p/kWh for gas and coal, and 0.43 p/kWh for electricity.</p>
	General	Netherlands	<p>The Netherlands environmental plan (MAP) is financed by a MAP-levy of maximum 2% of the energy tariff. Total budget is approximately Dfl 250 million/yr.</p>
	General	Norway	<p>A levy of 0.00036 EURO/kWh is payable on the transmission and distribution of electricity. The revenue is used to finance information programme and networks.</p>

ANNEX 9

FOURTH MINISTERIAL CONFERENCE

ENVIRONMENT FOR EUROPE

ÅRHUS, DENMARK
23 - 25 JUNE 1998

DECLARATION

**by the Environment Ministers of the region
of the United Nations Economic Commission for Europe (UN/ECE)**

A. PREAMBLE

1. We, the Environment Ministers and Heads of delegations from 52 countries in the UN/ECE region and the representative of the European Commission, met at Århus, Denmark, from 23 to 25 June 1998, in the fourth of a series of Ministerial Conferences held as part of the "Environment for Europe" process.

ENERGY EFFICIENCY ^{87, 88}

31. We endorse the Policy Statement on Energy Efficiency (see Conference document ECE/CEP/47) and welcome the Guidelines on Energy Conservation in Europe (see Conference document ECE/CEP/47/Add.1) submitted by the ECE Committee on Environmental Policy, and we remain convinced that increased energy efficiency will be a major tool for fulfilling our commitments in the Kyoto Protocol.
32. In particular, we will promote action to reform energy markets and pricing to ensure there are cost-based prices and economic incentives that increasingly internalize the environmental costs of energy production and use. In this context we support all international activities to develop measures to reduce aircraft noise and air emissions. We furthermore support work towards the introduction of regulatory or fiscal measures in high-growth transport sectors such as aviation. We

⁸⁷ Canada and the United States of America strongly support energy efficiency as a major tool for reducing greenhouse gas emissions. They are firmly committed to continuing to increase energy efficiency. The endorsement of the Policy Statement on Energy Efficiency and the Guidelines on Energy Conservation in Europe would be inconsistent with a fundamental tenet of the Kyoto Protocol, to permit countries to meet environmental goals in accordance with national circumstances. Therefore, Canada and the United States of America cannot support paragraphs 31, 32 and 35.

⁸⁸ Even though Turkey is not a signatory to the Kyoto Protocol, it has similar concerns to those of the United States and Canada. Therefore, it cannot support paragraphs 31, 32 and 35 either.

will promote action to progressively reduce and where possible remove energy price subsidies which counteract an efficient use of energy and/or have harmful effects on the environment by 2005.

33. We acknowledge the complex, cross-sectoral nature of energy efficiency policies and the need for the integration of those policies into other sectors, for instance in the field of housing, transport and industry. For energy efficiency policies to be effective, all relevant levels of government should ensure a strong and efficient coordination of policy measures.
34. We acknowledge the importance of international financing for effective energy conservation, and the development of renewable energy sources particularly in central and eastern Europe including the NIS countries, for example through the World Bank, the Global Environmental Facility (GEF), United Nations Development Programme (UNDP), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the EU PHARE and TACIS programmes. We urge the international bodies concerned to make energy conservation and efficiency a priority in their operational policies and project implementation guidelines.
35. We will promote action to strengthen international cooperation in monitoring the implementation of energy efficiency policies. Progress will be reported to the next "Environment for Europe" Conference.

POLICY STATEMENT ON ENERGY EFFICIENCY

Endorsed by Ministers at Aarhus Conference, June 1998

Having regard to:

- The >Environment for Europe< Ministerial Declaration, Sofia, October 1995,
- The Rio Declaration on Environment and Development and Agenda 21, June 1992,
- The Programme for further implementation of Agenda 21, United Nations General Assembly Special Session, June 1997,
- The Convention on Long-range Transboundary Air Pollution and its protocols, United Nations Economic Commission for Europe (UN/ECE),
- The Energy Charter Treaty and the Protocol on Energy Efficiency and Related Environmental Aspects, to come into force in 1998,
- The Kyoto Protocol to the United Nations Framework Convention on Climate Change, December 1997,

- The background papers, case studies and country profiles of the Energy Conservation Initiative prepared during 1997 and 1998 for this Conference,
- National, bilateral and multilateral cooperative efforts to increase energy efficiency,
- The Global Environment Facility (GEF), which provides financial and technical support for the implementation of the United Nations Framework Convention on Climate Change and other global conventions,

Considering that:

- Continued improvements in the entire energy cycle from production to distribution and consumption have many environmental benefits because they help to reduce greenhouse gas emissions and to relieve local and regional air pollution, acidification and water pollution, land degradation, health problems and other environmental impacts,
- There are important principles and approaches that can be widely applied although there is no single formula for energy efficiency policy which is appropriate for all countries,
- Energy efficiency is a driving force in economic development and environmental protection, thus contributing to both competitiveness and sustainable development,
- A high potential remains for cost-effective energy efficiency improvements by the introduction of energy-efficient technologies, good energy management techniques and energy-efficient behaviour,
- A substantial part of this potential may be achieved at no cost or even with immediate economic benefits,
- Energy efficiency may interact beneficially with small-scale energy supply and renewable energy,
- End-use energy prices should reflect as much as possible a competitive market, ensuring market-oriented price formation, including full reflection of environmental costs and benefits, and appreciating that such price formation is essential to progress in energy efficiency,
- Many market and institutional barriers delay the realization of the full potential for energy efficiency improvements,
- A systematic and comprehensive approach to energy efficiency policies and programmes should complement and reinforce the market approach and not replace it,

- This approach has to be pursued in partnership with Governments, the private sector and others integrating various responsibilities ranging from energy, economy, industrial development to transport and the environment,
- Many opportunities are open for cooperation amongst members of the Energy Charter Conference, and of UN/ECE and the Parties to the United Nations Framework Convention on Climate Change (UN/FCCC) to share experiences, know-how and financial support,
- The United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and the World Bank could contribute to the implementation of energy efficiency programmes and projects through the GEF financial mechanism,

We, the Ministers at the Århus Conference,

1. **Recognise** that energy efficiency policies are one of the most important elements in achieving our national and international goals in economy, environment, energy supply security, and technology, which all influence the quality of life;

2. **Welcome** the *Guidelines on Energy Conservation in Europe*⁸⁹, appreciating that its findings are important and should be considered, as appropriate, in the further elaboration and implementation of our national, regional and local energy efficiency policies and for setting ambitious targets for energy efficiency;

3. Agree to promote action to:

(a) Review, revise and invigorate as necessary our Governments' national approaches to energy efficiency promotion, and better integrate energy efficiency into our national energy, environmental, economic and social development strategies;

(b) Promote the implementation of energy efficiency policies, and, in that context, develop general public awareness, ensure a suitable market mechanism and a framework which enables decentralized approaches, and introduce or develop highly performing yet cost-effective and environmentally sound technologies and integrated systems;

(c) Promote energy markets and pricing reforms to ensure less distorted prices and incentives which encourage better energy use and increasingly reflect the environmental costs of energy production and use, specifically by:

⁸⁹ Contained in ECE/CEP/47/Add.1.

- (i) Modifying and phasing out those energy price subsidies which have an adverse impact on the environment before the year 2005 and encouraging international cooperation to establish review mechanisms to ensure this;
 - (ii) Internalizing to the extent necessary and practicable environmental externalities in the energy prices before the year 2005;
- (d) Promote energy-efficient and cleaner technologies by transforming our domestic and international markets, specifically by:
 - (i) Developing, implementing and monitoring at an appropriate level in cooperation with the relevant parties, mandatory or voluntary minimum energy efficiency standards (such as voluntary commitments) on an ambitious and dynamic level for buildings and for relevant household appliances and standardized equipment, wherever practicable before the year 2005;
 - (ii) Developing a strategy for promoting combined heat and power and, to the extent efficient and feasible, district heating and cooling, and combined with renewable energy, and encouraging international consideration of the options for establishing a focal point to assist in this;
- (e) Promote investments in energy efficiency by encouraging international financial institutions, donors and other relevant parties, including the private sector, to increase energy efficiency investments significantly to become a considerable part of their economic activities within existing programmes; by supporting international cooperation in the continuous development of a >clearing house< for new small-scale energy efficiency projects in order to make them bankable; and by encouraging the development of an energy efficiency service industry;
- (f) Promote the international exchange of experiences on the best use of the opportunities for developing new markets in energy efficiency and energy services to create more jobs on a sustainable basis;
- (g) Support the development of improved data and indicators to monitor and evaluate the progress being made in energy use by the end-use sectors, including the environmental aspects of this;
- (h) Strengthen international cooperation in monitoring the implementation of energy efficiency policies. Progress should be reported to the next >Environment for Europe< Conference;
- (i) Urge those Governments that have ratified the Protocol on Energy Efficiency and Related Environmental Aspects to implement its provisions fully;
- (j) Urge Governments to work vigorously and cooperatively to achieve the objectives of the Kyoto Protocol and the Protocol on Energy Efficiency and Related Environmental Aspects, e.g. by speeding up, as appropriate, the processes to sign and ratify them.

ANNEX 10

from Plan of Implementation to World Summit on Sustainable Development, Johannesburg, September, 2002

9. Take joint actions and improve efforts to work together at all levels to improve access to reliable and affordable energy services for sustainable development sufficient to facilitate the achievement of the millennium development goals, including the goal of halving the proportion of people in poverty by 2015, and as a means to generate other important services that mitigate poverty, bearing in mind that access to energy facilitates the eradication of poverty. This would include actions at all levels to:
 - (a) Improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources, taking into account national specificities and circumstances, through various means, such as enhanced rural electrification and decentralized energy systems, increased use of renewables, cleaner liquid and gaseous fuels and enhanced energy efficiency, by intensifying regional and international cooperation in support of national efforts, including through capacity-building, financial and technological assistance and innovative financing mechanisms, including at the micro and meso levels, recognizing the specific factors for providing access to the poor;

20. Call upon Governments ... to:
 - (a) Take further action to mobilize the provision of financial resources, technology transfer, capacity-building and the diffusion of environmentally sound technologies ...;
 - (b) Integrate energy considerations, including energy efficiency, affordability and accessibility, into socio-economic programmes, especially into policies of major energy-consuming sectors, and into the planning, operation and maintenance of long-lived energy consuming infrastructures, such as the public sector, transport, industry, agriculture, urban land use, tourism and construction sectors;
 - (c) Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energies, improving energy efficiency and greater reliance on advanced energy technologies, including cleaner fossil fuel technologies;
 - ...
 - (h) Establish domestic programmes for energy efficiency, including, as appropriate, by accelerating the deployment of energy efficiency technologies, with the necessary support of the international community;
 - (i) Accelerate the development, dissemination and deployment of affordable and cleaner energy efficiency and energy conservation technologies, as well as the transfer of such technologies, in particular to developing countries, on favourable terms, including on concessional and preferential terms, as mutually agreed;

- ...
- (k) Promote increased research and development in the field of various energy technologies, including renewable energy, energy efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies, both nationally and through international collaboration; strengthen national and regional research and development institutions/centres on reliable, affordable, economically viable, socially acceptable and environmentally sound energy for sustainable development;
 - (l) Promote networking between centres of excellence on energy for sustainable development, including regional networks, by linking competent centres on energy technologies for sustainable development that could support and promote efforts at capacity-building and technology transfer activities, particularly of developing countries, as well as serve as information clearing houses;
- ...
- (n) Utilize financial instruments and mechanisms, in particular the Global Environment Facility (GEF), within its mandate, to provide financial resources to developing countries, in particular least developed countries and small island developing States, to meet their capacity needs for training, technical know-how and strengthening national institutions in reliable, affordable, economically viable, socially acceptable and environmentally sound energy, including promoting energy efficiency and conservation, renewable energy and advanced energy technologies, including advanced and cleaner fossil fuel technologies;
 - (o) Support efforts to improve the functioning, transparency and information about energy markets with respect to both supply and demand, with the aim of achieving greater stability and predictability and to ensure consumer access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services;
 - (p) Policies to reduce market distortions would promote energy systems compatible with sustainable development through the use of improved market signals and by removing market distortions, including restructuring taxation and phasing out harmful subsidies, where they exist, to reflect their environmental impacts, with such policies taking fully into account the specific needs and conditions of developing countries with the aim of minimizing the possible adverse impacts on their development;
 - (q) Take action, where appropriate, to phase out subsidies in this area that inhibit sustainable development, taking fully into account the specific conditions and different levels of development of individual countries and considering their adverse effect, particularly on developing countries;
 - (r) Governments are encouraged to improve the functioning of national energy markets in such a way that they support sustainable development, overcome market barriers and improve accessibility, taking fully into account that such policies should be decided by each country, and that its own characteristics and capabilities and level of development should be considered, especially as reflected in national sustainable development strategies, where they exist;

- (s) Strengthen national and regional energy institutions or arrangements for enhancing regional and international cooperation on energy for sustainable development, in particular to assist developing countries in their domestic efforts to provide reliable, affordable, economically viable, socially acceptable and environmentally sound energy services to all sections of their populations;
 - (t) Countries are urged to develop and implement actions within the framework of the ninth session of the Commission on Sustainable Development, including through public-private partnerships, taking into account the different circumstances of countries, based on lessons learned by Governments, international institutions and stakeholders and including business and industry, in the field of access to energy, including renewable energy and energy-efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies;
 - (u) Promote cooperation between international and regional institutions and bodies dealing with different aspects of energy for sustainable development within their existing mandate, bearing in mind paragraph 46 (h) of the Programme of Action for the Further Implementation of Agenda 21, strengthening, as appropriate, regional and national activities for the promotion of education and capacity-building regarding energy for sustainable development;
- ...
- (w) Strengthen and, where appropriate, facilitate dialogue forums among regional, national and international producers and consumers of energy.

21. Promote an integrated approach to policy-making at the national, regional and local levels for transport services and systems to promote sustainable development, including policies and planning for land use, infrastructure, public transport systems and goods delivery networks, with a view to providing safe, affordable and efficient transportation, increasing energy efficiency, reducing pollution, reducing congestion, reducing adverse health effects and limiting urban sprawl, taking into account national priorities and circumstances. This would include actions at all levels to:

- (a) Implement transport strategies for sustainable development, reflecting specific regional, national and local conditions, so as to improve the affordability, efficiency and convenience of transportation, as well as improving urban air quality and health, and reduce greenhouse gas emissions, including through the development of better vehicle technologies that are more environmentally sound, affordable and socially acceptable;
- (b) Promote investment and partnerships for the development of sustainable, energy efficient multi-modal transportation systems, including public mass transportation systems and better transportation systems in rural areas, with technical and financial assistance for developing countries and countries with economies in transition.

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ACRONYMS

CDM	Clean Development Mechanism, a flexible mechanism under the Kyoto governing project-level carbon credit transactions between Annex I and non-Annex I countries
CEEC	Central and East European Countries
CIS	Commonwealth of Independent States (former Soviet Union, except for Baltic States)
CO ₂	Carbon dioxide
EBRD	European Bank for Reconstruction and Development
EC	European Commission of the European Union
ECS	Energy Charter Secretariat
EEI	Energy Efficiency Initiative, publication prepared for Aarhus Conference
EU	European Union
FSU	Former Soviet Union
GEF	Global Environment Facility
GHG	Greenhouse Gases
IEA	International Energy Agency
JI	Joint Implementation, a flexible mechanism under the Kyoto Protocol
OECD	Organisation for Economic Co-operation and Development
OPET	Organisations for the Promotion of Energy Technologies
PEEREA	Protocol on Energy Efficiency and Related Environmental Aspects of the Energy Charter Treaty
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VAs	Voluntary Agreements

GLOSSARY OF SELECTED TERMS

Demand-side Management (DSM): “Covers a whole range of activities designed to induce energy consumers to change their consumption patterns. DSM involves measures that specifically seek a cost effective reduction in the use of energy below the level that would otherwise prevail. Such reductions involve elimination of outright waste, reduction of inefficient energy-using activity, substitution of one form of energy for another, or substitution of other productive factors like capital and labour for energy”. [Source: J. Ferriter address published in IEA, *Demand-side Management: Opportunities and Perspectives in the Asia-Pacific Region*, Conference Proceedings, Paris, 1993.]

Energy Efficiency: “An improvement in energy efficiency is regarded as any action undertaken by a producer or a consumer of energy products that reduces energy use per unit of output, without affecting the level of service provided. Energy efficiency improvements can therefore be considered at all stages of the various fuel cycles. Greater energy efficiency can be brought about through hardware improvements, such as technological enhancements; software changes, such as improved energy management and better operational practices; or a combination of both”. [Source: IEA, *Energy Efficiency and the Environment*, Paris, 1991.]

Note: “Energy efficiency” is often used interchangeably with “energy conservation.” Others consider “energy conservation” to refer to reduced energy consumption while not maintaining the same services (e.g. driving fewer kilometres or turning off lights and appliances). Some argue that turning off equipment or appliances when they are not needed is an efficiency improvement while others argue it is only a conservation measure.

Another expression is “energy saving”. Saving energy can be achieved through efficiency improvements, lower energy services or fuel switching (e.g. substitution of oil by renewables).

Energy Indicators: “Energy indicators relate energy consumption to measures of output in ways that provide fine detail at the level of discrete activities. They may also be used to build broader aggregations. The aggregate indicators — built with a bottom-up methodology and not to be confused with misleading numbers calculated from aggregate data — give a global perspective on how broad energy categories have evolved”. [Source: IEA, *The Link Between Energy and Human Activity*, Paris, 1997]

Energy Intensity: “Energy “consumed” per unit of activity or output.” [Source: *Energy Efficiency Initiative*, Paris, 1998.]

From the same study, the elaboration of indicators and intensity is further explained by:

Delivered Energy Intensities: quantities formed by dividing the energy used for a given economic purpose — for example, energy use per tonne or monetary value of steel produced, energy use per square metre of space heated, or energy use per tonne-km of freight shipped.

Structural Indicators: relative amounts of subsectoral activity within a sector. In manufacturing, structure refers to the relative contribution to overall manufacturing GDP from different subsectors. In transportation, structure usually refers to the relative contribution to total passenger- or tonne-kms from each mode (rail, cars, air, etc.). For the residential sector, structure refers to end-uses to which a shift in relative energy consumption can apply, e.g. space heating, water heating, cooking, lighting and appliances.

Integrated Resource Plan: “An integrated resource plan is a plan in which there is a socio-economic balance between the endeavours of the supply side as regards energy production and distribution on the one hand and on the other the investments made by the supply side and the consumers with a view to energy efficiency. The measures on the demand side can be information, campaigns, consultancy and other types of assistance — concerning energy conservation activities about more efficient use of energy and concerning private electricity production”. [Source: Integrated Resource Planning in the Danish Electricity Utilities, *Integrated Resource Planning: From Concept to Practice*, October 1994.]

The same publication states that IRP consists of: “A balanced evaluation of the supply side and the demand side in which all energy supply alternatives and all conversion of energy into energy services are subjected to evaluation on a level playing field”.

And that the objective of IRP is: “To fulfill consumers’ needs and expectations as regards *energy services*, while incurring the lowest possible costs within the political framework of society (energy and environmental policies)”.

Least-cost Planning: See Integrated Resource Planning.

Potential: Potential is divided into different estimates”. [Source: *Energy Efficiency Initiative*, Paris, 1998.]

Technical potential is the achievable savings resulting from the maximum energy efficiency improvement available at a given time, regardless of cost considerations.

Market potential is the saving that can be expected to be realised in practice. It reflects what is seen to be technically and financially viable by individuals and organisations.

Economic potential is the saving that can be achieved by optimising costs and get the best overall use of resources. It reflects the viewpoint of individuals and organisations.

Social potential is the saving that can be achieved at a net positive economic effect to society as a whole. Here, multiple economic actors are included and externalities taken into consideration.

Third-party financing: “A third-party investor covers the financing, carries out the work under its own responsibility and guarantees the result. The investment is repaid on a pro rata basis from operational savings over a limited period. The risk is assumed by the third-party financier who is compelled to limit the difference between estimated and actual energy savings”. [Source: *Energy Efficiency Initiative*, Paris, 1998.]

Voluntary Agreement: “An agreement between government and industry to facilitate voluntary action with a desirable social outcome, which is encouraged by the government, to be undertaken by the participant based on the participant’s self-interest”. [Source: *Energy Efficiency Initiative*, Paris, 1998.]



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