Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA)

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

Energy Charter Secretariat

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

INTRODUCTION

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

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

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects

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

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

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

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

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EXECUTIVE SUMMARY

Estonia, the smallest of three Baltic states, is one of the strongest candidates for EU accession, expecting to become a member as early as 2004. It is a lightly industrialised country - primary energy supply in 2001 was only 4.7 Mtoe so the residential sector accounts for about half of national energy use.

Estonia is unique in the world in that it uses indigenous oil shale as its main energy source. The only other significant indigenous fossil source is peat. As there is no oil and no refineries, all petroleum products are imported. Natural gas is imported from Russia. The Estonian chemical industry also uses oil shale for the production of shale oil, which is used in domestic applications as well as exported.

Power generation is dominated by oil shale at two large power plants, both situated in the North East of the country. District heating plants use a range of fuels including natural gas, wood, heavy fuel oil and oil shale.

Institutionally, energy efficiency is the domain of the Ministry of Economic Affairs, where only four staff share responsibility for both energy efficiency and renewable energy. The small group is responsible for all aspects of energy efficiency - from policy design, strategy design, planning and programme design to programme management and implementation, as well as representing Estonia at national and international levels in energy efficiency-related matters. There is no energy efficiency agency to share these tasks.

Estonia invests relatively little in energy efficiency, much of which is focused on energy efficiency in schools, hospitals and social institutions. The energy efficiency budget for the year 2002 is only 3,655,000 EEK (approx. €234,600). Recent requests by the counties for support for energy efficiency projects from the Public Investment Programme outstripped available money by a ratio of 10:1. The contribution of multilateral and bilateral donors to energy efficiency projects over the last decade has very much exceeded the level of funding available from the national budget.

The Energy Act and the Energy Efficiency of Equipment Act are the primary energy efficiency-related laws, together with secondary legislation some of which is still under development.

Some of the main barriers to energy efficiency in Estonia are the high proportion of low-income energy consumers; relatively unattractive financing conditions for energy efficiency investments; small-scaled investment opportunities which are not interesting to larger investors; low awareness of energy auditing and energy management; relatively high costs of setting up energy auditing systems and campaigns in energy efficiency field as compared to targeted budgetary allocations; lack of awareness of the benefits of energy efficiency opportunities amongst company managers, housing associations and public officials; relatively inconsistent data about feasible energy efficiency improvement sites on national and county levels; and a lack of indigenously-produced energy efficiency equipment.

There is unwavering political support for the continuing use of oil shale as the main fuel for power production. Furthermore there is resistance to liberalisation of the electricity market, with Eesti Energia remaining a fully state-owned vertically integrated utility. The EU has given Estonia a derogation to the year 2012 from the requirement to fully-comply with the Electricity Directive, so the limited scope for power sector competition is no longer a barrier to EU accession. All natural gas comes from Russia, and is supplied by AS Eesti Gaas, the largest shareholder of which is Gazprom of Russia. Liquid fuel markets are fully deregulated.

Estonia has embraced the principles of rational energy pricing policy by successfully removing subsidies and cross subsidies from the energy sector and retaining subsidies for public transportation.

The very high specific heat consumption of the district heating systems at the beginning of the 1990s has gradually improved as a result of supply-side investments and conversion to local and cleaner fuels. However, Estonian district heated households still consume about 30% more energy than in neighbouring Finland, and the scope for further supply-side improvement is becoming limited.

Emissions fees for SO_2, NO_x, solid particles, ash and CO_2 are in place but set at a low level which has been fixed until the year 2005. Despite the position of the energy sector as the largest source of atmospheric pollution, the funds raised are not focused primarily on energy efficiency as the Ministry of Environment, which controls the funds, considers energy efficiency to be the domain of the Ministry of Economic Affairs.

There are very few fiscal incentives to promote energy efficiency in Estonia, and a reduced VAT regime for district heating.

Municipalities have few hard legal obligations in the field of energy efficiency, but have some legal powers and hence enjoy considerable freedom to decide how they deal with energy efficiency issues. Depending on local understanding and institutional capacity, the approach and level of commitment to energy efficiency varies considerably from municipality to municipality.

Despite continuing subsidies to encourage energy efficiency in the transport sector, the ratio of public transport to private transport has moved from 70:30 to 30:70 in the past decade. The fuel consumption of vehicles has improved radically as a result of substitution of modern vehicles for old, soviet era vehicles. Road taxes will be introduced for the first time in 2003, replacing an existing registration tax.

Energy efficiency policies are not stated explicitly, but are implicit in a number of planning documents, strategies and laws. The Long-term Energy Sector Development Plan for Estonia 1998 which had a strong focus on EU integration will be updated in 2003.

It appears that a long-term energy development plan for the capital, funded by the municipality of Tallinn, appears to have a supply side bias. Some other muncipalities prepare energy development plans, but the quality and impact varies enormously.

The first 'Energy Efficiency Target Programme' which commenced in 1992 achieved goals of reducing fuel imports by 50% and substituting imported fuels with local fuels. These were energy policy goals rather than energy efficiency goals - indeed the Estonian local fuels introduced as a result of the Programme, oil shale and peat, are of lower efficiency and are more polluting than some of the fuels which they displaced. However, Estonia's rapid transition from a centrally planned economy to a market economy, which has included the successful introduction of rational energy pricing policies in most areas, has created both appropriate price signals and created substantial market incentives to improve energy efficiency.

The current Energy Efficiency Target Programme, which began in 2000, aims for energy consumption growth to be no more than half GDP growth and CO_2 of emissions to be reduced by 8% against 1990 levels, through energy efficiency and fuel switching. An associated Implementation Plan which was approved in 2001 defines the main activities to be carried out by 2005 in order to meet targets and reads like a well-designed textbook plan of the right things to do to improve energy efficiency on a large scale. However it is not clear that the budgets or political commitment to successfully convert this plan into concrete measures and actions to be implemented is yet in place.

A Programme for Heating Optimisation and Cogeneration Exploitation, which is under preparation in 2002, will lead to a National Strategy and Plan of Action for use of CHP and a feasibility study for a full scale biomass CHP demonstration plant. The Programme appears to have a supply-side focus rather than a demand-side focus.

Estonia and Denmark share joint responsibility for the energy component of Agenda 21/ Baltic 21, an initiative of all Baltic Sea countries to implement the principle of sustainable development in the agriculture, energy, fishery, forestry, industry, tourism, and transport sectors. There have been few energy activities so far.

Energy legislation includes the Energy Act, which makes little impact on energy efficiency, and the Energy Efficiency of Equipment Act, through which EU energy efficiency standards are incorporated into Estonian Law. Three new energy laws are planned: Electricity Market Act, a Natural Gas and District Heating Act and a Liquid Fuels Act. The proposed new legislation represents an opportunity for Estonia to take a fresh look at the policies which are to be reflected in the legislation.

Institutionally, the main energy efficiency actor is the Energy Department of the Ministry of Economic Affairs, which has only two staff with responsibility for energy efficiency. There is no national agency for energy efficiency. The roles of a number of governmental and non-governmental energy efficiency stakeholders are reviewed in this report, including the Environmental Investment Centre, the Regional Energy Centres and the Credit and Export Guarantee Fund (KredEx).

It was noted that there appears to be a shortage of empowered, grassroots local NGOs to promote energy efficiency in Estonia.

The problem of oil shale pollution is examined in some detail, together with Eesti Energia's €400 million investment plans to mitigate some of the environmental impact of continuing oil shale use.

There are three reasons for Estonia's political commitment to oil shale, which can be summarised as firstly a concern for social issues in the Ida-Virumaa region (Narva); secondly a reluctance to become reliant on Russian natural gas; and finally that oil shale-fired power is sufficiently cheap to internalise environmental costs, as described in more detail in this report.

The chapter on environmental issues highlights that the year 1990, which was selected as the base for measuring CO_2 emissions reductions, was just before the industrial decline resulting from the political changes of the early 1990s in former communist states, and that Estonia has comfortably assumed the most stringent Kyoto obligations. The Act on Sustainable Development of 1995 is described, as is the National Environment Strategy of 1997 which set short-term and long-term tasks to be achieved by 2000 and 2010.

A National Environmental Action Plan for 2001-2003 which is currently being carried out includes preventive, clean-up, restorative, monitoring and regulatory actions to improve the environment.

In the final two chapters, an assessment of Estonia's progress is made as are specific recommendations on how, in the opinion of the Review Team, the Government of Estonia could improve its performance in the fields of energy efficiency and related environmental aspects.

A Review of Progress discusses how Estonia appears to recognize the potential for economic, social and environmental improvements through energy efficiency and the required expertise and experience to make this happen are available locally. However, the specific level of human and financial resources devoted by the Government to catalyzing energy efficiency appears to be inappropriately low. Similarly, institutions, both at a national and a municipal level, have relatively low levels of responsibility, power, resources and/or focus on energy efficiency issues.

Based on the findings of the Review Team, 29 specific recommendations are made on how the Government of Estonia could improve its performance in the fields of energy efficiency and related environmental aspects. Themes include creating and improving energy efficiency legislation, policies and strategies; improving energy price and markets; strengthening institutional frameworks and inter-institutional dialogue; improving energy efficiency funding and fiscal policy; implementation of specific programmes and instruments; strengthening demand-side management and district heating; creating energy efficiency and environmental policies; and carrying out information and awareness building.

IN-DEPTH REVIEW OF ENERGY EFFICIENCY POLICIES AND PROGRAMMES

1. Introduction To The Peerea Review

In June 2002, a team of representatives from the Working Group of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects reviewed the energy efficiency policies and programmes of Estonia.

The role of the in-depth energy efficiency review undertaken on a peer basis by the Working Group is to enhance the level of co-operation amongst contracting parties (Article 3.1).

The in-depth review is also being used to assess progress, promote continuous dialogue and transfer information.

The Review Team, representing four Energy Charter Member States, consisted of Mr. Sune Westermark of Sweden, who chaired the review, Mr. Valdis Kregers of Latvia, Mr. Geza Meszaros of Hungary and Mr. Rimantas Sevastijanciukas of Lithuania. Professional support was provided by Mr. Tudor Constantinescu of the Charter Secretariat and Mr. Mark Velody, consultant to the Secretariat, and Mr Seppo Silvonen from the Baltic Sea Region Energy Co-operation (BASREC) Secretariat.

Organisations visited are included in Annex 4 of this report.

The Review Team wishes to express its thanks to all Estonian participants in meetings for the period of the review.

Special thanks go to officials of the Ministry of Economic Affairs who undertook all the preparation of the mission, completing the PEEREA questionnaire and providing background papers and other information as requested.

The report is based on material provided by Estonia as well as data and analyses from various other sources, including the International Energy Agency and other related materials.

The work was carried out in co-operation and cost-shared between the Energy Charter Secretariat and BASREC. The review was one of the tasks in the BASREC 2002 project co-funded by the Synergy programme of the EU.

Statistical data are presented according to the most current data available.

2. Overview

General background

Estonia, the smallest of three Baltic states, is divided into 15 counties, 205 rural municipalities and 42 towns. Total population is 1.37 million, about 70% of whom live in urban areas.

Major cities are Tallinn (capital), Tartu, Narva, Kohtla-Järve and Pärnu. Estonians comprise 65% of the population, Russians 28%, other 7%.

Figure 1. Map of Estonia

Politically, Estonia is a unicameral parliamentary republic, headed by a President who appoints a Prime Minister, subject to approval by the Parliament. Estonia is a signatory to both the Energy Charter Treaty and the United Nations Framework Convention on Climate Change, and has been approved for membership of the World Trade Organisation. It is also one of the strongest candidates for EU accession, expecting to become a member in 2004.

Total Primary Energy Supply (TPES) in 2001 was only 4.7 Mtoe, dominated by oil shale (59.4%), followed by natural gas (15.2%), motor fuels (12.5) and peat/firewood (12.1%). A full breakdown for selected years from 1990 is provided in Table 1 below:

Table 1. Total Primary Energy Supply by fuel, Mtoe, 1990 - 2001

	Coal and coke	Oil shale	Peat and firewood	Fuel oils	Motor fuels	Gas	Electricity (exports)	Total
1990	0.20	5.78	0.33	1.78	1.19	1.26	-0.60	9.95
1995	0.03	3.36	0.60	0.26	0.59	0.59	-0.07	5.37
1996	0.04	3.47	0.68	0.24	0.65	0.65	-0.07	5.66
1997	0.03	3.43	0.71	0.16	0.67	0.63	-0.08	5.55
1998	0.03	2.98	0.58	0.28	0.68	0.60	-0.03	5.11
1999	0.04	2.73	0.56	0.30	0.55	0.59	-0.05	4.71
2000	0.04	2.88	0.54	0.04	0.42	0.67	-0.08	4.52
2001	0.06	2.82	0.57	0.04	0.59	0.72	-0.05	4.75

Source: Ministry of Economic Affairs/Statistical Office of Estonia, 2002

Primary energy supply has been declining since 1991, mainly as a result of reduced industrial activity but also of a reduction in the production of power for export to Latvia and Russia, and as a result of efficiency improvements and fuel switching from oil to wood in the heating sector.

As Estonia is not heavily industrialised, residential energy consumption represents approximately half of Total Final Energy Consumption - 50.6% in 2000. Other sector shares were industry - 21.5%, transport - 14.8%, commercial and public services - 10.4% and agriculture - 2.6%.

The Estonian energy sector is unique in that it is the only country in the world which relies on indigenous oil shale as its primary source of energy. There are approximately 1.2-1.4 Gt of active resources and about 4 Gt of passive resources.

The only other significant indigenous primary energy resources are peat, which can be found in 22% of Estonia's territory, resources having been evaluated at around 2.4 Gt; and firewood, as in forests and wooded areas covers about 52% of Estonia's territory.

Estonia has no indigenous natural gas, so it is fully-dependent on imports for natural gas from Russia.

Estonia has no oil and no refining capacity. The Estonian market for crude oil and oil products is deregulated, open and competitive. Import and export of heavy fuel oil are affected by international fuel oil market, as oil shale can be converted to shale oil. There is also considerable transit of both crude oil and petroleum products.

Power generation is dominated by oil shale, which is a heavily polluting fuel, and represented 91% of production in 2000. However, this is a reduction from the share of 98% in 1996, reflecting a trend in recent years to move away from highly-polluting oil shale towards cleaner fuels, particularly natural gas but also heavy fuel oil and peat. The average efficiency of the two main oil shale fired power plants is less than 30%. Plans for the future reflect a renewed political commitment to the continuing use of oil shale for power generation, and include investment to mitigate some of the environmental impact of this policy.

The total installed capacity of thermal power plants was 3,215 MW in 2001, and the capacity of hydro and wind power plants was 1.9 MW.

Heating plants use a range of fuels, with natural gas, wood, heavy fuel oil, shale oil and other fuels using 35.9%, 26.8%, 10.2%, 15.4% and 11.7% respectively in 2001. The capacity of boilerhouses was 5,887 MW in 2001.

The share of cogeneration power plants in electricity supply is between 12% and 14%. The share of renewables in electricity generation is lower than 0.1%, although the share of renewables in TPES is much higher, with wood and peat representing 12.1% of TPES in 2002.

Estonia invests in energy efficiency through the Public Investment Programme, although the level of energy efficiency financing has declined in recent years. The national energy efficiency budget for 2002 is only 3.7 million EEK (approx. €234,000).

International donors have also made substantial financial contributions towards improving the Estonian energy sector. The Danish Government and EU PHARE Programme are the largest donors, but in addition, Sweden, Norway, Finland and the USA have made substantial contributions in the field of energy efficiency.

The Energy Act provides the legal, regulatory and institutional framework for the energy sector.

The Energy Efficiency of Equipment Act, and associated secondary legislation (some of which is still under development) regulates labeling and standard product description requirements for household products, including refrigerators, washers, lamps, boilers and others products.

Some of the main barriers to energy efficiency in Estonia are the high proportion of low-income energy consumers; relatively unattractive financing conditions for energy efficiency investments; small-scaled investment opportunities which are not interesting to larger investors; low awareness of energy auditing and energy management; relatively high costs of setting up energy auditing systems and campaigns in energy efficiency field as compared to targeted budgetary allocations; lack of awareness of the benefits of energy efficiency opportunities amongst company managers, housing associations and public officials; relatively inconsistent data about feasible energy efficiency improvement sites on a national and county levels; and a lack of indigenously-produced energy efficiency equipment.

3. Main Energy Policy Highlights

There is unwavering political support for the continuing use of oil shale as the main fuel for power production, supported by an aggressive investment programme to mitigate some of the substantial environmental impact of this policy.

Energy markets

Estonia is resisting liberalisation of the electricity market as it conflicts fundamentally with its policy to give priority to oil shale fired power generation. The resistance appears out-of-kilter with the overall approach of the Government to modernise the economy in preparation for EU integration.

Eesti Energia remains a fully state-owned vertically integrated utility which carries out oil shale mining, electricity and heat generation, transmission, distribution and supply. The mining operations were incorporated into the company as recently as 1998.

According to the Ministry of Economic Affairs, the schedule for market opening will be set in the Electricity Market Act, leading to eligibility of 35% of legal persons by a date to be set - perhaps 2008, but this has not been approved yet. At present, the power market has been liberalised for electricity customers with an annual consumption of more than 40 GWh, representing 12% of the market.

Although negotiated third party access exists in principle, the domination of the Eesti Energia's Narva power plants prevents real competition from emerging. According to the Estonian Heat and Power Association, CHP plants wishing to sell surplus power to the grid are offered the Narva price or less by Eesti Energia.

The natural gas market is dominated by AS Eesti Gaas, which is a privately-owned company, the shareholders of which are Ruhrgas of Germany (32.1%), Gazprom of Russia (30.6%), Gasum of Finland (10%) and small shareholders (27.3%). *De jure*, a regime for regulated third party access is in place, but there is only one *de facto* actor. Similarly, there is no *de jure* limitation on gas imports by third parties, but *de facto* Eesti Gaas is the only importer.

Liquid fuel markets are fully deregulated.

Energy pricing policy

Estonia has embraced the principles of rational energy pricing, and removed or is removing cross subsidies in energy prices. Prices are subject to value added tax (VAT), the standard level for which is 18%. District Heating and certain fuels - wood, peat, peat briquettes and coal - are all subject to a lower VAT rate of 5%.

Network-based energy prices are regulated by the Energy Market Inspectorate, and for non-network fuels, such as motor fuels, high excises rates have provided an incentive for consumers to replace outdated and inefficient Soviet vehicles with modern, more energy efficient vehicles. Public transport remains subsidised to guarantee its competitiveness and promote sustainable development in the transport sector.

Environmental policy related to energy

As the energy sector is the major source of atmospheric pollution and waste disposal in Estonia, environmental issues are integrated into all energy policies and programmes, particularly the Energy Efficiency Target Programme as described in Chapter 6 of this report.

The energy sector is the largest contributor to greenhouse gases (GHG), particularly to carbon dioxide emissions, in Estonia. Estonia signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC), and fully supports the idea to implement maximum measures in order to avoid harmful climate changes in future. Estonia has accepted a national target to decrease GHG emissions by 8% compared with 1990 for the period 2008-2012. The Kyoto Protocol was ratified by the Parliament on 3rd September 2002.

Policy on investing in demand-side energy efficiency

Estonia invests relatively little in energy efficiency when compared with energy efficiency funds donated to Estonia by the multilateral and bilateral communities.

Some €6.9 million has been invested from the Public Investment Programme into energy efficiency-related projects and activities over the period 1992-2002, at a rate which has

declined substantially since peaking in 1995. The total national energy efficiency budget for the year 2002 is only 3,655,000 EEK (approx. €234,600).

On four occasions, the Government issued calls for energy efficiency project proposals by the fifteen counties, using money administered by the Public Investment Programme. The Ministry of Economic Affairs selected the successful proposals. When the Review Team asked the Ministry for criteria used to assess the proposals, it was accepted that the principal criterion was that each county should receive 'its share' of funding and that regions with the most problems tend to get most of the money. The economic merits of the proposals appear to be secondary considerations in this respect.

District heating policies

Estonia has adopted a *laissez-faire* approach to district heating policy which is gradually reducing the efficiency of the systems and may ultimately prove to be unsustainable. Only the seven largest district heating companies are subject to national regulation, but the regulator does not become involved in demand-side issues. Municipalities nominally regulate district heating at the local level, but many demonstrate little awareness of energy efficiency issues and options for the district heating sector.

There is a general absence of municipal zoning preventing gas-to-district heating competition which the gas company is exploiting by grabbing market share away from district heat.

Non-payment for district heat and disconnection from the networks by buildings and apartments are important energy efficiency issues, as every disconnection drives up prices and lowers the energy efficiency of the system. Householders who do not pay present a serious problem in some parts of Estonia, ranging from a low 2-3% in the cities to 10% in Kohtla-Järve in the east, and as much as 20% for some of the smaller systems. The national average is 4-5%. District heating companies contract with the building, not the apartments, so the householders share the burden of payment.

According to the Estonian Heat and Power Association, the policy of its members in attempting to prevent further disconnection is to use public relations, consumer contact and publications on how to save energy in households. However, their energy saving information focuses on improving comfort levels rather than introducing technologies which enable autonomous control of heating costs by householders (heat cost allocators and thermostatic radiator valves). As a result, the EHPA 'energy saving' policies make limited impact on lowering household energy demand and household energy costs. According to the EHPA, Estonian district heated households consume far more heat than households in neighbouring Finland.

In summary the overall result of Estonia's lax district heating policy is a vicious circle of disconnection leading to a lowering of energy efficiency and rising costs which may ultimately prove too unsustainable and lead to the collapse of some systems. This issue is explored in Chapter 5 of this report.

4. Energy Pricing And Taxation

Subsidies

In the early 1990s the Government established the principle that subsidies, including cross-subsidies, should be eliminated from the energy sector. As a result, district heating and natural gas have not been subsidised at all and cross-subsidies in the electricity market (household and industry) were finally removed as of April 1st 2002.

The lower VAT rate for district heating and some other fuels can be said to represent an indirect subsidy.

Public transport subsidies are described in Chapter 5 of this report.

Electricity prices

Estonia has successfully completed the difficult transition from the situation in 1992 where electricity had, by tradition, been supplied at a tiny fraction of cost (only 6 EEK/kWh cents - i.e. less than half a Eurocent/kWh), to a standard household tariff of 105 EEK cents/kWh (6.7 Eurocents/kWh). As a result of the price increase of April 1st 2002, which was relatively large, residential customers now pay the same rate as commercial customers within the same voltage band (less than 10kV)

A simple time-of-day tariff (day/night) encourages householders to move some of their power consumption to night time, which flattens the power load and hence improves supply side energy efficiency. From January 2001, the daytime component of this tariff was, for the first time, set at a higher rate than the standard tariff. This represents a significant change in philosophy, as it is no longer clear that householders always benefit from choosing the time-of-day tariff. It is suggested that the Energy Market Inspectorate should monitor the impact of this change, and, if householders are choosing to revert to the standard tariff as a result of the revised structure, consider reverting to the old structure.

Table 2: Residential electricity tariffs 1992 - 2002

Period	EEK cents/kWh			Eurocents/kWh		
	Time-of-day tariff		Standard tariff	Time-of-day tariff		Standard tariff
	Night	Day		Night	Day	
01.02.92 - 20.06.92	6	10	10	0.38	0.64	0.64
01.12.92 - 01.11.93	11	15	15	0.70	0.96	0.96
10.11.93 - 01.09.94	13	19	19	0.83	1.21	1.21
01.09.94 - 01.01.95	18	29	29	1.15	1.85	1.85
01.01.95 - 01.10.95	22	35	35	1.41	2.24	2.24
01.10.95 - 01.06.96	22	39	39	1.41	2.49	2.49
01.06.97 - 01.05.97	22	45	45	1.41	2.88	2.88
01.05.97 - 01.01.98	36	60	60	2.30	3.83	3.83
01.01.98 - 01.01.99	39	65	65	2.49	4.15	4.15
01.01.99 - 01.01.01	45	75	75	2.88	4.79	4.79
01.01.01 - 01.04.02	63	97	90	4.03	6.20	5.75
01.04.02 - ...	74	127	105	4.73	8.12	6.71

Source: EKVU

Green electricity

Eesti Energia is selling 'Green Electricity' at a premium price, with a guarantee that a part of the power is produced using renewable energy sources. Environmentally committed customers buy 'Green Electricity' for a small premium over the regular electricity tariff.

It was not clear whether the Green Electricity programme is creating any real benefit, apart from the opportunity for consumers to publicise that they buy, as the proportion of renewable energy in the package is clearly very low. The regime is not regulated by the Energy Market Inspectorate, as, according to Eesti Energia, the decision by its customers to pay a premium for 'Green Energy' is entirely voluntary.

According to Eesti Energia, 201 customers bought Green Energy in 2001 and they were sold 23% of the renewable energy produced in Estonian within a year. About half of the customers were companies who are permitted to use the 'Green Electricity' logo on their products as a result.

From each kWh of Green Energy sold, the Estonian Fund for Nature receives 0.1 EEK for the financing of nature conservation projects. In 2001, Green Energy financed children's environmental education project, a cycle tour and the renovation of the Linnamae Hydropower Plant.

District heating prices

According to the Estonian Heat and Power Association (EHPA), the price of district heating varies from town to town within the range 235 EEK (€15) per MWth. in Narva to 577 EEK (€36.9) MWth. in Viivikona. The average, in June 2002, was around 400 EEK (€25.6) MWth.

EHPA has been lobbying for the introduction of a capacity charge, payable throughout the year, and a separate commodity charge, payable during the winter months only. According to EHPA, municipalities generally oppose this idea, but EHPA plans to continue to lobby every year until it happens. The town of Haapsalu has already introduced this system.

End-user prices are payable according to the size of apartments, so the price signal, as well as the ability to control heat use, is entirely absent for most district heating consumers. The implications of uncontrolled heat consumption on Estonian energy efficiency are discussed in the section on district heating issues in Chapter 5 of this report.

Other energy prices

Prices for gasoline, fuel oil, diesel, natural gas and coal are described in Table 24 in Annex 3 of this report.

Taxation of electricity, natural gas and district heating

Household electricity and natural gas are subject to the standard VAT rate of 18%. There is a reduced VAT regime in place for district heating, wood, coal and peat briquettes, which will be charged at only 5% until the year 2005. The issue of whether to remove, continue or alter the policy is reviewed annually, and it is not a straightforward decision. Conventional wisdom suggests that a VAT reduction for a form of energy supply sends an incorrect price signal, encouraging householders to use more energy rather than to invest in energy saving, unless balanced with a similar tax break on energy efficiency related equipment. However, as Estonian district heating consumers have no real control over their heating costs, the price signal is absent anyway. In this context the VAT reduction for district heating does not represent a barrier to energy efficiency at the present time.

Emissions fees for SO_2, NO_x, solid particles, ash and CO_2

The Pollution Charge Act provides the rates of the charge to be paid for the release of pollutants or waste into the environment. The actions subjected to pollution charge are waste disposal, contamination of the ambient air with gaseous and particle emissions and the release of waste into water bodies, groundwater or soil of organic matter, phosphorous compounds, etc. The CO_2 charge has to be paid by all enterprises with total capacities of boilers over 50 MW, excluding those firing renewable energy sources. The Act was revised in the Parliament in December 1999. New pollution charges were set until the year 2005.

Table 3 indicates rates of pollution change for release of pollutants into ambient air and waste disposal.

Table 3. Emissions fees (pollution charges). (€/t)

	1997	1998	1999	2000	2001
SO_2	2.76	2.72	3.13	3.25	3.79
NO_x	6.33	6.24	7.17	7.45	8.68
Solid particles	2.76	2.72	3.13	3.25	3.79
Ash disposal	0.09	0.17	0.26	0.34	0.48
CO_2	0.00	0.00	0.00	0.29	0.43

Source: Ministry of Economic Affairs, 2002.

At the request of industry, these charges have been fixed until 2005 in order to help plan environmental investments.

The Environmental Investment Centre, which is described in Chapter 7 of this report, both collects and spends the revenue generated by the emissions fees.

According to the Ministry of Environment, a working group is considering the introduction of a carbon tax, probably to replace the existing CO_2 charge. It was stressed that this is to be confirmed by the government, industry and other stakeholders, and that it is only a plan within the Ministry of Environment at present.

Legislation may be required to introduce a carbon tax. According to Estonian Law, taxes can only be levied by an Act of Parliament, and there is no provision for environmental taxes in the taxation laws. Existing environmental payments are considered to be 'charges and fees' rather than taxes, avoiding the need for separate legislation, but there is uncertainty whether this arrangement will be possible for a carbon tax.

Tax breaks for energy efficiency

There are very few incentives to promote energy efficiency in Estonia. The only fiscal incentives are VAT exceptions in case of foreign aid (which is normally a condition of the foreign aid in any case), and sovereign guarantees for loans from international financing institutions. The latter are subject to the "Foreign Borrowing by the Republic of Estonia and State Guarantees for Foreign Loan Agreements Act"

5. End-Use Sectors

Industry

Total final energy consumption in the industrial sector was 0.494 Mtoe in 2000, representing only 21.5% of the total, reflecting that Estonia is a relatively lightly-industrialised country. The main economic sectors are timber, transportation, shipbuilding, electronics, telecommunications, textiles, chemical products, banking, oil-shale energy, services, fishing and food industry.

Residential

Residential consumers used 1.163 Mtoe in 2000, representing just over half of total final energy consumption. There are 623,000 dwellings in Estonia with a combined floor area of 33.6 million m^2, so the area of an average dwelling is some 54 m^2, and average annual consumption rates are 1.87 toe/dwelling or 0.035 toe/m^2.

Despite measures to move away from the use of petroleum products, this is the most common household energy source, representing 32% of household use in 2000. The level has reduced from 36% in 1996, so it appears that policies to limit the use of petroleum products in favour of indigenous energy sources are enjoying some success.

Electricity is the second most common form of residential energy with 29%, followed by district heating with 11%. In absolute terms, the fuel use for district heating rose from 104 Mtoe in 1997 to 126 Mtoe in 2000, so, as no new networks have been constructed in this time, this indicates that more heat is being supplied to district heated buildings.

Further details of the evolution and structure of household energy consumption are provided in Table 17 in Annex 2 of this report.

District heating issues

District heat and hot water prices at the level of the apartment are paid according to the size of the apartment and number of residents. Technologies which bring individual autonomous control of heat use at the apartment level (heat cost allocators and thermostatic radiator valves), which are standard in a number of countries, were not favoured by the Estonian Power and Heat Association (EHPA) as being 'too complicated'. Apartment level volumetric meters for hot water (washing water) were similarly dismissed by EHPA, as there are no norms to regulate this in Estonia (although many apartment buildings use these technologies anyway, by mutual agreement between the householders). According to the Ministry of Economic Affairs, a project in the city of Tartu will demonstrate the impact of heat cost allocators.

EHPA does not favour introduction of demand-side energy saving technologies which depress the demand for heat and hence lower its members' revenues, preferring to focus attention on energy saving measures which increase comfort levels. According to the EHPA, in neighbouring Finland heat prices are about twice as high but consumers use about half as much heat as in Estonia.

According to the Estonian Society of Heating and Venting Engineers (EKVU) the specific heat consumption of the residential sector before 1991 was unknown, a result of the complete absence of metering, an energy saving culture and economic incentives to save energy. As the '90s progressed and market reforms took hold, data points began to emerge leading to the development of the following estimates by EKVU.

Table 4. Specific heat consumption (SHC) in the Estonian housing sector

Year		SHC kW/m³ per year	Comment
1993	"before"	125	Measurements before and after the World Bank district heating rehabilitation project.
1995	"after"	100	
1993	"before"	100	Measurements before and after the Oismae tee 5 project.
1995	"after"	67	
2002	"typical city"	Approx. 90	Data can now be measured in the normal course of events following the widespread introduction of metering.
	"renovated city"	70 – 80	
	"small towns"	40 – 60	

Source: EKVU

EKVU pointed out that poorly designed energy efficiency investments can be a problem in district heated buildings, using the example of roof insulation without heat control, which has resulted in overheating the top floor of a building - so the heat consumer simply opens the window. The importance of understanding the impact of different measures on an entire building rather than a single unit within the building was highlighted, as was the importance of taking indoor air quality into account when designing energy efficiency measures for households.

Disconnection of customers from the district heating network

Generally speaking, the reasons for disconnection are: district heat quality is poor and prices are high and consumers have no control over their heat costs.

In the early '90s, many individual households in apartment buildings disconnected from the district heating system and installed alternative heat sources. This was a result of the poor quality of heat - perhaps 50-60 degrees water temperature was supplied, and so apartments were heated to only 10-15 degrees centigrade during the winter. Nowadays the character of disconnection is changing - it has become common for an entire building to want to disconnect from the district heating system and install a boiler for the building. The problem of disconnection is particularly acute in municipalities with smaller heat networks, where there is a vicious circle of disconnection driving up heat prices which in turn leads to further disconnection.

Some householders installing individual gas heaters have created exhaust gas problems as Estonian buildings are typically not equipped with suitable flues. Others have installed other forms of heating systems, which, even if more expensive than district heat on a per unit basis, nevertheless result in lower monthly heating bills as heating can be used as required rather than 24 hours per day.

The legal basis for disconnection from the district heating network

The legal basis for disconnection from the district heating network is unclear. Strictly according to the Law (The Apartment Property Act), internal heating systems of buildings are commonly

owned by the residents, so radiators in apartments officially belong to the building, not the apartment owner. In this context, an apartment owner does not, in theory, have the legal right to disconnect from the communal heating system without the permission of the other apartment owners in the building. However, according to the Regional Energy Centre, municipalities, heat companies, building associations and apartment owners typically do not know about, or certainly do not apply the right to restrict disconnection, so if an apartment owner chooses to disconnect, this choice is unlikely to be challenged.

An innovative solution has been adopted on one small municipality, where the district heating network services six apartment buildings and some municipal buildings, and around 10% of flats have disconnected. These flats continue to pay 15% of the district heating price, nominally to pay for residual heat from the system.

Zoning

There is little zoning in Estonia, so Eesti Gaas can and does target district heating areas. In many parts of Estonia, the gas company wants to extend the distribution network to areas served by district heating. Although this is nominally displacing natural gas with more natural gas, it is understood that there are two factors motivating Eesti Gaas in this respect. Firstly, district heating companies can switch to fuel oil when the oil price falls, whereas once a building or household has installed a gas boiler it becomes a captive customer; and secondly, assuming that the Estonian gas prices further harmonise with the rest of Europe over time, the value of household gas will rise and the value of bulk supply, such as sales to district heating companies, will fall.

It is widely considered that Estonian municipalities do not have the right to zone the city, and that every energy consumer has a right to choose to use district heating, or a boiler house for the building, or an internal gas boiler. The right to choose, both as an entrepreneur (energy supplier) and as a customer (energy consumer) is considered in some circles to be a freedom guaranteed by the Constitution of Estonia. However, the issue is not black and white. In the city of Tartu, the municipality has defined gas and heat zones anyway.

The share of district heating in Tallinn has already reduced from 80% to 60% of households.

The approach of municipalities to district heating

Most municipalities do not know what to do about district heating. A key step in improving the performance of the heating enterprises was municipalisation, which led to some improvements. However, there is widespread public dissatisfaction with the price and the quality of service, which can now be directed towards the municipal owners of the networks.

Some municipalities avoid addressing this politically charged issue. This approach is understandable, as there are significant barriers to substantially improving the heating systems - short-term views (three or five year political mandates); lack of sufficient technical, legal, and managerial expertise; and inadequate co-operation between private sector, municipal and consumer stakeholders.

The solution adopted by some of the municipalities has been to try to privatise management of the heat companies, in part to distance the local political leaders from the perception that they are responsible for the high prices and poor service. Some municipalities have retained a seat on the board or a 'golden share' in the privatised heat companies in an attempt to retain at least some level of involvement, although not necessarily much influence, in their future activities.

The Energy Market Inspectorate (EMI) runs seminars on heat and power but most of the muncipalities do not know that this assistance is on offer yet. EMI does not have the legal powers to provide municipalities with much more than advice, which it offers on heat issues as well as on wider issues such as natural gas zoning. Most municipalities do not have energy managers, as there is no legal requirement to have one.

Metering of district heating

There is no legal requirement for heat companies to supply district heated buildings on the basis of metered consumption. Only the seven largest district heating systems are regulated by the Energy Market Inspectorate, which does not get involved in heat metering issues and has no statistics on the number of heat meters in place. The smaller heat companies are unregulated or regulated by the municipal owners.

The use of heat cost allocators (HCA) and thermostatic radiator valves (TRV) to provide individual autonomous control to district heated households is very limited in Estonia. According to the Ministry of Economic Affairs, one demonstration project is under way to prove the impact of these technologies.

Tertiary

Energy efficiency obligations of municipalities

Municipalities have few hard legal obligations in the field of energy efficiency, but have some legal powers and hence enjoy considerable freedom to decide how they deal with energy efficiency issues. Depending on local understanding and institutional capacity, the approach and level of commitment to energy efficiency varies considerably from municipality to municipality.

The Energy Act excludes small municipalities from regulation by the Energy Market Inspectorate (Article 50). According to the Regional Energy Centre (REC), municipalities typically resent the burden of unwelcome municipal regulatory responsibility for heat created by this act.

The Act of Local Authorities is ambiguous, saying that municipalities are responsible for their energy management. Local municipalities can interpret this in two ways - that they have a right to choose to do nothing; or that they have an obligation to manage energy. The Act is widely interpreted.

The Building and Planning Act creates a regime for municipal permits for all buildings, so the municipalities can regulate the energy efficiency of all municipal constructions, ranging from buildings to heating plants, if they so choose.

The Competition Act gives municipalities rights over monopolistic companies, which means that regulation of the local district heating company is technically possible (taking into account that the Energy Market Inspectorate regulates only the seven largest district heating systems). However, only in one case has a (medium sized) municipality tried to put a cap on the price per MWh to the private (or rented) district heating company, which has responded with its intention to shut down the plant. The case is not yet resolved, but in the opinion of the REC, the legal framework is such that the municipality has the legal powers to regulate the local heat company if it chooses to do so.

Transport

Transport Development Plan

A new Transport Development Plan will contain a chapter on Energy Efficiency.

According to the Ministry of Transport, a Public Transport Development Plan to 2006 was prepared a few years ago, but it did not receive political support and is not being implemented. The Plan called for larger subsidies, but this did not happen. A Long-term Public Transport Plan to 2015 is now being developed by the Ministry and will be ready 2003. It is not known whether this will receive political support.

The new Plan will contain an energy efficiency chapter which will compare which transportation modes are the most efficient for the local conditions in Estonia. As the population density is low in Estonia, trains are sometimes almost empty, so busses - or even cars - may be more efficient. On the energy side, the technical requirements for vehicles will be reviewed - including maximum exhaust gasses. For new cars, the Euro 3 standards is already in force.

At the local level, Tallinn has a Long-term Public Transport Development Plan in place, as do three or four of the counties. The Ministry of Transport often asks for transport development plans from the other counties, and typically receives the response that the counties will agree to prepare when the Ministry agrees to fund it.

A range of statistical transport indicators are provided as Table A2.8 in Annex 3 of this report.

Transport subsidies

The level of transport subsidy reduces every year. Estonia has set aside almost 1.2 billion EEK (approx. €76.7 million) of the total state budget of 30 billion EEK (approx. €1.8 billion) for the transport sector, so transport represents some 4% of the budget. An additional 250 million EEK (approx. €16 million is from the Tallinn municipal budget is also spent on transport subsidies).

Table 5. State and municipal transport budgets, 2002

	EEK (millions)	€ (millions)
Subsidies - state budget	500	32.0
Railway	220	14.1
Electrified railway	60	3.8
Diesel engine railway	160	10.2
Busses	131	8.4
Connection with islands	110	7.0
Sub-total - state transport budget	**1,181**	**75.5**
Tallinn municipal transport subsidy	250	16.0
Total - national transport budget	**1,431**	**91.5**

Source: Ministry of Transport, 2002

As parliament sets the subsidy level on an annual basis, so it is impossible to set accurate long-term transport budgets. In practical terms, the subsidy level has reduced every year. The uncertainty makes planning difficult - for example, it is hard to make long-term agreements with the bus companies, as municipalities do not know how much subsidy they will get next year. Therefore, if the budget reduces during a five-year cycle - i.e. a contract has been awarded but the amount of subsidy money reduces - the only practical solution is to reduce the number of lines or routes.

Busses

Bus is by far the most popular form of public transport. 70% of public transport is by bus, which reflects the fact that there are many small centres of population with few passengers, and that bus transport costs around 1/3 of the price of train transport by line kilometre.

Local busses are heavily subsidised, with an aggregate of 52-54% of the price of a local bus ticket represented by the subsidy.

As a result of the subsidy, monthly bus passes are very much the cheapest way of paying for local public transport. In Tallinn, a monthly pass costs 150 EEK full fare (€9.59) or 70 EEK (€4.47) for students. A full-fare single journey bus ticket (valid for one hour) is relatively expensive, costing 10 EEK (€0.64) for a normal bus, or 15 EEK (€0.96) for an express bus. Pensioners, children and students also get special deals. Sometimes busses are free for schoolchildren, but this depends on the municipality. Disabled people and people over 70 years old are entitled to free transport by law.

Tallinn, in particular, is active in promoting the continuing use of public transport with a large network of bus lanes and a ban on parking for private cars in the city centre. A 'Park and Ride' scheme is planned for the outskirts of Tallinn, featuring secure parking and a regular trolleybus to the city centre.

Long-distance bus operators do not benefit from subsidies, but prices are cheap as a result of the introduction of competition in 2001. Market liberalisation (route permits became

much easier to obtain), resulted in many new players entering the market and the price of tickets falling by more than 50% on some routes. For example, the price of a ticket from Tallinn to Tartu (approx. 180 km) reduced from 110 EEK (approx. €7) to 50 EEK (€3.20) following the introduction of competition.

Trains

There are few train links.

Only the four largest centres of population have good rail links, with diesel train routes between Tallinn-Pärnu, Tallinn-Narva and Tallinn-Tartu. There is also an electrified rail system in Harju county, near Tallinn, which runs local trains. However, in total only 7% of public transport is by train.

Internationally, Estonia is part of a group that is planning a Helsinki to Berlin train route by fast electrified train, which would probably pass through Pärnu to Riga. Although only an outline plan at the moment, it would help to develop the local train network and in this context the Ministry of Transport is hoping for EU support to build this railway.

There is a good rail link to Russia at present in the form of a train link to St Petersburg which started to operate in June 2002. It is expensive when compared to bus transport. Freight from Russia, mainly chemicals, are also delivered to the port of Tallinn by train. There may be a problem with the route in the future as Russia is planning to electrify its rail network, so diesel trains will no longer be able to operate. The solution will probably be electrification of Estonia's railway to the east of Narva.

Sea and air transport

Sea and air transport links are well-developed.

Passenger transport Tallinn and Stockholm/Helsinki includes several roll-on roll-off ships, as well as catamarans to Helsinki. Estonian Airlines flies regularly between the two cities, and a helicopter, which departs every half an hour, also competes for passengers on the popular Tallinn - Helsinki route.

Ships also transport containers (i.e. trains do not drive onto the ship as in some countries). There are also tankers for oil products.

The volume of goods and passenger transport from Tallinn Airport has grown every year since 1992. There are regular flights to London, Moscow, Warsaw, Frankfurt and many other destinations.

Ferries operate between the Estonian mainland and the islands. There are no bridges to the islands at present, but a toll bridge is planned to connect Muhu to Saaremaa. The price will be set at the same rate as the ferries.

Cars

Private car use has exploded during the last decade

Ten years ago, the ratio of private to public passenger transport was 30:70. The pattern has now reversed to 70:30.

There are some 440,000 registered passenger cars in Estonia, of which around half are old soviet-era vehicles, which are more commonly used in the countryside than in the more prosperous Tallinn. The overall number of cars was 490,000 in 2001, but at the beginning of 2002 the registration system changed, resulting in 50,000 cars (which were standing idle) not being re-registered.

Energy efficiency of vehicles

Every private vehicle has to pass an annual Roadworthiness test. Roadworthiness tests for public transport is the responsibility of municipalities, and may be more frequent than annually - for example Tallinn tests taxis twice per year and busses once per year.

Taxation of transportation

There are no road taxes at present, but from Jan 1st 2003 12,500 kg+ vehicles will be required to pay a road tax of 15,000 EEK, (approx. €960) with higher rates for 40,000 kg+ vehicles. Air suspension will be factored into the rates.

An existing registration tax for private cars, which promotes energy efficiency by factoring in the age and capacity of the car, will be removed from January 1st 2003. This was a political decision, not a recommendation from the experts in the Ministry of Transport, who, like the Review Team, consider it to be a step backwards for Estonia in terms of rational transport policy.

6. Energy Efficiency Policies And Programmes

Policies

The Estonian approach to energy policymaking can be characterised as one of limited involvement, formulating the necessary framework and letting the market actors formulate the practical rules-of-the game. This liberal approach, together with the relatively low population of Estonia, has resulted in lower numbers of civil servants than in some other countries. The absence of an energy efficiency agency is perhaps the result of this overall approach.

Energy efficiency policies are not stated explicitly, but are implicit in a number of planning documents, strategies and laws which are reviewed in this section of the report.

Plans

Long-term Energy Sector Development Plan for Estonia 1998

Strategic Goals for the energy sector were last set in 1998, and, according to the Ministry of Economy, have largely been achieved. A new energy strategy, which is expected to be ready at the beginning of 2003, is now under preparation.

The Ministry of Economic Affairs presented the 1998 strategic goals to the Review Team, and made comments on progress towards meeting the goals. These are reviewed in the following table.

Table 6. Energy efficiency strategic goals, 1998

1.	To provide the sufficient and stable fuel and energy supply in conformity with the required quality and with optimal prices for the consistent regional development and for reaching the economic growth required for the accession to the European Union.
2.	To provide the political and economic independence of the state by the fuel and energy supply as a strategic branch of economy; to establish the strategic security reserves in conformity with the requirements of the European Union.
3.	To implement the National Energy Reserves Programme with the aim to decrease the intensity of energy consumption.
4.	To provide conformity with the international environmental requirements.
5.	To provide higher efficiency in oil shale based energy production
6.	To prefer the principle of distributed electricity production and combined heat and power production by planning new power plants with the concurrent optimal use of the available heating capacities.
7.	To promote wider use of renewables with applying tax allowances both on the respective investments and energy production based on those investments.
8.	To provide the development of the Estonian energy sector in conformity with the EU directives and trends.

The Ministry of Economic Affairs made several comments on Estonia's progress against the above goals over the period 1998 - June 2002, noting in particular that the EU accession was very high on the political agenda in 1998, hence the strong EU focus. The EU closed the Energy Chapter with Estonia during the summer of 2002. Two transition periods for full compliance with energy directives were agreed - for liquid fuel stocks until 2010 and for compliance with the rules for opening of the electricity market until 2012. The latter was requested in order to secure financing for the rehabilitation of the oil shale-fired Narva power plants, as Estonia had to provide guarantees to the financiers that there will be a market for the power. As the loan for the first €100 million was signed during the week of the mission to Estonia by the Review Team (June 2002), before the Energy Chapter had been closed, it appears that Estonia presented the EU with something of a *fait acomplit*.

The Review Team noted that the Ministry of Economic Affairs appeared to interpret improved security of supply as increasing the share of domestic fuels in the energy balance, rather than diversification of fuels and suppliers.

Environmental improvements in the energy sector have not taken place on a large scale, but some environmental investment by Eesti Energia has occurred since 1998, and very substantial new investment is at an advanced planning stage, as described in Chapter 8 of this report. In addition, Estonia is now a signatory to 26 international environmental conventions or their protocols, a full list of which can be viewed at www.envir.ee/eng/conventions.html.

The Review Team also noted that the strategic goal to prefer the principle of distributed electricity production and combined heat and power production by planning new power plants with the concurrent optimal use of the available heating capacities appears to have been quietly dropped by Estonia. The Ministry mentioned that the Narva Power plant represents over 90% of production, so there is limited scope for introducing new CHP. Also, the strategic goal to promote the wider use of renewable energy sources has not had a very substantial impact so far.

Long-term Energy Development Plan for Estonia 2003 (planned)

A Commission of seven people is responsible for heading the preparation of a new Strategy Paper, which will update the Long-Term Development Strategy of 1998. A contract between the Ministry of Economic Affairs and the Technical University is under preparation.

Long-Term Energy Development Plan for Tallinn 2002

The scope of the project is to develop a 15-year energy plan for the city, taking into account all aspects of energy supply, with the objective of helping the city administration, businesses and householders. The project is financed by Tallinn municipality, carried out in collaboration with the utilities, and will be finalised in the autumn of 2002.

When the plan was presented to the Review Team, the approach to heat supply was described as a being to 'balance heat supply or conservation - sometimes it is cheaper to produce more - sometimes it is cheaper to conserve. If there is no money for energy conservation, then have to produce more'. The Review Team noted that there may be a bias towards producing more, considering that the study is not independent - it has been commissioned by Tallinn municipality which also owns the heat supply system. It was pointed out that the District Heating company has rented the District Heating system from the municipality for the next 20 years so the municipality has no conflict of interest in this respect, and can concentrate on finding a least-cost solution.

The study will not result in an energy conservation programme for Tallinn, but some of the recommendations may highlight the points for action by the city, such as which schools are the least energy efficient.

Municipal Energy Development Plans

When the EU PHARE Programme financed Regional Energy Centres (RECs), grant financing was available for 90% of the project planning costs for Municipal Energy Development Plans (MEDP). There are no such support schemes any more, but, the Ministry of Economic

Affairs is 'trying to support some energy planning from state funds'. About 10 new energy development plans have been co-financed (50% or 25%) by the central government since 1999, so while the overall support is now greatly reduced there is still some financing to act as a catalyst.

The impact of the MEDPs, which were implemented with PHARE assistance, varied widely. Some municipalities continue to use the plan as a 'living document', updating it regularly and acting upon it. Other municipalities put it on the shelf and forgot about it. For the municipalities using the plans actively, they are useful documents to support loans for the reconstruction of boiler plants or district heating networks. It was noted that even with the 'living documents', when the municipal governments change the MEDP sometimes does not make the transition to the new administration. This can be accidental - because people change - or deliberately - when a new administration wishes to differentiate itself from its predecessor.

The REC commented that amongst the more enlightened municipalities, €10,000 for a Municipal Energy Development Plan is considered to be a wise investment, whereas others prefer to invest €10,000 in a piece of plant.

Programmes

This section of the report reviews programmes and provides an overview of legislation impacting the energy sector.

The first Energy Efficiency Target Programme - EETP 1992

The objectives of the first Energy Efficiency Target Programme (EETP) were to reduce fuel imports by 50% within 4-5 years; replace fuel imports with local fuels; and stimulate people and society to save energy.

The first two objectives have been achieved, if not strictly to the timetable, as the percentage of imported fuels in Estonia decreased by 53.7% between 1991 and 1999, with a corresponding increase in local fuel use. However, as these measures neither brought energy efficiency gains nor reduced pollution levels, they cannot accurately be described as energy efficiency measures at all. The third objective has been achieved, particularly through the effective introduction of a rational energy pricing policy which has successfully created market incentives to improve energy efficiency in most sectors. The fact that knowledge about energy efficiency measures and technologies is much more widespread in 2002 than in 1991 is clearly apparent throughout the Estonian economy.

The current Energy Efficiency Target Programme - EETP 2000

A new EETP was approved by the Government on 4th January 2000. The programme aims for energy consumption growth to be no more than half of GDP growth and CO_2 emissions to be reduced by 8% against 1990 levels, through energy efficiency and fuel switching.

EETP 2000 identifies the following activities as being necessary to improve energy efficiency in Estonia.

- strengthening of the institutional framework, intensification of scientific and developmental activity, implementation of energy efficient technology;
- changing of the consumption habits of the consumers and implementation of the tax policy;
- creation of the business environment proceeding from legislation, including liberalisation of the market and creation of the prerequisites for free competition;
- rational use of financial means allocated from the state budget within the framework of EETP.

The EETP 2000 Implementation Plan 2001

An Implementation Plan for EETP 2000 was approved by the Government on 6th March 2001. It defines the main activities to be carried out by 2005 in order to meet EETP targets.

Measures include: strengthening institutional frameworks, altering energy consumption habits, creating an enabling business environment for energy efficiency through legislation and by achieving rational use of state energy efficiency financing. Eligible energy efficiency projects, including renovation of public buildings, boilers and district heating networks, have been carried out under the energy chapter of the Public Investment Plan, although as noted above, investment levels are low, both in absolute terms and as compared with investment levels during the mid-1990s.

The Implementation Plan sets the following tasks: development of methods for energy certification of buildings; development of methods for conducting energy audits in industrial enterprises; development and implementation of regular inspection system for boilers with a capacity over 15 kW; development and implementation of programme on economically viable exploitation of biological fuels, other renewable energy sources and peat in energy production; development of a programme for optimisation of district heating systems and exploiting the potential of cogeneration; continuation of preparing development plans and feasibility studies in energy issues for counties and local governments; international co-operation and participation in energy efficiency projects; training on energy efficiency; information campaigns on energy efficiency; and analysis of methods of measurement of energy consumption and their link with energy consumption and consumer behaviour.

Programme for heating optimisation and cogeneration exploitation 2002

The objectives of this programme are to help the Ministry of Economic Affairs to identify necessary changes in Estonian legislation for the promotion of CHP, and to forecast the impact of such changes. Assistance with the development of a National Strategy and Plan of Action for use of CHP and a feasibility study for a full scale biomass CHP demonstration plant will also be carried out.

A report will recommend legislation, tariffs, connection and financing tools and mechanisms, capacity building issues. A policy status paper, fuel inventory report and a review report on CHP policies in other countries are already complete (June 2002).

Energy sector component of Baltic 21

Agenda 21/Baltic 21 is an initiative of all Baltic Sea countries to implement the principle of sustainable development in the agriculture, energy, fishery, forestry, industry, tourism, and transport sectors. Estonia and Denmark share joint responsibility for the energy component.

The scope of possible energy efficiency activities is wide, including aiming to enhance the work of the executive authorities responsible in the sector; pursue Kyoto priorities; encourage regional energy conservation and renewable energy markets; organise seminars; encourage co-operation municipalities for the further development of district heating; evaluate regional sustainable development; and encourage co-operation in research and development in the energy sector.

There have been few concrete activities so far, but indicators for the energy sector have already been developed, and Tallinn, Copenhagen and Albertslund are now focusing their attention on the further development of district heating systems.

Legislation

Planned new energy legislation

According to the Ministry of Economic Affairs, although the Energy Act 1998 is already harmonised with the (current) EU Electricity Directive, three new Acts are planned.

- Electricity Market Act
- Natural Gas and District Heating Act
- Liquid Fuel Acts

The content of the new legislation has not yet been developed.

Impact of current legislation on energy efficiency

Article 53 of the Constitution of the Republic of Estonia provides that "Everyone has a duty to preserve the human and natural environment and to compensate for damage caused to the environment by him or her." This is a very vague requirement open to considerable interpretation.

The Act on Sustainable Development (1995) requires national strategic planning in economical sectors and areas where environmental pollution and use of natural resources can harm biodiversity or balance in ecosystems. In this respect, national strategies are required for forestry, tourism, agriculture, industries (milk, chemical, building materials), energy and

transport sector. This law appears to be the driver behind some of the strategic documents prepared by the Ministry of Economic Affairs, but a requirement to provide the resources to implement the resulting strategies is absent.

The Energy Act 1998 (Article 10) provides a non-specific requirement for fuel and energy enterprises to promote energy efficiency, but this is soft law which is not backed up by hard regulation from the Energy Market Inspectorate.

The Energy Efficiency of Equipment Act empowers the Minister of Economic Affairs to establish requirements for the consumption of energy and for energy labeling. Refrigerators, freezers, washing machines, dryers, dishwashers; electric ovens; water heaters, hot-water storage appliances; lighting sources and air-conditioners have all been harmonised with EU directives under this law. While the legislation is a necessary part of harmonisation, and while the impact on a European level is substantial, the specific impact for Estonia should not be over-stated - white goods destined for the European market are designed to meet the standards and bear the labels anyway.

Energy efficiency requirements for hot-water boilers have been harmonised with EU directives. Although harmonisation with other energy efficiency-related directives, such as for fluorescent lighting ballasts, has not yet taken place, the Ministry of Economic Affairs is aware of this and understands what needs to be developed.

Financing of energy efficiency

The Public Investment Programme

Some €6.9 million has been invested from the National Budget, (including the Public Investment Programme) into energy efficiency-related projects and activities over the period 1992-2002, at a rate which has declined substantially since peaking in 1995. The total national energy efficiency budget for the year 2002 is only 3,655,000 EEK (approx. €234,600).

Funded energy efficiency projects over the decade have included:

- reconstruction and fuel conversion in boiler houses (early '90s)
- renovation of district heating substations and networks
- energy efficiency feasibility studies and development plans
- preparation of legislation and norms
- energy efficiency campaigns, training
- renovation of social buildings (schools, hospitals, kindergartens, etc.)
- preparation for loan implementation (World Bank loan)
- KredEx (which was not funded from energy sector budget; KredEx is reviewed in this chapter.)
- Energy efficiency financing in private sector
- energy situation in municipalities and role of energy planning

Table 7. Energy efficiency funding from the Public Investment Programme

Year:	92	93	94	95	96	97	98	99	00	01	02	total
Million EEK	1.7	14.4	15.0	19.0	14.7	8.7	8.7	8.7	8.4	4.8	3.7	107.9
Million €	0.11	0.92	0.96	1.21	0.94	0.56	0.56	0.56	0.54	0.31	0.23	6.98

Source - Ministry of Economic Affairs, 2002

The Ministry of Finance mentioned that all new social housing is constructed to highly energy efficient buildings standards, similar to those used in the Nordic countries, so part of this money may also be considered to have been invested in energy efficiency. This investment is not reflected in the above chart.

According to the Ministry of Economic Affairs, evaluation of energy efficiency project proposals from counties for support from the Public Investment Programme contains a large element of ensuring that each county receives a share of the money, rather than being awarded strictly on the merits of the proposals.

Grant applications to the Public Investment Programme must meet three conditions: the investment must be made in a facility that has public services purposes and cannot, or is unlikely to be privatised; a minimum of 25% municipal co-financing is required; and a feasibility study or energy plan must be prepared.

The Review Team noted with concern that the value of applications by the municipalities for grants from the Public Investment Programme greatly outnumbers the money available. For example, applications for financing for the year 2003 total 30 million EEK (approx. €1.9 million), whereas the national budget for energy efficiency (for all activities, not just municipal projects) in 2002 is only 3.7 million EEK (approx. €236 thousand). This implies that municipalities may be going to very considerable effort to carry out feasibility studies and energy plans, in the hope that perhaps one in every ten applications may receive government funding. It is accepted that this approach has some merits - as the investment in preparation may lead to the municipality carrying out the project anyway without government support - but the level of national investment is very low.

According to the Ministry of Finance, the size of the Public Investment Programme has not changed very much over the last decade, although it has reduced as a percentage of the overall state budget from 10-12% to around 7% of total budget. The share of the energy sector in the Programme has always been less than 1%, and the Ministry of Finance indicated that in order to receive support from Programme, there must now be a contribution from an international aid programme.

Private sector finance

Private sector financiers offer reasonably good terms in Estonia, particularly when compared to some of the countries of central and eastern Europe, whose banks offer only short-term fully-secured loans at abnormally high interest rates.

The EEK is a stable currency, which was fixed against the Deutchmark in 1994 and is now fixed against the Euro at €1: 15.64664 EEK. This has resulted in local banks - Hansabank, Union Bank of Estonia, Sampo Bank, Merita Bank, Estonian Credit Bank and Tallinn Business Bank - being able to offer quite reasonable terms. Banks will typically fund 70-75% of the value of a commercial project at an interest rate of around 10% per annum, providing that the project and the borrower are bankable. In September 2001, loans to governmental institutions became cheaper than loans to commercial undertakings for the first time.

It should be noted that despite the stability of the EEK, the currency risk is typically passed to the borrower. For example, Hansabank draws up its loan agreements in Euro, although the loan is actually advanced and serviced using EEK.

Credit and Export Guarantee Fund (KredEx)

Kredex is a self-sustaining fund, which supports the development of small and medium-sized enterprises (SMEs), exports and housing. It was initially capitalised by the Ministry of Finance and is operated as an independent company under the overall jurisdiction of the Ministry of Economic Affairs. Although a non-profit company, the operation is profitable so the size of the fund is growing continuously.

When Kredex was established in July 2000, Apartment Associations could not borrow money from Estonian banks, as they could not provide collateral and hence were not 'bankable' in the eyes of the banks. KredEx, by providing loan guarantees to some Associations, demonstrated that they were indeed bankable. As a result, the banks now lend to Apartment Associations based on their cash flow (unsecured) within the normal course of business. Nowadays, KredEx only provides guarantees in special cases - particularly in rural areas where the value can be very low.

KredEx has guaranteed loans for around 70 Apartment Associations. Typically the loans include funds for insulation of the envelope (wall insulation, repairs to the roof), heating system upgrades and heating system regulation, particularly in Tallinn where substations are already in place in 80-90% of buildings. The banks are not interested in small loans, so usually all of the above works are carried out under a single loan.

According to KredEx, Estonians can be reluctant to borrow money. Many apartment associations have their loans approved by the banks, but don't take the money, preferring to wait until they have collected the money and then carry out the work.

KredEx also guarantees loans for buying houses/flats, particularly for young families who would otherwise be unable to borrow. A KredEx guarantee reduces the deposit requirement from 34% to 10% of the borrowed sum, which has made the housing market much more widely accessible. In addition, before KredEx was established, loans of 5-30 years (mortgages) were almost impossible to acquire, so the activities of KredEx have also stimulated the overall market for mortgages. Although not designed as an energy efficiency

measure, the KredEx housing guarantee scheme is significant for energy efficiency. As tenants, there is little incentive for young families to invest in thermal renovation and other energy efficiency measures. As owners, young families typically renovate the house/flat before they move in.

Around 20% of KredEx housing guarantees have been for renovation of a house/flat rather than purchase. It was noted that although loans to purchase houses are income tax deductable (26% of the interest is returned the following year), renovation loans do not benefit from this tax break.

Multilateral and bilateral donors

The main multilateral donor for energy efficiency is the European Union, using pre-accession funds and programmes such as ISPA (Instrument for Structural Policies for Pre-accession) and PHARE. Major bilateral donors are Denmark, Sweden, Finland, Norway and the United States. Kyoto mechanisms (Joint Implementation) represent another source of non-reimbursable financing for energy efficiency.

Donor funding, as described in this section of the report, represents a much higher proportion of overall investment in energy efficiency than national funding. This, combined with the fact that the level of national funding has declined steeply since peaking in the mid-1990s, suggests that the level of financial commitment to energy efficiency by the Government may be considered to be inappropriately low.

According to the Ministry of Economic Affairs, the reason for the reduction of state support for energy efficiency over the last five years is a change of priorities towards the efficiency of the economy and supporting entrepreneurs. The state budget has grown very little over this period, so there has been correspondingly more for the priority sectors and less for energy efficiency.

European Union (EU)

The EU is the single largest investor in energy efficiency in Estonia, having contributed €7.3 million for energy sector projects during the period 1992-2002 (June). A full list of EU energy projects completed by September 2001, accounting for €7.1 million of the above, is included as Table A3.5 which may be found in Annex 3 of this report, and selected projects are presented below:

Table 8. Selected EU energy efficiency-related projects in Estonia.

Contract title	Duration	Budget € (000s)
Energy conservation strategy	1996-1997	200
Energy strategy plan for Estonia	1996-1997	450
Institutional development of the energy sector	1996-1997	200
Regional Energy Centres	1995-1999	850
Post-implementation performance analysis for energy investments	1997-1998	300
Metering plan for the electricity sector	1997	350
Training of staff in the energy sector	1997-1998	350
Investment preparation facility	1997-2000	924
Project implementation unit	1997-1999	500
Total		**4,124**

Source: Ministry of Economic Affairs, 2002

The EU plans to continue to support energy efficiency in Estonia after accession.

In 1997-98, the EU funded a post-implementation performance analysis of its energy efficiency investments in Estonia to assess actual impact against planned impact. Of the twelve projects that were assessed, seven were on the supply-side and five on the demand-side. For the demand-side projects, the report concluded that energy saving objectives were often too optimistic, other benefits such as improved comfort levels and decreased maintenance needs were greater than expected and that the impact could be raised with improved dissemination of results through energy efficiency awareness campaigns.

For supply side projects, the main conclusions were that a good heat market forecast is the most critical issue in many feasibility studies; that poor fuel quality can significantly decrease real performance of projects; and that goals cannot be reached without appropriate training.

As a result of the project, the EU reformed the way in which it designs projects, and an evaluation system for post-implementation performance analyses has been established. Owners of facilities that are granted EU funding for energy efficiency projects now have a formal obligation to provide feedback on the success of such projects.

Sweden

Energy-related bilateral assistance from Sweden has included SEK 9 million in 1992 for the supply of fuel oil to Estonia and SEK 9.3 million from 1995 for 15 technical support projects and feasibility studies. The focus of Swedish international development is now shifting away from Estonia and the other Baltic states towards the NIS.

In addition to the above, the Swedish climate programme has lent a total of 67.6 million SEK (approx. €7.5 million) to finance 21 projects in Estonia. Technical support for implementation of the projects has been financed through grants to the value of 20.7 million SEK (approx. €2.2 million). The projects, in the areas of boiler conversion, district heating

and energy efficiency, resulted in a reduction of CO_2 emissions of some 96,150 tonnes by the year 2000.

Denmark

Denmark has contributed energy-efficiency related technical assistance and support to energy efficiency investments in Estonia to the value of 42.5 million EEK (€5.7 million) since 1994. So far, the focus has been on CHP and district heating.

Finland

Finland has mainly concentrated its donor activities on the financing of technical assistance projects, including:

- Energy Conservation Programme for Estonian industry (1992-1996)
- Energy-efficient renovation of a residential block in Tallinn and training on energy conservation (1994-1995)
- Rehabilitation of the Tallinn district heating network related to the World Bank loan (1993-1997)

Financiers of energy efficiency projects

The major international lenders

Loans from the major international financial institutions, which carry sovereign guarantees, represent the least cost (reimbursable) financing option for energy efficiency projects. However, these institutions have a tendency to lend for large supply-side projects rather than demand side projects.

Table 9. International loans to the Estonian Energy sector: millions of EEK

	EU 1993-1994	EBRD 1992-1996	WB, EIB, SIDA 1994-2000	TOTAL
Tallinn	3.8	88.3	305.4	397.6
Tartu		23.4	175.0	198.4
Parnu		14.3	78.3	92.6
Other towns and counties	720.0	147.5	98.0	317.5
Eesti Energia		78.5	112.0	185.5
Eesti Gaas		20.4	0.0	20.4
TOTAL (Millions of EEK)	**75.8**	**367.5**	**768.7**	**1,212.0**
Equivalent (Millions of €)	*4.8*	*23.5*	*49.1*	*77.5*

Source: Ministry of Economic Affairs, 2002

The EU, EBRD and World Bank loans were mainly for supply side projects - typically upgrading district heating systems and converting them to use local fuels.

In addition to the above, Eesti Energia borrowed €100 million in June 2002 as the first tranche of a planned €400 million suite of loans to upgrade the Narva power plants.

Other sources of reimbursable financing are the Nordic Investment Bank (NIB) and export credit funds, particularly from Denmark and Finland.

7. Organisation Of Energy Efficiency Activities

Governmental institutions

Ministry of Economic Affairs

The Energy Department of the Ministry of Economic Affairs is responsible for elaborating energy efficiency policy. The Department features 14 staff, of which four are responsible for both energy efficiency and renewable energy. (The Energy Market Inspectorate, which is subordinate to the Ministry, has another ten staff, but no specific energy efficiency-related role).

There is no national agency for energy efficiency, so the four staff at the Ministry of Economic Affairs, as mentioned above, have responsibility for both policymaking and the management of energy efficiency and renewable programmes.

Several of the questions put by the Review Team to the Ministry of Economic Affairs on the issue of the Energy Efficiency Target Programme resulted in the response that actions were planned, delayed or under-developed. This illustrated that the Ministry of Economic Affairs is under-resourced to carry out a Programme of this type, and reinforced the need for a separate energy efficiency agency with its own budget, staff and responsibilities.

The Ministry maintains a web site at www.mkm.ee.

Ministry of Environment

The Ministry of Environment considers energy efficiency to be the responsibility of the Ministry of Economic Affairs, hence outside of its area of responsibility. This is surprising, considering that the energy sector is the greatest contributor to greenhouse gasses.

When questioned about the working relationships between various ministries in the field of energy efficiency, the Ministry of Economic Affairs commented that contacts are good, particularly for climate change issues, but that tasks for each ministry have not been delineated yet. The Ministry of Finance controls the Public Investment Programme, and hence the budget for energy efficiency, but is not necessarily considered to be one of the energy efficiency stakeholder ministries.

The Environmental Investment Centre (EIC)

EIC is a government foundation, within the competence of the Ministry of Finance, which spends national environmental funds raised through environmental fees and charges. It features a staff of more than ten, with its own management structure, overseen by a Board,

which is chaired by the Minister of Environment and which features four government-nominated and four parliament-nominated members.

EIC enjoys considerable autonomy regarding the programmes which it runs, which are closely related to the thematic priorities of the Ministry of Environment. The management team develops project proposals, and the board decides on them. EIC typically co-finance projects, normally 70%-30% or 50%-50%, but 100% financing is also possible. EIC runs a number of sub-programmes - for example, the Air Protection sub-programme - each of which has its own 'godfather' in the Ministry of Environment. EIC collects project proposals - clearly defines priorities from the National Environmental Programme and EU accession documents, and makes funding decisions.

The Ministry of Environment has no explicit energy efficiency responsibilities and confirmed that energy efficiency is not considered to be a ministerial priority, although it does have responsibility for renewable energy. The Review Team noted with concern that the absence of energy efficiency responsibilities for the Ministry of Environment appears to excluded demand-side energy efficiency projects from being considered for EIC funding.

Energy Council, Renewable Energy Council and the WEC

The Estonian Energy Council and Renewable Energy Council are advisory bodies for the Minister of Economic Affairs. The role of these bodies is to advise, the Minister of Economic Affairs and Minister of Environment respectively.

According to its Chair, the Energy Council is not functioning well. There are theoretically 15 members who represent industry and academia, but active membership (attending meetings) is very much lower. At the only meeting of the first half of 2002, the main decision was to organise new membership. It is likely that the Council will soon re-establish itself as the National Committee of the World Energy Council, with the same basic membership but a different role.

Energy Market Inspectorate (EMI)

EMI is the energy regulatory authority which was established in 1998 when the Energy Act came into force. Legal responsibilities, which are largely administrative, apply to electricity, natural gas, the seven largest district heating companies (i.e. with plants over 50 MW), solid fuels and all petroleum products. While some powers could theoretically be used to make a strong impact on regulated companies, such as approving prices and supervising market-dominating enterprises, EMI is subordinate to the Ministry of Economic Affairs and is clearly not empowered as an agent for substantial change to the status quo.

It was noted that when EMI presented its role to the Review Team in June 2002, they described themselves as a 'very young' organisation. This was surprising, as at four years old it would have been expected that it would have reached a point of relative maturity, particularly in a very small country such as Estonia. The Inspectorate was also described as being 'under the Ministry of Economic Affairs', reflecting that according to the Energy Law, their level of independence is low.

In summary, EMI appeared to be an administrative organisation with limited powers, little independence and few staff. This may have been appropriate for the early years of its existence, when its main tasks were to issue the first licences, build up expertise, develop internal experience, create regulatory databases and publicise the role and meaning of independent regulation, which was something new in Estonia and little understood by energy suppliers and consumers alike. However, the time may now be ripe to strengthen the independence of EMI, and in particular to provide a firmer focus on the interests of energy consumers, rather than the current role of 'balancing the interests of suppliers and consumers'.

It is well known that competition provides an economic imperative for energy suppliers to reduce costs by improving energy efficiency. The role of a modern energy regulator is often described as being to stimulate competition, or to simulate the benefits of competition where actual competition is impractical or impossible. As a result of the political commitment to protect oil shale-fired power production and natural gas infrastructure limitations, true competition is currently impractical for electricity and impossible for gas. In this context, EMI may benefit from very much stronger powers and greater independence to exercise such powers, in order to deal with the de-facto electricity and gas monopolies.

Technical Inspectorate (TI)

Inspection of energy efficiency of equipment is one of the responsibilities of the Electrical Safety Unit, which is one of four units of the Technical Inspectorate, which has a total of 41 staff members.

An Electrical Inspection Centre carries out energy efficiency tests and performance of appliances. Hot water boilers are tested, for example, where testing standards are available. The standardisation centre and accreditation centres both work in close collaboration with the Technical Inspectorate, the Energy Market Inspectorate and the Consumer Protection authorities.

There is also a legal metrology unit, but it is not involved in metering of buildings or apartments.

The TI has responsibility for some energy efficiency standards - for example hot water boiler for 4-400 kW (EU Directive 92/42). On a practical basis, while the TI has the competence to remove a boiler from the market for failing to comply with energy efficiency requirements, this has never been necessary.

The TI will strengthen its focus on energy labeling by participating in a new Danish Energy Agency-funded project entitled 'Energy Savings through the Labeling of Domestic Appliances'.

The TI has limited information on the volume of sales of different products according to their energy efficiency, largely because such information would not normally be collected in the day-to-day course of business by the wholesalers, who are the main source of information. However, it was noted that according to the wholesalers, some 80% of refrigerators on the market now carry CE labels with "A" or "B" energy efficiency ratings.

The TI is not limited to act only on the basis of regulations. For example, it ran an energy efficiency promotion/leafleting activity as a voluntary action on its own initiative. It also runs seminars for surveillance authorities, to explain what labels are for and what to do in the case of consumer complaints.

The TI is not involved on a voluntary basis or otherwise with the labeling of cars or buildings at present.

Municipalities

According to the Ministry of Economic Affairs, there are very large variations between municipalities in the size of energy efficiency investments, and the size of investments and their structure at the municipal level is not thoroughly monitored at national level.

Many municipalities give energy efficiency low priority and are not willing to borrow to invest in energy efficiency projects. Some are not able to borrow to invest in such projects, being at the limit of their borrowing potential. According to the Rural Municipality and City Budget Act a municipality may not borrow more than 75% of annual budget revenues nor commit more than 20% of total budget volume to annual repayments and loan interest.

Stakeholders and non-governmental organizations

Eesti Energia

Eesti Energia is the largest employer in the country, with some 10,000 employees, many of whom are concentrated around the Narva power plants and oil shale mines in the north-east of the country. An additional 10,000 people are said to rely on the company in that region, either as dependents of employees or as contractors to the company. The two Narva oil shale fired power plants, Eesti and Balti, provide the vast majority of power in Estonia. Eesti Energia also owns a gas fired CHP plant near Tallinn.

Table 10. Eesti Energia, installed generation capacity, 2002

Plant	Fuel	Electrical capacity MW	Heat capacity MWth
Eesti	Oil shale	1,197	84
Balti	Oil shale	1,189	505
Iru (Tallinn)	Natural gas (can use HFO)	159	459

Source: Eesti Energia

The environmental impact of Eesti and Balti are discussed in Chapter 8 of this report. Eesti Energia has no energy efficiency department and is not involved in demand side energy efficiency issues. In addition, toleration of non-payment by residential consumers by Eesti Energia is high, reflecting the administrative culture of the state-owned company. According to Eesti Energia, there is a legal impediment to the company entering communal buildings to disconnect individual non-payers.

Local energy efficiency professional organisations and NGOs

Local energy efficiency NGOs - whether professional organisations, consumer groups or lobby groups - are missing entirely or extremely weak in Estonia. Neither discussions with the various organisations interviewed by the Review Teams nor an Internet search revealed the name of an energy efficiency-related specialist group of this type. By contrast, several NGOs and lobby groups represent supply-side energy interests.

The position is similar for environmental NGOs. According to several sources, there is no particularly active green movement in Estonia. Only one such NGO (Nõmme) was mentioned during the period of the mission of the Review Team, in the context that it is not particularly well known and hence is often excluded from the consultation process by the ministries.

According to the Ministry of Economic Affairs, green movement organisations do exist in Estonia, but typically have different views from both administration and other political parties, and rarely have very clear views on particular energy efficiency measures and developments. Generally, such organizations overwhelmingly support implementation of new technologies, especially for renewable energy use, but rarely have realistic proposals on how these technologies could overcome social and financial barriers. Green movement organisations were involved in the consultation process for the draft Electricity Market Act, and their opinions on the planned renewable energy support scheme were forwarded to the Parliament.

A professional association of registered energy auditors may develop in the future, as methodologies required to stimulate the development of energy auditing standards are planned. However, according to the Ministry of Economic Affairs (June 2002), work on developing such standards has been delayed.

Stockholm Environment Institute Tallinn Centre (SEI-Tallinn)

SEI-Tallinn is an independent, international research institute specializing in sustainable development and environment issues. It promotes sustainable development, environmental protection, nature conservation, environmental policy and management analysis, energy efficiency and energy conservation-related environmental studies. It seeks to bridge the gap between science and policy-making.

The SEI network is based in (Sweden), Boston (US), York (UK) and Tallinn.

Regional Energy Centres (RECs)

The RECs are a network of regional centres located in the towns of Rakvere, Viljandi and Võru. They offer a wide range of services for municipal and private clients, including preparation of energy sector development plans, energy management for local governments or corporations, energy planning, pollution calculations, energy audits and more.

The RECs were established under the European Union's PHARE programme in 1996, which funded the Centres until 1999. The Government of Estonia had agreed to continue to

fund the RECs after PHARE withdrew, but this simply did not happen, so in 1999 they set themselves up as an independent non-profit organisation. The reason for the Government's change of heart was that in 1999 the trend was to close and to merge Government Foundations. For example, three governmental non-profits were merged into KredEx, which is reviewed later in this Chapter.

The RECs work in small and medium sized municipalities, not in the big cities. This is a legacy from the original PHARE Terms of Reference rather than a particular philosophy. However, as there are 247 muncipalities in Estonia - from largest, Tallinn, to the tiny island of Ruhnu with a population of around 60 - there is plenty for the RECs to do.

Although run as a non-profit company, RECs operate in a competitive market, and consider that essential money-making activities detract from their overall impact.

Estonian Energy Research Institute/FEM-OPET Estonia Centre

The Institute is the hub of energy academia in Estonia, with a wide range of activities, including both research and advisory/consulting services. It is also the OPET Estonia Centre, the Baltic Chain Estonia Country Desk Centre, and runs laboratories for energy economy and planning; electrical power development; thermal engineering; energy processes diagnostics; and alternative energy development. The Institute is also represented on the Energy Council (as Chair), the Renewable Energy Council and the World Energy Council.

The size of the institute has reduced considerably, from a staff of 340 in 1989 to a 35 in 2002, of which only 15 are active researchers.

The Institute also acts as the FEM-OPET (Fellow Member-Organisation for the Promotion of Energy Technologies), which is an EU co-funded initiative. The Institute has been carrying out this work since 1998 with a local partner company, SA Archimedes. The main areas are energy efficiency in buildings, district heating and combined heat and power; renewable energy sources and technologies, particularly for biomass. Work on clean coal technologies is scheduled for 2003.

FEM-OPET activities have included participation in preparation of the National Energy Efficiency Target Programme and its Implementation Plan; providing training on energy audits as a tool for energy efficiency; publications, including 'Environmentally Adapted Energy Systems and Energy Audit Guide for Buildings'; and regular 'OPET Eesti' newsletters since May 2001. The newsletters each feature a new topic, such as renewable energy sources for the future - CHP - taxation policy for energy - small-scale hydroelectricity - EU Green Paper for Security of Supply.

Apartment associations and housing cooperatives

Some 75% of the Estonian population live in communal houses or apartment buildings. Some two thirds of these (i.e. 50% of the population) are organised into housing co-operatives, giving Estonia the highest percentage of the population living in co-operatives in the world.

The other third, which have not formally set up co-operatives, usually have residents' associations which is a less formal structure.

There are 6,624 housing co-operatives in Estonia, of which 2,767 in Tallinn.

The co-operatives provide a direct link between the companies servicing a building and the consumers in the building.

The Estonian Union of Co-operative Housing Associations, which was established in 1996, represents 800 member co-operatives with around 100,000 inhabitants. The Union has nine offices in different towns in Estonia, and represents the co-operatives at national and international levels.

Activities of the Union include a magazine ('Elamu'), a membership card, a training programme, consulting in legal and accounting issues (from the nine offices), handbooks and study trips in Estonia and abroad. The Union also holds an annual forum for co-operatives, provides the latest information at www.ekyl.ee, and arranges for member discounts on items such as PCs, insurance and credits.

The Union is involved in energy savings. It considers that Estonian apartment buildings - which house some 75% of the population - require a minimum of 60 billion EEK (approx. €3.8 billion) for renovation. In this context, the Union helps to find low-interest credits for co-operatives. They started a project last year with Tallinn city - to give out 6.5%-7.5% low-interest credits. The project was successful and over-subscribed, so they have acquired additional funding and are planning to continue for another two years.

Other energy savings activities include the project '100 co-operatives 2000' which provided energy audits for 100 co-operatives in Tallinn, and trained several energy managers with Finnish partners. In addition, an energy saving project with NBBL (Norway) which involves 15 seminars and further training in Norway for at least 30 energy managers (for this purpose, 'energy manager' is defined as someone who has done enough training to deal with energy issues on behalf of a co-operative. It does not refer to a professional energy manager).

Estonian Heat and Power Association (EHPA)

EHPA was established in 1995 by 26 Founder Members as a non-profit, NGO. Its 49 members are the biggest companies working in the Estonian heat and power Market, representing 60% of the heat market and 98% of the power market. Their website is at www.ehpa.ee.

EHPA acts as a lobby group for its members, and provides information. According to its Chair, the most successful single action to date has been to lobby successfully for 5% VAT on heat for residential customers when the authorities were proposing 18%.

Internationally, EHPA is a member of Cogen Europe and EuroHeat&Power, and works with the Finnish, Swedish, Latvian and Lithuanian heat and power associations. Nationally, it runs a number of working groups. There is no energy saving group, but one may be established

in the future. Many of the smaller district heating companies, that account jointly for 40% of the Estonian market, are not represented by EHPA.

EHPA is aware of consumer issues - over-heating, under-heating, late starting, high prices, lack of individual autonomous control of heating costs by householders - but addressing these issues is not the focus of the organisation. The Chair of the EHPA noted that consumers associations are not developed as well in comparison to EHPA, and that although an association of apartment owners exists it has a very wide remit, and, in his view, it is a passive organisation.

Estonian Gas Association (EGA)

EGA is also a non-profit NGO. According to the Chair of the EHPA, EGA is considered to be a competitor rather than a partner as district heating and local heating compete for market share. In this context, EHPA promotes the use of local fuels (peat, bio-fuels, wood) and EGA promotes gas.

8. Energy Efficiency And The Environment

Oil shale pollution

Estonia is unique in the world in that it uses indigenous oil shale as its main source of fuel for power production. After considerable internal debate, the Review Team abstained from making recommendations regarding the future use of this very highly polluting fuel, which is a highly sensitive issue in Estonia.

Most of the oil shale is used by Eest Energia in the Narva power plants, although Kiviter AS oil shale-to-oil processing company and Kunda-Nordic Tsement AS cement manufacturing company are also significant consumers of oil shale.

According to the Ministry of Economy there have been least-cost calculations which support the continuing use of oil shale as the predominant fuel for power generation in Estonia, although it was noted that this is not the same as a thorough least-cost study development strategy by an independent third party. It was also noted that from a security of electricity supply perspective, the position of Estonia is particularly weak. Rather than diversify, Estonia has opted to continue to have 'all its eggs in one basket' with almost all electricity being supplied by a single company operating from a single geographical location populated by a potentially militant minority group.

Three principal reasons were provided by the Ministry of Economy for Estonia's continuing commitment to oil shale:

Firstly employment - some 15,000 people (1% of the population) work in the oil shale business in the north-east of Estonia. Over 80% of the population of that area is Russian speaking, so there is also a minorities' issue.

Secondly, the only practical alternative to oil shale for large-scale power generation would be natural gas, of which the sole supplier of gas is Russia (Estonia has no pipelines to the western

European natural gas networks). According to the Ministry of Economy, the only thing keeping natural gas prices low is the availability of oil shale power production, and the price would very probably be very much higher if Estonia closed its oil shale production capacity.

Thirdly, oil shale-fired power is cheap at around 0.03 €/kWh, which internalises the environmental costs.

In view of the above, closure of one or other of the two Narva power plants (Eesti and Balti) is not on the political agenda. The government is focusing solely on improving the environmental acceptability of the plants rather than continually re-opening the debate for their need.

As Eesti and Balti were built during the '60s and '70s, they now require very substantial modernisation and upgrading. In this context, €400 million will be invested from 2002-2005, into the boilers, the ash handing systems and fuel impact systems. As part of this process, overall capacity will be downsized from 2,500 MW to 1,800 MW, reflecting the fact that peak demand is currently only 1,700 MW.

Table 11. Environmental comparison of fuels

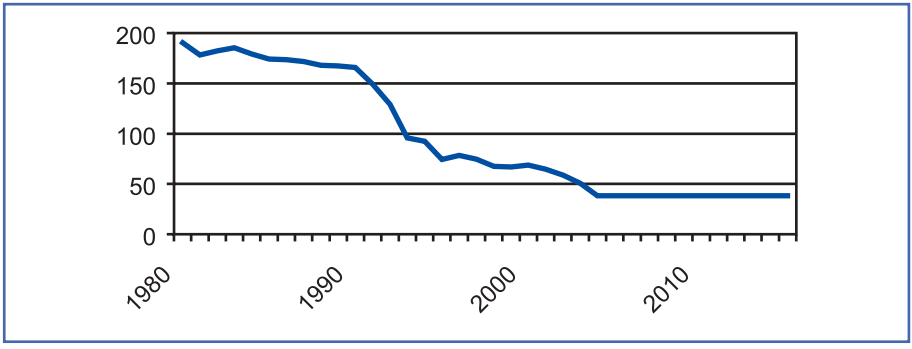
		Coal	Heavy Oil	Oil Shale
Moisture	%	5 -13	<3	10 - 12
Ash	%	5 - 25	0.3	43 - 47
Sulphur	%	0.5 - 3	<3	1.5 - 1.8
Heating value, MJ/kg		20 - 28	38	8 - 10

Source: Eesti Energia, 2002

The level of SO_2 emissions has declined since 1980, largely as a result of the collapse of electricity demand following the political changes of 1990. Eesti Energia now plans to stabilise emissions through the introduction of fluidized bed technologies at Narva.

Figure 2. Narva power plants - SO_2 emissions - history and outlook 1980-2015

Thousands of tonnes per annum

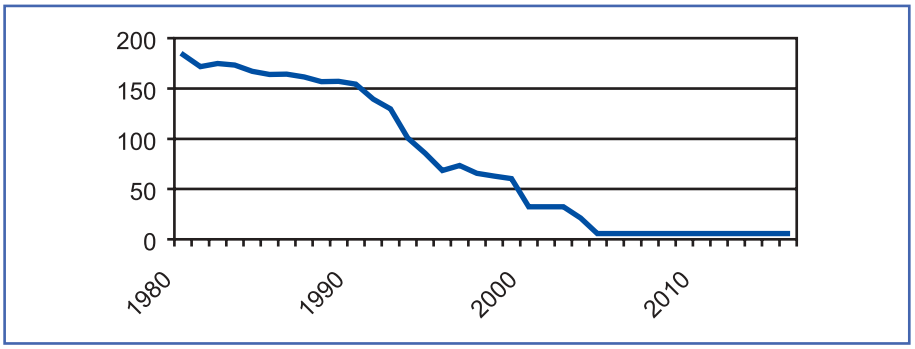


Source: Eesti Energia, 2002

Fly ash pollution should be almost completely eradicated by 2004.

Figure 3. Narva power plants - fly ash emissions - history and outlook 1980-2015

Thousands of tonnes per annum

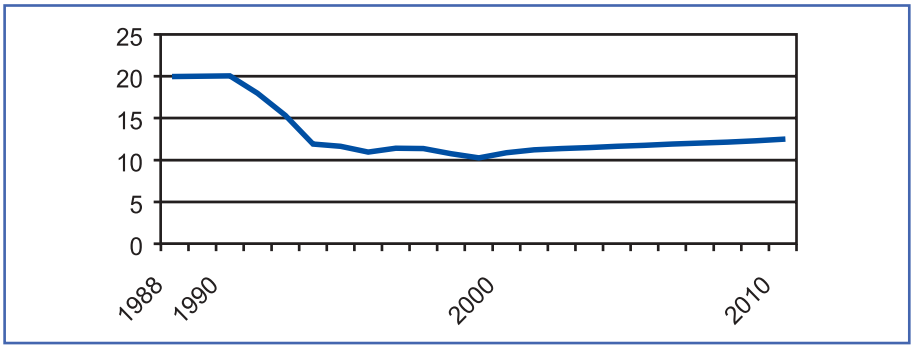


Source: Eesti Energia, 2002

CO_2 emissons are expected to rise proportionally with electricity demand growth.

Figure 4. Narva power plants - CO_2 emissions - history and outlook - 1988-2010

Millions of tonnes per annum



Source: Eesti Energia, 2002

Environmental action plan for Narva power plants

Eesti Energia has embarked on a 4.76 billion EEK (€304 million) environmental action plan at the Narva power plant. The plan has been under way since 1996 and is scheduled for completion in 2005, although the bulk of expenditure is yet to happen.

The investment programme, which commenced in 1996, includes the installation of eight ESPs to reduce fly ash emission, renovation of low-pressures part of turbines, treatment plant to phase out alkaline discharge into the river Narva, closure of an ash pond and much more.

However, by far the two largest projects, representing the bulk of the expenditure, will be the re-powering of Block 8 and Block 11 with CFB, which will cost 2 billion EEK and 1.8 billion EEK respectively (€131 million and €114 million). Each project will yield reductions of fly ash emissions of 5,000-6,000 tonnes/year and fuel savings of 300-400 thousand tonnes/year.

Combined heat and power (CHP)

Opportunities for CHP are severely limited.

According to the Ministry of Economic Affairs, as most of the electricity load which is carried by the Narva power plants and as there are a relatively low number of heat sinks in Estonia, CHP opportunities are limited to a maximum of 15% of total electricity production. It was noted that although district heating is widespread, with the exception of seven towns and cities, the systems are too small for CHP to be economically viable.

Renewable energy

An attractive regime is in place to promote the development of renewable energy.

Every network operator has an obligation to pay a preferential rate for renewable electricity. A high rate - 90% of the final sales price - is payable for all renewable electricity, regardless of who produced it, up to a ceiling of 2% of national power generation. The largest network operator and transmission system operator is Eesti Energia, which is seeking to minimise the financial burden represented by the preferential rate for renewables by establishing its own renewable subsidiary company, with the aim of generating the power itself. A 150 kW windmill, which was financed by the Danish Government and has already been transferred to the Estonian state, will probably be transferred into the ownership of the new company.

A recent study ('Estonia as a pilot for a sustainable society: utopia or opportunity', A.Oja, Stockholm Environment Institute - Tallinn Centre), suggests that Estonia's biomass potential is very much underdeveloped. There are around half-a-million hectares of agriculturally non-productive wetlands without any biodiversity value. Using waste water treatment areas for biomass production, 300,000 ha of energy/treatment wetlands could supply 61% of Estonia's annual heat consumption and 55% of electricity production, which could change Estonia's negative CO_2 balance to a similar positive balance.

The Kyoto Protocol

As 1990 was both the year selected as the base year for measuring CO_2 reductions under the Kyoto Protocol and the first year of the industrial collapse resulting from the dissolution of the former Soviet Union, Estonia, like other countries of the region, can meet its Kyoto commitments with ease. For example, CO_2 emissions from Narva have already reduced by some 50%. The Ministry of Environment has prepared documentation for the ratification of the Kyoto Protocol, which, at the request of the Ministry of Economic Affairs, shares responsibility for actions between various ministries. The Kyoto Protocol was ratified by the Estonian Parliament on 3rd September 2002.

The Ministry of Environment is developing a National Programme for the Reduction of Greenhouse Gas Emissions to 2013, which will be complete by the end of 2002. A Commission will probably be established to deal with this issue now that the Kyoto Protocol has been ratified.

Act on Sustainable Development 1995

The general principles of the environmental policy are laid down in the Act on Sustainable Development (ASD) adopted in 1995, the National Environmental Strategy (NES) endorsed by the Parliament of Estonia in 1997 and the National Environmental Action Plan (NEAP).

ASD sets the fundamentals of national strategy for the sustainable development, based on internationally accepted principles and initiatives, the historical traditions of Estonia and taking into account socio-economic situation in the country.

The National Environmental Strategy (NES) 1997

The National Environmental Strategy was adopted by Parliament in 1997.

NES specifies the trends and priority goals of environmental management and protection in a new political and economic situation and sets the main short-term and long-term tasks to be achieved by 2000 and 2010 respectively. The main principles are: 1. encourage environmentally sustainable economic development. 2. anticipate and prevent environmental damage; 3. exercise caution in environmental decision-making; 4. integrate environmental requirements into the development strategies of other sectors; 5. include environmental requirements in environmental and other socio-economic legislation; 6. prioritise environment above political or business interests; 7. apply the 'polluter/consumer pays principle'; 8. co-operate on trans-boundary environmental issues; 9. apply environmental protection measures at the political and/or administrative levels; 10. promote traditional nature conservation and nature management.

The Government will report back to the Parliament on implementation of the NES during 2002.

The National Environmental Action Plan (NEAP) 2001

NEAP specifies the actions and measures for achieving the ten objectives of the NES. The first NEAP was drawn up shortly upon endorsement of the NES and was approved by the Government in May 1998. However, because of considerable changes over the past few years the first NEAP got quickly outdated and the Ministry of Environment organised the revision and updating of the NEAP. As an outcome of this process, the Estonian National Environmental Action Plan for 2001-2003 was prepared, and approved by the Government on 5 June 2001. Categories of NEAP actions include preventive, clean-up, restorative, monitoring and regulatory actions.

Voluntary agreements with industry (environmental)

The Ministry of Environment has a small number of voluntary agreements with industry in place, particularly with the cement industry and construction companies. The agreements are typically with foreign-owned companies which are involved in environmental schemes outside of Estonia and have a need to clarify and formalise their environmental relationships in this respect.

According to the Energy Research Institute, environmental voluntary agreements in Estonia are more narrow than in other countries, representing no more than a weak indication that an enterprise is willing to reduce emissions levels, without firm commitments.

Activities Implemented Jointly (AIJ)

Bilateral agreements on greenhouse gasses are pending with the Netherlands, Sweden, and Switzerland and Finland.

A memorandum of understanding in place between STEM of Sweden, Tallinn Technical University and Stockholm Environmental Institute for an AIJ projects involving boiler conversion or replacement in small and medium-sized towns.

The Ministry of the Environment appeared to be bemused about the price per tonne of CO_2 associated with some of the AIJ projects being implemented or proposed at the present time. Typically, deals are being proposed for Estonia with prices as low as €2/tonne, which is much lower than deals being struck in other countries - for example, the Dutch ERUPT and CERUPT programmes quote prices of €5-9 EUR/tonne. The Ministry considered it unlikely that Estonia would agree to deals at artificially low rates.

Ownership of emissions rights is unclear. According to the Ministry of Environment, although a working group has been established, it does not yet have a fully-developed view of whether 'hot air' represents 'a national treasure?' ; 'a state-owned thing'?; 'a municipal thing'; or a 'company asset?'; or 'something else'. It is possible that the practical solution will be to wait until the bilateral agreement has been signed and then ask what it represents. At the moment, the government thinks that 'hot air' is not tradable, but as Estonian emissions have reduced by some 50% since 1990, theoretically there are a lot to sell.

The Ministry considers that some of these issues will probably be resolved at EU/international level rather than at national level.

9. Assessment of Progress

Government policy and strategy - overall assessment

The Review Team received the overall impression that while Estonia is progressing in implementing PEEREA and has moved towards achieving some of the strategic goals for the energy sector which it set for itself in 1998, the goals themselves lacked clearly set priorities, targets and specific dates against which overall performance could be monitored.

Although many of the elements of best practice energy efficiency policy were present in the work of the Energy Department of the Ministry of Economic Affairs, these elements did not appear to be backed up by definite plans, measurable targets, appropriate budgets and the human resources to make very much happen.

The Ministry of Economic Affairs described the energy conservation potential in Estonia as being quite substantial on the supply side, noting that considering the economic situation and investment possibilities in the near future, the energy saving potential could be as high as 30%. The Review Team noted that as Estonia has chosen to shield its power sector from competition for the next ten years, the potential for competitive forces to drive energy efficiency improvements will not be present.

The Ministry appeared to be more pessimistic about the specific potential for energy efficiency improvements on the demand side. It was noted that energy efficiency measures are typically considered unaffordable for a wide range of consumers; that energy prices do not provide enough motivation for energy efficiency measures; that financing conditions are often relatively unattractive for small-scaled projects with medium-long payback periods; that projects are often too small to attract professional investors (banks, funds etc); energy auditing and energy management are not widely known nor accepted; and that public awareness of energy efficiency technologies and techniques are low.

Improvement in demand-side energy efficiency by district heated households is hindered by a laissez-faire approach to district heating policy. A general absence of municipal zoning to prevent gas-to-district heating competition has contributed to an exodus of both apartments and buildings from the district heating systems. An absence of demand-side metering and control technologies results in uncontrollable heating bills, a non-affordability/ non-payment problem and a further exodus from district heating in favour of fuels where heating costs can be controlled. As district heating networks are designed to meet a certain load, the resulting vicious circle of disconnection and rising prices may ultimately prove to be unsustainable.

Energy efficiency programmes and funding

It was clear that the officials of the Energy Department of the Ministry of Economic Affairs have an excellent grasp of what is required in the field of energy efficiency, together with commitment to push programmes through. However, the lack of an appropriate and predictable budget and the low number of staff dedicated to energy efficiency are barriers to achieving a great deal with the level of national funding available to them, which accounts for the observed over-reliance on EU, Danish, Swedish and Finnish bilateral funding and technical assistance for energy efficiency. It is hoped that this PEEREA Review may help Ministry officials to build awareness of the benefits of social, environmental and economic benefits of energy efficiency at a higher (political) level, resulting in increased budgets and resources.

It was noted that not only has the level of energy efficiency funding from the Public Investment Programme been low, but that a large proportion of it went towards projects in the schools,

hospitals and the social sector, so it is arguable that even these projects primarily represented a commitment to the social sector rather than a real commitment to energy efficiency.

Year-to-year budgeting is an issue. Improving energy efficiency on a national scale involves an element of culture change and long-term planning, which is inhibited by short-term budgeting. If - as the Review Team has recommended - some form of permanent governmental institution for energy efficiency is to be established in Estonia, it would be most effective if financed in a way that creates the possibility of multi-annual programmes.

There is no system in place to use funds from the Public Investment Programme to leverage international financing by offering conditional co-financing. As a result, Estonian organisations are being excluded from participating fully in programmes such as SAVE (for energy efficiency) and Altener (for renewable energy). This can be said to represent a missed opportunity for Estonia.

Organisation

Perhaps the most striking element of national organisation is the absence of an agency to implement national energy efficiency policies and programmes. The progress which Estonia has made is remarkable in the context of the very small number of public officials working on energy efficiency issues within the Energy Department of the Ministry of Economic Affairs. The dedication and commitment of these few individuals should not be overlooked. Nevertheless, Estonia would clearly benefit from an implementing agency with its own budget, responsibilities, offices and staff.

The absence of energy efficiency as a perceived responsibility of the Ministry of the Environment is surprising in the context of the role of the energy sector as the main contributor to environmental degradation.

Some aspects of the role of the Energy Market Inspectorate (EMI) may result in opportunities for demand-side energy efficiency being missed and consumer interests being under-represented. EMI is currently required to balance the interests of the suppliers and consumers. As suppliers are rich, well-organised and able to lobby for their interests and consumers, generally, are not, the commercial interests of the suppliers appear to take precedence over the interests of consumers, particularly householders. The consumer protection authorities are understood not to have a particularly strong energy focus.

The absence of effective energy efficiency-related NGOs and lobby groups in Estonia is striking, but it is not something which should appear in the recommendations to the Government in this report, as NGOs are typically created ‘bottom up’.

It was noted that district heating companies may lobby against tariff reform, metering and control as, if successful, these measures will lower heat sales and revenues. As there is no strong consumer organisation to lobby *for* reform, in the absence of determined governmental or regulatory intervention, the status quo is unlikely to change.

The failure of the Government to continue to support the activities of the Regional Energy Centres when EU funding expired can be said to represent a missed opportunity, as these organisations have been demonstrated to be effective in catalysing energy efficiency at the local level.

Energy pricing and taxation

Estonia has completed the difficult task of removing cross subsidies in the electricity sector, which has been achieved by increasing the tariff for households from less than half a Eurocent/kWh to more than 7 Eurocents/kWh over a period of ten years. This represents a considerable achievement, as it has created an appropriate price signal for consumers which is often considered to represent the cornerstone of energy efficiency.

As described in detail in Chapter 4 of this report, the change in the structure day-night electricity tariffs may lead to householders, even if equipped with day-night meters, choosing to return to the standard tariff. This would be contrary to the interests of energy efficiency, and should be monitored by the Energy Market Inspectorate with a view of reverting to the former tariff structure if necessary.

The pricing regime for district heating is weak, as it does not provide a proper price signal for householders so the incentive to regulate consumption using thermostatic radiator valves is missing. (This issue is explored in detail in Chapter 4). There is also a danger that heating companies may be exploiting the absence of such controls by selling more heat, when comparing the years 1997 and 2000, heat sales rose by more than 21% although the number of district heating systems did not rise. These are areas where energy efficiency gains, as well as better consumer protection, could be achieved through improved legislation and regulation.

Environment

Estonia's renewed political commitment to oil shale represented the most difficult area for the Review Team, in the context of its responsibility to make recommendations for Estonia relating to the Energy Charter Protocol on Energy Efficiency and *Related Environmental Aspects*. After considerable debate it was concluded that fuel choice is an energy policy issue and hence not within the specific ambit of the Review Team.

Some progress has been made in stimulating the use of peat and wood, but this could be improved. Wood represents a substantial resource for Estonia, and it is understood that the use of waste wood as fuel could be improved.

In relation to environmental policies, a need for better integration of energy efficiency and environmental policies was noted, and in particular that the Ministry of Environment should not consider energy efficiency, which often represents the least-cost approach to making environmental improvements, to be the exclusive domain of the Ministry of Economic Affairs.

10. Recommendations

Based on the findings of the Review Team and the assessment of progress the following recommendations are provided for the Government of Estonia:

General recommendations

The Government should promote market liberalisation and increased competition throughout the energy sector while ensuring that new opportunities for improving energy efficiency are identified and captured.

Regional opportunities for co-operation, trade and power exchange with the other Baltic countries should be identified and exploited with a view to increasing overall efficiency of the energy cycle and reducing environmental impact of local oil shale-based power production.

Energy efficiency legislation, policies and strategies

Planned legislation for electricity, natural gas and liquid fuels should contain provisions relating to energy efficiency improvements, and energy market participants should be empowered to implement such measures, both on the supply side and the demand side.

The national target of limiting the growth of energy consumption to half the growth of GDP should be transposed into quantified sectoral targets which should be monitored rigorously.

The Government should define a Long-term Energy Efficiency Strategy which reflects the policy objectives of reducing energy intensity, improving security of energy supply and mitigating environmental impacts.

The Government should improve interministerial co-ordination, with a view to capitalising on the efforts which have already been taken to integrate energy efficiency into various economic policies, and hence better exploiting the benefits which would result from energy efficiency improvements.

Energy prices and markets

The Government should continue energy price reform with a view to providing the optimal signal for investments in energy efficiency and better reflection of environmental costs.

The Government should review the role of the Energy Market Inspectorate and strengthen its capacity and operational independence, with a view to achieving a liberalised and effective energy market.

Institutional framework

The Government should establish an energy efficiency implementation unit or organisation with its own budget and management, with a clear mandate and well-defined responsibilities.

The Government should encourage professional associations, consumers associations, housing co-operatives and NGOs to play a more active role in the promotion and implementation of energy efficiency measures.

The Government should make better use of the expertise developed in the Regional Energy Centres in building institutional capacity for promoting and implementing energy efficiency measures at county and municipal levels.

Energy efficiency funding and fiscal policy

The Government should commit to providing long-term funding for a national energy efficiency programme, rather than relying mainly on bilateral and multilateral financing.

The Government should stimulate the involvement of Estonian energy efficiency stakeholders in multilateral and bilateral programmes by making appropriate co-financing available to successful project proposals.

The Government should capitalise on the over-subscribed applications for energy efficiency funding for projects identified by the counties by making substantial additional funding available, either from budgetary funds or by creating a revolving fund for this purpose.

The Government should promote financial and fiscal instruments to encourage the use of energy efficient technologies and energy auditing as well as to stimulate the development of Energy Service Companies.

The Government should design a financial scheme to support energy efficiency in municipalities based on measurable benefits of the energy efficiency projects.

Implementation of specific programmes and instruments

The Government should capitalise on the opportunity presented by bilateral projects to train energy managers and energy auditors to create a national energy audit system.

The Government should analyse the possibility of establishing specific voluntary agreements with industry with a view to reducing energy intensity in the manufacturing sector.

The Long-term Development Plan for Public Transport, which is currently under development, should include concrete proposals for improving energy efficiency of both individual vehicles and the overall park of vehicles.

The Government should continuously monitor the growing number of private vehicles and the subsequent need for building appropriate infrastructure; in this context, policy measures such as the removal of the registration fee for private cars and the continuing reduction of the level of subsidy for public transport may be reviewed.

The Government should develop specific programmes for improving energy efficiency in the buildings sector; a first step could be a programme dedicated to public buildings.

The Government should develop and implement minimum thermal insulation and heating efficiency standards for new buildings.

The Government should improve the collection of energy data and statistics and build and disseminate energy efficiency indicators to allow effective monitoring of energy efficiency improvements in the various sectors of the economy.

Demand-side management and district heating

The Government should establish the necessary regulation and legislation in order to secure better individual metering of energy consumption with a view to improving the efficient consumption of heat and hot water.

As long as Eesti Energia remains as a vertically integrated utility with a dominant position on the energy market, the Government and the Energy Market Inspectorate should request it to develop specific energy efficiency demand-side management programmes.

The Government should strengthen its policy for promoting small scale cogeneration and all district heating cogeneration by empowering the Energy Market Inspectorate to create a specific tariff mechanism which guarantees a market for power sold to the grid.

Energy efficiency and environmental policies

Programmes and instruments promoted by the Ministry of Environment should better-incorporate energy efficiency considerations, both at the stage of policy design and implementation.

The Government should establish guidelines for the Environmental Investment Centre to allow financing of demand-side energy efficiency projects that will lead to reductions in energy consumption and therefore in greenhouse gas emissions.

Information and awareness building

The Government should set up a programme to build awareness of energy efficiency opportunities for end-use energy sectors.

The Government should support the development of education programmes which cover the rational use of energy and its link to climate change, both in schools and in higher educational institutions.

Annex 1: Energy Situation In Estonia

Estonia is the only country in the world to use indigenous oil shale as its primary source of energy. Most of the oil shale is used for power production, but there is also use in the shale oil and cement industries. Peat is another important primary energy resource, as is wood - more than half of the territory of Estonia is forested. There are a number of small hydro plants. Estonia has almost no petroleum, natural gas or coal. There are no refineries, so all petroleum products are imported, as is natural gas which is from a single source, Russia.

Table A1.1. Selected energy production, supply and consumption statistics

	1990	1996	1997	1998	1999	2000
Total Primary Energy Production (Mtoe)	5.341	3.921	3.869	3.250	2.977	3.163
Net imports (Mtoe)	5.294	2.214	2.577	2.548	2.506	1.733
Total Primary Energy Supply (TPES) (Mtoe)	9.951	5.658	5.556	5.110	4.716	4.518
Total Final Consumption, observed (Mtoe)	5.098	2.727	2.673	2.517	2.275	2.297
Total Electricity Consumption (TWh)	7.299	5.417	5.581	5.579	5.286	5.422

Source: Statistical Yearbook of Estonia, 2001
Ministry of Economic Affairs

According to the US Department of Energy and Energy Information Administration, which carried out an energy review of Estonia, oil shale mining will continue in the Viru and Estonia mines. The Narva and Sirgala quarries will be under one firm, AS Narva Karjaar (Narva Quarry Ltd.). The Kohtla mine and Aidu quarry will be under another firm. Eesti Polevkivi also plans to merge the Ahtme mine with either the Viru or Estonia mine and to stop extraction at Ahtme at the start of 2002. This will continue a pattern of shale oil mine closings, since the Tammiku mine closed in 1999. The oil shale company, Eesti Polevkivi, estimated that oil shale production for 2001 was approximately 12 million tonnes, and that annual production will remain at that level through 2006. After 2006, annual production will most likely drop to about 10.5 million tonnes.

The power sector is dominated by Eesti Energia, which is a fully state owned vertically integrated company. The second half of the 1990s were characterised by uncertainty, inertia and political infighting about whether, and if so, how Eesti Energia, should be privatised to the US company NRG. At this time, the oil shale mines were incorporated into the power company in preparation for privatisation. Although a deal was finally struck in 2000, it collapsed as a result of the reduction in international business confidence which followed the collapse Enron.

Privatisation of the power sector is no longer on the immediate political agenda, so the management of Eesti Energia is now taking a lead role in modernising the power generation and mining operations. The company has borrowed the first €100 million of a planned €400 million suite of loans to reduce the environmental impact of the company, as the two

oil shale-fired power plants are amongst the most polluting in the world. The European Union has agreed a ten-year derogation on compliance with the Electricity Directive for Estonia, partially to protect Eesti Energia from competition while environmental improvements are being financed, and partially for social reasons, as some 10% of the population, all from the same geographical representing an ethnic minority, depend on the oil shale industry.

The natural gas sectors are privately owned, with the single natural gas supplier being Gazprom of Russia, which is also a significant stakeholder in the utility Eesti Gaas. The supply of liquid fuels and LPG is all privately owned. District heating companies are owned by municipalities. There is a regulatory authority, the Energy Market Inspectorate, which licenses all fuel and energy suppliers, including the seven largest district heating companies but excluding the many smaller heat companies.

Annex 2: Selected End Use And Associated Data Tables

Conversion of units

Units are converted to Mtoe using specific factors for the energy content of each quality of coal, oil etc. In general the net calorific value is used.

Electricity data are converted using the relationship: 1 terawatthour = 0.086 Mtoe.

Table A2.1. Total final energy consumption by end-use sector (Mtoe)

	1990	1996	1997	1998	1999	2000
Residential	n.a.	1.383	1.410	1.234	1.201	1.163
Industry	n.a.	0.693	0.649	0.621	0.456	0.494
Services	n.a.	0.223	0.189	0.195	0.230	0.240
Transport	n.a.	0.332	0.346	0.384	0.334	0.341
Agriculture	n.a.	0.095	0.078	0.083	0.054	0.059
Non-specified						
Total TFC, observed	5.098	2.727	2.673	2.517	2.275	2.297
observed TFC/GDP toe/1,000 US$)	n.a.	0.735	0.652	0.585	0.532	0.503

Sources: Energy Balance 1998; Energy Balance 2000; Estonian Energy 1999 Ministry of Economic Affairs

Table A2.2. Total final energy consumption by source, residential sector (ktoe)

	1996	1997	1998	1999	2000
Total	1383	1410	1234	1201	1163
a. Electricity	418	437	339	326	333
b. Heat	106	104	116	117	126
c. Oil products	500	505	454	412	376
d. Gas	244	270	242	261	251
e. Coal	44	43	51	48	48
f. Combust. Renew. & Waste	26	27	20	24	18
g. Others	45	24	12	13	11
Floor Area (1,000 m²)	33 200	33 300	33 400	33 503	33 560
No. of dwellings (x 1,000)	620	622	623	623	623
Residential use per dwelling (toe/dwelling)	2.23	2.27	1.98	1.93	1.87
Residential use per surface (toe/1,000m²)	41.7	2267.6	1981.3	1927.7	1866.6

Sources: Energy Balance 1998; Energy Balance 2000; Estonian Energy 1991-2001; Building Registry

Table A2.3. Final energy consumption by industry sector/ energy source 1999

	mining and quarrying	Manufacturing							Construc-tion	Total
		produc-tion of other non-metallic mineral products	food pro-cessing, beverages and tobacco	produc-tion of wood and wood products	textile, leather and clothing industry	chemical industry	pulp, paper and printing industry	other industries		
Coal		22.91	0.05		0.02			0.96	0.00	23.93
Oil shale		51.04				0.00		0.00		51.04
Crude oil										
Shale oil			0.24						0.26	0.50
Petroleum products	1.77	4.90	3.03	5.18	0.07	0.02	0.10	1.86	12.97	29.90
Gas	1.98	15.05	2.99	0.10	0.02	1.65	0.41	4.85	1.19	28.23
Nuclear	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Hydro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Geothermal. Solar etc.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Combust. Renew. & Waste	0.00	0.45	1.22	1.05	0.02	0.00	0.00	0.48	0.10	3.32
Other fuels		0.91					0.00	0.00		0.91
Electricity	0.67	12.95	22.95	18.87	25.87	26.73	8.93	31.72	8.62	157.30
Heat	0.14	3.39	47.43	39.34	28.40	17.48	19.59	37.95	5.11	198.84
Total	4.56	111.59	77.91	64.54	54.41	45.88	29.02	77.82	28.26	493.98
Value added per sector mill. 1995 USD*	57.67	44.93	162.27	118.14	129.34	35.29	40.29	355.31	294.51	1237.8
Energy/value added {PJ/[mill 1995 USD]}	0.0791	2.4838	0.4801	0.5462	0.4207	1.3003	0.7202	0.2190	0.0959	0.3991

** Preliminary values*
Source: Energy Balance 2000; Statistical Office
Ministry of Economic Affairs

Table A2.4. Final consumption of services by energy source (Mtoe)

Service sector	1996	1997	1998	1999	2000
Total	9 354	7 931	8 180	9 646	10 036
a. Electricity	4 469	5 025	5 238	4 540	4 910
b. Heat	4 520	2 548	2 413	4 548	4 612
c. Oil products	256	258	427	371	360
d. Gas	4	7	5	20	18
e. Coal	6	4	3	16	17
f. Combust. Renew. & Waste	93	80	78	142	108
g. Others	6	9	16	9	11
No. of employers (mil.)	0.3168	0.3328	0.335	0.3317	0.3276
Floor area (1000m²)					
Value added in basic prices (MUSD)	1134.7	1222.7	1265.5	1289.8	1334.7
Energy/value added (MJ/MUSD)	8.24	6.49	6.46	7.48	7.52
GJ/Employee	29.53	23.83	24.42	29.08	30.63
GJ/m²					

(Includes commercial and non-commercial consumption)
Sources: Energy Balance 1998; Energy Balance 2000; Estonian Energy 1991-2001
Ministry of Economic Affairs

Table A2.5. Gross domestic product, 1995 - 2000

(billion USD, in 1995 prices and 1995 USD exchange rate)

	1995	1996	1997	1998	1999	2000
GDP, constant prices (1995), bill. EEK	40.897	42.529	46.969	49.339	48.996	52.369
USD/EEK	11.46	12.04	13.87	14.08	14.69	16.98
GDP, constant prices (1995), bill. 1995 USD	3.568	3.710	4.097	4.304	4.274	4.568
GDP, constant prices (1995), bill. USD of respective year	3.568	3.532	3.387	3.505	3.334	3.085

Source: Statistical Yearbook of Estonia 2001; Statistical Office
Ministry of Economic Affairs

Table A2.6. Population of Estonia 1990 - 2000

	1990	1996	1997	1998	1999	2000
Population (millions)	1.571	1.469	1.458	1.450	1.442	1.369

Source: Statistical Yearbook of Estonia, 2001
Ministry of Economic Affairs

Table A2.7. CO_2 emissions 1990 - 2000

	1990	1996	1997	1998	1999	2000
Total CO_2 emissions (10^3 tonnes/year)	37494	20057	19998	17950	16425	16494
Share residential sector (%)	4.15	5.53	6.20	6.01	6.31	5.87
Share industrial sector (%)	7.08	3.64	3.28	3.71	4.02	2.93
Share transport sector (%)	7.18	5.22	6.06	6.97	8.23	6.24
Share other (%)	2.23	0.22	0.20	0.34	0.29	0.41
Total CO_2/GDP (tonnes/mill. USD '95)		5406	4881	4170	3843	3610
Total CO_2/capita (tonnes/inhabitants)	23.9	13.7	13.7	12.4	11.4	12.0
Total CO_2/ TFC (tonnes/toe)	7.35	7.36	7.48	7.13	7.22	7.18

Sources: Estonian Energy 2000, Institute of Ecology

Table A2.8. Transport indicators 2000

	Freight	Travel	Total
TFC (Mtoe)	n.a.	n.a.	0.341
10^9 tonne-km	n.a.	n.a.	16.102
TFC/10^9 tonne-km	n.a.	n.a.	0.02117
10^9 Person-km	n.a.	n.a.	3.392
TFC/person-km (TFC/10^9 person-km)	n.a.	n.a.	0.10048
Number of passenger cars/1000 inhabitants	64.4	343.8	408.2

Sources: Energy Balance 2000; Statistical Yearbook of Estonia, 2001

Annex 3: Selected Pricing, Financing And Other Tables

Table A3.1. Energy prices in end use sectors 2000 (1995 USD per Unit)

	Un-leaded gasoline 95 RON (litre)	Light fuel oil (1000 litres)	Diesel (litre)	Heavy fuel oil (tonne)	Nat Gas (10^7 kcal GCV*)	Steam Coal (tonne)	Electricity (kWh)
Industry	0.394	205	0.360	97.8	72.2	31.6	0.0375
Households (incl. 18 % VAT)	0.458	239	0.360	124.0	97.4	57.9	0.0534

** Gross calorific value*

Energy Balance 2000/Ministry of Economic Affairs

Table A3.2. Average prices of energy and fuels 1999-2001 (EEK)

	Average			Small consumer			Medium consumer			Large consumer		
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001
Coal, EEK/tonne	758	599	705	847	833	914	820	837	913	715	534	696
Oil shale, EEK/tonne.	130	131	139	178	151	197	132	120	202	130	x	139
Sod peat, EEK/tonne	247	243	268	260	215	300	240	227	274	248	260	267
Peat-briquette, EEK/tonne	594	595	624	618	572	735	627	601	632	565	596	614
Firewood, EEK/m^3 sol.vol.	98	100	123	126	133	153	104	119	153	68	82	118
Waste wood, EEK/m3 sol.vol.	111	117	110	117	98	147	105	109	88	114	121	111
Natural gas, EEK/thousand m^3	1,149	1,078	1,139	1,369	1,402	1,786	1,250	1,236	1,651	1,100	1,025	1,126
Liquefied gas, EEK/tonne	5,195	7,266	6,326	5,930	7,834	8,372	5,356	7,281	8,609	4,976	7,057	6,143
Heavy fuel oil, EEK/tonne	1,045	2,171	2,086	1,101	1,784	2,305	1,062	1,760	2,007	1,027	2,415	2,087
Shale oil, EEK/tonne	1,084	1,683	1,898	1,213	1,739	2,076	1,125	1,714	2,017	991	1,630	1,874
Light fuel oil, EEK/tonne	2,924	4,892	4,818	3,021	4,839	4,852	2,975	4,907	4,927	2,883	4,881	4,802
Diesel oil, EEK/tonne	4,625	6,400	6,605	5,079	7,281	8,263	4,986	6,908	8,032	4,143	5,980	6,511
Motor gasoline, EEK/tonne	7,633	9,097	10,082	7,998	9,299	10,152	7,643	9,027	10,142	7,493	9,242	10,067
Electricity, EEK/MWh	604	636	747	731	768	887	652	719	851	543	535	728
Heat, EEK/MWh	299	305	332	351	353	387	333	349	382	224	258	321

Source: Ministry of Economic Affairs/Statistical Office of Estonia, 2002

Table A3.3. Average prices of energy and fuels 1999-2001 (€)

	Average			Small consumer			Medium consumer			Large consumer		
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001
Coal, €/tonne	48.4	38.3	45.1	54.1	53.2	58.4	52.4	53.5	58.4	45.7	34.1	44.5
Oil shale, €/tonne.	8.3	8.4	8.9	11.4	9.7	12.6	8.4	7.7	12.9	8.3	0.0	8.9
Sod peat, €/tonne	15.8	15.5	17.1	16.6	13.7	19.2	15.3	14.5	17.5	15.9	16.6	17.1
Peat-briquette, €/tonne	38.0	38.0	39.9	39.5	36.6	47.0	40.1	38.4	40.4	36.1	38.1	39.2
Firewood, €/m^3 sol.vol.	6.3	6.4	7.9	8.1	8.5	9.8	6.6	7.6	9.8	4.3	5.2	7.5
Waste wood, €/m^3 sol.vol	7.1	7.5	7.0	7.5	6.3	9.4	6.7	7.0	5.6	7.3	7.7	7.1
Natural gas, €/thousand m^3	73.4	68.9	72.8	87.5	89.6	114.1	79.9	79.0	105.5	70.3	65.5	72.0
Liquefied gas, €/tonne	332.0	464.4	404.3	379.0	500.7	535.1	342.3	465.3	550.2	318.0	451.0	392.6
Heavy fuel oil, €/tonne	66.8	138.8	133.3	70.4	114.0	147.3	67.9	112.5	128.3	65.6	154.3	133.4
Shale oil, €/tonne	69.3	107.6	121.3	77.5	111.1	132.7	71.9	109.5	128.9	63.3	104.2	119.8
Light fuel oil, €/tonne	186.9	312.7	307.9	193.1	309.3	310.1	190.1	313.6	314.9	184.3	312.0	306.9
Diesel oil, €/tonne	295.6	409.0	422.1	324.6	465.3	528.1	318.7	441.5	513.3	264.8	382.2	416.1
Motor gasoline, €/tonne	487.8	581.4	644.4	511.2	594.3	648.8	488.5	576.9	648.2	478.9	590.7	643.4
Electricity, €/MWh	38.6	40.6	47.7	46.7	49.1	56.7	41.7	46.0	54.4	34.7	34.2	46.5
Heat, €/MWh	19.1	19.5	21.2	22.4	22.6	24.7	21.3	22.3	24.4	14.3	16.5	20.5

Source: Ministry of Economic Affairs/Statistical Office of Estonia, 2002
Converted throughout using the rate EEK 15.64664: €1.
The size of average user is not determined, although it exists in statistical brochures. See table 18 of Energy Balance 2001

Table A3.4. Fuel excise tax rates

Product group	Excise tax	
	EEK	€
Petrol (per 1,000 litres)	3.50	0.22
Diesel (per kg)	3.04	0.19
Aviation kerosene (per kg)	3.87	0.25
Aviation gasoline (per kg)	1.50	0.10
Compressed gas as motor fuel (per kg)	1.30	0.08
Light fuel oil (per kg)	1.50	0.10
Agricultural/fisheries fuel (per kg)	0.49	0.03

Source: Law on Fuel Excise Tax/Ministry of Economic Affairs

Table A3.5. Energy projects funded by the EU 1992 - 2001

Project	Value € 000s	Year completed
Energy Advisor for the Ministry of Energy#1	300	1993
Energy Advisor to the Ministry of Energy#2	200	1995
PIU Estonia Energy Sector	435	1997
Energy database for Estonia	199	1996
Restructuring of electricity sector	339	1997
Establishment of regional energy strategy	450	1997
Energy conservation programme development	200	1997
Establishment of Regional Energy Centres	499	1997
PIU Estonia Energy Sector	434	1996
Oil shale perspectives- energy production	450	1997
Institutional development of energy sector	197	1997
Standardising heat load & energy consumption	50	1997
Standardisation of energy sector in Estonia	50	1997
Energy PIU - Estonia - bridging contract	47	1997
Energy PIU - Estonia	467	1998
Evaluation energy strategy Estonia	5	1996
Evaluation for energy PIU Estonia	6	1996
Metering plan for the electricity sector	350	1998
Post implementation performance analysis	350	1998
Training of staff in energy sector Estonia	350	1999
Energy training facility Estonia	100	1998
Investment preparation facility regional development	924	2000
Regional Energy Centres	396	1999
Evaluation of tenders for Regional Energy Centres	5	1997
Legal assistance for Min. Economic Affairs	45	1997
Assistance to Energy Market Inspectorate	150	1999
Definition of consequences for energy consumers	96	2000
Total to September 2001	7,094	

Source: EU Delegation, Tallinn

Table A3.6. Index of tables in this report

Annex 4: Organisations Visited By The Review Team

- Ministry of Economic Affairs
- Ministry of Transport and Communications
- Ministry of Environment
- Ministry of Finance
- Energy Market Inspectorate
- Technical Inspectorate
- Regional Energy Centres
- Estonian Credit and Export Guarantee Fund (KredEx)
- Estivo Ltd
- Association of Heating and Ventilation Engineers
- Union of Apartment Associations
- Estonian Energy Research Institute
- Eesti Energia AS
- Estonian Heat and Power Association
- FEM-POET
- Stockholm Environment Institute - Tallinn
- Tallinn Municipality
- Tallinn Technical University
- Vattenfall AS.

GLOSSARY

AIJ	Activities Implemented Jointly under the UNFCCC
CHP	Combined heat and power, also known as cogeneration
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DKK	Danish Krone
DSM	Demand-side management
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EEK	Estonian Crown, fixed at EEK 15.64664: €1
EKVU	Estonian Society of Heating and Venting Engineers
ESCO	Energy Service Company
EU	European Union
Eurostat	Statistical Office of the European Communities
€	Euro
FEM-OPET	Fellow Member - Organisation for the Promotion of Energy Technologies
IEA	International Energy Agency
GCV	Gross Calorific Value
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse gas
GJ	Giga Joule
GWP	Global Warming Potential
IFC	International Finance Corporation
kcal	Kilocalorie
kt	Kilotonne
ktoe	Thousand tonnes of oil equivalent
kW	Kilowatt
kWh	Kilowatt hour
LPG	Liquified Petroleum Gas
m^2	Square metre
m^3	Cubic metre
MJ	Mega Joule
Mt	Million tonne
Mtoe	Million tonne of oil equivalent
MW	Megawatt
NEP	National Environmental Programme
NGO	Non Governmental Organisation
NO_x	Nitrous Oxide
OECD	Organisation of Economic Co-operation and Development
OPET	Organisation for the Promotion of Energy Technologies

PEEREA	Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
PHARE	EU assistance programme for economic restructuring in the countries of Central and Eastern Europe
PJ	Peta Joule
PPP	Purchase power parity
R&D	Research and Development
RTPA	Regulated third party access
SAVE	EU programme for the promotion of energy efficiency
SCORE	Supporting Co-operative Organisation of Rational Energy Use Programme
SEK	Swedish Krona
SME	Small and medium size enterprise
SO_2	Sulphur Dioxide SYNERGY EU international energy cooperation programme
TFC	Total Final Energy Consumption
THERMIE	EU Programme for the promotion of research, development and demonstration in non-nuclear energy technologies (under the Fourth Framework Programme for Research, Technological Development and Demonstration)
TJ	Tera Joule
TPES	Total Primary Energy Supply
TWh	Terawatt hour
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax