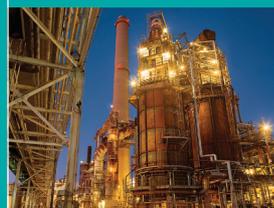


IN-DEPTH REVIEW OF ENERGY EFFICIENCY POLICIES AND PROGRAMMES



BULGARIA

2008



In-Depth Review of the Energy Efficiency Policy of Bulgaria

**Energy Charter Protocol on Energy Efficiency and
Related Environmental Aspects (PEEERA)**

May 2008



Disclaimer

Information contained in this work has been obtained from sources believed to be reliable. However, neither the Energy Charter Secretariat nor its authors guarantee the accuracy or completeness of any information published herein, and neither the Energy Charter Secretariat nor its authors shall be responsible for any losses or damages arising from the use of this information or from any errors or omissions therein. This work is published with the understanding that the Energy Charter Secretariat and its authors are supplying the information, but are not attempting to render legal or other professional services.

© **Energy Charter Secretariat, 2008**
Boulevard de la Woluwe, 56
B-1200 Brussels, Belgium

ISBN: 978-905948-000-1 (hardback)

Dépôt Légal (Belgium): D/2008/7850/5

Reproduction of this work, save where otherwise stated, is authorised, provided the source is acknowledged. All rights otherwise reserved.

The Energy Charter

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 states¹. 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 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 trade and transit, investment and energy efficiency and environment are held in between Conference meetings.

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

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 fifty-one 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 Gene McGlynn Tel: +322 775 9854 or e-mail: Gene.McGlynn@encharter.org or Mrs Valya Peeva, Tel: +322 775 9853 or e-mail: Valya.Peeva@encharter.org.

¹ Albania, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, 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, United Kingdom, Uzbekistan.

Table of Contents

Executive Summary	11
<i>Background</i>	11
<i>Energy Policy</i>	11
<i>Energy Efficiency Policy</i>	12
<i>Renewable Energy Policy</i>	13
<i>Overall Assessment of Progress</i>	14
<i>Recommendations</i>	15
Introduction	21
<i>Bulgaria in the Energy Charter Process</i>	21
<i>Purpose of the Energy Efficiency In-Depth Review</i>	21
Background	23
<i>Geographical Profile</i>	23
<i>Economic Profile</i>	25
<i>Energy Background</i>	27
<i>End-use sectors</i>	33
Energy Policy	43
<i>Strategic and Legal Basis</i>	43
<i>Energy Market Liberalisation</i>	44
<i>Institutions</i>	47
<i>Energy Pricing Policy</i>	49
Energy Efficiency Policies and Programmes	55
<i>Strategic and Legal Basis</i>	55
<i>General Energy Efficiency Programmes</i>	58
<i>Policy Instruments and Measures</i>	60
Organisation of Energy Efficiency Activities	71
Financing of Energy Efficiency Activities	75
Renewable Energy Policy	81
Environmental Policy Related to Energy	89

Assessment of progress	91
<i>General Assessment of Progress</i>	<i>91</i>
<i>Progress Evaluation by Key Energy Efficiency Indicators</i>	<i>91</i>
<i>Progress Evaluation as Compared to Key Recommendations from the First In-depth Review of Bulgaria in 2001</i>	<i>97</i>
Recommendations.....	101
Annexes	107
<i>Annex 1: General economic and energy data</i>	<i>107</i>
<i>Annex 2: Selected end-use data tables.....</i>	<i>110</i>
<i>Annex 3: Energy Prices (as of 20. April 2008)</i>	<i>112</i>
<i>Annex 4: ODYSSEE - Energy Efficiency Profile Bulgaria</i>	<i>115</i>
<i>Annex 5a: Energy efficiency measures in the residential sector in the First Bulgarian National Energy Efficiency Action Plan</i>	<i>120</i>
<i>Annex 5b: Energy efficiency measures in the tertiary sector in the First Bulgarian National Energy Efficiency Action Plan</i>	<i>124</i>
<i>Annex 5c: Energy efficiency measures in the industry sector in the First Bulgarian National Energy Efficiency Action Plan</i>	<i>126</i>
<i>Annex 5d: Energy efficiency measures in the transport sector in the First Bulgarian National Energy Efficiency Action Plan</i>	<i>128</i>
<i>Annex 6: Fact Sheets for Energy Efficiency Financing Activities in Bulgaria.....</i>	<i>130</i>
<i>Annex 7: Recommendations from the In-depth Review of Bulgaria in 2001 ...</i>	<i>144</i>
<i>Annex 8: Organisations Contacted by the Review Team.....</i>	<i>148</i>
<i>Annex 9: General References and Information Sources.....</i>	<i>149</i>

Table of Figures

Figure 1. Bulgaria.....	23
Figure 2. Temperature profiles for two of the largest cities in Bulgaria	24
Figure 3. Macroeconomic development of Bulgaria.....	25
Figure 4. GDP Development in Bulgaria compared to other new EU Member States and the EU	26
Figure 5. Bulgaria: Total Primary Energy Supply by Fuel 1990-2005	28
Figure 6. Bulgaria: Total Final Consumption by Fuel 1990-2006	30
Figure 7. Bulgaria: Total Final Consumption by Sector in 2005	30
Figure 8. District Heat Output	31
Figure 9. Combined heat and power generation - Percentage of gross electricity generation.....	32
Figure 10. Energy Intensity of Bulgaria	32
Figure 11. Total final consumption by sector in 2005.....	33
Figure 12. Final Consumption of the Residential Sector by Energy Source.....	34
Figure 13. Final Consumption of the Residential Sector for Space Heating by Energy Source.....	35
Figure 14. Specific energy efficiency indicators for the residential sector in Bulgaria	35
Figure 15. Break-down of the industrial GDP in Bulgaria.....	36
Figure 16. Development of the industrial production index by branch.....	36
Figure 17. Bulgaria: Final Consumption of Industry by Energy Source	37
Figure 18. Structure of Energy Consumption in Industry by Subsectors, 2005 ...	38
Figure 19. Bulgaria: Final Consumption of Transport by Energy Source	38
Figure 20. Stock of passenger cars in Bulgaria	39
Figure 21. Modal shift passenger transport (upper graphs) and goods transport (lower graphs)	40
Figure 22. Stock of passenger cars in Bulgaria by age.....	40
Figure 23. Bulgaria: Final Consumption of Services by Energy Source	41
Figure 24. Number of main electricity generating companies and their cumulative market share, 2006	46

Figure 25. Number of main natural gas suppliers to final customers and their cumulative market share, 2006	47
Figure 26. Household electricity prices in Bulgaria 2004-2007 for different consumer groups (incl. all taxes)	50
Figure 27. Household electricity prices (1200 kWh incl. all taxes, first quarter 2007).....	50
Figure 28. Industry electricity prices in Bulgaria 2004-2007 for different consumer groups (excl. taxes).....	51
Figure 29. Industry electricity prices (30 MWh, maximum demand: 30 kW; annual load: 1 000 hours; excl. taxes, first quarter 2007).....	51
Figure 30. Household gas prices 2007	52
Figure 31. Industry natural gas prices (annual consumption of 41 860 GJ, load factor of 1600 hours; excl. taxes, 1 January 2007).....	53
Figure 32. Target of the Bulgarian National Energy Efficiency Action Plan	57
Figure 33. The importance of the EU accession process for energy efficiency in Bulgaria.....	60
Figure 34. Introduction of energy efficiency measures in Bulgaria by year	61
Figure 35. Excise duties on unleaded petrol in Bulgaria compared to other EU Member States	65
Figure 36. Organisational Chart of the Bulgarian Energy Efficiency Agency ...	72
Figure 37. Indicative breakdown of the Community contribution from the ERDF by priority themes.....	77
Figure 38. Fact sheet for renewables in Bulgaria: Renewables in 2005	82
Figure 39. Aggregate progress indicators for energy efficiency	92
Figure 40. ODEX and sectoral energy efficiency indicators.....	92
Figure 41. ODEX – Comparison with other EU Member States	93
Figure 42. Energy Efficiency Index Industry – Comparison with other EU Member States	94
Figure 43. Energy Efficiency Index Households – Comparison with other EU Member States	94
Figure 44. Energy Efficiency Index Transport – Comparison with other EU Member States	95
Figure 45. Efficiency of the Bulgarian Iron/Steel sector compared to other European countries.....	96

List of abbreviations

BEERECL	Bulgarian Energy Efficiency and Renewable Energy Credit Line
BgEEF	Bulgarian Energy Efficiency Fund
CEB	Council of Europe Development Bank
CHP	Combined Heat and Power Generation
DSO	Distribution System Operator
EBRD	European Bank of Reconstruction and Development
ECT	Energy Charter Treaty
EE	Energy Efficiency
EEA	Energy Efficiency Agency of Bulgaria
EEI	Energy Efficiency Improvement
EEL	Energy Efficiency Law
EIB	European Investment Bank
EPBD	Energy Performance Directive for Buildings
ERDF	Fund for Regional Development
ESO	Electricity System Operator
ESD	Energy Service Directive
ESCO	Energy Service Company
ETS	EU Emission Trading Scheme
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
HPP	Hydro Power Plants
IEA	International Energy Agency
JI	Joint Implementation
KfW	Kreditanstalt für Wiederaufbau
KIDSF	Kozloduy International Decommissioning and Support Fund
MEE	Ministry of Economy and Energy
MEEP	Bulgaria Municipal Energy Efficiency Programme

MRRB	Ministry of Regional Development and Public Works
MWe	Megawatt Electric
NAP	National Plan for Allocation of Emission Allowances
NEEAP	National Energy Efficiency Action Plan
NEK	Natsionalna Elektrieska Kompania (National Electric Company)
NGO	Non-Governmental Organisation
NLTEEP	National Long-term EE Programme 2005 – 2015
NSTEEP	National Short-term EE Programme 2005 – 2007
ODEX	Odyssee Energy Efficiency Index
OECD	Organisation for Economic Cooperation and Development
OP	Operational Programme
PEEREA	Protocol on Energy Efficiency and Related Environmental Aspects
REECL	Bulgarian Residential Energy Efficiency Credit Facility
RES	Renewable Energy Sources
RES-E	Renewable Energy Sources for Electricity
RES-H	Renewable Energy Sources for Heat
SEWRC	State Energy and Water Regulatory Commission
TPP	Thermal Power Plants
TSO	Transmission System Operator
USAID	US Agency for International Development

1 Euro = 1.9585 Leva

Executive Summary

Background

Bulgaria ratified the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in July 1996. In fulfilment of its commitments under PEEREA Bulgaria presented two regular reviews of its energy efficiency policies - the first in June 2001, and the second in May 2004. The current PEEREA In-depth Review is the second for the country; the first one was completed in 2001.

Bulgaria experienced rapid economic growth in recent years having started late compared with other new EU Member States. The economy grew at an average annual rate of 5.5% during the period 1998-2005. Despite this impressive rate of growth Bulgaria's per capita income was only 37% of the EU-27 average in 2007.

Bulgaria has substantial reserves of lignite representing 80 years of production at current production rate. It has no domestic oil resources, only limited natural gas reserves, and modest hydroelectric resources. Bulgaria's primary energy supply is relatively well diversified, with solid fuels holding the majority share, followed by oil and nuclear, with a significant contribution from natural gas. Total primary energy supply has decreased by 33% since 1990. Over 47% of the primary energy resources extracted or imported into Bulgaria are lost during the process of transformation to electricity and heat. Electricity generation is largely based on coal and nuclear energy. Six nuclear power reactors provided almost 40% of generated electricity, but four of these have closed as part of the agreement on EU membership. District heating output has been decreasing continuously. Only 54% of the heat produced in Bulgaria is from co-generation and this level is well below the European average.

Final energy consumption in 2005 was 40% lower than in 1990. Despite this large decrease, Bulgaria's economy still has a high level of primary energy consumption per unit of GDP compared to averages for countries in the OECD. Oil and electricity have the highest shares of final energy consumed. Consumption of final energy by industry has reduced by 60% since 1990 influenced by the re-structuring and modernisation of the Bulgarian economy, but industry has still the highest share (36%) of final energy consumption. Transport accounts for 30% of final energy consumption and is the fastest growing energy use in Bulgaria. Residential and services energy use have risen continuously since the year 2000.

Energy Policy

The principal responsibility for energy policy in Bulgaria rests with the Ministry of Economy and Energy. The National Energy Strategy, adopted by the Parliament in 2002, lays down the basis for the introduction of market mechanisms and for

transforming the energy sector, including improving the efficiency of energy use in Bulgaria. The Energy Strategy is currently in a process of revision.

The main provisions for the functioning of the energy sector are laid down in the Energy Law 2003 (with major amendments in 2006 and March 2008). The Law provides for the legal, operational and accounting separation of energy sector companies into production, transmission, distribution, and supply, as a necessary condition for increased efficiency, through liberalisation, market competition, and privatisation. The Law includes, among others, specifications for heating billing, renewables and CHP.

The State Energy and Water Regulatory Commission (SEWRC) was established in 1999 to structure and regulate the electricity, gas and heat markets. Electricity and gas markets were unbundled and operational units privatised. The energy market is now liberalised and the privatisation well advanced. Another important actor is the Electricity System Operator (ESO EAD).

The prices for liquid fuels and coal are set by the market. Electricity, heat, and natural gas, are subject to regulation. Electricity prices are 35% to 50% (industry) of the EU average, gas prices are 50% (residential) to 60% of the EU average.

Energy Efficiency Policy

Energy efficiency activities are organised by the Bulgarian Ministry of Economy and Energy and the Energy Efficiency Agency. The Agency is an executive body established in 2002, whose mandate flows from the Energy Efficiency Act. The role of the Energy Efficiency Agency has been continuously strengthened over the years as evidenced by the efforts to adapt the structure of the agency to new challenges.

During the last years the process of harmonisation of the energy efficiency framework of Bulgaria with European legislation was a priority. The Energy Efficiency Act was adopted by the Parliament in February 2004. In relation to the major priorities set in the energy policy in Europe, some amendments in the Energy Efficiency Act were elaborated in 2006 and 2007. The secondary legislation for the implementation of the Energy Efficiency Act is developed. The latest ordinances that have been elaborated are mainly directed to the implementation of the legal provisions concerning the certification of buildings. A new energy efficiency law is under development.

Main programme documents concerning energy efficiency implementation in Bulgaria are:

- The National Long-term Energy Efficiency Programme 2005 – 2015 and the National Short-term Energy Efficiency Programme 2005 – 2007, instituted by the Energy Efficiency Act. A primary energy intensity reduction of 17% and a final energy intensity reduction of 8% by 2015 were targeted by the Long-term Programme.
- The First National Energy Efficiency Action Plan for 2008 – 2010, adopted by the Government in 2007. The energy saving target for the three years is 209 ktoe, distributed by sector: households 61 ktoe (29%), services 29 ktoe (14%), industry 48 ktoe (23%), transport 63 ktoe (30%), and agriculture 8 ktoe (4%).

Bulgaria has introduced in recent years a large number of energy efficiency measures under the combined influence of the EU accession process and the increased emphasis at national level on energy efficiency issues.

The main general programmes for energy efficiency in residential and tertiary sector buildings are the National Programme for Renovation of Multi-family Buildings (2006-2020) and the National Strategy for Financing of Buildings Insulation for Energy Efficiency Improvement (2006 – 2020). In addition, Bulgaria has introduced a number of important energy efficiency measures in buildings, which can be grouped into several categories: measures linked to EU accession, measures in support of thermal performances of homes, subsidies and fiscal measures.

The main measure for energy efficiency in the industrial and tertiary sector is the introduction of energy management with efficiency and audit focus and financial support for energy management. A group of specific measures is aimed at energy management in municipalities.

In the transport sector, in addition to the National Short-Term Energy Efficiency Programme in the Transport Sector 2006-2008, there are two categories of measures: mandatory inspections and speed limits, and taxation measures.

The funding sources for energy efficiency activities in Bulgaria have evolved considerably over the years, stimulated and supported by the EU accession process. While in the earlier years donor programmes played an important role, in recent years Bulgaria's own funding sources, for example from the state budget and, most importantly, the EU structural and cohesion funds have taken up the major role. Bulgaria has also developed interesting funding schemes by way of public-private partnerships like the Bulgarian Energy Efficiency Fund and specific credit lines.

Regional and Local Authorities started being legally involved in energy efficiency activities with the promulgation of the Energy and Energy Efficiency Act in 2002. This, together with a number of internationally-funded programmes and projects, gave an impetus to several local energy efficiency initiatives.

Given the fact that many of the measures have just been introduced in Bulgaria, relatively little is yet known in terms of impacts pointing to the necessity for Bulgaria to closely monitor their impacts in the coming years. The monitoring requirements laid down in the EU Directive 2006/32/EC for Energy Efficiency and Energy Services should help to develop further the required monitoring tools.

Renewable Energy Policy

Bulgaria has good opportunities to exploit indigenous renewable energies although the current penetration of renewables is still very low. The target to be achieved in 2010 is about 11% for electricity consumption and 16% in 2020 (draft EU Directive). The main potential for renewable energy production is from biomass, wind, geothermal and solar sources.

The main pieces of legislation relevant to renewable energy are: the Energy Act (2003), Energy Efficiency Act (2004), Ordinance on Setting and Applying Prices and Rates of Electricity (2002), and Regulation for Certification of the Origin of Electric Power Generated by Renewable and/or Combined Generation Sources, Issuance of Green Certificates and Trading (2005). The most recent legislation for renewables is the Renewable and Alternative Energy Sources and Biofuels Act (2007). It sets an ambitious framework for the support of renewables.

Bulgaria has put in place a comprehensive system of incentives based on feed-in tariffs which yields good results. The preferential tariffs set by Bulgaria are comparable with the German values, inferring that the tariffs are likely to be sufficient to promote renewables in Bulgaria. Financial support programmes for renewable energy have also been put in place. Recent developments show that the market is responding to the promotional regime.

Overall Assessment of Progress

The progress of Bulgaria as compared to the first review by the Energy Charter in 2001 was carried out along the following two lines:

- Firstly, the progress was evaluated in a quantitative way by making use of the key energy efficiency indicators which have been established by the Bulgarian Energy Agency in the frame of the European Odyssee-MURE project on energy efficiency indicators and policies.
- Secondly, the progress was evaluated in a qualitative manner by comparing the present situation to key recommendations from the first in-depth review of Bulgaria.

The main impression from this progress review is that Bulgaria has made good use of the EU accession process in the past years to improve the energy efficiency policy framework. Bulgaria has achieved substantial progress in the introduction of a coherent set of medium- to long-term strategies, specific legislation for energy efficiency, and concrete action plans, supported by the general move in the country towards EU accession and the interaction with other EU member states. This is evidenced by the multitude of support programmes for the residential and industry sector.

In the frame of the Energy Efficiency Law and in particular with the introduction of the First National Energy Efficiency Action Plan required by the EU Directive on Energy Efficiency and Energy Services, Bulgaria has developed for all end-use sectors clear objectives, tasks, and targets. In this context, Bulgaria is also working to introduce suitable policy and progress monitoring provisions. The challenge for energy efficiency policy makers will be to ensure efficient implementation of the policy measures and coherence among the various sectoral instruments in the coming years.

Recommendations

General Recommendations

- There is ample evidence that the Bulgarian authorities have adopted a structured approach to planning and the formulation of laws and to the placing of obligations and responsibilities on key actors. The Energy Efficiency Law of 2004 was a most significant step forward in the organisation and formulation of energy efficiency policies and targets, and the necessary institutional development. However, it is not clear that the allocation of the necessary budgets or implementation of sanctions for non-compliance with the law have followed. In general we would recommend that, wherever feasible, market drivers be reinforced by appropriate promotional activities and actions to remove barriers.
- The government has made significant progress in implementing the requirements and provisions of several important EU directives such as the Energy Performance Directive for Buildings (EPBD) and the Energy Service Directive (ESD). Continued efforts are, however, still required for the cost-effective implementation of the EPBD, the ESD as well as achieving compliance with the provisions of the EU Emission Trading Scheme (ETS).
- Low-income groups are particularly vulnerable to high and increasing energy prices. Meeting the basic energy service needs of households with low incomes requires special policies, targets, and measures to meet their needs with energy efficient solutions.
- The ongoing process of reforming the energy market and of implementing the Energy Service Directive may provide opportunities to develop mechanisms for promoting energy efficiency compatible with the process of liberalisation and the completion of the internal EU energy market.

Energy Efficiency Policy and Legal Framework

- Bulgaria's first National Energy Efficiency Action Plan should serve as a starting point and integrating mechanism for national efforts to realise the benefits of energy efficiency gains. Energy efficiency can powerfully enhance the competitiveness of the economy, create new jobs, reduce import dependency, and mitigate the inflationary effects of higher fuel prices.
- The implementation of the National Energy Efficiency Action Plan should be carefully monitored by the Government and adjusted in the light of progress or otherwise. It is recommended that market actors, including companies engaged in the supply of energy, are actively engaged, as the additional driver of a profit motive will help secure success.
- There are a variety of European-wide EU and derived national strategies that impact and interact with each other in a complex way. It is recommended that at the national level a careful balance of objectives and their implications for technology and policy implementation be made. The role that energy efficiency can play in meeting economic, policy objectives should be kept under review and strengthened where possible.

- The enactment by the Government of important pending laws, such as the proposed Condominium Law, is of critical importance for the efficient provision of cost-effective energy services to the occupants of multi-dwelling apartment buildings. The provisions of the law are essential in so far as they allow for the creation of legal entities that can contract with energy supply companies and other service providers.

Institutional Framework

- The Ministry of Economy and Energy and the Energy Efficiency Agency have played a leading role in the formulation and coordination of energy efficiency and renewable policies and programmes, although the overall achievement would not have been possible without the support of many actors. Further strengthening of the institutional capacity at an implementation level, is a prerequisite to a successful unfolding of present and future policies.
- In particular the proposed amendment of the Energy Efficiency Act requires additional resources to achieve results, monitor progress and enhance the value of the provisions through early analysis and suitably structured and informed promotional activities. This is an Agency function and the capacity of the Energy Efficiency Agency should be enhanced to enable it to fulfil this very necessary function.
- Continued efforts are necessary to build on the good coordination with other state bodies and ministries to effectively advance the integration of energy efficiency into all state-led activities.
- Local energy agencies could play an effective role in implementing energy efficiency but require assistance in creating the demand and environment for the commercialisation of their services and by coordinating their efforts further.
- Energy efficiency in the public sector can be promoted by requiring each municipality to appoint an energy officer with the authority and means to promote and deliver energy efficient initiatives in the municipality.

Energy Markets

- Stimulating the wider application of public-private partnerships and ESCOs may be necessary to support the uptake of energy efficiency initiatives in the public sector and in municipalities. Developing internal ESCO capacities within municipalities may also provide further options to realise energy efficiency gains.
- Contractual and cost recovery legal provisions should be put in place in order to make it attractive to ESCOs to deliver energy services to all consumers including those who are not in a position to meet the costs of their basic energy requirements. It will be important to ensure sustainable outcomes for suppliers and consumers in the refurbishment of privately owned multi-family buildings, including provisions that will prevent such companies from choosing only the most attractive projects, or skipping dwellings with low income inhabitants.

Energy Efficiency Funding

- The government should continue to finance energy efficiency activities from different financial sources, including the state budget, EU Structural Funds, International Financial Institutions, and bilateral agreements. A published overview of the size, conditions, and progress of such possibilities could raise awareness and increase coordination of financing sources and efficiency of spending. In a long-term perspective, international support should not be considered as the main funding source for energy efficiency.
- Energy programmes financed through the Operational Programmes of the structural funds should be kept under review and strengthened where appropriate. The EU Operational Programmes are large and ambitious and the challenge will be in their delivery. Successful programmes may be expected to benefit from funds re-allocation in future progress reviews.
- The Bulgarian Energy Efficiency Fund is a good example of a successful approach to addressing project finance needs through the creation of a revolving energy efficiency fund. Securing the revenue stream and attracting further fund capital will be challenging tasks for the near-term future but may enrich the energy efficiency financing portfolio.
- The government should continue to consider specific incentives and test a variety of approaches to stimulate the investments needed and achieve the objective of increased energy efficiency in residential buildings.
- Stimulating Kyoto mechanisms in order to keep the interest of the business sector in JI projects may provide an additional financing source up to 2012. In parallel the governmental bodies in charge of energy efficiency may wish to monitor the progress of the EU ETS, and ensure that the benefits of energy efficiency improvements are implemented by the companies included in the scheme. Excluding those companies from the mandatory industrial audit scheme may remove from them a basic tool to introduce energy efficiency measures.

Specific Energy Efficiency Programmes and Measures

Buildings Energy Efficiency

The government should continue targeted efforts in buildings:

- The priority here must be to facilitate the necessary improvements to the energy performance of the building stock and multi-dwelling panel buildings in particular. This is necessary for social and economic reasons and merits the high priority assigned to it in pending legislation, proposed demonstration, and the allocation of funds through the operational programme. Significant efforts by a range of actors will be necessary if success is to be achieved.
- In order to limit consumers switching to electricity for heating purposes, the continued economic impediments for district heating companies and providers of natural gas should be removed. Legal provisions, that establish requirements for private owners of apartments in multi-family dwellings to form legal entities, should be put in place as soon as possible.

- The growing use of electricity for heating by private consumers is not efficient in terms of primary energy requirements. Growth of such usage should be closely monitored by the EEA. If further assessment shows that this may develop into a major problem for the energy sector, the Bulgarian government should take appropriate preventative action.
- For electric heating and other new heating applications mandatory technical performance indicators should be implemented (for example, for heat pumps a minimum coefficient of performance).
- The provision of building energy rating certificates and of passports is a significant measure. The promotion of these measures to target groups such as the general public, architects, intermediaries in sales of houses and flats, is recommended to enhance their impact.

Energy Efficiency in Industry

The government should continue targeted efforts in industry:

- Promotional and information activity should be informed by the evidence provided through the audit process. Adherence to the time frame of the first wave of the mandatory audits will contribute to the success of this instrument.
- Mandatory energy management in enterprises outside the EU ETS with high energy consumption, and the support for networking among these managers may be further initiatives to promote energy efficiency in the industrial sector. Monitoring the improvement of energy performance in these enterprises could also be considered.

Energy Efficiency in Transport

The government should direct a range of efforts to increase energy efficiency in the transport sector:

- The increase of transport sector energy demand is a continued issue of concern which may be addressed in a broad strategy. Options to be explored may include increased mineral oil taxes, purchase and annual car taxes based on energy efficiency, extension of the regular safety inspections for older cars, or car-scraping schemes.
- Generally, given the long time frame involved, the government should ensure that energy efficiency considerations are taken into account in urban development, infrastructure projects, and in public transport.
- The government should continue to identify the potential for cost effective energy efficiency improvements in the transport sector in line with the envisaged overall improvements in the transport infrastructure, public transport, and railways.

Renewables, CHP and Gasification Strategy

- District heating is a highly efficient technology to supply customers in areas with high heat demand. Historically Bulgaria has a good position and it is desirable to secure it in the short-term, and where feasible, expand the role of district heating.
- Progress has been already made in refurbishing the district heating systems but further improvements are necessary to secure the efficiency of the systems and to satisfy the demand of customers. Efforts should be made especially in:
 - Increasing the share of CHP in heat generation, and in the
 - Utilisation and integration of renewable energy such as biomass and waste and in addition heat potentials in industry and from other sources.
- Promoting heat and gas networks in parallel requires careful balancing of competition aspects and the need for a stable investment environment given the large investments necessary.
- The scheme for the promotion of renewable electricity is designed to reach EU targets. Careful consideration of the financial implications would help to achieve the optimum balance between renewable energy promotion and energy efficiency in the best interests of electricity consumers.
- Considering the large scale of the biomass resource a strategy for its exploitation should be in place to effectively coordinate the realisation of its potential to meet renewable energy and energy security targets. The role of biomass may be further explored, for example in CHP schemes, biogas for transport fuels or wood pellet furnaces.

Data Collection and Monitoring

- Monitoring and evaluating deployed actions in energy efficiency should be strengthened to assure the basis for tuning and revision of these initiatives. Enhanced efforts on such evaluation and forecasting tools will also benefit the implementation of the ESD.
- The general public and specialised target groups may benefit from enhancing the structured internet presentation of this type of information as well as other issues such as municipal initiatives for energy efficiency.
- Further capacity development to receive and communicate audit data on buildings and industrial sites in electronic form may require further development of capacities in the Energy Efficiency Agency.

Introduction

Bulgaria in the Energy Charter Process

Bulgaria ratified the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in July 1996. In fulfilment of its commitments under PEEREA Bulgaria presented two regular reviews of its energy efficiency policies – one in June 2001, and one in May 2004. The current PEEREA In-depth review is the second for the country; the first one was completed in 2001.

Purpose of the Energy Efficiency In-Depth Review

In ratifying PEEREA, countries commit to establishing policies for improving energy efficiency and reducing the negative environmental impacts of the energy cycle (Art.3), and to develop, implement and regularly update energy efficiency programmes (Art.8). A guiding principle of the Protocol is that contracting parties shall cooperate and, as appropriate, assist each other in developing and implementing energy efficiency policies, laws and regulations (Art.3).

The In-depth Review is a peer review, aiming to assess the progress of a country in fulfilling its commitments under PEEREA. It seeks to enhance the level of co-operation among PEEREA Parties and to promote continuous dialogue and to the transfer of experience and information.

The in-depth review of the energy efficiency policy of Bulgaria was carried out by a team, comprised of officials from four countries that are Parties to the Protocol: Mr. David Taylor from Sustainable Energy Ireland SEI (team leader), Mrs. Inguna Ozolina from the Bulgarian Energy Agency, Mr. Herbert Lechner from the Austrian Energy Agency, and Mr. Peter Nielsen from the Danish Energy Authority. The team also included Mrs. Valya Peeva from the Energy Charter Secretariat and Mr. Wolfgang Eichhammer, consultant to the Secretariat. The review team visited Bulgaria in the period 31 March to 3 April 2008 and met with a number of organisations as listed in Annex 8. The review team expresses its high appreciation to the Ministry of Economy and Energy and the Bulgarian Energy Efficiency Agency for the very professional organisation of the mission in Bulgaria and special thanks to all Bulgarian participants in the meetings.

The main sources of information on the energy efficiency policies and programmes, and the relevant data, are the Regular Reviews, presented by Bulgaria to the PEEREA Working Group and the information provided by Bulgarian institutions during the country visit. Other sources of information are also used, e.g. relevant publications of the Bulgarian government, EU, EBRD, IEA, OECD, etc. The statistical information used in this report is primarily based on the IEA energy statistics, including data up to 2005. Another important source was the European project ODYSSEE-MURE, in which Bulgaria is participating, and the energy efficiency indicators set up by this project.

Background

Geographical Profile

Bulgaria is a medium-sized country in South-East Europe with a surface of about 110 910 km². Bulgaria is situated in the north-eastern part of the Balkan Peninsula and comprises both mountain areas (the Balkan and the Rodopa mountains) and lowlands (the Danube plain in the north and lowlands between the Balkan and Rodopa Mountains). The Danube River forms to a large extent the northern frontier with Romania; other neighbouring countries are Serbia, the Former Yugoslav Republic of Macedonia, Greece and Turkey. In the East, Bulgaria borders the Black Sea, where the important sea port of Varna is located.

The capital of Bulgaria is Sofia, with a population of more than 1.38 million inhabitants. Other important cities include Plovdiv (377,000 inhabitants), Varna (349,000 inhabitants), Burgas (210,000 inhabitants), Ruse (176,000 inhabitants), and Stara Zagora (163,000 inhabitants).

Figure 1. Bulgaria

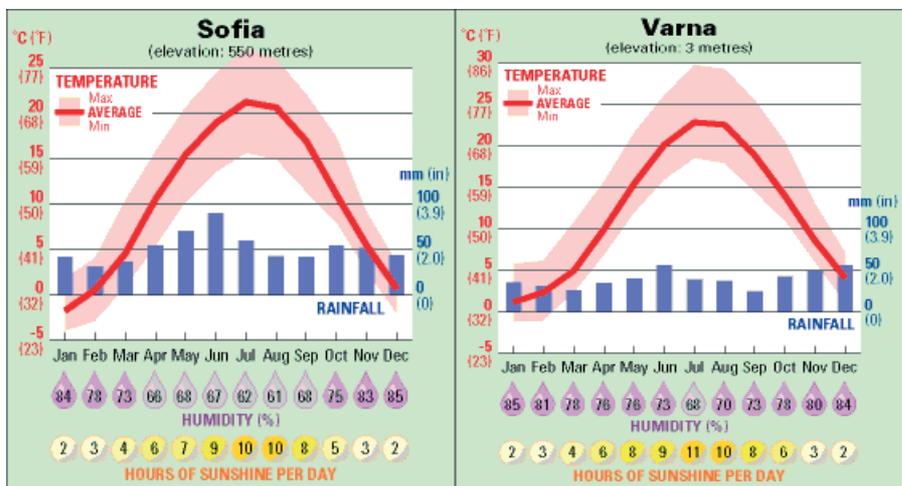


Source: <http://www.worldtravelguide.net/country/44/map/Europe/Bulgaria.html>

In recent years, Bulgaria has had one of the slowest population growth-rates in the world. Negative population growth has occurred since the early 1990s due to economic collapse and high emigration. In 1989 the population comprised 9.0 million inhabitants; in 2008 it amounted to 7.28 million¹.

The climate in Northern Bulgaria is moderate continental, while the climate in Southern Bulgaria is intermediate continental tending to Mediterranean. The climate in the regions with an altitude of 1900-2000 m above sea level is mountainous and along the Black Sea coast it is maritime. The climate of the seaside regions is milder in the winter and cooler in the summer than the climate of the interior of the country. The average annual temperature is 10.5°C, in winter about 0°C. The lowest temperature – 38.3°C - was measured in 1947.

Figure 2. Temperature profiles for two of the largest cities in Bulgaria



Source: <http://www.worldtravelguide.net/country/44/climate/Europe/Bulgaria.html>

The average number of heating degree days is about 2680 degree-days in most of the settlements, with variations from 2395 to 2931 between 1990 and 2004². The average number of hours of sunshine is around 2100 hours a year.

¹ Source: <http://en.wikipedia.org/wiki/Bulgaria#Demographics>

² Source: *Odyssee database* www.odyssee-indicators.org

Economic Profile

Bulgaria experienced a decade-long delay in its transition to a market economy. Its delay in proceeding with reforms left the country far behind other transition economies. In early 1997, the country experienced a severe economic and financial crisis. The same year, the government adopted a comprehensive economic reform programme, including a Currency Board Arrangement. Wide-ranging reforms included major trade and price liberalisation, social-sector reform, and restructuring of the financial, enterprise, agriculture, and energy sectors, including the divestiture of state-owned enterprises. The implementation of the programme lowered inflation, improved investor confidence, and helped transform Bulgaria into a market economy. The EU accession was a driving force and a model for these developments. Bulgaria signed the European Union Treaty of Accession on 25 April 2005. It became a full member of the European Union on 1 January 2007.

Bulgaria experienced rapid economic growth in recent years (Figure 3) having started late compared with other new EU Member States.

Figure 3. Macroeconomic development of Bulgaria



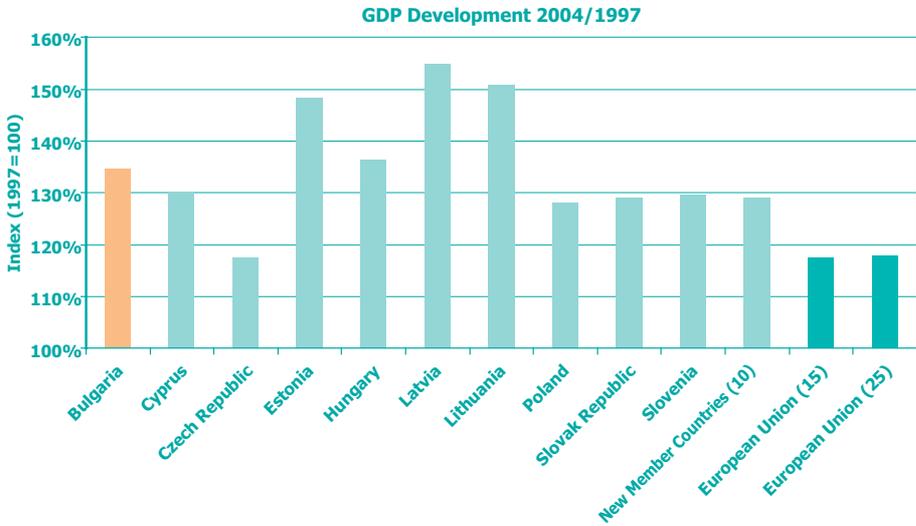
Source: EEA (2007)

The country is still amongst the poorest of the member states of the EU, but standards of living have started to rise. Bulgaria has succeeded in moderating inflation, but the latest figures show an increase in the inflation-rate to 12.5% for 2007. Unemployment declined from over 17% in the mid-1990s to almost 10% in 2007. However, the unemployment rate in some rural areas continues in high double-digits. An "Industry Watch" report predicts an inflation rate of 5% for 2008, with unemployment projected

to reach a record low of 6.5%. Due to its positive economic profile, Bulgaria might join the Eurozone, but currently the country does not have a target date for adoption of the Euro.

In the last eight years 1998–2005 there has been sustained growth in the GDP of Bulgaria. In 2005, economic growth was around 6.2%, following growth of 6.6% in 2004, 5.0% in 2003 and 4.5% in 2002. The total real growth during the period 1998–2005 was 44.3% and the average annual growth rate was 5.5% per annum (Figure 4). Bulgaria's GDP grew by 6.2% in 2007 compared to 2006, according to preliminary data of the Bulgarian National Statistical Institute. In 2007 Bulgaria's GDP was valued at BGN 56.5 billion (EUR 28.9 billion) in current prices. Despite this impressive growth Bulgaria's per capita income in 2007 is estimated at EUR 3,754, which is only 37% of the EU-27 average.

Figure 4. GDP Development in Bulgaria compared to other new EU Member States and the EU



Source: Odyssee Database (2007)

Energy Background

The average total primary energy consumption of Bulgaria in 2001-2005 is around 19-20 Mtoe annually (see the tables in Annex 1). Of the primary energy supply requirement, the share of coal is 35%, of crude oil 33%, of natural gas 14%, and nuclear 24%. Energy import dependence is about 68% (excluding primary electricity production). For gas and oil the import dependence is in the range of 90-100%.

Bulgaria has a competitively diverse energy mix with an average level of dependence on imported fuels (oil and natural gas from Russia and also solid fuels). Domestic energy production includes nuclear energy and solid fuels which comprise the main fuels for electricity generation. Bulgaria's role as an electricity exporter in the region is expected to change following the closure of two nuclear reactors as part of the agreement for EU accession. There are plans to restore nuclear capacity through construction of a new plant. The contribution of new renewable energy sources (biomass and hydro) has increased in recent years, although is still below EU average. Final energy consumption has decreased considerably in recent years and industry is still the most energy-consuming sector. Bulgaria is the member state with the highest energy intensity in the EU.³

Energy Resources⁴

Bulgaria has substantial reserves of lignite (2.3 billion tonnes, equivalent to 80 years at current production rate). However the reserves are difficult to reach (located under cities and villages), are of low quality; with a high sulphur content of 2% and a low calorific value of 2,000 kcal/kg. Bulgaria has additional, more modest, reserves of sub bituminous coal. The largest deposit is the Maritsa coal field in Southern Bulgaria. Based on expected production rates, the reserves at Maritsa are projected to last about 50 years.

Bulgaria has no domestic oil resources. There is an important refinery with a production capacity of 300,000 bl/day, located on the Black Sea coast at Burgas. Natural gas reserves are limited to 6 bcm approximately and almost all gas consumed in the country is imported from Russia. In 2006 Bulgaria consumed 3,760 mcm, which includes 3,249 mcm imported from Russia and an additional 511 mcm of domestic production.

Bulgaria has modest hydroelectric resources. Water accumulates in 50 or so large reservoirs, with capacities ranging from 60 to 424 mcm. There is a large potential to utilise biomass as an energy source. In Bulgaria, 60% of the overall land area consists of arable and agricultural lands, and approximately 30% are forests, where fuel-wood, followed by residential consumption of wood briquettes produced from forest wastes and sawmill byproducts amount to 2 mcm per annum. The wind and solar energy resource potential is significant, but only a few projects exist at the moment. Bulgaria has a sizable reserve of geothermal energy and is rich in low enthalpy geothermal waters. In Bulgaria there are some 1,000 thermal springs and aquifers. According to the geological structure, the country can be divided into five separate geothermal regions. The theoretical potential in proven reserves is estimated to be 4,000 GWh/year.

³ Bulgaria – Energy Mix Fact Sheet, http://ec.europa.eu/energy/energy_policy/facts_en.htm

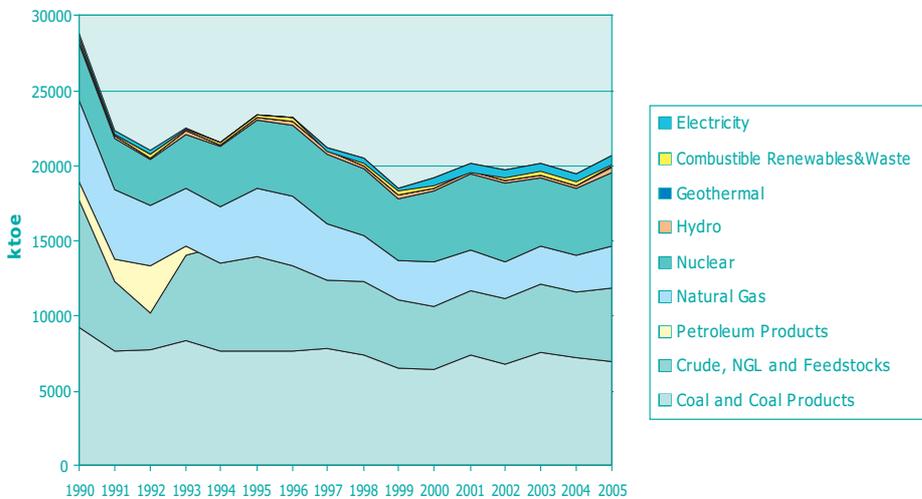
⁴ Source: Economic Consulting Associates/Penspen/Energy Institute Hrvoje Požar: South East Europe: Regional Gasification Study. Bulgaria Market Report, October 2007

Primary Energy Supply

Bulgarian primary energy supply is fairly diverse, with solid fuels holding the majority share of just over a third, oil and nuclear follow in that order, with significant contribution from natural gas. The shares of solid fuels and nuclear energy are significantly above the corresponding EU-27 average values (18% and 14% respectively).

Total primary energy consumption has decreased by 33% since 1990 and this reduction is reflected mainly in the reduced supply of oil and natural gas (55% and 54% decrease respectively since 1990). In 2004, renewable energy supply was five times greater than in 1990 and the share of renewable energy in energy supply is close to the EU-27 average of 6%. This includes, however, a much larger share of traditional solid biomass in heat supply.

Figure 5. Bulgaria: Total Primary Energy Supply by Fuel 1990-2005



Source: Based on IEA Energy Statistics, Electronic version 2007

Bulgaria has significant domestic energy production, consisting mainly of solid fuels and nuclear energy. Total indigenous production increased by 12% since 1990. Renewable energy production doubled between 1997 and 2004, with biomass being used mainly for heat and hydro for electricity.

Bulgarian energy import dependence is slightly below the EU-27 average. Oil accounts for 45% of imported energy, whereas gas accounts for 25%. The Russian Federation is the main source of oil for Bulgaria and also the only supplier of natural gas. The remaining 30% of energy imports are solid fuels. The volume of imported energy

has declined by 49% over the period 1990-2004, mainly due to reduced energy consumption. Bulgaria has traditionally been one of the region's main electricity exporters.

Electricity Generation

Electricity generation is largely based on coal and nuclear energy (combined share of 86%). Six nuclear power reactors provided almost 40% of generated electricity, but four of these have closed as part of the agreement on EU membership. New reactors are planned to replace the existing ones. The share of gas and oil in electricity generation has been steadily decreasing, whereas the share of renewable sources has been increasing.

The total installed capacity for electricity production is 8,566 MW in 2007⁵, with an annual production of around 45 TWh in 2006. The thermal power plants have installed capacity of 4,860 MW: 4,280 MW (coal), 220 MW (oil), 360 MW (gas) and an annual production of 21.6 TWh in 2006. Nuclear accounted in 2007 for 1,906 MW and 19.5 TWh, hydro for 1,800 MW and 4.3 TWh.

Over 47% of the primary energy resources extracted in or imported to Bulgaria are lost in the process of transformation to produce electricity and heat supply. Upgrading energy transmission grids and outdated energy production capacities falls within the scope of the National Strategy for Integrated Development of the Infrastructure of the Republic of Bulgaria until 2015. These investment projects are to be financed through state and state-guaranteed loans, commercial loans, own resources, and grants (Kozloduy International Decommissioning and Support Fund KIDSF) to a total value of around 3 billion Euro.

Major electricity-production projects are⁶: construction of new thermo-electric power plant (TEPP) using local lignite coal (Maritza East 1), construction of hydro-electric power plant (Tzankov kamak), and construction of nuclear power plant (Belene). Rehabilitation and modernization of Kozloduy NPP, Maritza East 2, Maritza East 3 and Varna thermo-electric power plants is also under way. Given that nearly 50% of the existing TEPPs have been in operation for more than 30 years, there is a need to prolong their life, to increase their output and efficiency, and to fulfil the requirements of environmental legislation.

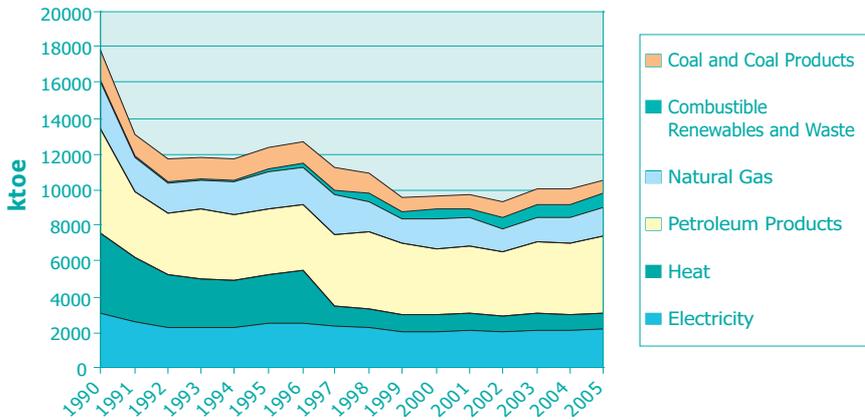
Final Energy Consumption

Final consumption in 2004 was 44% lower than in 1990. Oil and electricity have the highest shares of final energy consumption. Petroleum products are the principal fuel in transport and the services sector, but also they have a high share in the industry energy consumption. Electricity has the highest share in the consumption of the residential sector and industry (see Figure 6 and more details in Annex 1).

⁵ ENERDATA GlobalStat 2008

⁶ Operational programme "Development of the competitiveness of the Bulgarian economy 2007-2013". http://www.opcompetitiveness.bg/uploadfiles/documents/opcompetitivenesseng_final_2007.pdf, p. 53, September 2007.

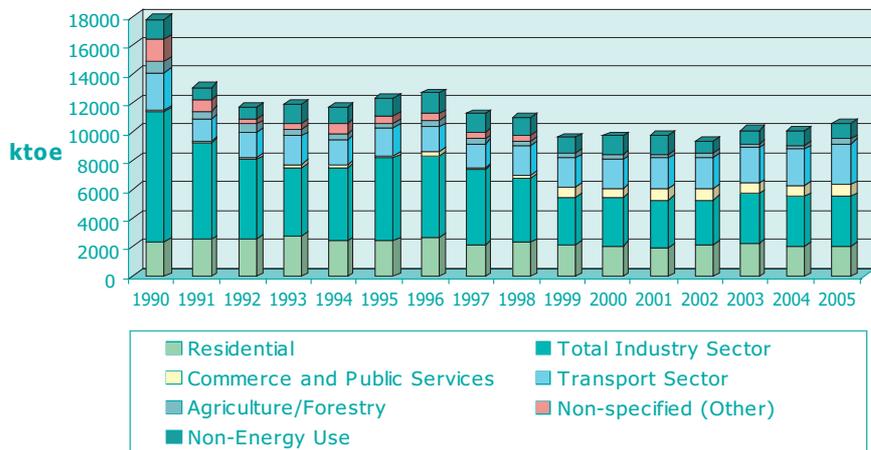
Figure 6. Bulgaria: Total Final Consumption by Fuel 1990-2006



Source: Based on IEA Energy Statistics, Electronic version 2007

Although the consumption of final energy by industry has been reduced by 60% since 1990, industry is still the largest energy-consuming sector. Industry's share of final energy consumption is significantly higher than the EU-27 average of 28%. Transport accounts for a 30% of final energy consumption and is the fastest growing energy use sector in Bulgaria. In 2005 the residential sector and services sector had shares of 22% and 8.6% respectively in final energy consumption (excluding non-energy uses). Residential sector energy use has been decreasing for some years while the energy consumption of the service sector was continuously on the rise (Figure 7).

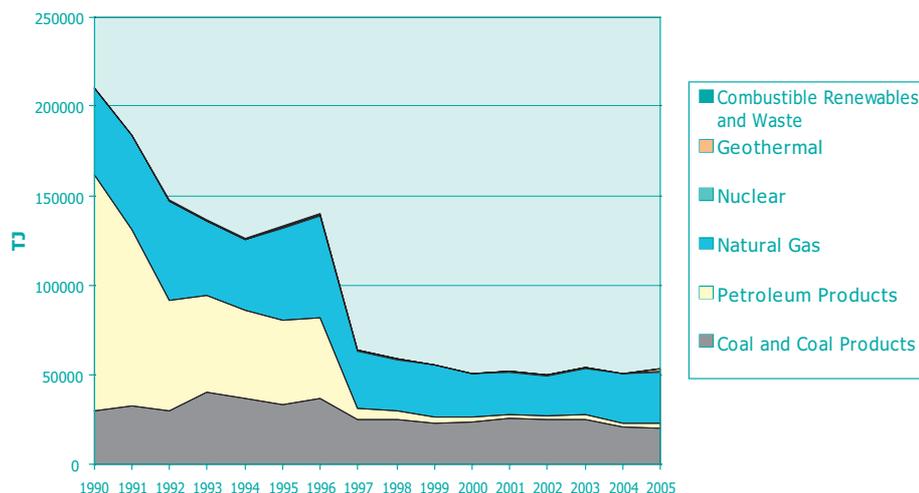
Figure 7. Bulgaria: Total Final Consumption by Sector in 2005



Source: Based on IEA Energy Statistics, Electronic version 2007

District heating is the principal form of heat supply in the multifamily buildings in the bigger cities. District heating output has been decreasing continuously from around 210,000 TJ in 1990 to only 53,500 TJ in 2005 (Figure 8. and Table 13. in Annex 1). Currently there are 16 systems for central district heating in the country. The installations are 20-36 years old. The principal fuels are coal and gas.

Figure 8. District Heat Output

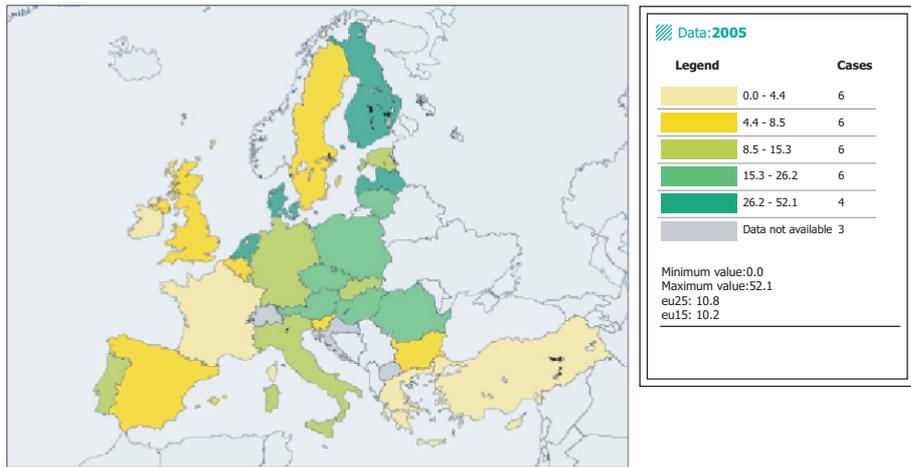


Source: Based on IEA Energy Statistics, Electronic version 2007

Only 54% of the heat produced is from co-generation plants. The electrical generation capacity installed in CHP is 775 MW_{el}. About 38% of the heat produced for district heating in Sofia is from non-cogeneration thermal plants. The average ratio of electricity to heat released by the cogeneration installations is 0.386; for Sofia it is 0.32. The total energy efficiency of the cogeneration systems is 58% (natural gas ≥ 75%, coal 33-58%, gas-engines over 80%).⁷ The CHP share in Bulgaria is among the lower ones in Europe and well below the European average of 11.1% in 2005 (Figure 9).

⁷ Source: Presentation "Analysis of the national potential for the implementation of a highly effective heat and electricity cogeneration output" for the Energy Charter review (April 2008).

Figure 9. Combined heat and power generation - Percentage of gross electricity generation

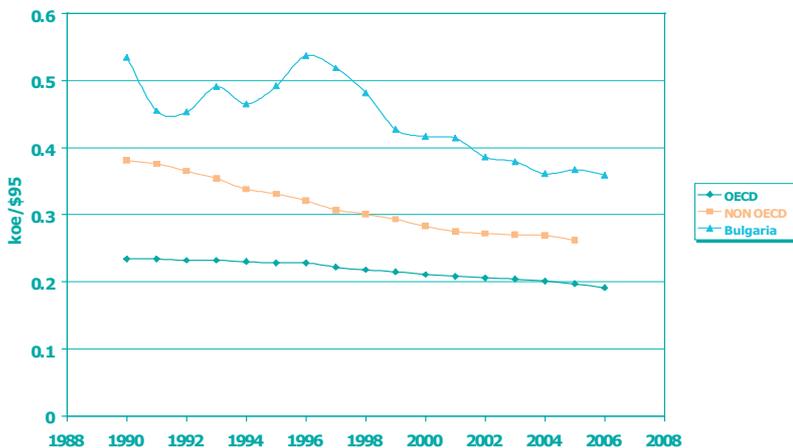


Source: Eurostat <http://epp.eurostat.ec.europa.eu/t>

Energy intensity

Despite a large decrease especially since 1997 Bulgaria's economy is still characterized by a high level of primary energy consumption per unit of GDP compared to both OECD and non-OECD averages (Figure 10.). This high energy intensity is explained by the extensive use of electricity in metal processing industry; the low efficiency of electricity generation, supply and consumption; and the growing practice of using electricity for heating by residential users.

Figure 10. Energy Intensity of Bulgaria

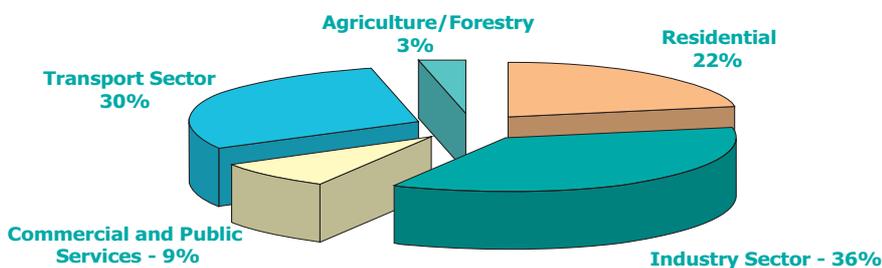


Source: Based on IEA Energy Statistics, Electronic version 2007

End-use sectors

Industry has still the highest share of final energy consumption in Bulgaria (36%, excluding non-energy uses), mainly due to three energy intensive sub-sectors viz., chemicals and petrochemicals, non-metallic minerals, and iron/steel. The transport sector has the second highest share (30%) and is increasing rapidly, followed by the residential sector (22%). The share of the service sector of final energy consumption is still comparatively low (9%) as compared to other countries. Agriculture, although it is the smallest sector, has comparatively large energy consumption when compared with other EU countries (3%).

Figure 11. Total final consumption by sector in 2005



Source: Based on IEA Energy Statistics, Electronic version 2007

Residential

Bulgaria had in 2005 around 2.82 million permanently occupied dwellings, a slight increase on 2.76 million dwellings in the early nineties. The total stock of dwellings is at 3.64 million units considerably larger which is indicative of a high number of dwellings not permanently occupied.

Over 92% of the residential building stock in Bulgaria is privately owned and most are owner-occupied. Nearly 40% of the dwellings are situated in large-panel apartment blocks. Still, no widely recognised legal basis for association of home owners exists, and this has led to low levels of management of the buildings and has driven individual renovations.

The average size of Bulgarian dwellings is still quite small, mainly due to the fact that many dwellings are located in multi-family buildings. This, next to economic and affordability constraints, is also the reason why the average size of the dwellings was fairly stable at around 63.5 m².

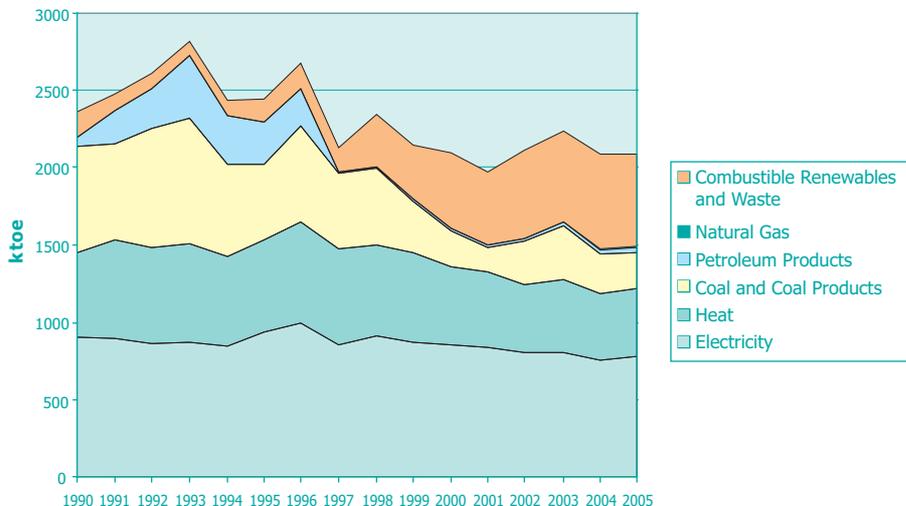
The economic development of recent years may lead to an increase in single family houses, potentially increasing energy consumption in the residential sector. There is a tendency of increased size in the dwellings completed since 2002. In 2006, the number of dwellings completed was 13,270, an increase of 10% compared to the previous year and of nearly double in comparison with 2001. Most dwellings completed in 2006 were in towns (82.3%), and nearly all (99%) were in the private sector⁸. Nevertheless, the building activity in recent year does not yet confirm a trend in that direction: the activity on newly built houses is still lower than it was in the early nineties.

8 Source: Bulgarian National Statistics

About 58% of the dwellings are heated with individual room heating (including electric heating), around 42% have central heating (including district heating). Increased penetration of small residential air-conditioners is evident in cities. They are extensively used for cooling during the summer months, but also for heating in winter.

Residential energy use decreased from 1990 to 2000 (Figure 12), but it has started to grow again since. The share of each energy carriers has changed considerably: electricity is still by far the largest energy source but has decreased gradually due to less use of electricity for heating. The same is true for district heat which is the second largest source of energy in households. Natural gas has a very low penetration to date and hardly registers in the fuel mix. The largest increase occurred for combustible renewable and waste and this is most likely due to the increased use of firewood.

Figure 12. Final Consumption of the Residential Sector by Energy Source

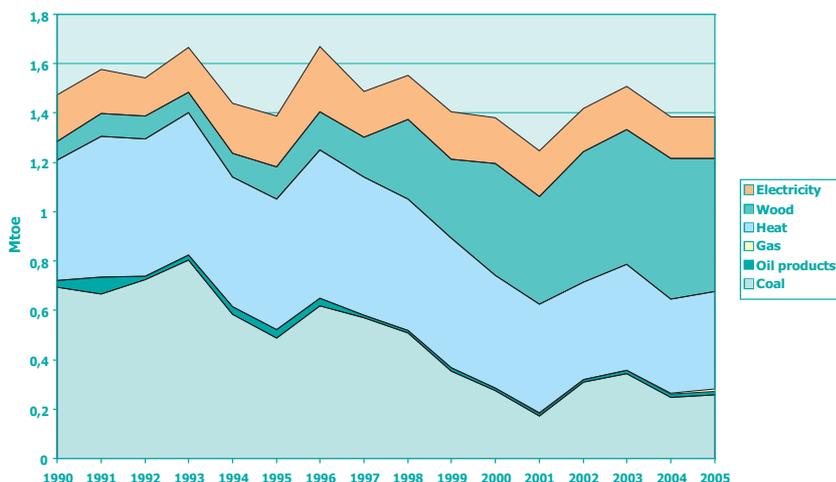


Source: Based on IEA Energy Statistics, Electronic version 2007

A closer look to the fuels used for space heating shows also the strong penetration of wood for heating purposes at the expense of coal and partial district heat (Figure 13). Although wood is a renewable energy source it would be preferable if it were used in highly efficient modern wood stoves with low particulate emissions. Such technologies are not yet widely used in Bulgaria.

The share of electricity used for heating purposes remained roughly at 25% over the past 15 years. This share may decrease with increased household equipment and electric appliances, and with rising gas penetration, and improved district heating networks.

Figure 13. Final Consumption of the Residential Sector for Space Heating by Energy Source

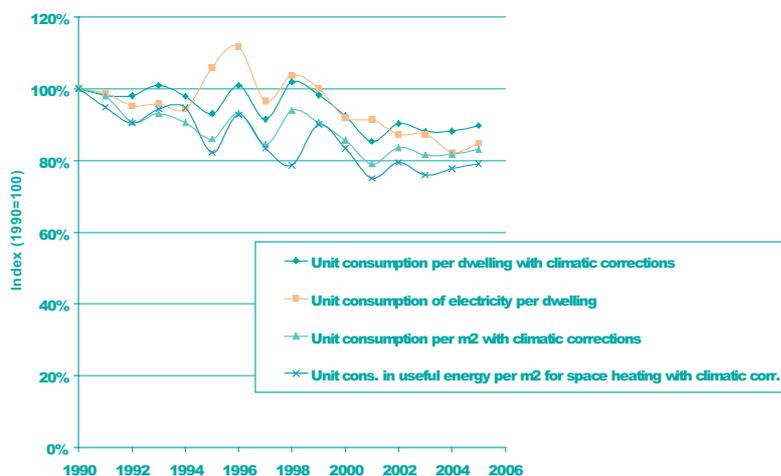


Source: Odyssee database version 2008

Figure 14 shows the development of specific energy efficiency indicators for the residential sector in Bulgaria:

- The unit consumption of final energy in dwellings has decreased by about 10% since 1990. Also the specific electricity use has decreased by 15%.
- More specific indicators for space heating relating energy consumption to the square metres shows an even stronger decrease exceeding 20%.

Figure 14. Specific energy efficiency indicators for the residential sector in Bulgaria

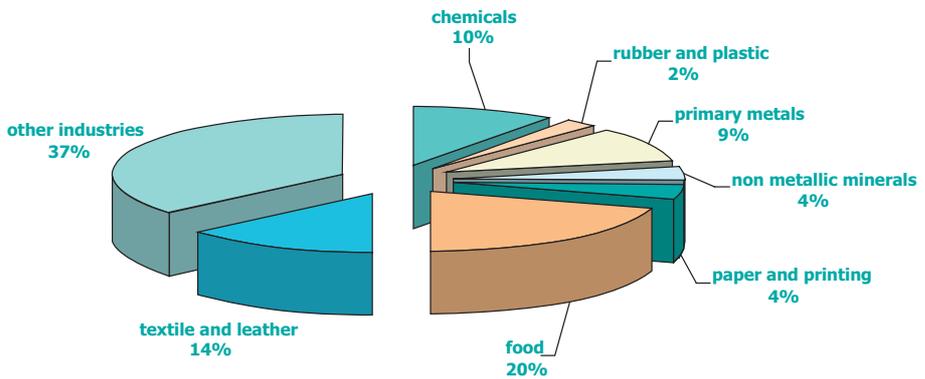


Source: Odyssee database version 2008

Industry

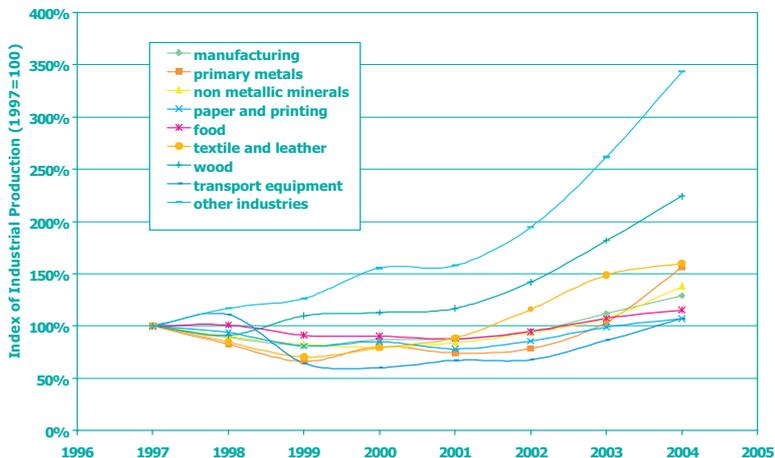
The Bulgarian industry sector accounted in 2006 for around 26% of GDP. The largest contributors to industrial added value are the food industry with 20%, the textile and leather branch with 14%, chemicals with 10%, and primary metals with 9% (Figure 15). As in other economies, the Bulgarian industry is shifting towards less energy-intensive production modes. On the other hand, energy-intensive industries such as primary metals, chemicals, non-metallic minerals or paper have been largely modernised and stand remarkably well in the country (see the industrial production index of these energy-intensive branches in Figure 16).

Figure 15. Break-down of the industrial GDP in Bulgaria



Source: Odyssee database version 2008

Figure 16. Development of the industrial production index by branch

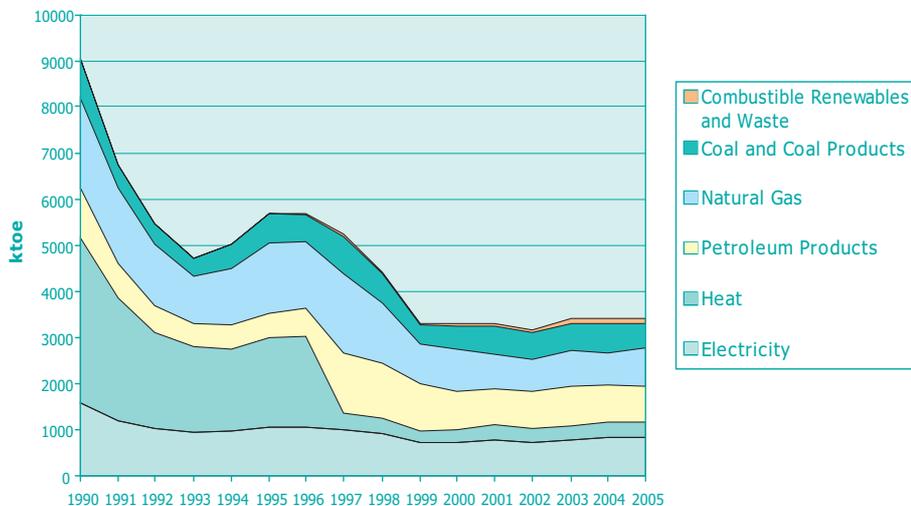


Source: Odyssee database version 2008

Small and medium enterprises (SMEs) account for 36.6% of the overall employment and for 77.9% of industrial employment in 2004. The real share of SMEs in GDP was 39%. These indicators have increased by 6-7% in the period 2001-2005. The total number of SMEs is about 221,000, 90% of them being micro-enterprises (with 1 to 9 employees). Major problem for SMEs is the low technology level and low awareness about advanced technologies. This refers to energy efficiency as well.

The energy consumption of the industrial sector decreased strongly from around 9 Mtoe in the early nineties to slightly more than 3 Mtoe in 2006 (Figure 17.). At the same time there was a shift in the structure of the fuels consumed in the industrial sector: the use of district heat has decreased sharply since 1997 leaving a place for electricity, natural gas and oil products. Coal resisted due to the continued presence of the steel industry based mainly on oxygen steel in the country.

Figure 17. Bulgaria: Final Consumption of Industry by Energy Source

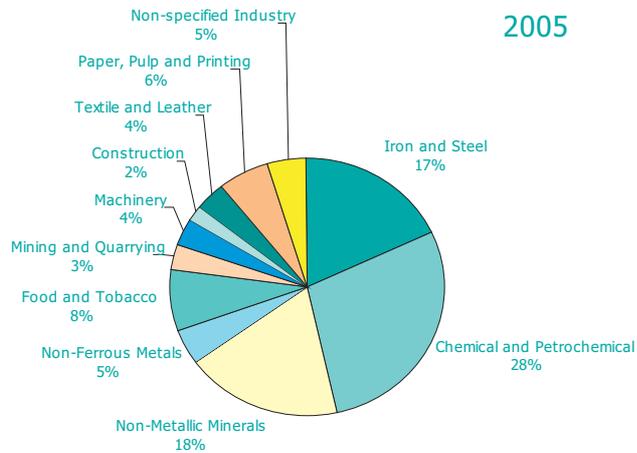


Source: Based on IEA Energy Statistics, Electronic version 2007

Industrial energy consumption is mainly due to three sub-sectors: chemicals and petrochemicals (28% of industrial energy consumption), non-metallic minerals (18%) and iron/steel (17%). The three branches together account for nearly 63% of the industrial energy consumption, while producing 23% of the industrial GDP. (Figure 18)

From 1997 to 2005 the final energy-intensity of industry decreased from 7.86 to 2.91 koe/Euro2000. At the same time the gross value added of the sector increased by 53%. This is indicative of energy efficiency improvement in the industry sector.

Figure 18. Structure of Energy Consumption in Industry by Subsectors, 2005

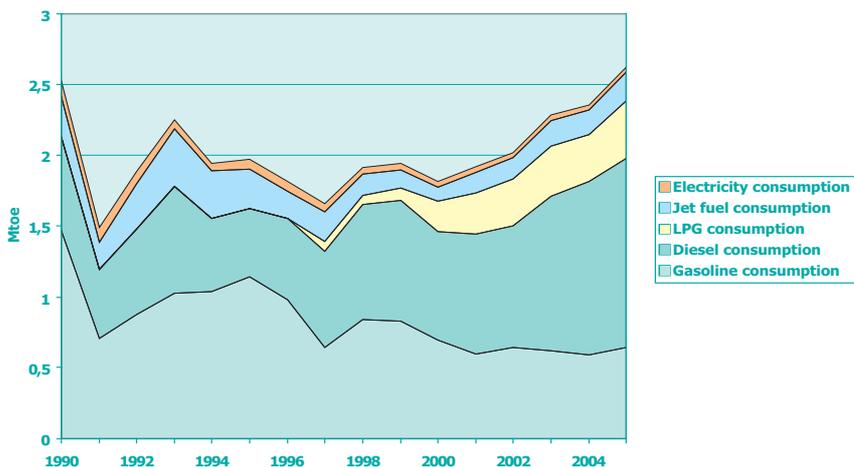


Source: Based on IEA Energy Statistics, Electronic version 2007

Transport

The transport sector is characterised by constantly growing final energy consumption (Figure 19.) and now accounts for 30% of final energy consumption. This is the only sector where energy intensity has increased in the last ten years. The fuel mix has shifted towards diesel following the general patterns in Europe. There was also a strong increase in LPG demand.

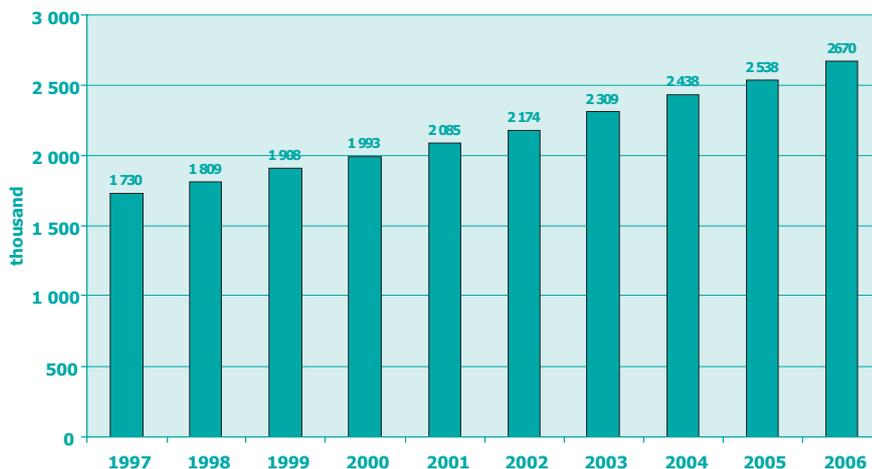
Figure 19. Bulgaria: Final Consumption of Transport by Energy Source



Source: Odyssee database version 2007

The stock of cars has increased by nearly one million cars or 60 % (Figure 20.). Car ownership, of around 330 cars per 1000 inhabitants, is still well below the EU15 average of more than 500; nevertheless car ownership in Bulgaria is exceeding countries like Slovakia or Latvia, and is not far away from Czech Republic or Portugal with around 400 cars per 1000 inhabitants.

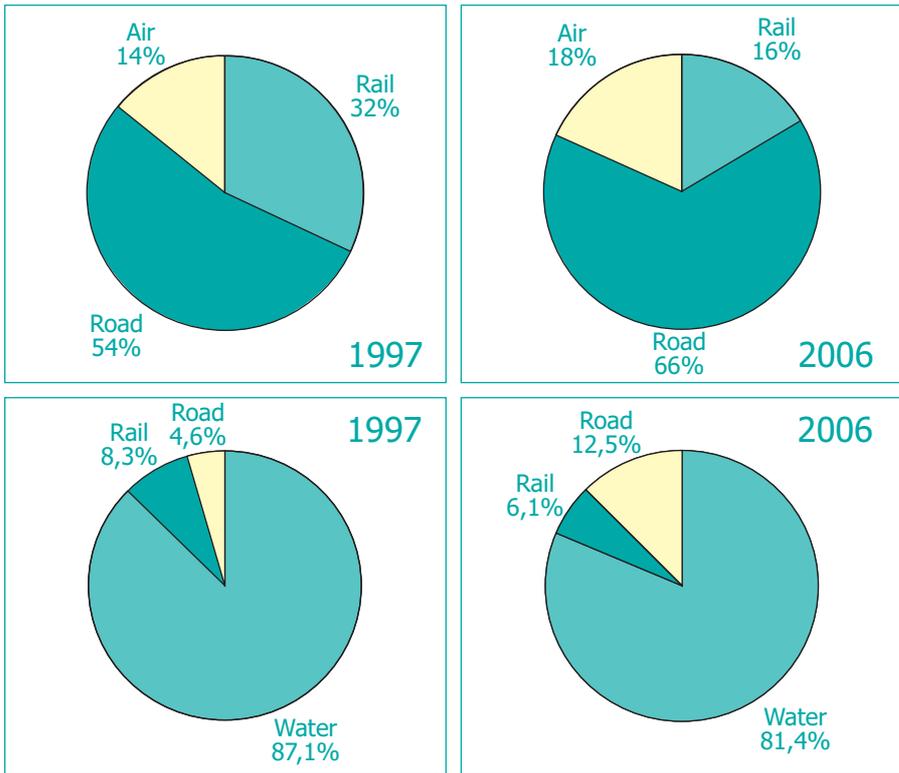
Figure 20. Stock of passenger cars in Bulgaria



Source: Ministry of Economy and Energy

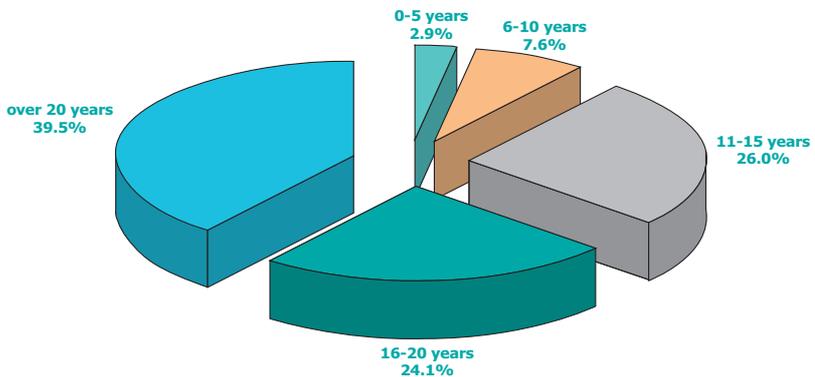
There has been a strong modal shift from passenger rail to road transport and similarly from goods transport by water and rail to transport on roads (Figure 21). A similar shift occurred from public urban transport to private cars implying a constant growth of urban traffic congestion.

Figure 21. Model shift passenger transport (upper graphs) and goods transport (lower graphs)



Source: Ministry of Economy and Energy

Figure 22. Stock of passenger cars in Bulgaria by age



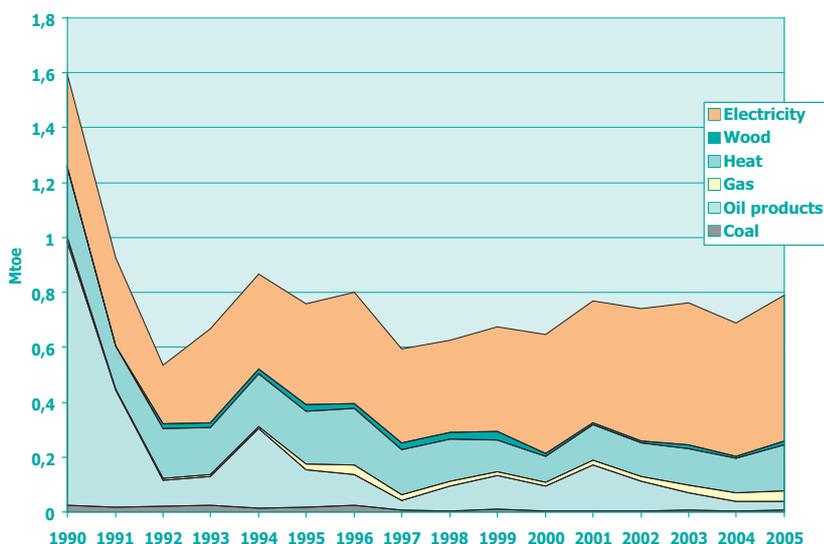
Source: Presentation Energy Efficiency in Transport by the Energy Efficiency Agency

Services

The value added by the service sector has increased in real terms by almost 50% since 2000; the contribution of the service sector to the overall GDP of Bulgaria is now more than 50%.

Energy consumption in the services sector decreased from 1990 to 1997 but has increased again since (Figure 23)⁹. Electricity has by far the largest share in this sector, followed by district heat. Other sources such as oil products or natural gas make much smaller contributions.

Figure 23. Bulgaria: Final Consumption of Services by Energy Source



Source: Odyssee database version 2008

The use of all kinds of electronic equipment but also for air conditioning as been increasing in Bulgaria as elsewhere in Europe, but there is little statistical information on their penetration in the country.

⁹ The energy consumption data for the service sector are not very reliable (as in many European countries). This sector is usually calculated as a difference which may include statistical artefacts.

Energy Policy

Strategic and Legal Basis

The energy policy of Bulgaria is based on national priorities and is in conformity with market-based economic principles, as well as with the requirements of the European Directives. The stated major priority is the requirement for effective and guaranteed operation of the energy sector, which is of great importance for sustainable economic development, competitiveness of the economy, and a high living standard. The Bulgarian energy policy also reflects the natural role of the country's energy sector for fuel and energy supply to the region.

The main objectives of the Bulgarian energy policy since 2002 are:

- security of supply at minimum cost
- establishment of a competitive domestic energy market
- nuclear safety
- increased energy independence through the utilisation of local energy sources
- rational use of energy and renewable energy sources utilisation
- energy sector development in conformity with environmental requirements
- integration of the Bulgarian energy system and market into the European ones.

Energy Strategy 2002

The major strategic document for the development of the Bulgarian energy sector is the Energy Strategy, adopted by the Bulgarian Parliament in July 2002.

As was stated in a Concept Paper on the National Energy Strategy 2002, the situation is characterized by high dependence on energy imports (over 70% of the country's primary energy requirement), by an above-average energy intensity, and the competing goals of ensuring security of energy supply and of meeting environmental requirements, particularly because of the direct relation between the emissions of sulphur dioxide and the increased consumption of lignite coal. The paper states that efforts focused on the reliability of supplies can be successful only if they are backed up with energy saving policy. And while in the case of supply the possibilities of Bulgaria are limited, in the case of energy efficiency the potential is high.

The national Energy Strategy lays down the basis for introducing market mechanisms and transforming the sector, including improving Bulgaria's energy efficiency. The Energy Strategy also plans to strengthen the autonomy of the State Commission for Energy Regulation. The Energy Strategy 2002 states as overall principles of energy policy:

- Introduction of market relations in the energy sector, based on cost-reflective tariffs and free contracting

- The active role of the state in the creation of a clear and stable legal and regulatory framework for investments, commercial activity, and protection of public interests.
- Creation of a legal, regulatory and market environment prior to the implementation of new large-scale investment and privatisation projects.
- Pro-active energy efficiency policy as a means for improving the competitiveness of the economy, security of energy supply and environmental protection
- Efficient social protection through shifting government subsidies from the producer to the consumer, through energy efficiency measures and introduction of socially-oriented tariffs
- Positioning of Bulgaria as a reliable country for the provision of future transit of oil, natural gas and electric power and as a dispatching and market centre in the region.

The Energy Strategy of Bulgaria is being updated at the moment.

Energy Law 2003

The Energy Law based on the Energy Strategy of 2002 was adopted by the Parliament in November 2003 and has been amended several times, the latest amendment being in force from 1 March 2008. The Energy Law provides for the regulation of energy markets, bringing the Bulgarian legislation in line with EU requirements.

The Energy Law provides for legal, operational and accounting separation of energy sector companies into production, transmission, distribution, and sales, as a necessary condition for increased efficiency, through liberalisation, market competition, and privatisation. The Law sets the legal framework for activities related to generation, transmission, distribution, and trade with electricity, heat, and natural gas. The functions of the state bodies responsible for the state management and regulation in the energy sector were also defined. The independent energy regulatory body (the State Energy Regulation Commission) was strengthened to fulfil its regulatory responsibilities and broad authority to set tariffs and to regulate prices for which electricity, heat and natural gas are sold to consumers.

The detailed regulation of the relations in the separate sub-sectors is developed through secondary legislative Acts. The regulations related to the process of structural, price and trade reform in the sector were adopted. They include ordinances and rules concerning price regulation, licensing, trade and technical rules. Their elaboration is in conformity with the legislative requirements of the EU Electricity (2003/54) and Gas (2003/55) Directives and other Acts of the relevant energy acquis.

Energy Market Liberalisation

Over the last decade, the Bulgarian energy sector has gone through a reform process to meet key requirements of EU membership. Key steps in the reform process were, the establishment of the State Energy Regulatory Commission (SERC) in 1999, and the

Energy Law of 2003, together with its most important amendment in 2006, directed to regulating the transition towards a fully liberalised energy market.

Until mid-2000, the national electric utility, NEK (National Electricity Company) was responsible for all power generation and transmission, as well as for energy trade. It owned all nuclear, hydro and pumped hydro power plants in Bulgaria. After restructuring in 2001, NEK is only responsible for transmission.

Following the adoption of the Energy Strategy and on the basis of the amended Energy Act and the relevant secondary legislation, the Privatisation Agency has undertaken the privatisation of the electricity generation companies. Only the Nuclear Power Plant (NPP) Kozloduy and the Thermal Power Plant (TPP) coal/lignite of Maritza East 2 remained in public ownership. Independent producers, concentrated into 9 municipal district heating companies and 17 industrial TPPs account for 11% of generation in the country. Several hydropower plants are in the process of being sold.

The seven regional distribution companies have been privatised and are now being held by foreign operators:

- Stolichno, Sofia Region, and Pleven – by CEZ A.S. Czech Republic
- Plovdiv and Stara Zagora – by EVN AG, Austria
- Varna and Gorna Oryahovitsa – by E.ON Energie“ AG, Germany

The eighth distribution company "Zlatni piasazi - Service" AD is also in private ownership.

The District Heating sector is in a process of privatisation since 2004. The privatisation projects of most of District Heating Companies have been already finished successfully. The work on the sale of District Heating Company Shoumen EAD and District Heating Company Pernik EAD continues. The Sofia district heating network, managed by the Sofia District Heating Company, jointly owned by the municipality and the state, is also planned for privatisation.

In the gas sector, Bulgargaz is the dominant player, a vertically integrated state-owned company performing public supply, transmission, storage and transit activities. In January 2007, Bulgargaz EAD was restructured into BULGARGAZ – HOLDING EAD through unbundling of newly established sole owner trading companies – BULGARTRANSNGAZ EAD - functioning as combined operator, involved in the storage, transit transmission and transmission of natural gas, and BULGARGAZ EAD acting as public supplier of natural gas and the related purchase and sale. 37 companies have licenses for gas distribution.

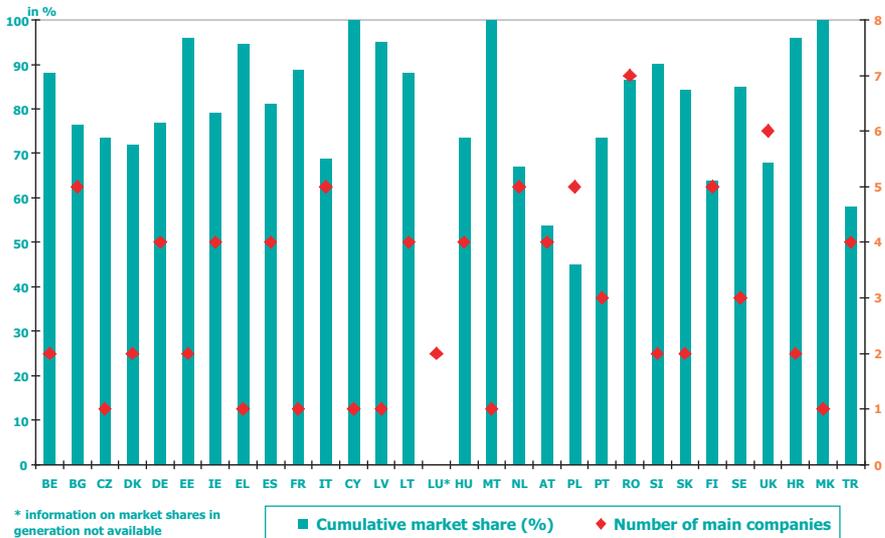
Upon accession of Bulgaria to the EU on 1 January 2007, the national energy market is a part of, and operates under the EU internal energy market rules.

The adopted model of the internal electricity and gas markets is based on regulated third party access to the network, bilateral contracts between suppliers/traders and consumers, and balancing market model. During the transition period of market liberalisation, both regulated and free electricity market segments exist.

Main characteristics of the power sector deregulation in 2007 are¹⁰: 28 % of the market is open; generation licensees; 1 transmission company with wholesale functions; 9 regional distribution/supply licensees companies; 14 licensed traders of electricity; regulated generation, wholesale, end-user prices; regulated third party access possibilities for eligible customers: bilateral contracts, balancing market; deregulated prices for ancillary services.

The following are some of the main indicators for electricity and gas market opening published by the European Union. For electricity, the number of main electricity generating companies in Bulgaria is in the upper range as compared to other EU Members while it is the opposite for companies active in gas supply to final consumers.

Figure 24. Number of main electricity generating companies and their cumulative market share, 2006



Source: Eurostat, *European electricity market indicators 2006*, <http://epp.eurostat.ec.europa.eu/>

¹⁰ Source: Energy Regulators Regional Association, <http://www.erranet.org/AboutUs/Members/Profiles/Bulgaria>

Figure 25. Number of main natural gas suppliers to final customers and their cumulative market share, 2006



Source: Eurostat, European gas market indicators 2006, <http://epp.eurostat.ec.europa.eu/>

Institutions

Ministry of Economy and Energy

The ministry responsible for energy policy is the Ministry of Economy and Energy (MEE). It was incorporated by decision of the Bulgarian Parliament in August 2005 through the merger of the Ministries of Economy and Ministry of Energy and Energy Resources. The Ministry of Economy and Energy is working on the development of the economic and energy policy of the Bulgarian state. Focal points are:

- increasing the competitiveness of the national economy and the various institutions
- encouraging investments, innovation, entrepreneurship, exports, modernization of the industrial base, stimulating measures on energy efficiency in the industry and the use of renewable energy resources
- implementation of the integration policy,
- foreign economic cooperation.

State Energy and Water Regulatory Commission (SEWRC)

The State Energy and Water Regulatory Commission (SEWRC) implements state regulation in the energy sector. Established in 1999 as an energy regulator, in February 2005 its functions were extended to include water market regulation and the Commission became a truly multi-utility independent regulator.

SEWRC performs the actions needed for granting of permits and licences. Also, it approves the General Conditions of Power, Heat and Natural Gas Sell Agreements that are proposed by the energy companies and approves the prices set by the energy companies. The Commission monitors all permits and licenses granted to the Companies within the Power Sector. Concerning competitiveness and the internal energy market, SEWRC is responsible for developing and implementing a tariff and price-setting methodology for electricity, gas and heating, and for approval of tariff proposals submitted by companies in the energy sector.

National Electric Company (NEK)

NEK is a single-owner joint-stock company, 100% held by the State. The single-owner rights are exercised by the Minister of Economy and Energy. After restructuring in 2001, the company's responsibilities have been cut back and are now focusing on the domain of transmission. Main activities:

- Generation and transmission of electrical energy
- Centralised purchase and sale of electrical energy
- Supply of electrical energy to customers connected to the transmission network
- Import, export of electrical energy
- Construction and maintenance of power generation and transmission facilities
- Investment
- Introduction and promotion of energy efficiency in the generation and transmission of electrical energy.

In line with the provisions of the Energy Act NEK was restructured and a new company ESO EAD (see below) was established. The remaining generation assets have been allocated to independent companies. Three partially privatised electricity distribution groups undertake distribution and supply for the regulated market.

Electricity System Operator (ESO EAD)

ESO EAD was established in 2007 as a subsidiary of the National Electricity Company and is 100 % owned by it. Main activities:

- General operational planning, coordination and control of the electrical power system
- Coordination and control of the electrical power system
- Operation, maintenance and reliable functioning of the power transmission network (maintenance activities and services concerning the energy sector)
- Transmission of electricity
- Monitoring the electricity market.

Energy Pricing Policy

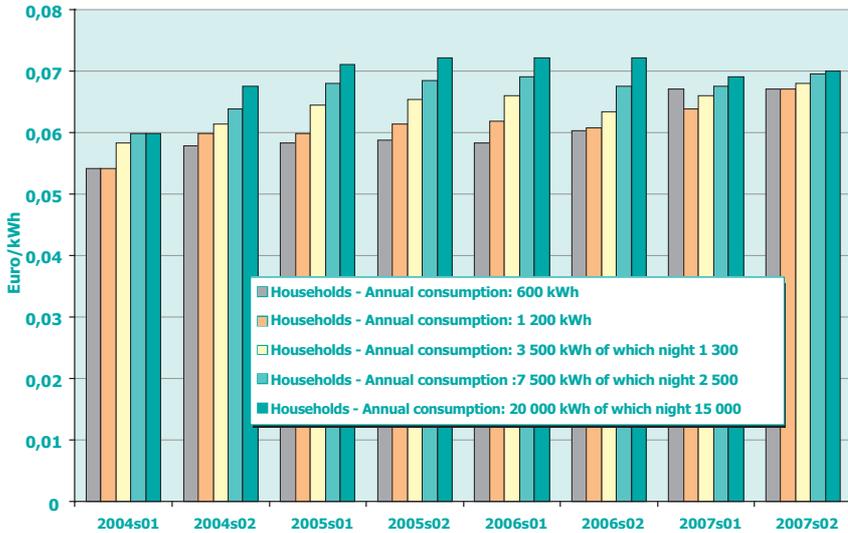
The prices for liquid fuels and coal are set by the market, while the prices for electricity, heat, natural gas, and renewable energy are liberalised, but regulated by the State Energy and Water Regulatory Commission. The Commission applies the "cost-plus", "price cap" and "revenue cap" basic methods of price regulation for electricity and heat, allowing for return on capital and stimulating efficiency improvement.

The Council of Ministers sets binding rules for the formation and application of prices and tariffs for electric energy. The energy enterprises set prices and tariffs according to the binding rules and basic principles, and submit them for approval to SWERC one month before publication along with the pricing documents. There are two electricity market segments: regulated prices (70% of the market) and free market (30%). The difference between the two types is in the profit, there are no subsidies for the regulated segment of the market. Cross-subsidies are also absent. There are intentions to increase the share of the free market. Electricity distribution companies are stimulated to reduce energy losses, as the price for covering the allowed losses is higher than the price for purchasing the electricity.

Household electricity prices have risen by 13.6 % over the last three years (as of 2007, Figure 26.) and are about 49 % below the European averages (Figure 27.). Similarly, industrial user prices have risen by 12.5% over the last three years (Figure 28.) and remain about 39% lower than the European averages (Figure 29.). Prices for industrial users are lower in absolute terms than for households. The impact of electricity prices on industrial consumers is weaker than on household.

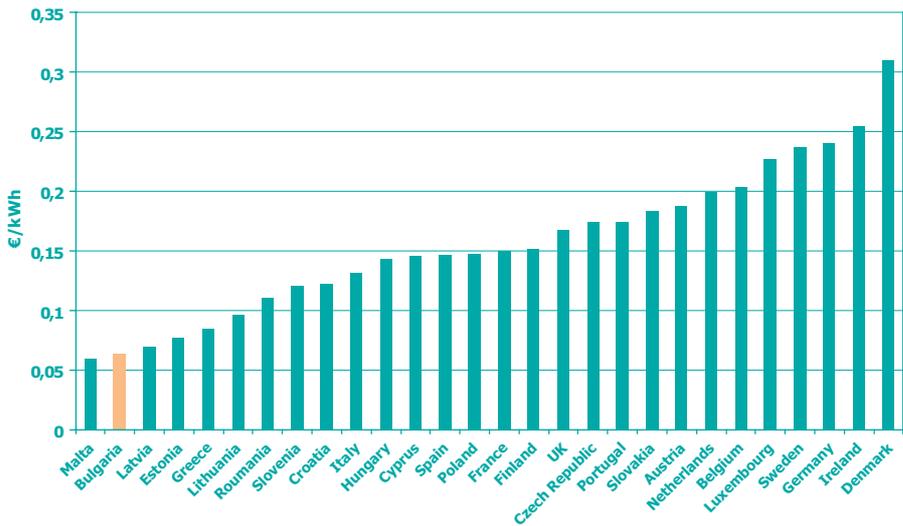
There is a special incentive pricing policy for CHP and renewable electricity, based on preferential feed-in tariffs. This is discussed in detail in the chapter on Renewable Energy Policy.

Figure 26. Household electricity prices in Bulgaria 2004-2007 for different consumer groups (incl. all taxes)



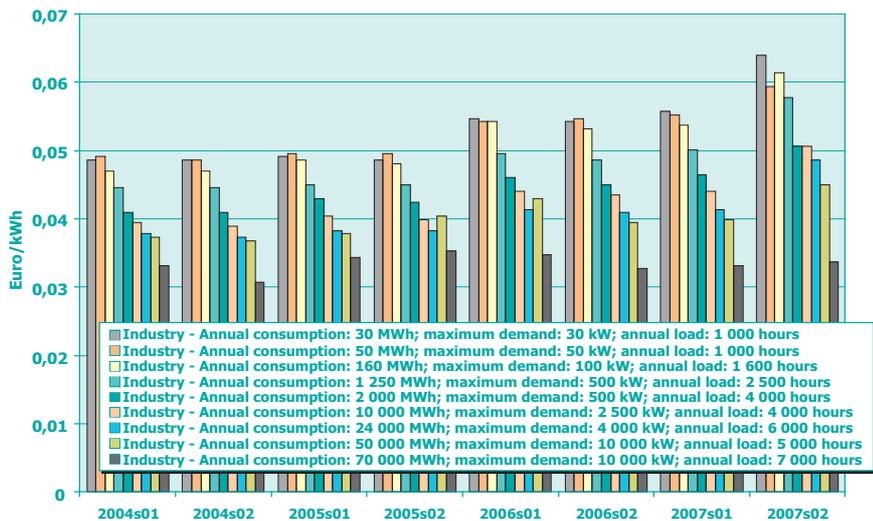
Source: Eurostat

Figure 27. Household electricity prices (1200 kWh incl. all taxes, first quarter 2007)



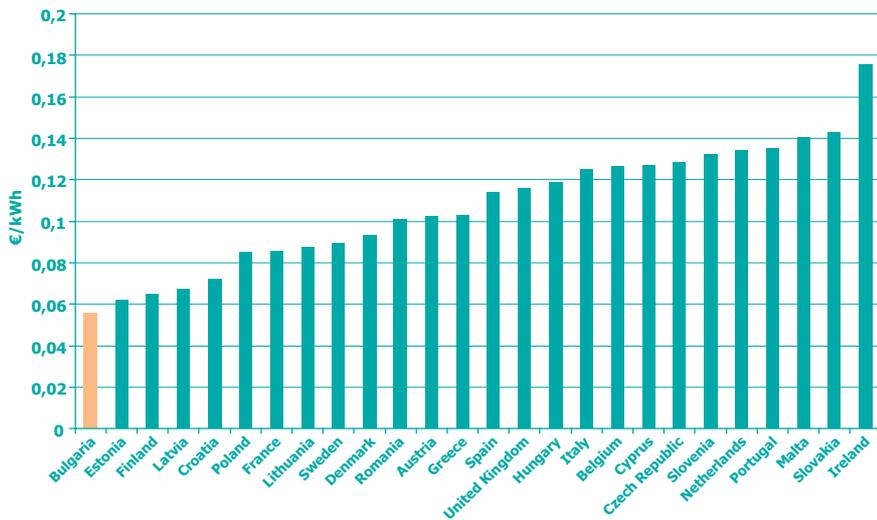
Source: Eurostat

Figure 28. Industry electricity prices in Bulgaria 2004-2007 for different consumer groups (excl. taxes)



Source: Eurostat

Figure 29. Industry electricity prices (30 MWh, maximum demand: 30 kW; annual load: 1 000 hours; excl. taxes, first quarter 2007)



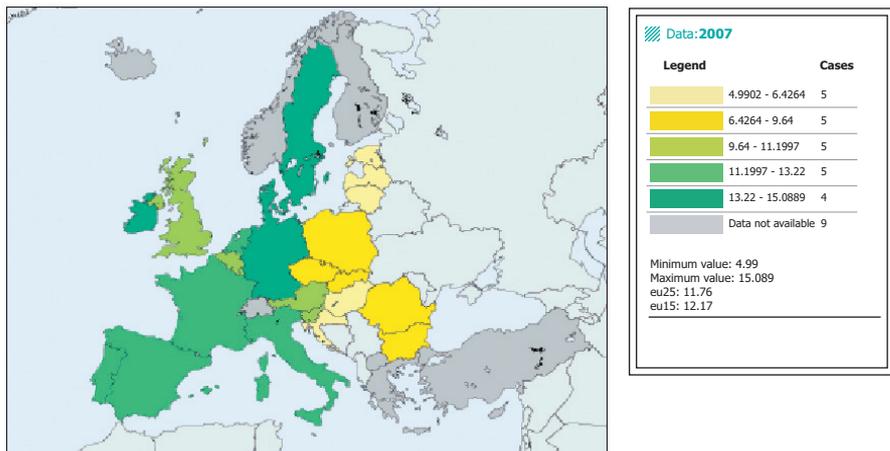
Source: Eurostat

Tariff reform in the district heating sector continued for almost a decade. In the beginning there was a unified tariff for all district heating companies, which was not sufficient to cover the real production and transportation costs. At a later stage separate prices for different district heating companies were introduced. Tariff increases were introduced periodically; however they did not at all lead to a lowering of the level of subsidies since the enterprises continued to make losses for a number of reasons, such as lack of investment in improvement of the efficiency of the systems, poor accounting and collection practices, and disconnection of a growing number of subscribers because of the price increases. In 2002 pricing reform started focusing on the phase-out of subsidies and in 2005 all the prices were liberalised. After the removal of subsidies only low-income people still receive financial support for energy needs by the social safety net programme. Since 2002 the State Energy and Water Regulation Commission (SEWRC) is responsible for district heating tariff setting and regulation.

The prices for natural gas depend on international prices and have been on the rise in Bulgaria as elsewhere in Europe but for both domestic and industrial users they still count among the lowest in the European Union (Figure 30. and Figure 31.).

An overview of the present tariffs for electricity, district heat and natural gas in Bulgaria is provided in Annex 3.

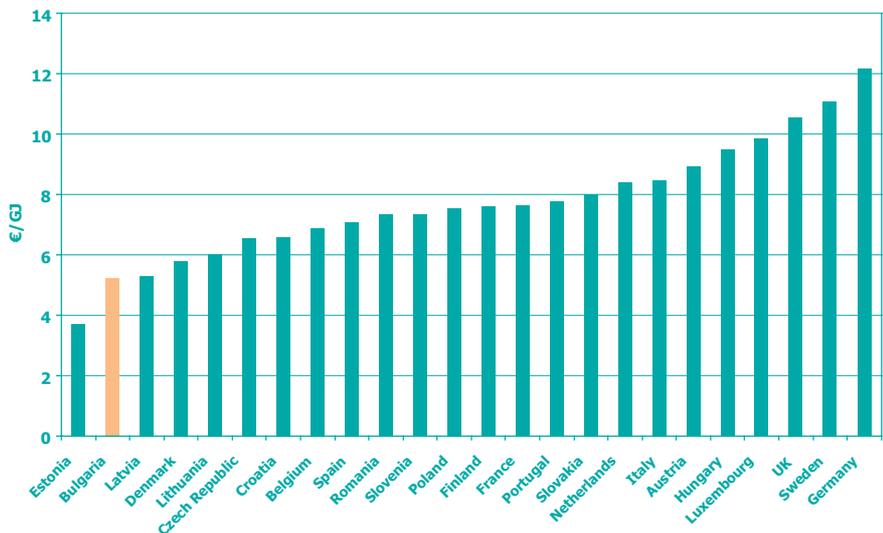
Figure 30. Household gas prices 2007 ¹¹



Source: Eurostat <http://epp.eurostat.ec.europa.eu/>

¹¹ This indicator presents the natural gas prices charged to final domestic consumers, who are defined as follows: annual consumption of 83.7 GJ (equipment: cooking, water heating and central heating). Prices are given in Euro (without taxes) per GJ corresponding to prices applicable on 1st January each year

Figure 31. Industry natural gas prices (annual consumption of 41 860 GJ, load factor of 1600 hours; excl. taxes, 1 January 2007)



Source: Eurostat

Energy Efficiency Policies and Programmes

Strategic and Legal Basis

During the last years the process of harmonisation of the energy efficiency framework of Bulgaria with European legislation was a priority. Energy efficiency activity is a matter of high priority at national level and increased attention is given by national authorities to energy efficiency issues.

The Bulgarian policy on energy efficiency is laid down in the following documents:

➤ **Energy Strategy and Improvement of Energy Efficiency till 2010 - adopted by the Council of Ministers in July 2002**

The Energy Strategy of the Republic of Bulgaria puts the main accent on the implementation of medium- and long-term actions in policy, legislation, institutional framework, tax and price policy to achieve the main goals of:

- Secure supply of energy
- Enhanced competitiveness of the economy
- Protection of the environment and preventing climate change.

The Strategy prescribes pro-active energy efficiency policy as a means for improving the competitiveness of the economy, security of energy supply and environmental protection; efficient social protection through shifting government subsidies from the producer to the consumer, through energy efficiency measures and introduction of socially-oriented tariffs.

The Energy Strategy of Bulgaria is being updated at the time of writing this report.

➤ **Provisions for Energy Efficiency in the Energy Law**

Chapter 10 of the Energy Law, adopted in November 2003, introduced individual billing of heat energy from district heating to multi-family buildings on the basis of a share distribution system if the consumers have installed devices for share distribution (individual allocators or heat meters). In the case of absence of devices for share distribution the consumed heat energy is calculated on the base of installed capacity of the heating radiators multiplied by the maximum specific consumption for the building.

Chapter 11 deals with the promotion of electricity generation by Renewable Energy Sources (RES) and of cogeneration of heat and electricity. The public provider and public suppliers are obliged to provide priority connection and purchase the entire electricity production from RES and CHP at preferential prices. The legislation for renewable energy is more specifically dealt with in one of the following sections.

➤ The Energy Efficiency Act – adopted by the Parliament in February 2004

The Energy Efficiency Act defines energy efficiency as a national priority; it determines the engagement and support of the State and creates institutional and regulatory conditions for the implementation of the national policy. The state policy for the improvement of energy efficiency is carried out by the Minister of Economy and Energy and is an integral part of the energy policy of the country. The measures and activities in this regard are implemented by the Executive Director of the Energy Efficiency Agency acting jointly with the central and territorial bodies of the executive authority and other state bodies.

In relation to the major priorities set in the energy policy in Europe and to the ongoing harmonisation of the Bulgarian legislation, some amendments in the Energy Efficiency Act were elaborated in 2006 in line with the critical review and recommendations of the European Commission towards further development of ordinances. The amendments relate to the harmonisation and introduction of compulsory requirements, which are provided for in the European Union Directives in the energy efficiency area, as well as enhancing control functions of the Executive Director of the Energy Efficiency Agency, in his capacity of executive authority representative, through enlarging the group of bodies subject to control. An amendment adopted in 2007 further reflects the EU requirements.

The Energy Efficiency Law also defines:

- The requirement for implementing the government policy on energy efficiency on the basis of a national long-term programme and short-term programmes adopted by the Council of Ministers
- Responsibilities for the development and implementation of sectoral, regional, and municipal energy efficiency programmes to the sectoral ministries, the regional governors, and the municipal councils respectively
- The requirement for defining a national indicative target for raising the end use energy efficiency as a percentage of the total end use of fuels and energy in the country, and for adoption of energy efficiency action plans for achieving the indicative national target
- The possibility for the certification of buildings and the mandatory certification of public buildings with a gross floor area above 1000 m², as well as requirements for those who carry out the certification
- Specific obligation for energy efficiency management and application of energy efficiency services
- The establishment of an Energy Efficiency Fund and the rules for its operation
- Control over energy efficiency and administrative penalties for non-compliance with the provisions of the Law

The secondary legislation for the implementation of the Energy Efficiency Act is developed. The latest ordinances that have been elaborated are mainly directed to the implementation of the legal provisions concerning the certification of buildings:

- Ordinance for the energy parameters of the facilities – this ordinance regulates the rules and methods for comparison of energy parameters of facilities
- Ordinance for the certification of buildings – this ordinance sets the rules and conditions for certification of buildings. Each building - state or municipal property - with gross floor area over 1000 m² is subject to mandatory certification

- Ordinance for energy efficiency audits – Producers of goods and services with annual energy consumption, equal to, or higher than, 3,000 MWh and state and municipal buildings with gross floor area over 1000 m² are subject to mandatory audits
- Ordinance for registering persons who implement energy efficiency audits and buildings certification - specifies the requirements for persons, authorised to perform audits and certification.

A new energy efficiency law is under development. The proposed new provisions include:

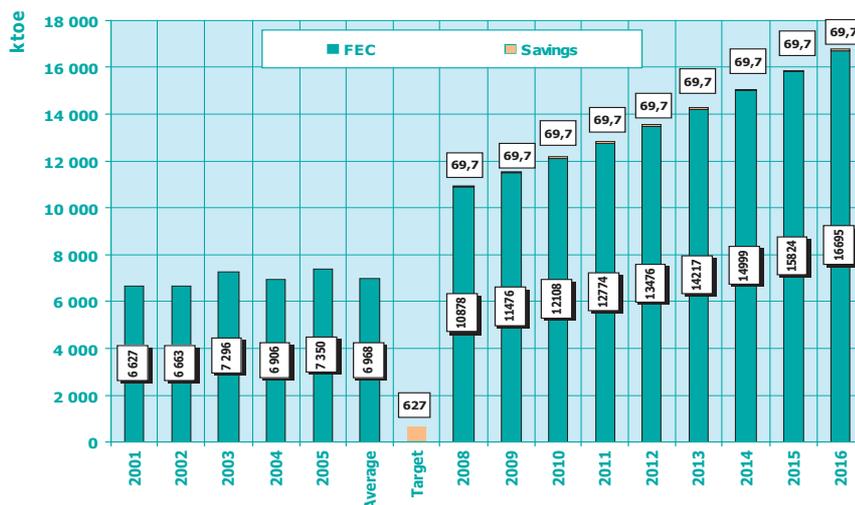
- Establishing the legal basis for the development and implementation of energy efficiency strategy and action plans
- Introduction of energy passports for all buildings in the country
- Mandatory inspections of boilers (>20kW) and conditioners (>12 kW)
- Energy services: introduction of national and individual targets for energy savings
- Requirement to appoint energy managers in large energy consumers
- Long term agreements
- Introduction of certificates proving energy savings

➤ First National Energy Efficiency Action Plan 2008 – 2010

Further, in order to realise the main energy and climate change target of the EU of 20% energy savings by 2020 and according to Directive 32/2006, Bulgaria prepared the First National Energy Efficiency Action Plan 2008–2010. The Action Plan was adopted by the Government on 9 October, 2007 and sent to the European Commission.

For the whole period of the Directive (2008-2016) the national energy savings target is 627 ktoe (7291 GWh). Compared to the expected growth of energy consumption based on an economic growth of 5.5% annually, the impact of the planned savings is still limited (Figure 32.).

Figure 32. Target of the Bulgarian National Energy Efficiency Action Plan



Source: First Bulgarian National Energy Efficiency Action Plan

The distribution of energy saving targets by sector for the first three years up to 2010 is as follows: households 61 ktoe (29%), services 29 ktoe (14%), industry 48 ktoe (23%), transport 63 ktoe (30%), agriculture 8 ktoe (4%) of the total 209 ktoe (100%). The detailed list of proposed measures under the Action Plan is presented in Annex 5.

General Energy Efficiency Programmes

In view of the commitment to pursue the energy efficiency and renewable energy policy through implementation of long-term and short-term national, branch, regional and municipal programmes, the following strategies and programmes have been developed and approved. The programmes are expected to lead to a 30% reduction of energy intensity per unit of GDP produced¹²:

- **National Long-term Energy Efficiency Programme 2005 – 2015 (NLTEEP)** - adopted by the Council of Ministers (Decision 620/04.07.2005). The programme analyses the conditions and trends of energy efficiency and proposes measures for rational use of energy in all sectors in order to achieve a reduction of the energy intensity of the GDP towards average European levels. A primary energy intensity reduction of 17% and a final energy intensity reduction of 8% are expected by 2015.
- **National Short-term Energy Efficiency Programme 2005 – 2007 (NSTEEP)** - adopted by the Council of Ministers from 15 December 2005. This is a three-year action plan and includes 552 projects with a total amount of 276.28 million BGN. As a result of the implementation of the programme 140 ktoe (about 1.5% of the Final Energy Consumption of the country in 2006) will be saved, and greenhouse gas (GHG) emissions will be reduced by about 600 kt CO₂.
- **National Programme for Renovation of multi-family buildings 2006-2020** - adopted by the Council of Ministers. The state budget covers 20% of all expenditures for full renovation of private multi-flat panel buildings. Expected effects: average energy savings 25-35 kWh/m² build area/year, emissions savings (central heating 272 g CO₂/kWh, electric heating 683g CO₂/kWh, Wood heating 20 g CO₂/kWh, coal heating 445 g CO₂/kWh). This process will be linked with issuing the necessary building passport, energy audits, and building certification. (see National Energy Efficiency Action Plan, residential measures).
- **National Strategy for Financing of Buildings Insulation for Energy Efficiency Improvement 2006–2020**, adopted by the Council of Ministers on 14 July 2005. About 4,000 state and municipal building (508 state and 3,454 municipal) have to be insulated up to 2020 and 650,981 private flats in multi-family buildings. The total amount of state financing is: for state buildings 147 million BGN, including 2.5 million BGN for audits and certification; for municipal buildings 10.2 million BGN for audits and certification; for private flats in multi-family buildings 500 million BGN, including 48.8 for audits. All funds required from the state budget for the implementation of the Strategy amounts to approx. 657 million BGN or on average 43.8 million BGN annually.

¹² Source: Presentation "Energy Efficiency Programs in Bulgaria" by the Energy Efficiency Agency (April 2008)

The state budget covers expenditure for studies and certification of municipal buildings and all expenditure, including for insulation, in state buildings.

➤ **National Annual Target Programmes for Energy Efficiency in Buildings.** These annual programmes are based on the National Short-Term Energy Efficiency Programme and the Strategy for Building Insulation. The annual Target Programmes include state budget financing of the audits and certification of state and municipal owned buildings which are subject to mandatory certification according to Art. 16 of the Energy Efficiency Act (state and municipal buildings with a gross floor area above 1000 m²) and the insulation of state-owned buildings.

- Under the **Target Programme 2006** the state budget provided 2 million BGN for obligatory audits and certification of state and municipal buildings according to the Energy Efficiency Act (see next section). The Target Programme has already started with the energy audits and insulation of state and municipal large buildings. Energy efficiency audits were performed in 139 sites with 250 buildings (mainly hospitals and schools) with 1.82 millions m² gross floor area. Expected energy savings are 163.5 GWh/annually after implementation of the proposed energy-saving measures.
- The **Target Programme 2007** includes: Audits in 116 municipal buildings with a total useful area of 306,069 m² and in 15 state buildings with a total useful area of 51,897 m²; insulation measures in 10 state buildings, audited in 2006 with a total useful area of 49,500 m². The Programme has been approved by the Council of Ministers on 6 July 2006.
- The **Target Programme 2008** envisages the following activities: (1) Audits in 1980 buildings including 553 state buildings with a total useful area of 2 million m²; and 1,427 municipal buildings with a total useful area of 4 million m²; (2) Implementation of energy-saving measures in 232 already-audited buildings with a total useful area of 1.5 million m². The total resources needed for the programme implementation are 66.2 million BGN (for energy audits 6 million BGN, for the implementation of energy-saving measures 60.2 million BGN). The expected annual energy savings after the implementation of measures will be over 130 GWh/year, equivalent to 12.4 million BGN per year. The average payback period is 4.9 years.
- The **Target Programme 2009** envisages the following activities: (1) the implementation of energy-saving measures in state buildings audited in 2008; (2) obligatory audits in municipal and state buildings according to the Energy Efficiency Law (Art. 16/2). These buildings are part of the Annual Objective Programmes, prepared by the Bulgarian Central Authorities and the Regional Governors.

➤ **National Programme for Energy Efficiency Improvement in the Transport Sector** through application of energy-saving measures (2006–2008). The Programme includes energy efficiency audits of all consumers in the sector subject to mandatory audits under the Energy Efficiency Act. The Programme starts energy audits in 14 state and municipality transport companies after which energy efficiency measures for 70 millions BGN will be realized. The Programme is prepared by the Energy Efficiency Agency on behalf of the Ministry of Transport.

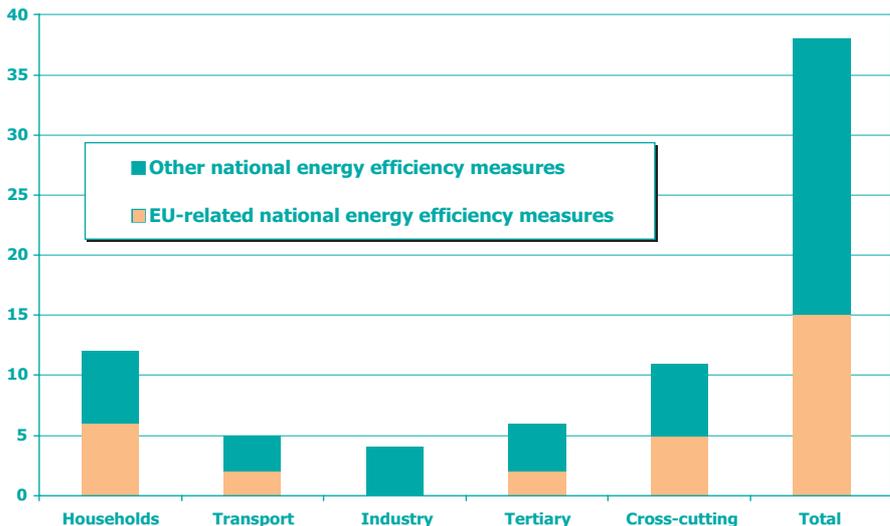
➤ Programme for Energy-Saving Technology Encouragement in Small and Medium Enterprises after the execution of energy audits 2006 (Council of Ministers Decree № 290 from 30.10.2006). Resources of 1 million BGN from the budget of the Ministry of Economy and Energy have been given for energy efficiency audits in Small and Medium Enterprises. The general purpose is to encourage energy-saving technologies in the enterprises.

Policy Instruments and Measures

Bulgaria has introduced in recent years a large number of energy efficiency measures under the combined influence of the EU accession process (40% of all recent energy efficiency measures in Bulgaria are triggered by EU legislation, see Figure 33) and the increased emphasis at national level on energy efficiency issues. This is evidenced by Figure 34, which is an extract from the MURE database on energy efficiency measures in the EU27. The sector with the least activities concerning energy efficiency is the transport sector.

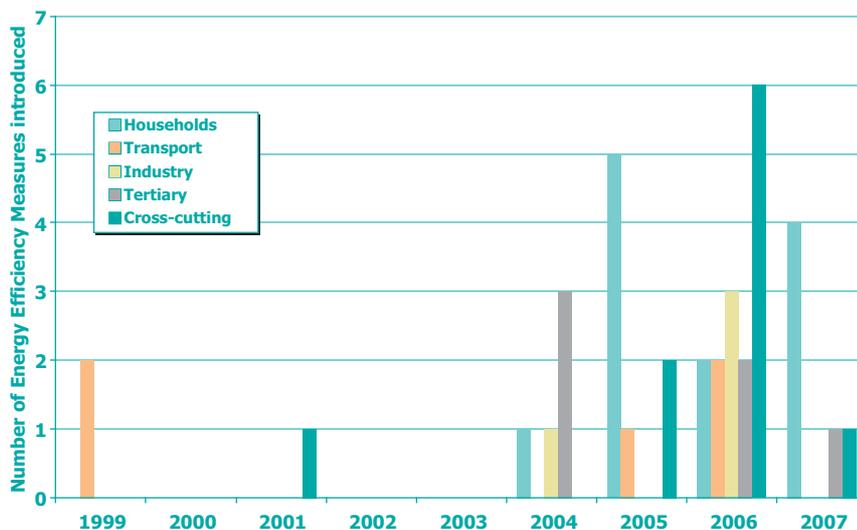
Given the fact that many of the measures have just been introduced in Bulgaria, relatively little is yet known in terms of impacts pointing to the necessity for Bulgaria to closely monitor their impacts in the coming years. The monitoring requirements laid down in the Directive for Energy Efficiency and Energy Services should help to develop further the required monitoring tools.

Figure 33. The importance of the EU accession process for energy efficiency in Bulgaria



Source: MURE database version 2008

Figure 34. Introduction of energy efficiency measures in Bulgaria by year



Source: MURE database version 2008

Residential sector

The main general programmes for energy efficiency in residential and tertiary sector buildings are the National Programme for Renovation of Multi-family Buildings (2006-2020) and the National Strategy for Financing of Buildings Insulation for Energy Efficiency Improvement (2006 – 2020), already mentioned. In addition, Bulgaria has introduced a number of important energy efficiency measures in buildings. They can be grouped into several categories:

Measures that are linked to the EU accession process

The following regulations transpose the EU Directives and requirements into Bulgarian national law and constitute a major block of energy efficiency measures in the residential sector.

- **Minimum efficiency standards for boilers:** This regulation transposes Directive 92/42/EEC into national law and should help to introduce efficient boilers onto the market. However, this regulation at the EU level is now already more than 15 years old and the market has evolved since then. Therefore, the impact of the regulation may be limited.
- **Mandatory measures for efficient lighting:** This regulation translates Directive 2000/55/EC into national law. It is mainly aimed to introduce energy efficient ballasts for fluorescent lighting.
- **Mandatory energy labelling of electrical appliances:** This regulation translates EU Directive 92/75/EEC and associated ordinances for different types of appliances into practice. As in other EU Member States it can be expected that information

provided to the consumers helps them to choose the most efficient appliances. In any case, given the fact that the European appliance market is largely interconnected, Bulgaria will profit from the development so far in other countries. Nevertheless, there is a scope for different Member States to reinforce the application of the labels in the retail markets and to promote their use strongly.

- **Minimum efficiency standards for electrical appliances:** translates Directive 96/57/EC on minimum standards for cooling appliances into national law. This Directive has been overtaken by technical progress in the meantime and may have little impact in Bulgaria.
- **Buildings Energy Performance Standard:** This measure translates Directive 2002/91/EC into national law and introduces a variety of new features in the building sector, especially building passports and building certificates, the requirements for the regular inspection of boilers and of air conditioning systems as well as a harmonised framework for energy efficiency standards in buildings. The building passports and certificates require well-skilled certified organisations. Bulgaria has undertaken important steps to certify enough national organisations for the introduction of the passes. It will also be important for Bulgaria to promote the use of such passports and certificates in transactions such as the sale or renting out of the buildings.

Mandatory measures in support of thermal building regulation for new and existing buildings (major renovations)

In addition to the EU requirements on energy performance standards for buildings Bulgaria has introduced national regulation in support of these standards.

- **Measures linked to technical norms in respect of thermal building regulation:** minimum thermal insulation standards, control systems for heating (regulation), maximum indoor temperature limits heating period, heating pipe insulation. These measures are important complements to the thermal standards.
- **Individual billing (multi-family houses):** This measure is very important in the Bulgarian context with many multi-family buildings. It specifies individual billing and payment of heating energy costs in multi-family residential buildings connected to district heating. The impact of this measure is not evaluated but its efficiency is very high and the average savings of heat energy from district heating are above 20% without deterioration of thermal comfort.

Subsidies and fiscal measures

These are aimed in particular to support energy efficiency in existing buildings and enhance the building programmes described above.

- **Residential Energy Efficiency Credit Facility (REECL).** This support scheme is described in the section on energy efficiency financing.
- **Building Tax Exemption.** This measure constitutes an innovative way of using the new building certification. The owners of buildings, having obtained a certificate category A (or B) are exempt from building taxation for 7 (3) years, If they use renewable energy sources in addition they are exempted for 10 (5) years. The impact of such measures may, at first be limited; however, together with other measures of this type, e.g. by promoting strongly the use of the certificates in sales and renting out of buildings, they will constitute an additional support to the energy performance directive in Bulgaria.

Industry and tertiary sector

The programme for energy efficiency in SMEs has already been mentioned. The main measure for energy efficiency in the industrial and tertiary sector is the introduction of and financial support for energy management. In addition the exemplary role for energy efficiency of the public sector is to be promoted.

Energy efficiency management

The Energy Efficiency Act provides for an obligation on industrial and public energy consumers using considerable quantities of energy, to prepare regular analyses of general and specific energy consumption. The Energy Efficiency Act sets the rules regarding energy efficiency certification and auditing, which are further specified in the secondary legislation (the four ordinances already mentioned). These are relevant to industrial and tertiary sector consumers.

Grants to support energy management

Financial support is necessary and was provided for in Bulgaria to support the energy management provisions:

- **Grants for energy audits in SME** (see also the section on General Programmes). These grants aim to cope with the important role of SMEs in the economic system of Bulgaria: 221 000 companies, 99.3% of all enterprises, 36.6% of employment, and 19.2% of Gross Domestic Product. On the other hand, almost half of manufacturing companies (45.5%) work with equipment which is more than 10 years old and almost three quarters (72.8%) - with equipment which is more than five years old. Only half of SMEs can spare 10% of their investments for new technologies. The grants will help them to modernise their production facilities.
- **Energy Efficiency and Renewable Energy Credit Line (BEERECL) and the Operational Programme on Competitiveness.** These measures are described in detail in the financing section.

Measures aimed in particular at energy management in municipalities

These measures aim in particular to realise the exemplary role for energy efficiency required by the EU Energy Services Directive for the public sector:

- **Regional Councils on Energy Efficiency:** These Councils are composed of experts and representatives of the district and municipal administration, local businesses, civil organisations and associations, etc. The Energy Efficiency District Councils assist in the preparation and adoption of district and municipal EEI programmes.
- **Mandatory Energy Action Plan for Municipalities:** The mayors organise and implement the measures foreseen in the municipal energy efficiency improvement programmes by allocating target funds in their budgets for their implementation.

Transport sector

The measures in the this section are in addition to the National Short-term Energy Efficiency Programme in the Transport Sector 2006-2008 described previously. They can be grouped into two categories:

Mandatory measures

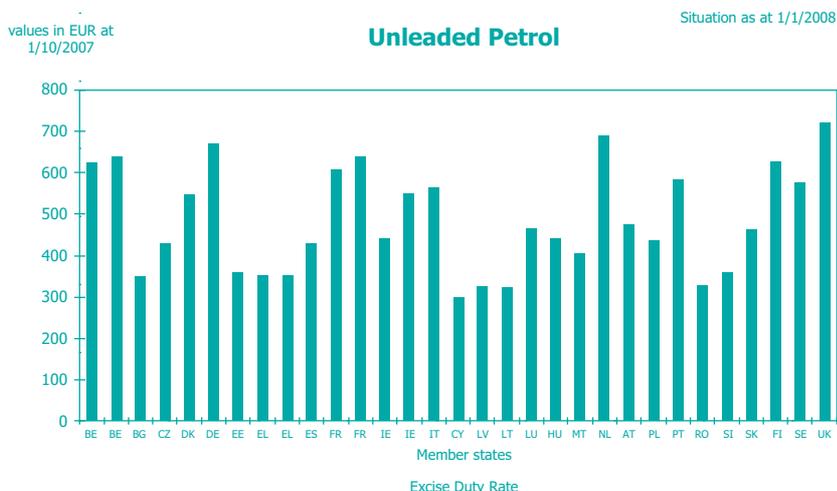
Mandatory measures have been implemented with the main aim of enhancing security in the transport sector and were introduced already in the late nineties.

- **Mandatory inspections of vehicles:** If adequately applied this is an important measure in the particular context of Bulgaria with its large number of old cars. In addition to poor energy performance these cars frequently have security-related technical problems.
- **Mandatory speed limits:** While the main aim of the measure is not energy savings, speed limits are frequently credited with substantial energy savings depending on the traffic conditions.

Taxation measures

These measures are also triggered by European Union legislation. They either require the harmonisation of national taxes on motor vehicle fuels with the minimum requirements at EU level, or an excise tax relief for bio-fuels and other clean fuels in order to cope with the EU objectives on bio-fuel shares. The excise duties on motor fuels after the latest amendments effective as from 1 January 2007 are as follows: Europlus Unleaded Gasoline A-95H and A-98H - 635 BGN/1000l; Diesel fuel - 535 BGN/1000l. The excise duty on motor fuels is one of the most efficient measures to limit consumption of fuel oils in the transport sector. With respect to the excise tax levels on energy products, Bulgaria is now in line with the minimum requirements of the EU (see the example of unleaded petrol in Figure 35.). It should be noted that with respect to the present income levels in the country the minimum requirements on taxation are substantial efforts. The value-added tax is 20% for all fuels. The taxes constitute about 50% of the end price of petrol and diesel fuel.

Figure 35. Excise duties on unleaded petrol in Bulgaria compared to other EU Member States



Minimum excise duty: 359 EUR per 1000 litres

Source: *Excise Duty Tables Part II 2008 – Energy products and Electricity* <http://ec.europa.eu>

District Heating

The measures for district heating were mainly concentrated on the modernisation of the network and the substations. This is illustrated by the rehabilitation activities for the largest Bulgarian district heating network of Sofia¹³:

- Actions by the Government since 2000: tariff increases; strengthened connection of four zones in the district heating system; demand-side measures through metering consumption; rehabilitation of sub-stations
- Aim of the Project: rehabilitate district heating system in Sofia by replacing 60 km of pipelines and 7,000 substations. Reduce heat losses and improve network efficiency; correspondingly, energy consumption and CO₂ emissions are reduced. The project has been fully implemented. Sofia district heating network is now at variable flow that allows consumers to automatically regulate their heat consumption. It has strengthened the connections between the four zones of Sofia, optimising the heat supply.
- Measures taken: Replacement of piping: 60 km of transmission pipelines and over-ground thermal insulation have been implemented. Replacement of substations: about 7,000 substations replaced. Variable-speed pumping: electricity consumption reduced by 30%; improvements in matching the required heat output to actual, real-time consumer demand.

¹³ Sources: Venkata/Putti: *Case study Sofia District Heating, March 2007*, <http://siteresources.worldbank.org>

The improvements were financed under the District Heating Project in Bulgaria by the EBRD, which improved district heating services in the cities of Sofia and Pernik. Under the project, Toplofikacia Sofia received a loan of US\$27.2 million equivalent and Toplofikacia Pernik - a loan of US\$7 million. Total costs of the project were estimated at US\$132.7 million. Financing is provided by the two district heating companies, the World Bank, the European Bank for Reconstruction and Development, and the European Union. In addition, USAID supported the institutional aspects of the project.

EU Programmes

Bulgaria is strongly involved in a variety of EU Programmes where Energy Efficiency is a major focus. This involvement in EU programmes is already a longstanding activity, starting with the EU accession process and participation in programmes such as PHARE and SAVE II.

➤ **PHARE financial mechanisms** - support has been received for the preparation of an energy efficiency strategy, new energy legislation and projects for energy efficiency in the energy sector, industry, in buildings and for utilisation of renewable energy sources. The twinning-project between Bulgaria and Italy, funded at the value of 1.1 million Euros under the EU PHARE Programme, (March 2006 - October 2007) supported the institutional building at the Energy Efficiency Agency (EEA).

➤ **SAVE II Programme** - EEA participated in consortia with executive agencies from EU countries in the following projects:

- BEEP – “Bankable Energy Efficiency Projects”, with coordinator DENA - Germany.
- CLEARCONTRACT – “Clearing House for Third Party Financing in Eastern Europe” with coordinator the Berlin Energy Agency.
- FRAMES – “Framework Innovations for Building Renovation” with coordinator EVA – Austria.
- Energy Efficiency Indicators for Central and Eastern European Countries – coordinator of the project was ADEME (France).

➤ **Intelligent Energy for Europe Programme** - The EEA is taking part in the following projects:

- “Concerted Actions” for the implementation of the Building Directive into local legislation
- “Securing the Take-off of Building Energy Certification through High Quality Energy Audit Schemes” (STABLE);
- Energy efficiency monitoring activities in the ODYSSEE-MURE projects, in which the Bulgarian Energy Efficiency Agency participates as the national focal point for Bulgaria and has published the first national report on energy efficiency¹⁴.
- “BEHAVE” – assessment of programmes on changing the behaviour of final energy consumers

¹⁴ http://www.odyssee-indicators.org/Publication/PDF/nr_bulgaria_2007.pdf

- Project "4EM" – application of energy-efficient electric motor systems in industry
- Project "Energy Path" – electronic model for energy efficiency education of students in secondary school
- Project "Promoscene" – promotion of the use of cohesion and structural funds for projects on rational energy use
- Project "Kids4future" – model for energy efficiency education directed to primary school students.

Important to mention is that a number of different Bulgarian organisations have participated in EU funded projects, including regional and municipal energy and energy efficiency agencies, universities, NGOs, etc. Many of these projects have supported the capacity building of these organisations, and have helped to raise the awareness of the authorities and the general public. A number of local energy agencies were established with the support of the SAVE Programme.

In summary, an impressive body of instruments and measures has been introduced in Bulgaria in recent years. The main challenge in the near and medium future will be to make sure that the impacts of these measures are maximised and that individual instruments and measures evolve in a coordinated manner. This is evidenced by the dense time schedule presented by Bulgaria in its first energy efficiency action plan (Table 1). Particularly challenging will be the mobilisation of private funds through the organisation of an energy services market, and the introduction of new instruments such as a White Certificate Scheme for energy savings.

Table 1: Summary of the time schedule proposed in the Bulgarian Energy Efficiency Action Plan

TYPES OF MEASURES	
Action plans	Development, harmonisation and adoption of the 1stAP by the CM
	Submit the 1st AP to the EC and update
	Report the results of the 1st AP
Organisational	Assess the structures and make proposals for optimisation
	Expand the functions of the EEA
	Expand the functions of the SEWRC
	Analyse the existing tariffs
	Reformulate the priorities of the EEF
	Develop EEI programmes (SMEs, transport, housing stock, residential and tertiary sectors)
	Absorb EU funds (preparation and implementation)
	Organise courses for energy managers.
	Assess the functioning of the ES market.
	Invest in EEI measures and RES, which will obviate the need for energy social benefits.
Attract Bulgarian producers and consumers to the European promotion programme of efficient electric drive systems "Future Efficient EDS"	
Normative–Act on the amendment of and supplement to the EEA, PPA and TA	Allow energy traders to offer extended ES and ensure that they will refrain from impeding the EEI measures.
	Competition between energy traders and ESCOs.
	Independent assessment of the results from complex ES.
	Monitor achievement of the indicative target and the mechanism for its allocation among energy traders, including penalties.
	Study and implement the white certificate scheme.
	Take into account energy performance (EE) competitive tendering for public contracts as an assessment criterion
	Special rights of movement for public transport
	Set up a Bulgarian federation of owners who manage the local building associations, managers of the property
Replace fuel oils by liquid bio-fuels.	
Financial	Ensure access to sources of easy financing for ES providers.
	Support absorption of EU funds by industrial companies.
	Support energy audits in industrial companies.
	Support the implementation of the Financing Strategy for Building Insulation, public and municipal property.
	Support the establishment of technical committees on standardisation of EE and RES
	Taxes for motor vehicles based upon their environmental performance.

CM: Council of Ministers, EEA: Energy Efficiency Act, EEF: Energy Efficiency Fund, PPA: Public Procurement Act, TA: Traffic Act

Organisation of Energy Efficiency Activities

Ministry of Economy and Energy

The ministry responsible for state energy efficiency policy is the Ministry of Economy and Energy. Within its wide scope of responsibilities, the Directorate "Energy Efficiency and Environmental Protection" is the unit which specifically deals with energy efficiency and renewable energy.

The Ministry has the legislative initiative in the energy efficiency area and it controls the implementation of legislative provisions. It also develops, and submits for adoption by the Council of Ministers, national indicative targets for energy savings, including an intermediate indicative target, and energy efficiency action plans. The Ministry interacts with other government authorities regarding the implementation of the state policy on energy efficiency and implements international cooperation of Bulgaria in the area of energy efficiency.

Energy Efficiency Agency (EEA)

The Energy Efficiency Agency (EEA) is an executive agency to the Minister of Energy and Energy Resources. The Agency was established in 2002 under the Energy Efficiency Act and is a successor of the National Energy Efficiency Agency at the Council of Ministers (1997) and the State Energy Efficiency Agency (1999). In 2006 – 2007 a project for institutional strengthening of the EEA was implemented, funded by the EU PHARE Programme, and managed by the Italian Ministry of EU Affairs.

The main responsibilities of the EEA evolving from the Energy Efficiency Act include:

- elaborate and present for approval by the Minister of Economy and Energy, supervise and coordinate the national long-term programme, the short-term programmes, as well as the targeted programmes for energy efficiency; present annual reports on the execution of the programmes
- organise the implementation of projects and measures related to the national long-term programme and short-term programmes on energy efficiency
- organise and participate in the drafting of secondary legislation in the area of energy efficiency
- interact with the central and regional authorities, with associations of employers, with industry organisations, associations of users and with not-for-profit entities in implementing the measures and activities for increasing energy efficiency
- make proposals on the development and improvement of standards in the area of energy efficiency for the purpose of their approximation with EU standards
- organise the introduction and maintenance of a national information system for the status of energy efficiency
- organise the establishment and updating of public registers for energy auditors
- organise and implement promotional activities and energy efficiency training.

The organisational structure of the Energy Efficiency Agency reflects the responsibilities assigned to the Agency (Figure 36.). A recent change was the transformation of the Centre for Energy Efficiency in Industry to the Ministry of Economy and Energy into a Directorate of the EEA. The Agency has a staff of 50. EEA is a regular member of the European Energy Network since 2004.

Figure 36 Organisational Chart of the Bulgarian Energy Efficiency Agency



Bulgarian Small and Medium Enterprises Promotion Agency (BSMEPA)

The Bulgarian Small and Medium Enterprises Promotion Agency (BSMEPA) is a government body under the Minister of Economy and Energy. The BSMEPA provides general information and consultancy about legal regulations, foreign trade and customs regulations, foreign exchange and investment regime, tax regime, employment relations and income taxation, international agreements, business support programmes, privatisation process, crediting, insurance, non-banking financial institutions to Bulgarian business and support them to start, grow, become more competitive and enter into new markets. BSMEPA is engaged in all activities related to the administration of the National Innovation Fund. Advice on financing energy efficiency is also an important activity in this general context of tasks.

Ministry of Regional Development and Public Works

The Ministry of Regional Development and Public Works (MRRB) holds the main responsibility for the development of the regions in Bulgaria, for the national housing strategy and policy, and construction and building standards, including the control for their implementation. The Ministry has initiated the "National Programme for Refurbishment of Residential Buildings in the Republic of Bulgaria, 2005 - 2020", and

has developed the draft Condominium Act. It has created the programme REECL - Residential Energy Efficiency Credit Line - in 2005 and coordinates all activities linked with the programme.

MRRB has introduced technical passports for buildings with the Law on Spatial Planning.

Regional and Local Authorities

Regional and Local Authorities started being legally involved in energy efficiency activities with the promulgation of the Energy and Energy Efficiency Act in 2002. This, together with a number of internationally-funded programmes and projects, gave an impetus to several local energy efficiency initiatives.

According to the current Energy Efficiency Law, the regional governors shall organise the development and the implementation of regional programmes for energy efficiency and shall interact with the local self-government and local administration. The municipal councils shall adopt programmes for energy efficiency, as well as for energy efficiency renovation of the building stock, administrative and business buildings on the territory of the municipality; shall introduce energy-saving lighting in settlements and in public buildings and other measures for energy efficiency improvement. The mayors shall organise and implement the measures stipulated by the municipal energy efficiency programmes, providing targeted resources in the municipal budgets for their realisation.

In implementing these requirements, local authorities are supported by a number of local and regional energy agencies. The Regional Energy Centres of Haskovo and Lovech were established under the EU PHARE Programme. Several agencies were established with support from the SAVE/IEE Programme, e.g.:

- Sofia Energy Agency (SOFENA). The main activity of this agency is to support the Sofia Municipality in developing a sustainable energy policy.
- Pazardjik Municipal Energy Agency, established in 2007.
- Municipal Energy Agency – Rousse, focusing on the development of municipal and regional strategies and programmes.
- Regional energy agency – Rousse, established in 2007, implementing energy efficiency activities in the big North- Eastern economic region of Bulgaria.
- Energy Agency of Plovdiv - This agency concentrates on energy efficiency in buildings, in SMEs and sustainable energy communities, as well as energy education and awareness-raising.
- Dobrich Local Agency for Energy Management, developing and implementing energy-saving projects in the territory of Dobrich municipality

The Black Sea Regional Agency for Energy Management (BSRAEM) is an NGO, established in 2003 by the Union of Bulgarian Black Sea Local Authorities. It works in collaboration with eight municipalities bordering the Bulgarian Black Sea coast. Major activities include exchange of information and experience; common lobbying and support for energy efficiency policies; collection of information and distribution of positive practices; consulting and technical support to the end users.

The Association of Bulgarian Energy Agencies (ABEA) is a non-government, non-profit, organisation, founded by energy management agencies on local and regional level, constituted with the financial and methodological assistance of the European Commission.

The Municipal Energy Efficiency Network EcoEnergy has been established in 1997 on an initiative of the mayors of 23 Bulgarian municipalities. On 27 October 2003 it was registered as a not-for-profit association of Bulgarian municipalities, for mutual help and joint activities aimed to formulate local policies for efficient use of traditional and alternative energy sources. Nowadays 45 municipalities and 1 regional municipal association are EcoEnergy members. EcoEnergy is a member of the association of European local authorities for the promotion of local sustainable energy policies Energie-cités.

Energy Efficiency Related Organisations

Center for Energy Efficiency (EnEffect)

EnEffect is an NGO that supports the efforts of central and local authorities in Bulgaria to attain sustainable development by investigating the energy efficiency potential in various sectors of the national economy, introduction of incentives for energy savings, elaboration of local/municipal energy efficiency programmes, provision of training, etc. EnEffect is the Contact Point for the GreenLight Programme and the GEF/UNDP project "Building the Local Capacity for Promoting Energy Efficiency in Private and Public Buildings". EnEffect functions as the Secretariat of the Municipal Energy Efficiency Network EcoEnergy and coordinates the Network activities.

Black Sea Regional Energy Centre

The activities of the Black Sea Regional Energy Centre (BSREC) include energy policy and energy co-operation, but also a number of energy efficiency projects. The Centre was established as an NGO at the initiative of the European Commission (EC), under its SYNERGY Programme by Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russian Federation, Turkey and Ukraine, and the EC. Later, the Former Yugoslav Republic of Macedonia and FR Yugoslavia became a member.

Energy for Sustainable Development Bulgaria (ESD)

ESD Bulgaria Ltd is an affiliate of ESD-UK that operates mainly in energy efficiency, GHG emission trading, CHP and Renewable Energy Sources as a consulting company and engages in the development and implementation of sustainable energy projects. ESD Bulgaria is involved in developing Joint Implementation projects.

Sofia Energy Centre LTD (SEC)

SEC is an independent consulting company with a lot of experience in the execution and implementation of projects under different EU programmes and Joint Implementation Projects in the field of energy efficiency and renewable energy sources.

Financing of Energy Efficiency Activities ¹⁵

The funding sources for Bulgaria have evolved considerably over the years, stimulated and supported by the EU accession process. While in the earlier years donor programmes like USAID and EU programmes like PHARE played an important role, in recent years Bulgaria's own funding sources, e.g. from the state budget and, most importantly, the EU structural and cohesion funds which support the development of EU countries with less than average income, have taken up the major role. The cohesion funding has opened up considerable funding sources for the general economic and social development of the country in the form of operational programmes and the major issue at stake from an energy perspective will be how much of the funds will be used to modernise production facilities, including energy efficiency, and to improve the efficient use of energy in the residential, service and transport sectors.

Bulgaria has also developed interesting funding schemes by way of public-private partnerships like the Bulgarian Energy Efficiency Fund. The challenge for the future will be to enhance the reach and the size of these funding schemes. Nevertheless, support from organisations such as the European Bank for Reconstruction and Development through the Residential Energy Efficiency Credit Line (REECL) or the Bulgarian Energy and Renewable Energy Credit Line (BEERECL) continues to be of first importance for energy efficiency improvement in the country.

The main funding sources for energy efficiency and renewables activities in Bulgaria are the following: European Bank for Reconstruction and Development (EBRD); Kozloduy International Decommissioning and Support Fund (KIDSF); European Investment Bank (EIB); Global Environment Facility (GEF); European Fund for Regional Development (ERDF); commercial banks; Bulgarian state budget; Eco funds; USAID; ESCOs (third-party financing).

Funding Schemes:

- USAID & UBB lending facility for municipal energy efficiency projects under USAID's DCA programme
- Bulgaria Energy Efficiency and Renewable Energy Credit Line (BEERECL) – industrial sector
- Residential Energy Efficiency Credit Line (REECL) – residential sector
- (new) European Union Energy Efficiency Finance Facility – industrial sector
- Bulgarian Energy Efficiency Fund (BgEEF)

Grant Funding Schemes:

- Operational Programme (OP) "Development of the Competitiveness of the Bulgarian Economy 2007-2013"
- Operational Programme "Regional Development" 2007-2013
- Operational Programme "Transport" 2007-2013
- Operational Programme "Environment" 2007-2013¹⁶

¹⁵ Sources: Presentation "Financing Energy Efficiency" by the Energy Efficiency Agency (April 2008);

¹⁶ The focus of the OP Environment is mainly on air, soil and water pollution

Table 2 provides an overview of the input by different financial resources for energy efficiency.

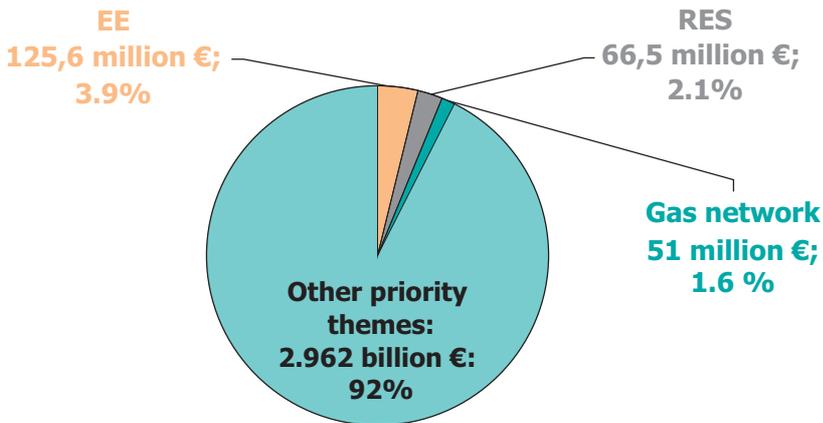
Table 2. Overview of financial resources¹⁷

Source of financial support	Total value of the projects, million Euro
Current situation	
State budget	
Programmes for auditing of buildings (2006/7 1200 buildings audited)	≈ 2.0
Energy audits for SMEs (2006/7 120 MSMS audited)	≈ 3.4
Bulgarian Energy Efficiency Fund (2006/7)	≈ 7.5
KIDSF, Kozloduy International Decommissioning and Support Fund (pilot project in buildings)	≈ 5.4
BEERECL, Credit lines for industry, 2006/7 (KIDSF, EBRD)	≈ 33.3
REECL, Credit lines for households 2006/7(KIDFS, EBRD)	≈ 22.5
Expected	
OP "Development of the Competitiveness of the Bulgarian Economy"	≈ 116.0 (starts with ≈22.0 in 2008/9)
OP "Regional Development"	≈ 400.0
European Union Energy Efficiency Finance Facility	≈ 145.0
Attracting financing from energy distributors and ESCOs	

Figure 37 gives an indicative breakdown of the community contribution from the European Regional Development fund ERDF by priority themes in the "Competitiveness" and "Regional Development" Operational Programmes. For the whole planning period 2008-2013 about 5.5% of the Community funding from the ERDF are foreseen for projects related to energy efficiency, co-generation, energy management and the construction of gas supply connecting pipelines. The share of the funding for energy efficiency is 3.9%, for RES 2.1%, for gas networks 1.6%.

17 Source: Presentation "Energy Efficiency in Bulgaria" by the Ministry of Economy and Energy (April 2008);

Figure 37. Indicative breakdown of the Community contribution from the ERDF by priority themes



Bulgarian Energy Efficiency Fund

The Bulgarian Energy Efficiency Fund (BgEEF) was established in 2004 and initially capitalised entirely through grants, its major donors being: the Global Environment Facility (GEF) through the International Bank for Reconstruction and Development (the World Bank), the Government of Austria, the Government of Bulgaria and several private Bulgarian companies. BgEEF is a revolving mechanism for development and financing of commercially viable projects and capacity building. BgEEF has the combined capacity of a lending institution, a credit guarantee facility and a consulting company. BgEEF supports the identification, development, and financing, of viable energy efficiency projects predominantly implemented by Bulgarian private enterprises and municipalities. These projects shall result in substantial reduction of greenhouse gases (GHGs), which is the main environmental objective of BGEEF as a donor project. The fund finances for example:

- Investments in improved energy efficiency in industrial processes, incl. purchase of equipment, machines/tools, training, technical assistance
- Rehabilitation of buildings
- Replacement of heat exchanger substations
- Fuel switching
- Heating insulation
- Improvements to heat source and distribution system
- Improvements to mechanical heating ventilation and air conditioning
- Modernisation of street lighting
- Small co-generation systems.

The underlying principle of BgEEF's operations is a public-private partnership (PPP). The Fund pursues an agenda fully supported by the Government of Bulgaria, but it is structured as an independent legal entity, separate from any governmental agency or institution. The Fund is profit-oriented and pursues financial sustainability of its own operation.

Until the end of 2007 the Fund has financed 42 projects with BGN10.5 million (Table 3). (See Annex 6 for more detailed information).

Table 3 BgEEF Results as of 31.12.2007

	Number of projects	Project size (BGN million)	BgEEF financing (BGN million)
Projects financed, incl.:	42	15.1	10.5
➤ Street lighting	4	0.9	0.7
➤ Reconstruction of the heating system	10	4.8	3.3
➤ Rehabilitation / isolation of buildings	28	9.4	6.5
➤ Municipalities	14	3.9	2.9
➤ Corporate clients	20	6.8	4.5
➤ Hospitals	4	2.9	1.8
➤ Universities	4	1.7	1.2

Source: www.bggeef.com

Bulgaria Municipal Energy Efficiency Programme (MEEP)

Electrotek Concepts, Inc operates the Bulgaria Municipal Energy Efficiency Programme (MEEP) funded by the US Agency for International Development (USAID). The project aims at establishing sustainable mechanisms for long-term energy efficiency project financing in Bulgaria:

- Develop a pipeline of bankable energy efficiency projects
- Assist commercial banks with establishing energy efficiency financing
- Develop project business plans and loan applications
- Structure financial deals with commercial banks
- Build municipal and industrial capacity to develop bankable energy efficiency projects
- Create broad-based public support for implementation of energy efficiency projects.

As of mid-2003, more than 30 projects had been initiated under MEEP. The total cost of these projects amounted to roughly US\$11 million, 40% of which was devoted to municipal initiatives. Projects have been conducted on central heating systems in schools and other public buildings, in addition to municipal street lighting. These municipal projects have thus far demonstrated an impressive return, with an average payback period of three and a half years.

Residential Energy Efficiency Credit Line (REECL)

To help Bulgarian households reduce their energy bills and consumption, the European Commission, the European Bank for Reconstruction and Development and the Bulgarian Energy Efficiency Agency have developed a €50 million Residential Energy Efficiency Credit Facility (REECL) to provide credit lines to reputable Bulgarian banks to make loans to householders for specific energy efficiency measures including double-glazing; wall, floor, and roof insulation; efficient biomass stoves and boilers; solar water heaters; efficient gas boilers; and heat pump systems.

To help stimulate the uptake of residential energy efficiency projects, an additional €14.63 million in grant financing is earmarked in support of project development and incentive grants paid to REECL borrowers after verification by independent consultant that each eligible residential energy efficiency project has been completed. Each borrowing household will benefit from up to a 30% incentive towards the cost of the energy savings projects (to a maximum of € 2000). Applicants need to use eligible products and materials to qualify for the incentive grants.

To date, the REECL Programme has committed to 15,560 energy efficiency home improvement projects, financed through personal loans totaling 45 million leva and incentive grants amounting to 7.8 million leva, saved a total estimated electricity equivalent of 108 GWh per year and the REECL supported projects have brought reduction in CO2 emissions of 157 kt per year. (See Annex 6 for more details)

Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL)

The BEERECL has been developed by the European Bank for Reconstruction and Development (EBRD) in 2004 in close co-operation with the Bulgarian Government and the European Union. The facility extends loans to participating banks for on-lending to private sector companies for industrial energy efficiency and small renewable projects. BEERECL provides incentives for energy efficiency projects at 15% of the loan amount, and for renewable energy projects – 20% of the loan amount, after meeting specified objectives (validated by independent energy expert). The total BEERECL Portfolio amounts to EUR 105 million. The types of projects qualifying for financing as energy efficiency include: co-generation, heat and steam recovery, automation and control, upgrade/replacement of utilities, fuel switching (coal/fuel oil to gas), ground source heat pumps, and process optimisation.

BEERECL success to date with energy efficiency projects can be illustrated by:

- 39 projects that cost 33.3 million Euros

- 19.4 million Euros in BEERECL loans and 1.88 million Euros in incentive grants
- Average energy savings of 40+ percent
- BEERECL cumulative loans and incentive grants: Over EUR 70 million in disbursed loans, over EUR 12 million in incentive grants
- Nearly 500,000 Tons of CO₂ Reduction

(See Annex 6 for more details)

European Union Energy Efficiency Finance Facility

In 2006, the European Commission decided to establish two multi-beneficiary programmes on energy efficiency, together with the Council of Europe Development Bank in co-operation with Kreditanstalt für Wiederaufbau and the European Investment Bank. The projects will cover Bulgaria, Romania, Croatia and Turkey. Both projects aim at providing financial assistance to the acceding and candidate countries in increasing investments in energy efficiency in the industrial sector. The total budget of the "Energy Efficiency Finance Facility" is € 145 million (€ 29 million EC contribution + € 92 million CEB/KfW + € 24 million EIB).

Renewable Energy Policy

Targets

By 2020 renewable energy should account for 20% of the EU's final energy consumption (8.5% in 2005). To meet this common target, each Member State needs to increase its production and use of renewable energy in electricity, heating (and cooling) and in transport.

Bulgaria has good opportunities to exploit indigenous renewable energies although the current penetration of renewable is still very low. The target to be achieved in 2010 is about 11% for electricity consumption. For 2020, the new target specified for Bulgaria in the proposed EU Directive on Renewables from January 2008 is 16% of renewables, up from 9.8% in 2005^{18, 19}.

In addition there is the bio-fuels target according to 2003/30/EC Directive: 5.75% share of bio-fuels in the fuel consumption in the transport sector for 2010. According to the new energy package this share shall increase to 10% by 2020.

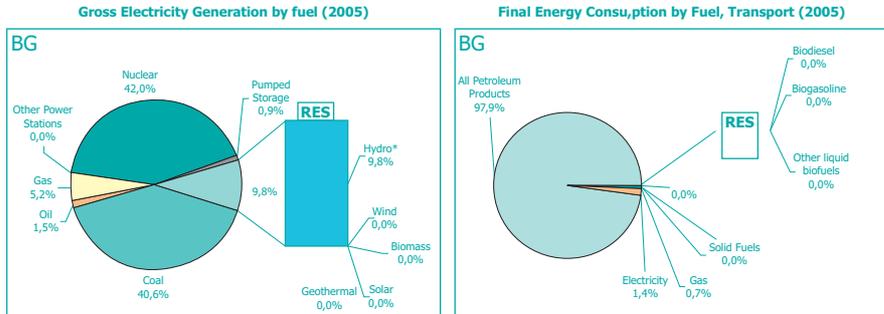
Potential

The present share of the RES-E includes large hydro power plants. The existing technical and economic potential for large hydro power is already exploited. There is a large potential to utilise biomass: 60% of the overall land area consists of arable and agricultural lands, and approximately 30% is under forest cover. There is potential to install around 2,200-3,400 MWe wind energy in the country. The best wind potential is in the mountains (about 1,000 m above sea level) and along peninsulas of the Black Sea. In the East and South of the country there is some solar potential. Bulgaria has a moderate potential for geothermal energy. Power generation potential from geothermal sources is about 200 MWe. Figure 38 shows that up to 2005 little new renewable energy facilities were installed in Bulgaria.

18 *Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources* http://ec.europa.eu/energy/res/legislation/doc/strategy/res_directive.pdf (Annex 1)

19 *The renewables targets are calculated as the share of renewable consumption to gross final energy consumption. Renewables consumption comprises the direct use of renewables (e.g. biofuels) plus the part of electricity and heat that is produced from renewables (e.g. wind, hydro), while final energy consumption is the energy that households, industry, services, agriculture and the transport sector use. The denominator for the RES share includes also distribution losses for electricity and heat and the consumption of these fuels in the process of producing electricity and heat.*

Figure 38. Fact sheet for renewables in Bulgaria: Renewables in 2005



Source Eurostat

* Not including generation from hydro pumped storage, but including electricity generation to pump water to storage. Municipal Solid Waste, Wood waste, Biogas included.

Source: http://ec.europa.eu/energy/climate_actions/doc/factsheets/2008_res_sheet_bulgaria_en.pdf

However, in order to improve from the current low penetration of renewables in energy supply Bulgaria has set up an ambitious promotion environment for renewable energy support.

Legislation

The main pieces of legislation relevant for renewable energy are the: Energy Act (2003), Energy Efficiency Act (2004), Ordinance on Setting and Applying Prices and Rates of Electricity (2002), and Regulation for Certification of the Origin of Electric Power Generated by Renewable and/or Combined Generation Sources, Issuance of Green Certificates and Trading (2005). Financial support programmes for renewable energy have already been described in the section on financing for energy efficiency programmes.

The most recent legislation for renewables is the **Renewable and Alternative Energy Sources and Biofuels Act (2007)**. It sets an ambitious framework for the support of renewables. The main provisions of this Act are as follows:

- Preferential connection to the grid of power plants generating electricity from renewable and alternative energy sources.
- Setting up feed-in tariff for purchasing energy generated through the use of renewable and alternative energy sources.
- Reducing the administrative burdens for the producers of energy from renewable and alternative energy sources and on construction of relevant facilities.
- While preparing their investment and maintenance programmes, the TSO and DSO shall allocate resources for grids development aiming to promote production of electric power from renewable and alternative energy sources.

- The public provider, or the final suppliers, respectively, shall purchase the entire quantity of electric power, for which there is a certificate of origin in place, except the contracted quantities in accordance with the free market or the quantities subject to balancing transactions, as well as the quantities generated for producer's self consumption.
- The public provider or the final suppliers, respectively, shall purchase the entire quantity of energy generated from renewable and alternative energy sources, except for the power generated by hydroelectric power plants with installed capacity over 10 MW, at preferential purchase prices.
- Each year, the State Energy and Water Regulatory Committee (SEWRC) shall determine preferential prices for sale of electricity generated from renewable or alternative energy sources.
- The system of preferential price forming will be applied: – Up to 2018 for the existing electricity generators using RES, including HPPs with installed capacity up to 10 MW; – For all the new electricity generators using RES during the next 12 years after starting commercial generation, however starting not later than 31.12.2011; – Up to 2018 for the existing generators of electricity from highly efficient cogeneration of electricity and heat; – For all the new generators of electricity from highly efficient cogeneration of electricity and heat during the next 8 years after starting electricity generation, however starting not later than 31.12.2011.
- The support scheme for electricity generated from RES has no limitations with respect to technologies and size of installed capacity in the power plant, including for HPPs with up to 10 MW. At the highly efficient cogeneration of electricity and heat, the support scheme is valid for electricity quantities up to 50 MW per hour, corresponding to the DER definition.
- The regulatory basis foresees for the preferential prices forming to be differentiated by technologies and to be not lower than 80% of final sale prices for household costumers in the past calendar year.
- It is expected that after 2012 a common system for green certificates trading will be developed and implemented in the European Union and the Bulgarian generators will join that scheme.

Pricing and other incentives

The mandatory purchase prices determined by the State Energy and Water Regulation Commission SEWRC according to the specifications in the Renewable and Alternative Energy Sources and Biofuels Act are currently set through the procedures described in the following box at the levels specified in Table 4:

Preferential tariffs for renewable energy sources based on the Renewable and Alternative Energy Sources and Biofuels Act (Prom. SG. 49/19.06.2007), Section IV

Art. 21. (1) Each year no later than 31 March, the State Energy and Water Regulatory Committee shall determine the preferential prices for sale of electricity generated from renewable or alternative energy sources, except for electricity generated by hydroelectric power plants with installed capacity exceeding 10 MW.

(2) The preferential price of electricity generated from renewable energy sources under para. 1 shall be determined at 80 percent of the average sale price for public utilities or end suppliers for the preceding calendar year plus an addition determined by the SEWRC depending to the type of primary energy source as indicated by the relevant ordinance stipulated by Art. 36, para. 3 of the Energy Act.

(3) The addition referred to in para. 2 for the next calendar year may not be less than 95 percent of the addition for the current year.

Table 4: Feed-in Tariffs, approved by the State Regulatory Commission on 31 March 2008 (without VAT)

	Feed-in Tariffs		Germany	
	leva/MWh	Euro/MWh	Euro/MWh	Notes
HPP with installed capacity lower than 10 MW	85.19	43.35	126.7 76.5	Up to 500kW 2-5 MW
Biomass plants with installed capacity lower than 5 MW			116.7 77.9	Up to 150 kW _{el} 5-20 MW _{el} (Cost regression 1%/a)
• Wood residues	215.00	109.41		
• Agricultural residues	162.00	82.44		
• Energy crops	184.00	93.64		
Wind power generators			79.5	Onshore-wind (Cost regression 1%/a)
• with installed capacity lower than 800 kW	120.00	61.07		
• with effective working hours less than 2 250h and installed capacity of 800 kW and higher	175.00	89.06		
• with effective working hours more than 2 250h and installed capacity of 800 kW and higher	156.00	79.39		
Photovoltaics				(Cost regression 8%/a)
• with installed capacity lower than 5 kW	782.00	397.96	424.8	Up to 30 kW
• with installed capacity higher than 5 kW	718.00	365.39	344.8	Over 1000 kW

Source: SEWRC website, International Feed-in-Cooperation (www.feed-in-cooperation.org)

For comparison, Table 4 shows also the present feed-in tariffs from Germany for comparable technology ranges as of December 2007. It can be seen the preferential tariffs set by Bulgaria are comparable with the German values inferring that the tariffs are likely sufficient to promote renewables in Bulgaria. The Bulgarian tariffs are guaranteed for 12 years for the individual installation while the German system guarantees 20 years. However, there is a cost regression built in the German system depending on the technology.

In addition, the renewables act provides for other boundary conditions for renewables such as preferential grid connection and preferential feed of renewables to the grid so that the conditions are established for a successful penetration of RES-E if no further administrative obstacles such as lengthy permitting procedures exist. In general, the generation of RES-E (with installed capacity up to 5 MW) and RES-H (with installed capacity up to 1 MW) does not require a licence. Delivery of machines and equipment for renewable energy sources that are produced abroad is exempt from VAT. Equipment and materials for the use of RES are also not subject to corporate income tax (towers, solar collectors and panels, heat stores, heat pumps, drilling rigs and installations for geothermal waters and biogas utilisation, and wind and hydro power units up to 10 MW).

Table 5 presents the status of licenses requested and issued so far, as well as the requests for connections to the grid. If these capacities in terms of MW installed are to be reached, this implies with the above feed-in tariffs for Bulgaria and taking into account a 12-year promotion period and a cost regression as in the German scheme an average annual promotion cost of 126 Million Euro per annum (based on the licences issued) and of 465 Million Euro per annum (based on the requests for connections to the grid). Although not all of the requests will be realised it shows the range. These are gross costs. Taking into account a pool price of roughly 30 Euro per MWh and an annual cost increase of 2% of this price, the net average annual costs are 72 Million Euro and 261 Million Euro respectively.

Table 5. Status of licenses issued under conditions before the construction of renewable energy facilities

	Hydro Power Plants	Wind Power Stations	Photovoltaic Power Stations
Number of requests for licenses	1	10	2
Capacity /MW/	7	800	51
Number of issued licenses	1	7	1
Capacity /MW/	7	620	26
Number of requests for connection to the electricity network	30	50	3
Capacity /MW/	90	2257	76

Sources: Presentation by the SEWRC (April 2008);

Recent developments show that the market is responding to the promotional regime. : The Greek company Marivent Ltd. will invest €500 million in a wind-energy farm near the town of Pernik. The installed capacity would be 800 MW. Marivent announced that it had already signed a contract for the construction with local authorities. The new plant will sell energy to the Bulgarian National Electric Company (NEC) for 20 years. Marivent will complete the project in less than 30 months. The company itself and EU funds would provide money for the project. Marivent expects 4.5 billion euro in revenues over the next 20 years. The project is considered one of the biggest in the sector in the EU²⁰.

Bulgaria has also introduced an [Ordinance on Issuance of Green Certificates and Trading](#) which became effective as of 1 January, 2005 and the new Green Certificate Market was planned to be put in place from 1 July, 2006 but was delayed. Currently the envisaged start will be in 2011. According to the Bulgarian Government the green certificate system will be guaranteed for 10 years from the date it starts. The regulation will determine minimum mandatory quotas of renewable electricity that public providers must supply as a percentage of the total annual electricity production. "Highly efficient" CHP will also be included under the tradable green certificate scheme. The regulation outlines details on the issuance of green certificates to renewable electricity and combined heat and power generation, the mandatory quotas for electricity generation from renewable energy and cogeneration, and the register for certificates. In a green certificate scheme there will still be mandatory purchase of electricity for production up to 50 MW. The introduction of such a scheme in Bulgaria is depending on the general European discussion on this issue.

Renewables for heat generation are mainly promoted through subsidy programmes such as the Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) (see the section on funding for energy efficiency programmes). RES projects benefit from a 20% grant.

In the heat sector [biomass](#) is playing an important role and has shown an annual average growth rate of 17% over the period 1997 to 2004. Biomass heating is largely dominated by wood and wood-waste applications in households. An important actor for biomass is the Bulgarian Biomass Association (BGBIOM). BGBIOM promotes renewable energy sources, mainly biomass, plant residues and animal manure as energy sources for sustainable society. BGBIOM is located at the Agricultural University in Plovdiv and a member of the European Biomass Association (AEBIOM).

In the years 1977 to 1990, the Bulgarian Government developed an energy efficiency programme for the utilisation of [solar](#) collectors in many of the state-owned hotel and holiday villages for hot water heating purposes. This led to the installation of some 50,000 m² of collectors, or around 17.5 MWth, located mainly along the Black Sea coastal regions. Today this figure has increased to 60,000 m². [Geothermal](#) heat also plays an important role and has shown growth over the period displayed in Table 6.

²⁰ Source: *Sofiaecho* 10 January 2008, http://www.sofiaecho.com/article/greek-company-to-invest-500-million-euro-in-wind-energy-plant/id_27018/catid_67

Table 6: Production of RES-heat in Bulgaria in 1997 and 2004 in ktoe

	Penetration 1997 (ktoe)	Penetration 2004 (ktoe)	Av. Annual growth [%]
Biomass heat	234	709	17%
Solar thermal heat	2	2	1%
Geothermal heat incl. heat pumps	35	40	2%

Source: OPTRES: RES Country Profile Bulgaria 2006

The Law on Excise Taxes and Storage Taxes (2005) specifies a zero excise tax on pure bio-diesel. (Standard tax on fossil diesel is charged at 30%). From 2008 there is the introduction of a proportional excise tax exemption for the blends. In addition there is an obligatory blending of bio-fuels for the distribution companies.

The National Long-term Programme on the Support of Biofuels Consumption in the Transport Sector 2008-2020 aims at the following activities²¹:

- Analysis of the potential of energy crops growth and bio-fuels production;
- Setting of national indicative targets for bio-fuels consumption in transport sector;
- Creation of preconditions for support of the bio-fuels consumption in transport sector;
- Monitoring and reporting in front of the Council of ministers and European Commission for the bio-fuels support policy implementation.

Table 7 specifies the national Bulgarian bio-fuel targets in line with the EU requirements.

Table 7: National Bulgarian bio-fuel targets

Thousand tones	2005	2008	2009	2010	2015	2020
Mineral fuels	1 952	2 193	2 265	2 317	2 732	3 146
Gasoline	572	485	456	426	417	370
Diesel	1 380	1 708	1 809	1 891	2 315	2 776
Bio-fuels	0	44	79	133	218	315
Bio-ethanol	0	10	16	24	33	37
Bio-diesel	0	34	63	109	185	278
Total fuels	1 952	2 237	2 344	2 450	2 950	3 461
National target, %	0.00	2.00	3.50	5.75	8.00	10.00

Source: Ministry of Economy and Energy²¹

²¹ Source: Presentation Renewable Energy Sources Policy in Bulgaria by the Ministry of Economy and Energy, April 2008

Environmental Policy Related to Energy

The Government's environmental protection policy is integrated into its sectoral policies transportation, energy, construction, agriculture, tourism, industry, education etc. and is implemented by the competent executive authorities. The Ministry of Environment and Water is responsible for applying the adopted environmental legislation on national scale and for cooperation with all other ministries. The Major priority during the last years was the alignment of Bulgarian environmental legislation with the European Union legislation.

The Ministry of Environment and Water elaborated a new Draft Sustainable Development Strategy of the Republic of Bulgaria in 2007 to replace the National Strategy for the Environment from 2001. The new Strategy defines the priority areas for environmental protection in the country in the following:

- Climate change and clean energy
- Sustainable transport
- Sustainable consumption and production
- Conservation and management of natural resources
- Public health
- Poverty and challenges to global sustainable development
- Good management

Bulgaria ratified the UN Convention on Climate Change in 1995 and the Kyoto Protocol in 2002. The country is committed to reducing greenhouse gases emissions by 8% in 2008-2012 compared to the 1988 base year.

The energy sector heads the list of GHG emission sources with its share of 77 % (waste ranked second and industrial processes ranked third.) The Second National Action Plan on Climate Change contains activities, policies, and measures, for the period 2005-2008, in respect of all sectors of the Bulgarian economy: energy, industry, transport, agriculture and forestry, and services. It includes also a range of financial and other instruments to achieve the objectives set; these include the Green Investment Scheme and the EU Emission Trading Scheme.

Since emissions from energy account for the main share of the GHG emissions in Bulgaria, and given that this share is expected to increase further if the energy intensive production pattern is not replaced by energy efficient options, energy is the principal focus for mitigation measures.

Joint Implementation under the Kyoto Protocol is considered to be an important mechanism to attract investments in energy efficiency, RES, cogeneration and low carbon and no-carbon technologies in Bulgaria. There are eight signed Memorandum of Understanding with other Annex I countries for JI projects, aimed at reducing the greenhouse gas emissions. The number of proposed JI projects is continuously growing and interest is increasing. Nineteen Joint Implementation projects were

approved, 30% of them for energy efficiency and 30% for renewable energy. Twenty JI projects were endorsed, of them 40% energy efficiency and 55% renewables.

The introduction of the EU Emissions Trading Scheme requires the country to have a National Plan for allocation of emission allowances (NAP). The Plan was elaborated and after a negotiation process, finally approved by the EU Commission. The NAP includes the following sectors under Annex I to the Directive:

- Energy activities (excepting incinerators of hazardous or solid household waste)
- Extraction and processing of ferrous metals
- Mineral processing
- Pulp and paper

In accordance with a National Allocation Plan, the Government has allocated allowances to each of the 150 installations in the country included in the ETS. One half of these installations are in the energy sector. It is expected that the Emissions Trading Scheme will be an incentive for companies to implement energy efficiency measures to both reduce their GHG emissions and improve their competitiveness.

Assessment of progress

General Assessment of Progress

In the following two sections the progress of Bulgaria as compared to the first review by the Energy Charter in 2001 is carried out along the following two lines:

- Firstly, the progress is evaluated in a quantitative way by making use of the key energy efficiency indicators which have been established by the Bulgarian Energy Agency in the frame of the European Odyssee-MURE project on energy efficiency indicators and policies.
- Secondly, the progress is evaluated in a qualitative manner by comparing the present situation (as established in the previous sections through literature review and the country visit) to key recommendations from the first in-depth review of Bulgaria.

The main impression from this progress review is that Bulgaria has made good use of the EU accession process in the past years to improve the energy efficiency policy framework and the corresponding secondary legislation in the time since 2001. There is a fairly complete policy framework for energy efficiency now in place. The indicators quantify the progress achieved by Bulgaria with the best results being recorded in the industrial sector. The transport sector is the furthest away from achieving progress in energy efficiency. The challenge energy efficiency policy makers will be to ensure efficient implementation of the policy measures and coherence among the various sectoral instruments in the next years.

Progress Evaluation by Key Energy Efficiency Indicators

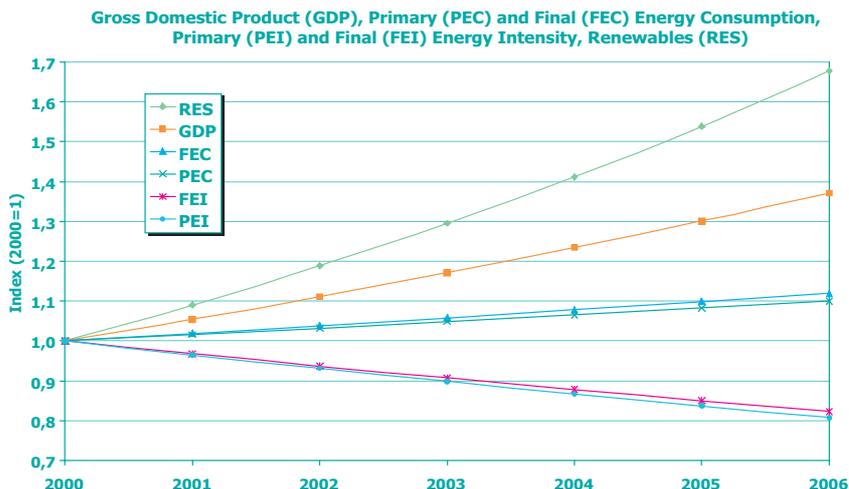
On an aggregate level progress in energy efficiency was quite significant in the period 2000-2006 (Figure 39.): while the economy grew by 5.4% (EU27: 2 %) in real terms on average during this period, the final energy intensity decreased by 3.2% annually (EU27: 0.7%), and the primary energy intensity decreased by as much as 3.5% (EU27: 0.6%). This led to an increase of the final energy consumption of 1.9%/year (EU27: 1.1%) and of the primary energy consumption of 1.6%/year (EU27: 1.1%). Hence the improvement in energy intensities was considerably larger than for the EU27. However, the economic growth was also considerably higher so that the final/primary energy consumption increased. It should be noted that the absolute levels of primary intensities are still much higher in Bulgaria than in the EU27 on average. Renewables grew by 10% annually but from a low base level.

Aggregate indicators are influenced by many factors such as structural changes in the economy or comfort factors. For this reason the Odyssee project for energy efficiency indicators²² has introduced a composite index which eliminates factors not directly

22 www.odyssee-indicators.org

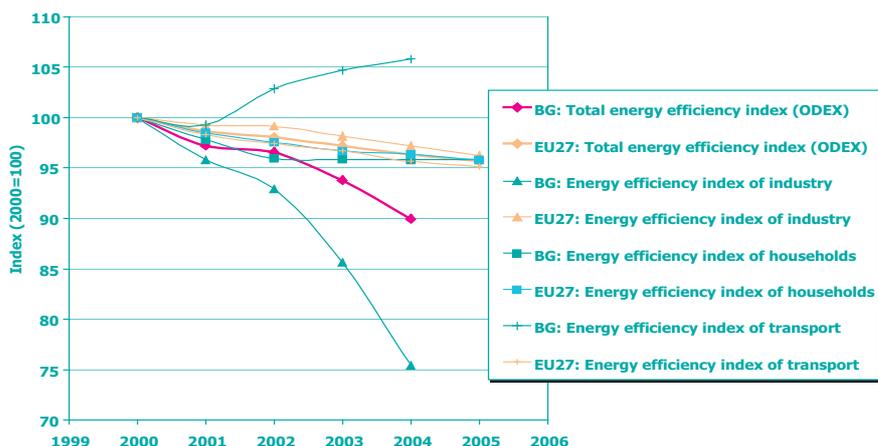
linked to energy efficiency (as much as the statistical basis of a country allows for it). Figure 40 shows the development of the overall ODEX²³ and of the sectoral energy efficiency indices for Bulgaria compared to the EU27 average.

Figure 39. Aggregate progress indicators for energy efficiency



Source: Odyssee database 2008

Figure 40. ODEX and sectoral energy efficiency indicators



Source: Odyssee database 2008

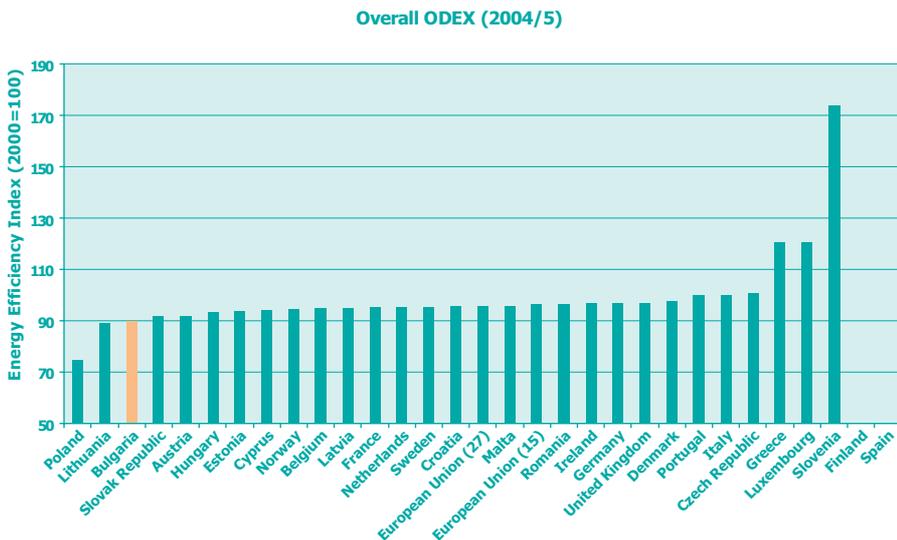
23 The energy efficiency index ODEX is calculated as a weighted average of the unit energy consumption index of each sub-sector or end-use, with a weight based on the relative consumption of each sub-sector in the base year. A decrease means an energy efficiency improvement.

While the industrial energy efficiency index shows a considerably better performance than the same index for the EU27 (influenced by the rapid re-structuring and modernisation of the Bulgarian economy over the past years), the index for the residential sector tended to slow down over the last years, ending with a similar performance as for the EU27 on average. Given the high energy consumption of the sector, this progress is not yet sufficient. For the transport sector there is a deterioration of the indicator for Bulgaria (while the corresponding transport index for the EU decreased by about 4 %), indicating that comfort factors, which cannot be separated totally in this index for Bulgaria, have overwhelmed any efficiency progress achieved for transport.

Overall, given the relative dominance of energy use in industry in Bulgaria and the good indicator for this sector, the Bulgarian ODEX was decreasing twice as much as for the EU27 in the period shown in the graphics.

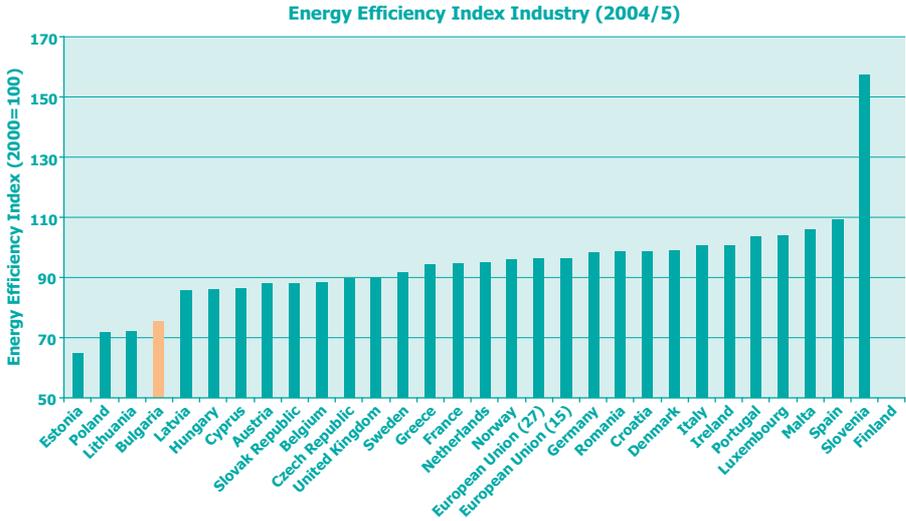
A comparison of key efficiency indicators for the overall economy (ODEX) and for the different sectors (industry, households, transport) with other EU Member States shows that Bulgaria has performed well over the period 2000-2004/5 at the overall level (Figure 41.), for industry (Figure 42.) and for households (Figure 43.), but is lagging behind for transport (Figure 44.).

Figure 41. ODEX – Comparison with other EU Member States



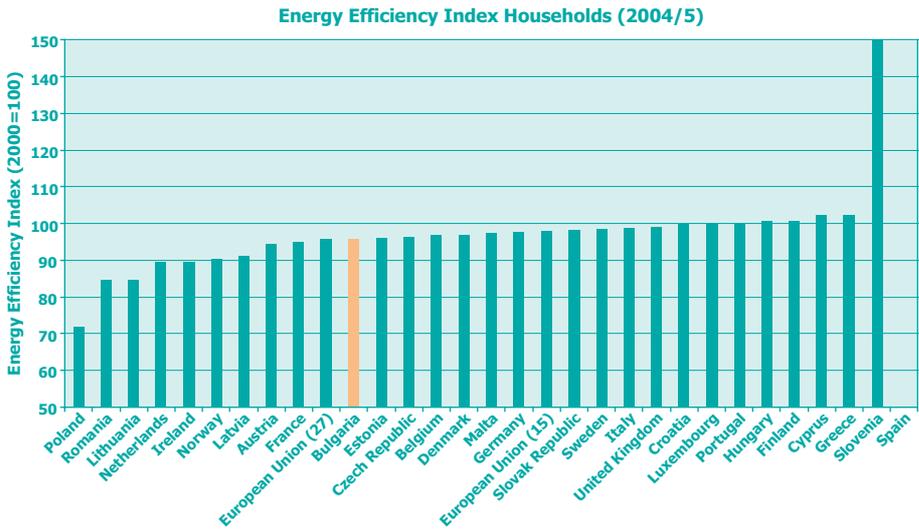
Source: Odyssee database 2008

Figure 42. Energy Efficiency Index Industry – Comparison with other EU Member States



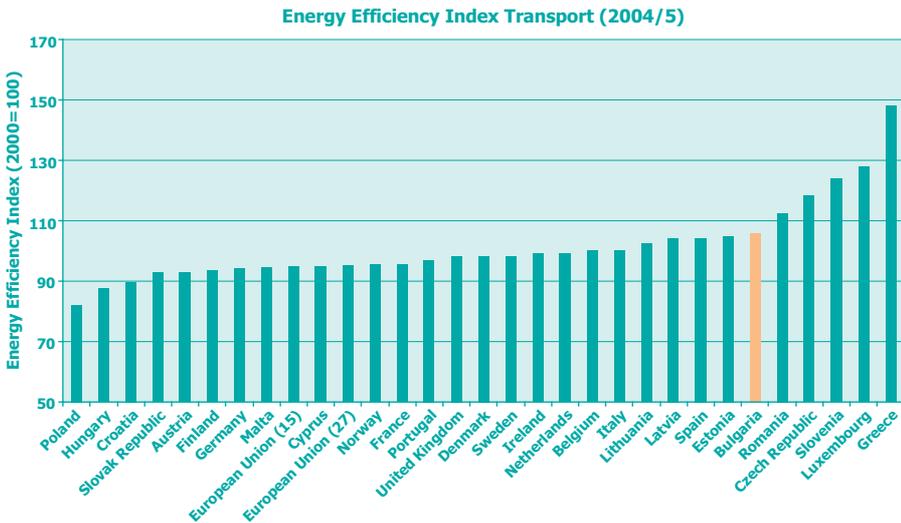
Source: Odyssee database 2008

Figure 43. Energy Efficiency Index Households – Comparison with other EU Member States



Source: Odyssee database 2008

Figure 44. Energy Efficiency Index Transport – Comparison with other EU Member States



Source: Odyssee database 2008

One way to illustrate the progress made by the industrial sector is to look at particular branches or sub-sectors and compare them with those in other European countries. Figure 45 shows this with the particular example of the iron/steel sector, which is an important sector for Bulgaria (20% of total manufacturing energy consumption). The figure compares the energy efficiency by using the indicator toe/tonne crude steel. Nevertheless, this indicator is influenced by the share of electric steel in the production mix of the country. Electric steel, which is made from recycled metal, uses less energy (even in primary energy terms) than steel made with the blast furnace route. For this reason, the comparison is made against the share of electric steel in the production mix. To the right are countries with only electric steel, to the left countries with mainly steel made with blast furnaces. The red line links at each time the best performing countries for a given product mix. Bulgaria has roughly 12% electric steel in the production mix. The distance indicated by the red arrow shows, by how much Bulgaria is separated from the best practice for this process mix²⁴. It is seen that the Bulgarian value is still about 20% higher but is not performing too badly as compared to many other EU countries.

²⁴ Bulgaria might also replace the current blast furnace route with more electric steel. In this case, more primary energy could be saved, but more electricity would have to be used for the electric steel.

Figure 45. Efficiency of the Bulgarian Iron/Steel sector compared to other European countries



Source: Odyssee database 2008

Despite this progress shown by the quantitative indicators of energy efficiency, in particular in the industrial sector, the Ministry of Economy and Energy has identified the following problem areas for the energy transformation and end use sectors²⁵:

- Primary energy and transformation sector: Bulgaria uses large quantities of low-quality coal for power production.
- Final energy: Renewables are still to a large degree based on traditional biomass.
- Transport sector: Liquid fuel consumption has increased faster than GDP. An important consideration in this sector is the average age of the cars: more than half of the cars are older than 15 years. Hence the instruments set up by the European Union (mandatory minimum standards and car labels) have little impact as they act only on new cars.
- Households: There is no visible tendency for total consumption to decrease. The total energy consumption starts to increase after 2005/2006. There are still large quantities of inefficient solid fuel use (30%) in the mix. Gas has still a very low share of 1%.
- Industry: The energy intensity of industry is decreasing because inefficient coal use is replaced with electricity and heat.

25 Presentation "Energy Efficiency in Bulgaria" by the Ministry of Economy and Energy (April 2008);

Progress Evaluation as Compared to Key Recommendations from the First In-depth Review of Bulgaria in 2001

The first in-depth review of Bulgaria included a number of recommendations (see Annex 7), which are evaluated here in an aggregate manner. In Annex 7 the recommendations are evaluated with respect to their achievement in three categories: "A" signifies "largely achieved", "P" signifies "substantial progress was made", "M" recommendation only moderately achieved.

General issues

From the information compiled in the previous sections it is evident that the energy efficiency policy framework and the corresponding secondary legislation have been continuously improved in the time since 2001, in particular through the EU accession process. There is a fairly complete policy framework for energy efficiency now in place. The challenge will be to assure efficient implementation of the policy measures and coherence among the various sectoral instruments in the coming years.

As a consequence of the introduction of this broad policy framework, the Ministry of Economy and Energy as well as the Energy Efficiency Agency have undertaken substantial efforts to review the policy progress in energy efficiency and to determine gaps.

Energy efficiency legislation, policies and programmes

As evidenced by the previous sections, without doubt, Bulgaria has achieved substantial progress over the last years in the introduction of a coherent set of medium to long-term strategies, specific legislation for energy efficiency, and concrete action plans, supported by the general move in the country towards EU accession and the interaction with other EU Members. This is evidenced by the multitude of supporting programmes for the residential and industry sector.

In the frame of the energy efficiency law and in particular with the introduction of the First National Energy Efficiency Action Plan required by the EU Directive on Energy Efficiency and Energy Services, Bulgaria has developed for all end-use sectors clear objectives, tasks, and targets. In this context, Bulgaria is also working to introduce suitable policy and progress monitoring provisions.

Generally, the integration of energy efficiency in other economic, environmental and social policies has been started, for example, by integrating energy efficiency promotion into industrial innovation funds but it requires continued efforts.

In the transport sector there is a lack of policy to tackle the specific problem of old cars in Bulgaria through a coherent set of policies combining car scrapping incentives, taxing of high CO₂ emissions like for other environment emissions, etc. This is influenced by social considerations.

Institutional framework

The Energy Efficiency Agency, which is a central body in the implementation of energy efficiency in the country, has been steadily growing over the past decade from a few persons in the beginning to around 50 persons today. A further consolidation and expansion process has been started with the merger of the energy efficiency agency with the Centre for Energy Efficiency in Industry.

The role of the Energy Efficiency Agency has been continuously strengthened over the years as evidenced by the efforts to adapt the structure of the agency to new challenges. These efforts were to increase the size but further challenges are ahead, in particular the organisation of the market for energy services in the frame of the Energy Service Directive and require further development of the agency and of other stakeholders, in particular at regional level.

Organising the private sector participation in improving energy efficiency is still a challenge, although instruments have been developed such as the Bulgarian Energy Efficiency Fund (BgEEF). However, the continuity and further enhancement of such instruments is not occurring autonomously and requires much effort and larger scale.

Important information about energy efficiency activities is provided by the Bulgarian governmental institutions to the national and international public through Internet and publications in Bulgarian and English language. More efforts are needed to better structure, further develop, profile, and present the information, in order to address different target groups, including the general public.

Energy markets and pricing

According to the Regulatory Commission SEWRC fossil energy prices are not subsidised any more in the country. The energy prices, including electricity prices have risen considerably in the past although, across all energy sources, they still remain among the lowest in Europe. The energy market was set up in such a manner as to provide a frame for renewables concerning the preferential feeding of electricity in the grid.

Pricing externalities, e.g. through adequate taxes on energy products has been applied to the minimum level required by the European Union and may further contribute to the financing of energy efficiency activities but the present context of high energy prices makes the introduction of such steps difficult.

Energy efficiency activities of the energy companies on the supply side are visible; however, demand-side efforts from energy companies are still largely not part of the company cultures and the present regulatory mechanism for establishing energy prices do not yet promote substantially such activities. The frame of the Energy Service Directive may provide a suitable springboard to improve on this situation.

Energy efficiency funding and fiscal policy

The accession to the European Union has opened up a variety of new funding sources for energy efficiency and renewable energy, in particular the Operational Programmes for Competitiveness and for Regional Development, but also the Operational

Programme for Transport, which foresees substantial investments in a modern public rail infrastructure. The country itself is participating with substantial own funds to improve energy efficiency.

Bulgaria is working on promotion policies for ESCOs and policies to develop private funds. The main funding sources for energy efficiency services continue to be public sources but the frame of the EU Directive for Energy Efficiency and Energy Services has opened up chances for private energy services to develop further. New funding mechanisms such as White Certificate Schemes are being considered but require much better understanding and need coordination at the European level.

The central administration provides funding for some energy efficiency activities at the regional and local level, but local actors may still face difficulties in financing energy efficiency promotion.

Renewable energy, district heat and cogeneration

Renewable energy sources benefit from a strong promotion policy introduced with the Renewable and Alternative Energy Sources and Biofuels Act (2007). If the impact of this act is not hampered by administrative barriers, it can be stated, given the importance of the preferential tariffs for the different types of renewable energy, that the Bulgarian promotion scheme sets a successful scene for the further penetration of renewable energy sources in the country.

The district heating systems have substantial benefit from important rehabilitation programmes aiming to improve the market position of district heating. These policies have, however, not yet succeeded in stopping the decrease in consumers connected to district heating networks.

There is not yet a coherent cogeneration policy. In addition, this technology is facing the problem of high gas prices and relatively low electricity prices.

Data collection, monitoring and forecasting

Through the participation of the Energy Efficiency Agency in the European monitoring project Odyssey-MURE for energy efficiency, much effort has been undertaken to improve the data situation and to collect previously scattered data in a homogeneous database. However, the statistical data still present gaps which may require dedicated examination in order to better understand energy efficiency trends in the country.

The culture to systematically evaluate policy impacts in both qualitative and quantitative terms is spreading with the reporting requirements under the Energy Efficiency and Energy Service Directive but there are still many policies where the impacts are not yet adequately determined.

Recommendations

General recommendations

- There is ample evidence that the Bulgarian authorities have adopted a structured approach to planning and the formulation of laws and to the placing of obligations and responsibilities on key actors. The Energy Efficiency Law of 2004 was a most significant step forward in the organisation and formulation of energy efficiency policies and targets, and the necessary institutional development. However, it is not clear that the allocation of the necessary budgets or implementation of sanctions has followed. In general we would recommend that, wherever feasible, market drivers be reinforced by appropriate promotional activities and actions to remove barriers.
- The government has made significant progress in implementing the requirements and provisions of several important EU directives such as the Energy Performance Directive for Buildings (EPBD) and the Energy Service Directive (ESD). Continued efforts are, however, still required for the cost-effective implementation of the EPBD, the ESD as well as achieving compliance with the provisions of the EU Emission Trading Scheme (ETS).
- Low-income groups are particularly vulnerable to high and increasing energy prices. Meeting the basic energy service needs of households with low incomes requires special policies, targets, and measures to meet their needs with energy efficient solutions.
- The ongoing process of reforming the energy market and of implementing the Energy Service Directive may provide opportunities to develop mechanisms for promoting energy efficiency compatible with the process of liberalisation and the completion of the internal EU energy market.

Energy efficiency policy and legal framework

- Bulgaria's first National Energy Efficiency Action Plan should serve as a starting point and integrating mechanism for national efforts to realise the benefits of energy efficiency gains. Energy efficiency can powerfully enhance the competitiveness of the economy, create new jobs, reduce import dependency, and mitigate the inflationary effects of higher fuel prices.
- The implementation of the National Energy Efficiency Action Plan should be carefully monitored by the Government and adjusted in the light of progress or otherwise. It is recommended that market actors, including companies engaged in the supply of energy, are actively engaged, as the additional driver of a profit motive will help secure success.
- There are a variety of European-wide EU and derived national strategies that impact and interact with each other in a complex way. It is recommended that at the national level a careful balance of objectives and their implications for technology and policy implementation be made. The role that energy efficiency

can play in meeting economic, policy objectives should be kept under review and strengthened where possible.

- The enactment by the Government of important pending laws such as the proposed Condominium Law is of critical importance for the efficient provision of cost-effective energy services to the occupants of multi-dwelling apartment buildings. The provisions of the law are essential in so far as they allow for the creation of legal entities that can contract with energy supply companies and other service providers.

Institutional framework

- The Ministry of Economy and Energy and the Energy Efficiency Agency have played a leading role in the formulation and coordination of energy efficiency and renewable policies and programmes, although the overall achievement would not have been possible without the support of many actors. Further strengthening of the institutional capacity at an implementation level, is a prerequisite to a successful unfolding of present and future policies.
- In particular the proposed amendment of the Energy Efficiency Act requires additional resources to achieve results, monitor progress and enhance the value of the provisions through early analysis and suitably structured and informed promotional activities. This is an Agency function and the capacity of the Energy Efficiency Agency should be enhanced to enable it to fulfil this very necessary function.
- Continued efforts are necessary to build on the good coordination with other state bodies and ministries to effectively advance the integration of energy efficiency into all state-led activities.
- Local energy agencies could play an effective role in implementing energy efficiency but require assistance in creating the demand and environment for the commercialisation of their services and by coordinating their efforts further.
- Energy efficiency in the public sector can be promoted by requiring each municipality to appoint an energy officer with the authority and means to promote and deliver energy efficient initiatives in the municipality.

Energy markets

- Stimulating the wider application of public-private partnerships and ESCOs may be necessary to support the uptake of energy efficiency initiatives in the public sector and in municipalities. Developing internal ESCO capacities within municipalities may also provide further options to realise energy efficiency gains.
- Contractual and cost recovery legal provisions should be put in place in order to make it attractive to ESCOs to deliver energy services to all consumers including those who are not in a position to meet the costs of their basic energy requirements. It will be important to ensure sustainable outcomes for suppliers and consumers in the refurbishment of privately owned multi-family buildings, including provisions that will prevent such companies from cherry-picking or skipping dwellings with low income inhabitants.

Energy efficiency funding

- The government should continue to finance energy efficiency activities from different financial sources, including the state budget, EU Structural Funds, International Financial Institutions, and bilateral agreements. A published overview of the size, conditions, and progress of such possibilities could raise awareness and increase coordination of financing sources and efficiency of spending. In a long-term perspective, international support should not be considered as the main funding source for energy efficiency.
- Energy programmes financed through the Operational Programmes of the structural funds should be kept under review and strengthened where appropriate. The EU Operational Programmes are large and ambitious and the challenge will be in their delivery. Successful programmes may be expected to benefit from funds re-allocation in future progress reviews.
- The Bulgarian Energy Efficiency Fund is a good example of a successful approach to addressing project finance needs through the creation of a revolving energy efficiency fund. Securing the revenue stream and attracting further fund capital will be challenging tasks for the near-term future but may enrich the energy efficiency financing portfolio.
- The government should continue to consider specific incentives and test a variety of approaches to stimulate the investments needed and achieve the objective of increased energy efficiency in residential buildings.
- Stimulating Kyoto mechanisms in order to keep the interest of the business sector in JI projects may provide an additional financing source up to 2012. In parallel the governmental bodies in charge of energy efficiency may wish to monitor the progress of the EU ETS, and ensure that the benefits of energy efficiency improvements are implemented by the companies included in the scheme. Excluding those companies from the mandatory industrial audit scheme may remove from them a basic tool to introduce energy efficiency measures.

Specific energy efficiency programmes and measures

- The government should continue targeted efforts in buildings:
 - The priority here must be to facilitate the necessary improvements to the energy performance of the building stock and multi-dwelling panel buildings in particular. This is necessary for social and economic reasons and merits the high priority assigned to it in pending legislation, proposed demonstration, and the allocation of funds through the operational programme. Significant efforts by a range of actors will be necessary if success is to be achieved.
 - In order to limit consumers switching to electricity for heating purposes, the continued economic impediments for district heating companies and providers of natural gas should be removed. Legal provisions, that establish requirements for private owners of apartments in multi-family dwellings to form legal entities, should be put in place as soon as possible.

- The growing use of electricity for heating by private consumers is not efficient in terms of primary energy requirements. Growth of such usage should be closely monitored by the EEA. If further assessment shows that this may develop into a major problem for the energy sector, the Bulgarian government should take appropriate preventative action.
 - For electric heating and other new heating applications mandatory technical performance indicators should be implemented (for example, for heat pumps a minimum coefficient of performance).
 - The provision of building energy rating certificates and of passports is a significant measure. The promotion of these measures to target groups such as the general public, architects, intermediaries in sales of houses and flats, is recommended to enhance their impact.
- The government should continue targeted efforts in industry:
- Promotional and information activity should be informed by the evidence provided through the audit process. Adherence to the time frame of the first wave of the mandatory audits will contribute to the success of this instrument.
 - Mandatory energy management in enterprises outside the EU ETS with high energy consumption, and the support for networking among these managers may be further initiatives to promote energy efficiency in the industrial sector. Monitoring the improvement of energy performance in these enterprises could also be considered.
- The government should direct a range of efforts to increase energy efficiency in the transport sector:
- The increase of transport sector energy demand is a continued issue of concern which may be addressed in a broad strategy. Options to be explored may include increased mineral oil taxes, purchase and annual car taxes based on energy efficiency, extension of the regular safety inspections for older cars, or car-scraping schemes.
 - Generally, given the long time frame involved, the government should ensure that energy efficiency considerations are taken into account in urban development, infrastructure projects, and in public transport.
 - The government should continue to identify the potential for cost effective energy efficiency improvements in the transport sector in line with the envisaged overall improvements in the transport infrastructure, public transport, and railways.

Renewables, CHP and gasification strategy

- District heating is a highly efficient technology to supply customers in areas with high heat demand. Historically Bulgaria has a good position and it is desirable to secure it in the short-term, and where feasible, expand the role of district heating.
- Progress has been already made in refurbishing the district heating systems but further improvements are necessary to secure the efficiency of the systems and to satisfy the demand of customers. Efforts should be made especially in:
 - Increasing the share of CHP in heat generation, and in the

- Utilisation and integration of renewable energy such as biomass and waste and in addition heat potentials in industry and from other sources.
- Promoting heat and gas networks in parallel requires careful balancing of competition aspects and the need for a stable investment environment given the large investments necessary.
- The scheme for the promotion of renewable electricity is designed to reach EU targets. Careful consideration of the financial implications would help to achieve the optimum balance between renewable energy promotion and energy efficiency in the best interests of electricity consumers.
- Considering the large scale of the biomass resource a strategy for its exploitation should be in place to effectively coordinate the realisation of its potential to meet renewable energy and energy security targets. The role of biomass may be further explored, for example in CHP schemes, biogas for transport fuels or wood pellet furnaces.

Data collection and monitoring

- Monitoring and evaluating deployed actions in energy efficiency should be strengthened to assure the basis for tuning and revision of these initiatives. Enhanced efforts on such evaluation and forecasting tools will also benefit the implementation of the ESD.
- The general public and specialised target groups may benefit from enhancing the structured internet presentation of this type of information as well as other issues such as municipal initiatives for energy efficiency.
- Further capacity development to receive and communicate audit data on buildings and industrial sites in electronic form may require further development of capacities in the Energy Efficiency Agency.

Annexes

Annex 1: General economic and energy data²⁶

Table 8. Energy Balance

Indicators	1990	1995	2000	2001	2002	2003	2004	2005
Total Primary Energy Production	9613	10298	9917	10408	10651	10223	10270	10649
Net imports	19208	13108	8801	9153	8475	9424	8671	9411
Total Primary Energy Supply (TPES)	28820	23406	18717	19561	19126	19648	18941	20060
Total Final Consumption (TFC)	17810	12328	9663	9723	9319	10085	10045	10567

ktoe

Table 9. Total Primary Energy Supply Structure

Products	1990	1995	2000	2001	2002	2003	2004	2005
Coal and Coal Products	9241	7631	6464	7370	6726	7526	7179	6944
Crude, NGL and Feedstocks	8437	8103	5451	5675	5367	5311	5810	6589
Petroleum Products	1267	-1813	-1268	-1429	-951	-706	-1442	-1655
Natural Gas	5394	4583	2931	2738	2403	2500	2492	2803
Nuclear	3822	4504	4748	5110	5286	4520	4396	4875
Hydro	162	199	230	149	189	260	272	373
Geothermal	0	0	0	0	0	0	0	33
Combustible Renewables & Waste	172	212	558	544	647	709	738	750
Electricity trade	326	-14	-397	-596	-541	-472	-506	-652
Solar/Wind/Other	0	0	0	0	0	0	0	0
Total Primary Energy Supply	28820	23406	18717	19561	19126	19648	18941	20060

ktoe

²⁶ Source: IEA Energy Statistics, Electronic Version 2007

Table 10. Total Final Energy Consumption

Energy products	1990	1995	2000	2001	2002	2003	2004	2005
Electricity	3033	2467	2086	2115	2071	2162	2142	2212
Heat	4542	2798	879	934	860	914	866	939
Petroleum products	5853	3656	3713	3844	3611	4032	3985	4203
Natural Gas	2597	2096	1709	1518	1287	1324	1421	1675
Coal	1612	1133	721	772	848	946	893	761
Combustible Renewables&Waste	172	178	555	540	642	707	737	745
Geothermal	0	0	0	0	0	0	0	33
Solar/Wind/Other	0	0	0	0	0	0	0	0
Total Final Consumption	17810	12328	9663	9723	9319	10085	10045	10567

ktoe

Table 11. Basic Energy Related Indicators

Indicators	1990	1995	2000	2001	2002	2003	2004	2005
Population (million)	8.718	8.400	8.060	7.910	7.869	7.823	7.781	7.740
GDP (billion 2000 US\$)	14.997	13.137	12.599	13.116	13.759	14.378	15.197	16.033
GDP (billion 2000 US\$ PPP)	58.178	50.962	48.876	50.88	53.373	55.775	58.954	62.197
Primary Energy Intensity (TPES/GDP) (toe per thousand 2000 US\$)	1.922	1.782	1.486	1.491	1.39	1.367	1.246	1.251
Primary Energy Intensity ^{PPP} (TPES/GDP PPP) (toe per thousand 2000 US\$ PPP)	0.495	0.459	0.383	0.384	0.358	0.352	0.321	0.323
TPES/Population (toe per capita)	3.306	2.786	2.322	2.473	2.431	2.512	2.434	2.592
Electricity Consumption/GDP (kWh per 2000 US\$)	2.766	2.695	2.382	2.357	2.195	2.162	2.017	1.99
Electricity Consumption/Population (kWh per capita)	4758.890	4214.167	3723.821	3907.459	3838.226	3973.54	3939.082	4121.189
Energy related CO ₂ Emissions (Mt)	75.21	53.54	42.12	44.96	42.17	46.49	45.40	46.12

Table 12. Electricity generation

Products	GWh							
	1990	1995	2000	2001	2002	2003	2004	2005
Nuclear	14665	17261	18178	19553	20222	17280	16815	18653
Coal and Coal Products	21180	17561	17207	19757	17373	19462	19107	18625
Petroleum Products	1230	1443	661	579	830	789	822	606
Natural Gas	3188	3210	1912	1908	1539	1762	1494	1729
Hydro	1878	2314	2673	1737	2194	3029	3168	4337
Solar/Wind/Other	0	0	0	0	0	0	1	2
Combustible Renewables and Waste	0	0	15	0	11	6	19	17
Total electricity generation	42141	41789	40646	43534	42169	42328	41426	43969

Table 13. Heat production

Products	TJ							
	1990	1995	2000	2001	2002	2003	2004	2005
Coal and Coal Products	29961	33017	23977	25793	25484	25420	20946	20398
Petroleum Products	131374	47385	2376	2085	1558	2053	2044	2262
Natural Gas	48721	51963	23958	23447	22025	25750	27169	28743
Nuclear	0	248	432	595	684	680	588	602
Geothermal	0	0	0	0	0	0	0	1368
Combustible Renewables and Waste	0	850	7	1	0	0	0	106
Total heat production	210056	133463	50750	51921	49751	53903	50747	53479

Annex 2: Selected end-use data tables²⁷

Table 14. Total Final Energy Consumption by Sector

Sectors	1990	1995	2000	2001	2002	2003	2004	2005
Residential	2364	2441	2097	1970	2114	2239	2085	2091
Industry Sector	9037	5692	3288	3302	3161	3414	3422	3421
Commercial and Public Services	115	194	649	762	737	764	695	824
Transport Sector	2571	1861	2029	2108	2212	2429	2560	2850
Agriculture/Forestry	794	387	316	277	282	285	278	305
Non-specified (Other)	1487	509	10	12	10	0	9	0
Non-energy use	1442	1244	1274	1292	803	954	996	1076
Total Final Consumption	17810	12328	9663	9723	9319	10085	10045	10567

ktoe

Table 15. Final Energy Consumption of the Residential Sector

Energy products	1990	1995	2000	2001	2002	2003	2004	2005
Electricity	901	942	848	839	800	801	754	778
Heat	542	590	508	489	439	475	424	438
Oil products	61	283	17	18	20	26	26	24
Natural Gas	0	0	0	1	1	3	6	14
Coal and Coal Products	688	482	236	152	284	347	261	238
Combustible Renewables&Waste	172	144	489	472	569	587	614	600
Total Residential Sector	2364	2441	2097	1970	2114	2239	2085	2091

ktoe

Table 16. Final Energy Consumption of the Services Sector

Energy products	1990	1995	2000	2001	2002	2003	2004	2005
Electricity	81	125	435	442	485	515	501	533
Heat	0	27	97	128	121	137	124	166
Oil products	2	20	95	174	109	64	36	31
Natural Gas	17	16	12	18	19	28	30	42
Coal and Coal Products	14	3	0	0	3	7	5	6
Combustible Renewables&Waste	0	3	10	0	0	13	0	14
Geothermal	0	0	0	0	0	0	0	33
Total Services Sector	115	194	649	762	737	764	695	824

ktoe

²⁷ Source: IEA Energy Statistics, Electronic Version 2007

Table 17. Final Energy Consumption of the Industry Sector

Energy products	1990	1995	2000	2001	2002	2003	2004	2005
Electricity	1595	1046	738	777	729	791	835	846
Heat	3570	1957	272	317	299	302	318	335
Oil products	1081	520	842	787	807	860	806	772
Natural Gas	1925	1533	912	746	706	766	728	830
Coal and Coal Products	865	628	482	616	557	592	624	512
Combustible Renewables & Waste	0	6	42	58	63	104	111	126
Total Industry Sector	9037	5692	3288	3302	3161	3414	3422	3421

ktoe

Table 18. Energy Consumption of the Industry Sector by Subsectors

Subsectors	1990	1995	2000	2001	2002	2003	2004	2005
Iron and Steel	1432	1051	594	645	605	731	654	607
Chemical and Petrochemical	2766	2056	1072	1090	927	1000	976	987
Non-Metallic Minerals	1112	977	508	505	542	553	590	611
Non-Ferrous Metals	284	323	164	161	126	139	158	155
Food and Tobacco	259	412	315	296	295	270	282	284
Mining and Quarrying	0	0	110	112	110	106	103	112
Machinery	460	301	133	124	119	121	114	124
Construction	343	135	49	52	46	57	53	71
Textile and Leather	83	184	116	116	116	128	124	121
Paper, Pulp and Printing	49	144	103	75	141	162	193	196
Non-specified/Other	2250	108	125	125	134	147	176	154
Total Industry Sector	9037	5692	3288	3302	3161	3414	3422	3421

ktoe

Annex 3: Energy Prices (as of 20. April 2008)²⁸

Electric energy

Electricity prices for enterprises with less than 50 employees and annual turnover up to 19.5 million leva, connected to medium and low pressure electricity distribution networks (BGN/kWh).²⁹

Tariff		Medium voltage level		Low voltage level	
		Lowest level defined	Highest level defined	Lowest level defined	Highest level defined
3 tariffs	peak	0.11587	0.13091	0.12802	0.14233
	day	0.06711	0.07410	0.05740	0.06871
	night	0.03743	0.03952	0.01193	0.02209
2 tariffs	day	0.08937	0.10004	0.09178	0.10430
	night	0.03743	0.03952	0.01193	0.02209
1 tariff		0.08513	0.09510	0.08402	0.09693

Source: Based on "Electricity prices defined by the State Energy and Water Regulatory Commission, www.dker.bg/prices_el.htm, 21/04/2008

Electricity Prices for Residential Customers, defined for different suppliers (BGN/kWh)

		Lowest level defined	Highest level defined
2 tariffs	day	0.07320	0.08159
	night	0.02590	0.03429
1 tariff		0.07320	0.08159

Source: Based on "Electricity prices defined by the State Energy and Water Regulatory Commission, www.dker.bg/prices_el.htm, 21/04/2008

²⁸ Source: State Energy and Water Regulatory Commission (www.dker.bg)

²⁹ Different levels are defined for different suppliers. The tables illustrate the lowest and the highest level defined.

District heat

Energy Prices in the District Heating Sector for residential customers (without VAT)

(BGN/MWh)

		01.11. 2002	01.7. 2003	01.7. 2004	01.11. 2005	01.07. 2006	01.08. 2007
1.	Sofia	47.38	42.32	50.45	55.85	60.25	60.25
2.	Plovdiv	47.22	45.41	57.79	61.18	66.91	68.87
3.	Pleven	54.12	48.55	50.62	58.27	66.64	63.46
4.	Shumen	55.56	62.78	58.34	63.71	72.59	72.82
5.	Pravetz	43.19	45.38	40.18	52.13 ²⁾	52.13	104.05
6.	Pernik	37.64	43.50	40.52	49.82	59.32	54.23
7.	Sliven	38.65	54.59	71.02	62.46	85.17	65.69
8.	Gabrovo	47.35	54.84	80.65	78.10	73.78	69.84
9.	Kazanlak	83.75	86.82	89.80	97.80	133.64	126.50
10.	Ruse	34.06	34.07	36.31	41.27	52.01	53.61
11.	Burgas	47.02	45.02	50.88	57.17	65.36	65.44
12.	Varna	49.69	49.16	49.60	56.86	71.29	72.50
13.	Vratsa	52.15	48.49	49.74	63.32	66.94	66.59
14.	Razgrad	50.65	47.68	58.16	57.20	69.75	80.39
15.	Lovech	68.76	73.20	76.42	-		
16.	Veliko Tarnovo	77.18	92.80	110.26	86.47	84.43	90.01
17.	Yambol	-	48.14	63.79	70.56		75.08
18.	Loznitsa	-	70.31	76.18	-		164.15
19.	Samokov	56.38	-	-	-		
20.	"NPP Kozloduy"	21.85	22.92	25.00	29.16		26.10
21.	"TEGE 21" Ltd Stamboliyski	75.3	-	91.32	120.83 ²⁾	120.83	76.99

1). The officially announced prices are defined on a monthly basis and have been recalculated in annual cross-section

2). Prices dated 1 January 2006

Sources: *Urban Heating in South East Europe, country Brief: Bulgaria, EnEffect for the Alliance to Save Energy, MUNEE/USAID, 2005; Maximum Prices for Heat Energy, State Commission for Energy and Water Regulation, 21.04.2008, www.dker.bg/prices_heat.htm*

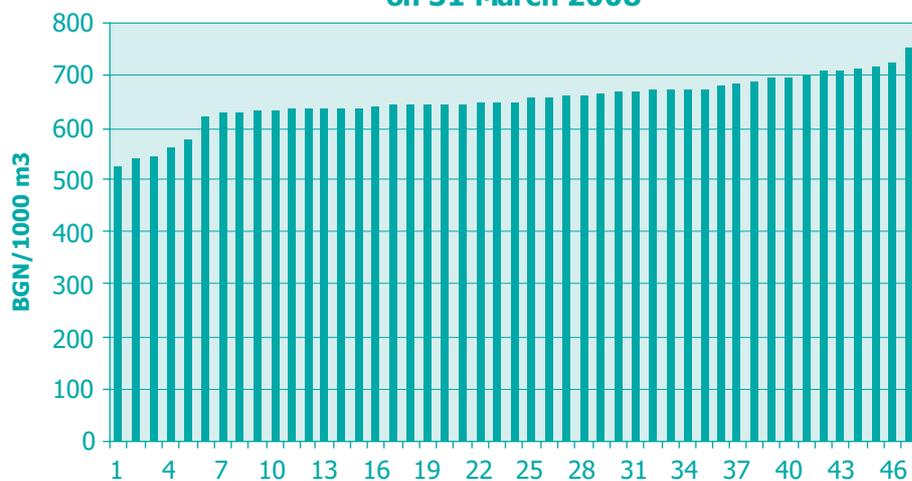
Natural Gas

Sector	US\$/mcm ¹
Industry	228
Commercial	334
Households	400

1) 1 BGN = 1.39952 US\$

Source: Economic Consulting Associates/Penspen/Energy Institute Hrvoje Požar: South East Europe: Regional Gasification Study, Bulgaria Market Report, October 2007.

Gas prices for households approved for 47 suppliers on 31 March 2008



Source: SEWRC

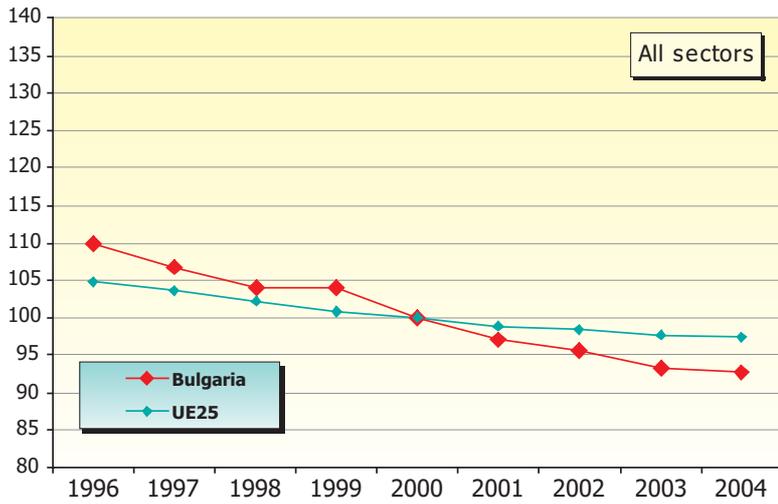
Annex 4: ODYSSEE - Energy Efficiency Profile Bulgaria³⁰

Energy Efficiency Trends

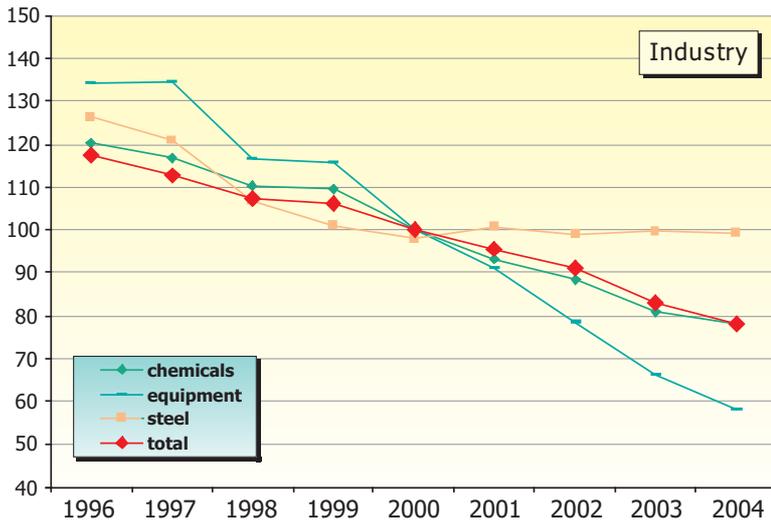
<p>Overview</p> <p>Over the period 1996 to 2004 the energy efficiency index (ODEX) for the whole economy decreases (which indicates an energy efficiency improvement) by 16 % in Bulgaria compared with an improvement of the energy efficiency of 7 % for the EU-25. This improvement in Bulgaria is due, largely, to the increased energy efficiency of industry. In the same way, the decrease in the energy intensity of the Bulgarian economy as a whole is due to a great extent to the decrease of energy intensity in industry</p>	<p>Transport</p> <p>During the period 1996 to 2004, the energy efficiency index in the transport sector increases by 19 %, which indicates a decrease in energy efficiency. The energy efficiency index of road transport increases by 12 %. The most significant driver of the deterioration of transport energy efficiency has been the shift from rail to road transport, the city congestions and the high average age of the Bulgarian vehicles stock (cars, light duty vehicles, buses, trucks).</p>
<p>Industry</p> <p>In the industrial sector, there has been reduction in the ODEX index of 34 % over the period 1996 to 2004, which indicates that significant energy savings have been made in the sector. The growing prices of fuels and energy carriers are the main reason and incentive for energy savings in this sector. The growth of production in the period allowed for increasing the load factor of existing production capacity, which becomes a favourable factor for improvement of energy efficiency.</p>	<p>Households</p> <p>Between 1996 and 2004, energy efficiency of the household sector improved by 4 % but it happened in a situation of considerable growth of private household consumption. This is an indicator that Bulgarian households increased the energy efficiency of consumption, but the effect of this improvement is used almost entirely for improvement of heating comfort, wider use of electric appliances, etc.</p> <p>This relatively small improvement of the index can be explained with different opposed processes:</p> <ul style="list-style-type: none"> ▪ improving the energy efficiency in building stock; ▪ increasing thermal comfort; ▪ increasing the number of household electric appliances; ▪ replacing electricity and heat energy by solid fuels (wood and coal).

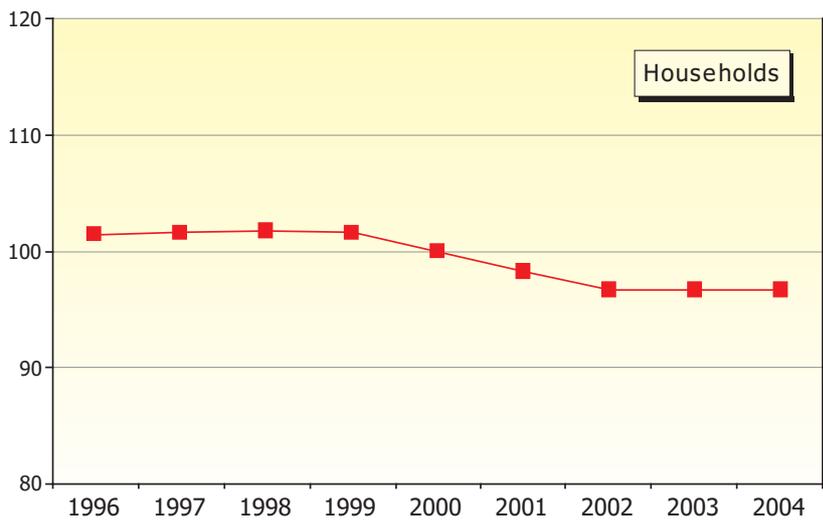
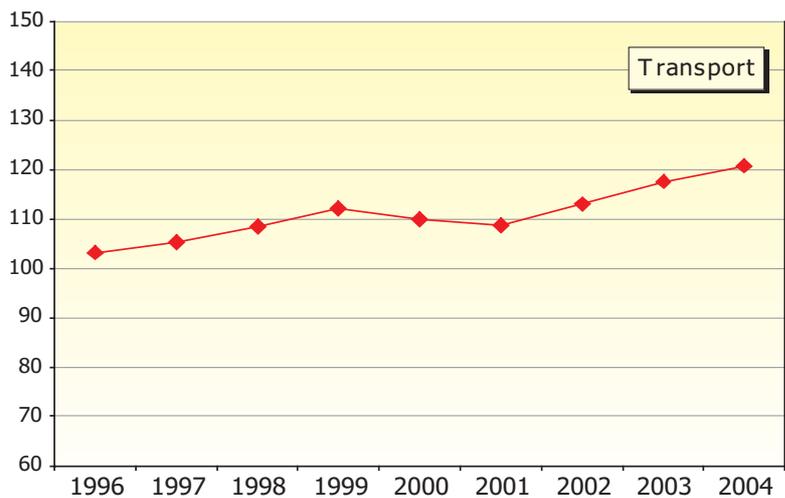
³⁰ *Odyssee-MURE: Country Profile Bulgaria 2007*, <http://www.odyssee-indicators.org/Publication/country%20profiles%20PDF/bgr.pdf>

Energy efficiency index



116





Energy Efficiency Policy Measures

<p>Institutions and programmes</p> <p>The Energy Efficiency Agency (EEA) is an executive Agency (governmental institution) to the Ministry of Economy and Energy, according to the provisions of the Energy Efficiency Law (EEL) adopted in March 2004. The basic EEA activities cover the implementation of broad spectrum of energy efficiency and renewable energy sources programs, projects and measures in all public sectors, in every aspect of life. http://www.SEEA.government.bg</p> <p>Industry</p> <ul style="list-style-type: none"> All energy consumers with annual consumption above 3,000 MWh are subjects to obligatory energy efficiency studies - according to the Energy Efficiency Law To June 2007, 79 projects have been financed under the Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL), receiving loans worth more than € 46.1 million for a total project value of over € 73.5 million. <p>Households and services</p> <ul style="list-style-type: none"> Obligatory energy audits and certification of all buildings with gross floor area above 1,000 m², state or municipal property, according to the Energy Efficiency Law. Mandatory energy labeling of electrical appliances with respect to the consumption of energy and other resources – implemented the Directives for labeling of household electric appliances. Minimum efficiency standards for hot water boilers with capacity 4 – 400 kW (heat) firing liquid or gas fuel – implemented EU Directives 92/42 and 2005/32. Buildings Energy Performance Standard - implemented EU Directive 2002/91 for the energy performances of buildings. Minimum efficiency standards for electrical appliances. With the Law for the technical requirements to the products, from 01.10.1999 are introduced energy efficiency standards for electrical appliances. Efficiency standards for lighting. Introduced essential requirements and estimation of the conformity of ballasts for luminescence lamps with respect to EE requirements – implemented Directives 92/75 and 2000/55. Residential Energy Efficiency Credit Line has been developed by the European Bank for Reconstruction and Development (EBRD) in 2004. 7335 loans have been received under the REECL worth € 10 million (including € 1.7 million grants) to May 2007. 	<ul style="list-style-type: none"> National Programme for Renovation of the Multi Flat Buildings, 2005-2020: The state budget covers 20% of all expenditures for full renovation of private multi flat buildings. National Strategy for Building Insulation, 2005-2020 about 4000 state and municipal building have to be insulated until 2020. The state budget covers the expenditures for studies and certification and insulation only in state buildings. National Expedient Annual Program in Buildings, 2006: energy audits of state and municipal large buildings. It includes 250 buildings with total floor area 1.82 million m². <p>Transport</p> <ul style="list-style-type: none"> Mandatory speed limits (1999). According to preliminary evaluation the effect of mandatory speed limits is the reduction of the average speed of personal cars, outside the populated area, with not less than 5 km/h. Mandatory inspections of vehicles. (from 01.09.1999 with several changes to 2007): periodical mandatory technical and emission control of vehicles. Considering the average age of the road vehicles in Bulgaria a regular maintenance can lead to not less than 2 % annual decrease of specific fuel consumption. Taxes on motor vehicle fuels. The new Excise Duties and Tax Warehouses Act (02.11.2005 r) is harmonized with the EU Directives 92/79, 92/80, 92/12 and 2003/96. The taxes (incl. VAT) are about 50 % of the consumer prices of gasoline and diesel oil. Energy Saving Program in Transport Sector, 2006-2008: <p>Cross-cutting measures:</p> <ul style="list-style-type: none"> The Energy Efficiency Law establishes "Energy Efficiency" Fund (independent legal body). Energy Strategy for Energy Sector and Energy Efficiency Development till 2010, approved with Governmental decision in July 2002 National Long-Term Program on EE, 2005-2015. It is 10 years Strategy, approved with Governmental decision in April 2005. National Short-Term Program on EE, 2005-2007. It is 3 years Action plan, approved with Governmental decision in December 2005. It includes 550 projects. Preferential prices for CHP generated energy. According to Energy Law, adopted on 26.11.2003 the public provider or public suppliers are obliged to buy the entire volume of electricity produced by CHP plants at preferential prices.
---	---

Selected Energy Efficiency Measures

Sector	Title of measures	Since	Energy savings	CO ₂
Industry	Obligatory energy efficiency studies	2004	112 ktoe (4.69 PJ) annually*	420 kt
Industry	Bulgarian Energy Efficiency and Renewable Energy Credit Line – soft loans for EE measures	2004	43.6 ktoe (1.825 PJ) annually (to June 2007)	163.4 kt
Residential	National Program for Renovation of the Multi Flat Buildings	2005	52.8 ktoe (2.21 PJ) annually (planned to 2016)	190 kt
Residential	Residential Energy Efficiency Credit Line - soft loans for EE measures	2005	4.3 ktoe (0.18 PJ) annually (to May 2007)	18 kt
Services	National Strategy for Building Insulation	2005	30 ktoe (1.256 PJ) annually (planned to 2016)	108 kt
Services	National Expedient Annual Program in Buildings 2006 – audits and insulation of state and municipal owned buildings.	2006	14.1 ktoe (0.59 PJ) annually*	51 kt
Transport	Energy Saving Program in Transport Sector, 2006-2008: energy studies in 14 large state and municipal owned transport companies and 9 projects		6.2 ktoe (0.26 PJ) annually*	38.8 kt

* after implementing the measures proposed in the audits

** after implementing the measures and projects included in the Program

Annex 5a: Energy efficiency measures in the residential sector in the First Bulgarian National Energy Efficiency Action Plan

№	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings 2016
1.	Residential Sector – Renovation of Residential Buildings in line with the National Renovation Programme for Residential Buildings in the Republic of Bulgaria	<p>Priority retrofitting of large-panel and other multi-family residential buildings</p> <p>Tying up this process with the necessary inventory-taking and energy auditing as well as certification of buildings.</p> <p>The more important obligations in this process are as follows: For the state: to provide financial incentives for the renovation of buildings; For the municipalities: to adopt new town plans and long-term municipal programmes for the modernisation of housing complexes; For the energy supply companies: to update energy meters and the energy distribution and supply network.</p>	2006 - 2020	613,8 GWh (52,8 ktoe)
2.	Residential Sector – Mandatory Measures for Efficient Illumination introduced in the Regulation on the essential requirements and conformity assessment of ballasts for fluorescent lamps in respect of energy efficiency requirements Regulation on the technical use of energy equipment - Chapter Six – Energy Efficiency Management and Control	Modernising lighting without reducing the luminance level and lighting quality – through the use of compact fluorescent lamps (CFL)	Since 1 February 2005 Since 11 March 2005	
3.	Residential Sector – Mandatory Labelling of Domestic Appliances introduced in the Regulation on the labelling requirements of domestic appliances in respect of their consumption of energy and other resources	Creating an information environment at the time of purchase of domestic electric appliances and an opportunity for selection of energy-efficient equipment.	Since 11 August 2006	
4.	Residential Sector – Minimum Efficiency Standards for Electric Appliances introduced in the Technical Requirements to Products Act and Regulation on the essential requirements and conformity assessment of domestic electric refrigerators, freezers and combinations thereof	Encouraging the purchase of energy-efficient appliances through harmonisation of the standards for domestic appliances and labelling in respect of energy consumption, noise level and other characteristics. Information on energy consumption motivates the choice of consumers at the time of purchase not only in respect of the price of the appliance but also in respect of the energy costs at the time of operation	Since 1 October 1999; amended 15 September 2006 Since 5 March 2004	

Nº	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings 2016
5.	<p>Residential Sector – Individual Metering (residential buildings) requirements introduced in Regulation Nº2 on heat supply</p> <p>The individual metering and payment of energy costs in residential buildings that are communal ownership have been established in Regulation Nº2 on heat supplies of 24 April 2007. It describes the methods of allocation of the heat consumption of all owners, as well as that of domestic hot water in residential buildings with a common terminal station.</p>	<p>Updating the provisions for individual metering of heat consumption, for individual regulation of heating and for the formation of individual bills for heat consumption.</p>	<p>Since 24 April 2007</p>	
6.	<p>Residential Sector – Maximum Indoor Temperatures in the Heating Period have been established in Regulation Nº15 on technical rules and norms for the design, construction and use of sites and facilities for generation, transmission and distribution of heat</p>	<p>Ensuring reliable and efficient heating and cooling systems; efficient management of the heat supply process. Improving the energy performance of the existing housing stock through renovation.</p>	<p>Since March 2006</p>	
7.	<p>Residential Sector – Minimum Indoor Temperatures in Buildings in the Heating Period introduced in Regulation Nº7 on heat saving and economy of energy in buildings</p>	<p>Improving the energy performance of the existing housing stock through renovation, which is to result in a reduction of heat losses through the enclosing structures and components, improving the performance characteristics of dwellings and achieving thermal comfort</p> <p>Mandatory pipe insulation in buildings has been laid down in the provisions of Regulation Nº 15/28.07.2007 on technical rules and norms for the design, construction and use of sites and facilities for generation, transmission and distribution of heat.</p> <p>Mandatory pipe insulation has been set forth in Section III Tubing of Chapter Nine of the Regulation, where the obligation for the installed insulation to comply with EN 12828 is imposed.</p> <p>Reducing energy loss over the heat transmission network and improving the technical characteristics of the system</p>	<p>Since 15 December 2004</p>	
8.	<p>Residential Sector – Mandatory Insulation of Pipes for Transmission and Distribution of Heat established in Regulation Nº15 on technical rules and norms for the design, construction and use of sites and facilities for generation, transmission and distribution of heat</p>	<p>Improving the energy performance of the existing housing stock through renovation, which is to result in a reduction of heat losses through the enclosing structures and components, improving the performance characteristics of dwellings and achieving thermal comfort</p> <p>Mandatory pipe insulation in buildings has been laid down in the provisions of Regulation Nº 15/28.07.2007 on technical rules and norms for the design, construction and use of sites and facilities for generation, transmission and distribution of heat.</p> <p>Mandatory pipe insulation has been set forth in Section III Tubing of Chapter Nine of the Regulation, where the obligation for the installed insulation to comply with EN 12828 is imposed.</p> <p>Reducing energy loss over the heat transmission network and improving the technical characteristics of the system</p>	<p>Since March 2006</p>	

№	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings 2016
9.	Residential Sector – EE Fund	<p>Energy Efficiency Fund: The Fund provides non-gratuitous financial assistance to energy efficiency projects eligible for funding by extending loans and/or by providing partial guarantees for loans extended by other financial credit institutions.</p>	Set up with the EEA	
10.	<p>Residential Sector – Standard for the Energy Performance of Buildings Regulation №18 on the energy performance of sites</p> <p>Regulation №7 on heat saving and economy of energy in buildings</p> <p>Regulation №5 of 2006 on the technical certificates of construction works</p>	<p>Improving the energy performance of the existing housing stock through renovation, which is to result in a reduction of heat losses through the enclosing structures and elements, improving the performance characteristics of dwellings and achieving thermal comfort;</p> <p>Utilisation of high-efficiency technology and materials in new housing and in renovations of existing buildings;</p> <p>A technical certificate is issued for the whole construction work ("new housing" or "reconstruction, major renovation, total renovation, restructuring", for which a building permit is required and which may be considered to be new housing, when they are started after 26 January 2007). The technical certificate is part of the construction papers of the construction work. It contains in a generalised form all data pertaining to the main characteristics of the construction work: type of construction system, type of structure, load capacity, seismic stability, degree of flammability and life-cycle of construction, sanitary -hygienic and environmental requirements, limit values of the noise level in the environment, energy performance value expressed as an annual amount of consumed energy, primary energy, in environmental equivalent, heat transfer coefficients of enclosing components of buildings, components of the secured accessible environment, etc.</p> <p>The technical certification will be carried out in the period 2007 – 2016, depending on the complexity and category of construction works, the deadline for technical certificates of existing construction works, public and municipal property, being 31 December 2011.</p>	<p>Since 12 November 2004</p> <p>Since 15 December 2004</p> <p>Since 27 January 2007</p>	
11.	Residential Sector – Control Systems of Heating Systems introduced in Regulation №15 on technical rules and norms for the design, construction and use of sites and facilities for generation, transmission and distribution of heat	Ensuring reliable and efficient automation and control of heating systems in buildings, taking into account outdoor climatic conditions and the wish of consumers	Since March 2006	

№	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings 2016
12.	Residential Sector – Minimum Efficiency Standards for Boilers introduced in Regulation on the essential requirements and conformity assessment of hot-water boilers fired with liquid or gaseous fuels with regard to useful efficiency	<p>Allowing a cost-effective choice of energy carriers, burner units and facilities for residential buildings</p> <p>Implementing high-efficiency facilities and automatic control systems</p> <p>This Regulation establishes the essential requirements to hot-water boilers fired with liquid or gaseous fuels with regard to useful efficiency;</p> <p>This Regulation applies to boilers with a rated output of 4 to 400 kW as well as to components of boilers, i.e. boiler bodies placed separately on the market designed to have a burner or burners fitted, burners designed to be fitted to boiler bodies</p>	Since 30 June 2005	
13	Residential Sector – Residential Energy Efficiency Credit Line (REECL).	<p>Under the credit facility, loans are extended to individuals and households in order to support specific energy efficiency improvement measures in multi-family and single-family buildings through a pool of Bulgarian commercial banks. Following the successful completion of the energy savings project, the bank reimburses 20% of the capital expenditure under the project but not more than EUR 850 per household.</p>	September 2005 – end of 2008. An extension of this period is possible.	<p>As at June 2007, the programme has financed 7770 projects totalling BGN 21.5 million, of which grants under the Kozloduy International Decommissioning Fund – BGN 3.7 million.</p> <p>The projects financed so far are expected to result in electricity savings of 50 474 MWh per year.</p>

Annex 5b: Energy efficiency measures in the tertiary sector in the First Bulgarian National Energy Efficiency Action Plan

№	Title of the EEI measures	End-use EEI action targeted	Duration	Annual energy savings in 2016
1	Energy Efficiency Act	<ul style="list-style-type: none"> - Mandatory certificates for sites, public or municipal property, in operation, with a total useful area of over 1000 sq. m; - Mandatory energy efficiency improvement programmes for the municipalities; - Setting up an Energy Efficiency Fund as a public-private partnership in order to finance investment projects in the field of energy efficiency; 	Effective as from 5 March 2004	
2	2006 National EEI Target Programme for the Housing Stock	Audited 139 sites with 250 buildings having a total built-up area of 1.82 million m ²	June 2006 -December 2006	163.5 GWh/y after implementation of the measures prescribed for the sites
3	2007 EEI Target Programme for Buildings	Auditing: - 15 buildings, public property, with a total useful area of 51897 m ² ; - 116 buildings, municipal property, with a total useful area of 306069 m ² ; Insulating: 10 buildings, public property, audited in 2006 with a total useful area of 49500 m ²	2007	

4	Energy Efficiency District Councils	<p>The Energy Efficiency District Councils have been set up by orders of the District Governors in the 28 districts in Bulgaria. These Councils are composed of experts and representatives of the district and municipal administration, local businesses, civil organisations and associations, etc. The Energy Efficiency District Councils assist in the preparation and adoption of district and municipal EEI programmes.</p>	Set up in 2004	
5	Mandatory EEI Programmes for the Municipalities	<p>In line with the provisions of the EEA, Article 9, para. 2, the mayors organise and implement the measures foreseen in the municipal energy efficiency improvement programmes by allocating target funds in their budgets for their implementation.</p>	Effective as from 5 March 2004	
6	Mandatory Energy Auditing of Buildings of over 1000 m ² (municipal or public property)	<p>The energy audits aim to identify energy saving opportunities and to propose EEI measures and the achievement of high degree of environmental protection</p>	Effective as from 1 January 2005	
7	Financing Strategy for Building Insulation	<p>Tying up this process with the necessary inventory-taking and energy auditing as well as certification of buildings. The more important obligations in this process: For the state: to provide financial incentives for the participants in the renovation process; to provide budgetary funds for the start of renovation; For the municipalities: to adopt new town plans and long-term municipal programmes for the modernisation of housing complexes; For the energy supply companies: to update energy meters and the energy distribution and supply network.</p>	2006 -2020	349 GWh (30 ktoe)

Annex 5c: Energy efficiency measures in the industry sector in the First Bulgarian National Energy Efficiency Action Plan

№	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings in 2016
1	Mandatory energy audits of industrial companies, producers of goods and services, the facilities of which have annual energy consumption of or more than 3 000 MWh – Article 17, para. 1 of the EEA, Regulation № 21/12.11.2004	Reducing the energy intensity of the sectors forming the GDP, mostly the industry sector	Implemented end 2004 with enforcement of Regulation of Regulation 21/12.11.2004. Audits every 3 years.	1 300 GWh These savings will be achieved only if EEI measures are implemented.
2	Financing the audits of 35 SMEs having annual energy consumption of or more than 3 000 MWh, which are subject to a mandatory audit under Article 17, para. 1 of the EEA, with funds from the state budget.	Reducing the energy intensity, respectively, boosting the competitiveness of SMEs through the implementation of energy saving measures prescribed as a result of the audits.	The measure started at the end of 2006. The audit reports containing prescribed specific EEI measures are expected to be submitted by the end of September 2007.	200 GWh These savings will be achieved only if EEI measures are implemented.

3	Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) for the industry sector	The credit facility has been established using funds from Kozloduy International Decommissioning Support Fund (KIDSF) and the European Bank for Reconstruction and Development in order to support energy efficiency and renewable energy projects of private companies. The facility extends loans to private-sector companies through a pool of Bulgarian banks. The incentive grant from KIDSF which covers part of the principal and the interest payments of the loan is provided upon completion of the projects and amounts up to 7.5% of the loan for energy efficiency projects.	End of 2004 – 1 January 2009. An extension is possible.	The projects funded under the programme as at June 2007 are expected to bring about electricity savings of 59 225 MWh per year and 1 610 926 GJ/year.
4	Encouraging the implementation of energy-saving and environment friendly technologies and RES	Encouraging the annual audits of SMEs having annual consumption of less than 3000 MWh, i.e. audits are not mandatory.	The measure is Programme №4 of the programming budget of the MEE for 2007 and the period 2008 – 2020.	
5	Long-term energy savings agreements	Energy savings in the industry sector	Started in 2006.	The results will be reported after 2010.

Annex 5d: Energy efficiency measures in the transport sector in the First Bulgarian National Energy Efficiency Action Plan

№	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings in 2016
1	2006-2008 programme for the energy efficiency improvement of the transport sector through the implementation of energy-saving measures	The programme envisages audits of 14 state and municipal transport companies, which are subject to mandatory energy audits as big energy consumers, in line with the requirements of Article 17(1) of the EEA and the Regulation thereto. The declared consumption of these companies in 2005 was 726 743 MWh/year. As a result of the audits, specific measures will be outlined to improve the energy efficiency of the transport companies. The programme also includes preliminary data on priority projects proposed by the Ministry of Transport and some municipalities. As a result of the audits, these projects will be updated and the data about them will be specified.	After 2006	
2	Mandatory speed limit	Under the Traffic Act (5 March 1999), drivers are obliged to limit the speed of the motor vehicle up to 50 km/h in settlements, up to 90 km/h in open country and up to 130 km/h on motorways.	Since 5 March 1999	

3	<p>Taxes on fuel oils for the transport sector:</p>	<p>The new Excise Duties and Tax Warehouses Act of 2 November 2005 introduces the requirements of EU Directives 92/79, 92/80, 92/12 and 2003/96. The excise duties on motor fuels after the latest amendments effective as from 1 January 2007 are as follows:</p> <ol style="list-style-type: none"> 1. Europlus Unleaded Gasoline A-95H and A-98H: 635 BGN/1000 l; 2. Diesel fuel: 535 BGN/1000 l; <p>The value-added tax is 20% for all fuels. The excise duty on motor fuels is one of the most efficient measures to limit consumption of fuel oils in the transport sector. The taxes constitute about 50% of the end price of petrol and diesel fuel.</p>	<p>Since 1 January 2006</p>	
4	<p>Mandatory periodical MOT tests.</p>	<p>Since 1 September 1999, by Regulation №32 of the Ministry of Transport (with a number of amendments until 2007), the procedure for mandatory periodical MOT tests and control of emissions from vehicles has been established. In Bulgaria, by reason of the advanced average age of the vehicle fleet, the improved maintenance and repairs have a direct effect on the reduction of fuel consumption. Tests are carried out in special MOT test points. Tests of public transport vehicles are carried out every 6 months, while those of other vehicles every year. Tests include an inspection of the technical condition of the main vehicle systems and of the allowed emissions of CO and smoke in the exhaust. If the vehicle does not comply with the requirements, it cannot obtain authorisation for use.</p>	<p>Since 1 September 1999</p>	

Annex 6: Fact Sheets for Energy Efficiency Financing Activities in Bulgaria

Operational Programme “Development of the competitiveness of the Bulgarian economy 2007-2013”³¹

Global objective:

- Development of a dynamic economy, competitive in the European and world market

Specific objectives:

- Encouraging innovations and increasing the efficiency of enterprises
- Improving the business environment

Priority axes:

- Development of knowledge - based economy and innovation activities
- Increasing efficiency of enterprises and promoting supportive business environment
- Financial resources for developing enterprises
- Strengthening the international market positions of the Bulgarian economy
- Technical assistance

Financial plan 2007-2013:

	EU Funds (a)	National public funds (b)	Total funds (c) = (a)+(b)	Percentage of national cofinancing (d) = (a)/(c)	Share of total OP budget (%)
Priority axis 1	209 525 000	36 975 000	246 500 000	15%	21.3%
Priority axis 2	504 762 113	89 075 667	593 837 780	15%	51%
Priority axis 3	170 000 000	30 000 000	200 000 000	15%	17.2%
Priority axis 4	73 960 090	13 051 780	87 011 870	15%	7.5%
Priority axis 5	29 636 016	5 229 885	34 865 901	15%	3%
Total	987 883 219	174 332 333	1 162 215 551		100%

Support for investments in renewable energy sources and energy efficiency in the OP:

Promotion of renewables and energy efficiency is part of the priority axis 2 “Increasing efficiency of enterprises and promoting supportive business environment” and more specifically the area of intervention 2.3. “Introduction of energy-saving technologies

³¹ Sources: www.opcompetitiveness.bg; Presentation “Operational programme **Development of the competitiveness of the Bulgarian economy 2007-2013**” by the Ministry of Economy and Energy on behalf of the Energy Charter (April 2008);

and renewable energy sources". Specific objective 3 is "Decreasing the energy intensity and diversification of energy sources used by enterprises".

Instruments:

➤ **Grant scheme "Introduction of renewable energy sources satisfying the needs of the enterprises"**

- Eligible beneficiaries – enterprises (micro, small, medium and large) and cooperatives, registered under the Trade law or the Law on cooperatives, having their headquarters in Bulgaria
- Maximum co-financing rate (provided by the OP) – 50% of total eligible costs of the project
- Indicative time schedule for launching the call for proposals – third quarter of 2008
- Maximum grant amount - 2 mln. BGN
- Total budget of the operation – 8 000 000 euro (15 646 640 BGN)
- Eligible activities – activities for purchase, delivery, installation and introduction of the following types of renewable energy sources satisfying the own needs of the enterprises: Solar collectors; Photovoltaic installations / parks; Wind turbines / parks; Hybrid wind – photovoltaic installations / parks
- Eligible activities of the projects will comprise investments (obligatory component) and consultancy services (optional component and only related to construction and installation works)
- Eligible activities for services, related to the particular investment, are: execution of construction supervision (for the construction and installation works); audit of project activities; visualization
- The electricity generated by renewables will only be allowed to be used for satisfying own needs of the beneficiary enterprise. The sale of the generated electricity or parts of it to the national energy network and its transportation through the national energy network will be forbidden under this scheme.

➤ **Grant scheme "Introduction of energy – saving technologies in enterprises"**

- Eligible beneficiaries – enterprises (micro, small, medium and large) and cooperatives, registered under the Trade law or the Law on cooperatives, having their headquarters in Bulgaria
- Maximum co-financing rate (provided by the OP) – 50% of total eligible costs of the project
- Indicative time schedule for launching the call for proposals – fourth quarter of 2008
- Maximum grant amount - 1 mln. BGN
 - Total budget of the operation– 23 000 000 euro (44 984 090 BGN)
 - Eligible activities – activities aimed at increasing the energy efficiency of the enterprises by: purchase, delivery and introduction of equipment for energy saving; purchase, delivery and introduction of energy efficient equipment (machines, production equipment etc.); reconstruction of energy infrastructure;

insulation and consolidation of buildings and production premises; optimisation of the production processes; utilization of waste heat; purchase, construction and introduction of cogeneration; purchase, delivery and introduction of equipment for production of geothermal energy satisfying the own needs of the enterprises.

- Eligible activities of the projects will comprise investments (obligatory component) and consultancy services (optional component and only related to the particular investment)
- Eligible activities for services, related to the particular investment, are: consultancy services, related to the introduction of the new energy efficient technologies, processes, equipment; execution of construction supervision (for the construction and installation works); audit of project activities; visualization
- Performed detailed inquiry for energy efficiency (according to the Energy Efficiency Law) will be a necessary condition for eligibility of the project proposal

The ex-ante evaluation of the OP concludes on Energy Efficiency & the Competitiveness OP (p.185):

- Despite energy being recognised a significant element in the competitiveness of the economy, the scope of the Competitiveness OP does not allow it to address on its own the issue in a coherent and holistic way.
- It is important to provide a clear picture of what gap in the knowledge and application of EERE measures that future projects will fill, in order to ensure that Competitiveness OP energy efficiency issues achieve complementarity with all other actions in EE in the country.
- It is highly recommended that the Ministry acquires a review of international experience in the application of support for EERE projects in the SME sector, including an appraisal of the available instruments and policy mechanisms appropriate to the Bulgarian SME profile. This will ensure successful programme implementation and high absorption and success rates.
- A review of energy and environment related directives and regulations should be undertaken with a view to identifying those with relevance to SMEs and subsequently designing future Competitiveness OP measures along those requirements.
- The Competitiveness OP needs to work in synergy with other OPs for the matters relating to energy and there should be a body or authority ensuring complementary measures under the OPs and avoiding duplication of work.

Context Indicator mentioned in the OP for energy efficiency and renewables (p. 130/133):

Definition/Name (Objectively verifiable Indicators)	Type	Baseline (year) 2005	Data source	Method of quantification	Frequency of reviewing	
					2013	2015
Energy intensity of economy (kgoe per 1 000 EUR) Definition: as per Eurostat	Context	2004 - 1628.16	Statistics	Estimations based on statistical data and MoEE calculations	1250.00	1150.00

Definition/ Name (Objectively verifiable Indicators)	Type	Baseline (year) 2006	Frequency of reviewing	Quantified target		Method of quantification	Data source/ measurement method
				mid- term	End- term		
Number of projects for renewable energy Definition:	Core	0	Mid-term (2010) End of implementa- tion period (2013) Ex-post evaluation (2015)	75	310	Estimations are made based on average grant amount of 350 000 euro and indicative budget for 2007-2013 of 97 MEUR	Monitoring system
Additional capacity of renewable energy production Definition: energy produced for the needs of enterprises by RES	Core	20 GWh wind energy for 2006	Mid-term (2010) End of implementation period (2013) Ex-post evaluation (2015)	21 GWh wind energy	36 GWh wind energy	Baseline value is based on MoEE statistics for pro- duction of energy from wind. Solar is not connec- ted to national power grid and is used only for own consumption, so National statistics does not keep record on it. Assumptions are made based on time schedule for implementing RES scheme (starting in 2009) and budget allocate- ments (2009-2013 – 97 MEUR)	Monitoring system

Operational Programme “Regional Development 2007-2013”³²

Global objective: To enhance the quality of life and working environment with better accessibility to the basic services and to create new opportunities for improved regional competitiveness and sustainable development.

Priority axes:

- Sustainable and integrated urban development (financial resources 52.4 %)
- Regional and Local Accessibility (financial resources 25 %)
- Sustainable Tourism Development (financial resources 13.6 %)
- Local development and co-operation (financial resources 5.6 %)
- Technical assistance (financial resources 3.4 %)

Overall funding by Priority subject:

Priority subject	Community funding (EURO)	National public funding (EURO)	Total funding (EURO)
Renewable energy sources - solar	7 880 674	1 182 101	9 062 775
Renewable energy sources – Geothermal and others	3 089 660	463 449	3 553 109
Energy efficiency	38 505 057	5 775 759	44 280 816
Alternative energy – RES or natural gas	51 040 633	7 656 095	58 696 728
Total	100 516 024	15 077 404	115 593 428

Priority axes 1: Sustainable and integrated urban development - Operation 1.1. Social Infrastructure

Specific objective: To ensure appropriate and cost effective, educational, health, social care and cultural infrastructures consistent with future demands of the cities and their surrounding urban areas.

Beneficiaries:

- Specific beneficiaries for State-owned education, health, medicine and social services facilities and cultural institutions and municipalities for the municipal-owned facilities, NGO’s and universities when they act as non-profit operators in order to deliver healthcare, social care, educational or cultural services

List of indicative activities to be supported

- Energy consumption audits and energy efficiency measures for all projects related to the above mentioned public institutions;

³² Sources: www.opcompetitiveness.bg; Presentation “Operational programme **Regional Development 2007-2013**” by the Ministry of Regional Development and Public Works on behalf of the Energy Charter (April 2008);

- Implementation of the foreseen energy efficiency measures– replacement of windows, thermal wall insulation, reconstruction of onsite heat and electricity installations, roof refurbishment, equipment
- Construction of installation and equipment for RES usage.
- Access facilities to public institutions mentioned above for disabled people

Funding:

(EURO)

Priority subject	Community funding	National public funding	Total funding
Renewable energy - solar	4 763 792	714 569	5 478 361
Energy efficiency -geothermal and others	2 381 896	357 284	2 739 180
Energy efficiency	4 763 792	714 569	5 478 361
Total funding of priority axis 1.1	713 207 778	125 860 1968	39 067 974

Priority axes 1: Sustainable and integrated urban development - Operation 1.2. Housing

Specific objective: To provide better living conditions for citizens and make a contribution to social inclusion through raising living standards and generally improving the quality of life among disadvantaged and vulnerable urban communities

Beneficiaries:

- Public authorities or non-profit corporate bodies, associations of owners of multi-family residential buildings

List of indicative activities to be supported

- Renovation of the common parts of multi-family residential buildings as follows: refurbishment of the following main structural parts of the building (roof, façade, windows/doors on the façade, staircase, inside and outside corridors, entrances and their exteriors, elevator); technical vertical installations (water supply, sewage, electricity, heating, communications, fire hydrants) of the building;
- Delivery of modern social housing of good quality for vulnerable, minority and lower income groups and other disadvantaged groups etc.,
- Energy consumption audits and energy efficiency measures for all projects related to housing, mentioned above (e.g. thermal insulation, replacement of woodwork, local installations connected to central heating systems, gas supply connecting pipelines or alternative renewable energy sources)

Funding:

(EURO)

Priority subject	Community funding	National public funding	Total funding
Renewable energy - solar	4 763 792	714 569	5 478 361
Energy efficiency	32 325 735	4 848 860	37 174 595
Total funding of priority axis 1.2	37 089 527	5 563 429	42 652 956

Priority axes 2: Regional and Local Accessibility - Operation 2.3. Access to Sustainable and Efficient Energy Resources

Specific Objective: To provide access to national gas distribution network or if possible to renewable energy sources in service of better investment attractiveness and regional competitiveness

Beneficiaries:

- Municipalities without granted gas distribution licences and not included in the list of identified territories for gas distribution
- Municipalities without granted gas distribution licences and included in the list of identified territories for gas distribution (gas distribution regions) on the basis of proven potential to use RES

List of indicative activities to be supported

- Construction of gas distribution pipeline sections as branches from the national gas transmission network to the concerned areas;
- Construction of installations that use RES and connection to supply of RES;
- Technical and feasibility studies and design

Funding:

Priority subject	Community funding (EURO)	National public funding (EURO)	Total funding (EURO)
Alternative energy – RES or natural gas	51 040 633	7 656 095	58 696 728

Priority Axis 4: Local development and co-operation - Operation 4.1. Small-scale Local Investments

Specific Objective: To support local development through implementation of essential and useful small-scale local investment solutions

Beneficiaries:

- Municipalities

List of indicative activities to be supported

- Renovation/reconstruction and equipment of public medical and health establishments;
- Energy consumption audits and energy efficiency measures for all projects related to public institutions mentioned above (e.g. thermal insulation, replacement of windows, local installations connected to central heating systems, gas supply connecting pipelines or alternative renewable energy sources and etc.) for all above mentioned projects for public institutions.
- Purchasing of equipment for organisation of waste collection and disposal systems;

- Establishment and reinforcement of small-scale infrastructure for prevention against floods and landslides, cleaning of river beds
- Access facilities to public institutions mentioned above for disabled people

Funding:

Priority subject	Community funding (EURO)	National public funding (EURO)	Total funding (EURO)
Renewable energy - solar	1 415 527	212 329	1 627 856
Renewable energy - geothermal and others	707 763	106 164	813 927
Energy efficiency	1 415 527	212 329	1 627 856
Total funding of priority axis 4.1	3 538 817	530 822	4 069 639

Sectoral Operational Programme on Transport SOPT 2007-2013³³

Specific goals: Two specific goals are identified in order to achieve the overall goal of SOPT:

- **Integration of the national transport system into the European Union transport network.**

One of the most essential aspects in the national and European Union transport policies is to complete the trans-European transport network. Taking into consideration that the Republic of Bulgaria will be one of the peripheral countries and external border of the European Union in 2007, this programme concentrates on: eliminating the bottlenecks on the Danube River, completing the priority roads and railways for absorbing the traffic flows; improving the quality of the main road and railway arteries, promoting the combined transport and transport by sea and inland waterway; developing high-quality multimodal passenger transport in the Capital City. With an interoperable trans-European transport network gradually being completed and traffic growth expected to rise, this programme is looking forward to better integration of the national network with those of the neighbouring countries and the EU.

- **Achievement of balance between the transport modes**

Most passengers and goods traffic goes by road. Saturation is a serious problem on the main road arteries and on the main boulevards in the capital city. The greatest competitive advantage of road transport is its capacity to carry goods all over the country with flexibility and at low price. The incomplete and low-speed railway infrastructure, the lack of built combined infrastructure and the low traffic capacity in the terminals on the sea and Danube River ports hinder the development of alternative transport modes. Turning intermodality into reality, revitalizing the railway sector, promoting the sea and inland waterway transport, developing of metropolitan railway in the big cities could provide means of coping with the congestion of the main road infrastructure and will support the achievement of better balance between the transport modes.

³³ Sources: <http://www.mtc.government.bg/page.php?category=173&id=1932>

Priority axis –EU Fund (million Euro)	Community Funding	National counterpart	Total funding	Rate of EU Funds contribution
	(a)	(b)	(e)=(a)+(b)	(f)=(a)/(e)
Priority axis 1 "Development of railway infrastructure along the Trans-European and major national transport axes"- CF	464	116	580	80%
Priority axis 2 "Development of road infrastructure along the Trans-European and major national transport axes" - CF	792	198	990	80%
Priority axis 3 "Improvement of intermodality for passengers and freight" - ERDF	179	32	211	85%
Priority axis 4 "Improvement of the maritime and inland-waterway navigation" - ERDF	133	24	157	85%
Priority axis 5 "Technical Assistance " - ERDF	56	10	66	85%
TOTAL	1 624	379	2 003	

Bulgarian Energy Efficiency Fund (BgEEF)³⁴

BgEEF is a revolving mechanism for development and financing of commercially viable projects and capacity building. BgEEF has the combined capacity of a lending institution, a credit guarantee facility and a consulting company for Bulgarian enterprises, municipalities and private individuals in developing energy efficiency investment projects.

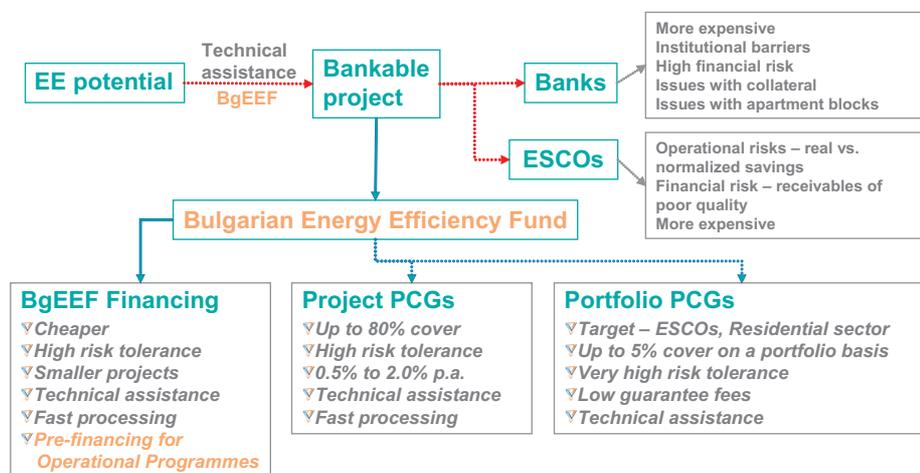
The Bulgarian Energy Efficiency Fund (BgEEF) was established through the Energy Efficiency Act adopted by the Bulgarian Parliament in February 2004. Initial capitalization of BgEEF with grant funds approx. BGN 22 million (USD 15 million): Global Environment Facility through the International Bank for Reconstruction and Development (the World Bank) - USD 10 million; the Government of Austria Euro 1.5 million; the Government of Bulgaria - Euro 1.5 million and several private Bulgarian companies (Enemona S.A. - BGN 200 000; DZI Bank /after the 1st of November 2007 - Eurobank EFG Bulgaria AD - BGN 100 000; Lukoil AD - BGN 100 000; Brunata Bulgaria - BGN 1000).

Key Operating Principles: Public-Private Partnership (Management Board, Fund Manager); Independently managed, autonomous legal entity; Self-sustainability; Transparency in administration of financial resources; Equal opportunities for all applicants; GHG reduction

A necessary condition for a successful application with the Bulgarian Energy Efficiency Fund is the presence of a detailed energy audit allowing for an energy analysis and the choice of energy-saving measures.

³⁴ Sources: www.bgeef.com; Presentation „Bulgarian Energy Efficiency Fund – Financing of Energy Efficiency Investment Projects and Pre-financing for EU Operational Programmes“ by the BGEEF on behalf of the Energy Charter (April 2008); MURE Database (www.mure2.com) – Measures for Bulgaria

Market Position:



PCGs: Partial Credit Guarantees

Financial conditions:

Beneficiary	Interest Rate	Maximal Duration (Payback)	Minimal Equity Contribution
Municipalities	4% - 7%	up to 5years	10% - 25%
Corporate Customers and Private Individuals	4% - 9%	up to 5years	10% - 25%

Loans: The project cost should range between BGN 30 000 and BGN 3 000 000

Partial Credit Guarantees: up to 80% of the amount of approved bank loan for projects meeting BgEEF eligibility criteria (limit: BGN 800 000)

Portfolio Guarantees: up to 5% of portfolio (limit: BGN 800 000). The main mechanisms of the portfolio guarantees are:

- ESCO portfolio guarantee - to attract more ESCO companies into this business and to make ESCOs more comfortable by guaranteeing the risk of their counterparties - the project beneficiaries.
- Residential portfolio guarantee - to kick-start the market of energy efficiency investments in the residential sector, by providing market products that overcome the lack of legislation in the country (condominium law not yet finally approved). The guarantee works in the following way: BgEEF helps the households in a building to develop a good project. Then a first class company is selected to implement the investment. The bank gives the funds to the project developer, but the repayments afterwards come from the individual households. Each household pays proportionately to their built-up area. BgEEF guarantees that it will cover

the first 5% of defaults within this block (or portfolio of blocks). Statistically the default rates in customers' loans are from less than 1% in some banks, to about 2.5-3%, so a guarantee of 5% will cover fully the risk of the commercial bank.

Fees for Guarantees: 0.5% to 2% p.a.

BgEEF Results as of 31.12.2007:

	Number of projects	Project size (BGN million)	BgEEF financing (BGN million)
Projects financed	42	15.1	10.5
Street lighting	4	0.9	0.7
Reconstruction of the heating system	10	4.8	3.3
Rehabilitation / isolation of buildings	28	9.4	6.5
Municipalities	14	3.9	2.9
Corporate clients	20	6.8	4.5
Hospitals	4	2.9	1.8
Universities	4	1.7	1.2

Savings for 2007:

	Unit	Quantity
Electricity savings	GWh	2.58
Heat savings	GWh	1.69
Reduced greenhouse gas emissions	kt CO ₂ equivalent	6.8

Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL)³⁵

Objectives:

- BEERECL was developed by the European Bank for Reconstruction and Development EBRD in 2004 to extend loans to local banks for on-lending to private sector companies for industrial energy efficiency and small renewable projects.
- The Kozloduy International Decommissioning Support Fund KIDSF provides incentive grants to Project Sponsors
- Incentive for Renewable Energy Projects – 20% of loan amount, Energy Efficiency Projects – 15% of loan amount after meeting of objectives (validated by independent energy expert)

³⁵ Sources: www.beerecl.com; Presentation "Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL)" by the BEERECL Deputy Program Manager on behalf of the Energy Charter (April 2008);

- Total BEERECL Portfolio: EUR 105 million
- Remaining Loan Portfolio: approx. EUR 21 million
- Emphasis now on energy efficiency projects

Participating banks: Postbank – since April 2004, United Bulgarian Bank – since April 2004, Unionbank – since April 2004, Unicredit – Bulbank (Bulbank – since September 2004, HVB~BankBiochim – since September 2004), DSK Bank – since November 2004, Raiffeisen Bank – Since July 2006, Piraeus Bank – Since October 2007.

Available technical assistance:

- BEERECL Marketing: assists banks to market and to identify bankable projects.
- Project Eligibility: help to restructure project, if applicable to meet eligibility requirements.
- Creditworthiness: help with pre-screening at banks.
- Energy Audit: free to project sponsor
- Financial Analysis: cash flow projections and analysis.
- Business Plan: develops Business Plan with the Project Sponsor and helps with its submission to the bank
- Project Completion/Validation Review: helps Project Sponsor with the request for the incentive grant

Types of projects qualifying as energy efficiency: Co-generation, Heat and steam recovery, Automation and control, Upgrade/replacement of utilities, Fuel switching (coal/fuel oil to gas), Ground source heat pumps, Process optimisation

BEERECL success to date with energy efficiency projects:

- 39 projects that cost 33.3 million Euros
- 19.4 million Euros in BEERECL loans
- 1.88 million Euros in incentive grants
- Average energy savings of 40+ percent
- Loan payback from a few months to a few years
- Cash incentive grants from 3,000 Euros to 150,000 Euros depending on loan size
- BEERECL cumulative loans and incentive grants: Over EUR 70 million in disbursed loans, over EUR 12 million in incentive grants
- Nearly 500,000 Tons of CO2 Reduction

Available BEERECL Funds (Euros)

Participating Bank	Energy Efficiency	Renewable Energy	Total
Raifaisen Bank	7,385,000	113,000	7,498,000
MKB Unionbank	2,198,824		2,198,824
Postbank	7,500,000	5,000,000	12,500,000
Bank DSK	340,000		340,000
Piraeus	2,003,004	777,500	2,780,504
UBB		1,000,000	1,000,000
Total Funds	19,426,828	6,890,500	26,317,328

Bulgarian Residential Energy Efficiency Credit (REECL) Facility³⁶

The REECL facility aims to give householders across Bulgaria an opportunity to realise the benefits of energy efficiency home improvements by providing them with loans and incentive grants through local participating banks.

Householders can obtain incentive grants from €350 to €2000. Applicants need to use eligible products and materials to qualify for the incentive grants. Loans and grants are given to the following energy efficiency installations:

- Energy Efficient Windows
- Insulation of Walls, Roofs, and Floors
- Gas Boilers with or without associated controls, space heating and hot water storage systems
- Biomass Room Heaters, Stoves and Boiler Systems with or without associated controls, space heating and hot water storage systems
- Solar Thermal Systems with or without associated space heating and hot water storage systems
- Cooling and Heating Heat Pump Systems

The REECL Facility provides loans for energy efficiency home improvements

To help Bulgarian households reduce their energy bills and consumption the European Commission, the European Bank for Reconstruction and Development, and the Bulgarian Energy Efficiency Agency have developed a € 50 million Residential Energy Efficiency Credit (REECL) Facility to provide credit lines to reputable Bulgarian banks to make loans to householders for specific energy efficiency measures including double-glazing; wall, floor, and roof insulation; efficient biomass stoves and boilers; solar water heaters; efficient gas boilers; and heat pump systems.

The borrowing households benefit from incentive grants

To help stimulate the uptake of residential energy efficiency projects, an additional € 14.63 million in grant financing is earmarked in support of project development and incentive grants paid to REECL borrowers after verification by independent consultant that each eligible residential energy efficiency project has been completed. Each borrowing household will benefit from up to a 30% incentive towards the cost of the energy savings projects (to a maximum of € 2000).

The grant financing comes from the Kozloduy International Decommissioning Support Fund (KIDSF), set up in 2000 with contributions from the European Commission, EU member countries, and Switzerland. KIDSF financially supports the early decommissioning of units 1-4 of Kozloduy Nuclear Power Plant. KIDSF also supports energy sector initiatives associated with the decommissioning effort, such as improving energy efficiency in Bulgaria.

The REECL Facility funds are limited

The REECL loans and incentive grants are available to REECL borrowers until 31 August 2008. It is anticipated that the total number of energy efficiency home improvement projects to be financed under the REECL facility will be in the range of 30,000.

³⁶ Sources: <http://reecl.org/indexen.php>;

Participating Banks:

Through Bulgarian banks the REECL Programme provides financing to Bulgarian householders to tackle the inefficient use of energy and fuels in their residences. The Bulgarian banks participating in the REECL Programme include:

- Bulgarian Postbank
- Bulbank
- DSK Bank
- Procredit Bank
- Raiffeisen Bank
- United Bulgarian Bank

REECL Programme to date:

To date, the REECL Programme has committed to 15560 energy efficiency home improvement projects, financed through personal loans totalling 45 million leva and incentive grants amounting to 7.8 million leva, saved a total estimated electricity equivalent of 108 GWh per year and the REECL supported projects have brought reduction in CO₂ emissions of 157 kt per year.

The REECL Programme to date in numbers is shown in the tables below:

Energy Efficiency Home Improvement Measure	Amount of Sub-loans (leva)	Amount of Completion Fees (leva)	Number of Projects	Percentage of Sub-loans	Electricity Equivalents Saved (MWh/Year)*	CO ₂ Reduction (Tonne/Year)
Energy Efficient Windows	21 679 107	3 468 657	9777	48.2 %	19 001	23 542
Wall Insulations	5 421 917	975 945	2242	12.1 %	7 920	9 813
Roof Insulations	253 439	50 688	146	0.6 %	370	459
Floor Insulations	172 936	34 587	122	0.4 %	253	313
Solar Water Heaters	1 849 503	369 901	632	4.1 %	1 850	2 292
Biomass Stoves & Boilers	1 497 919	239 667	440	3.3 %	9 846	23 907
Efficient Gas Boilers	3 567 717	570 835	1319	7.9 %	28 137	46 523
Heat Pump Systems	10 509 392	2 101 878	4782	23.4 %	40 940	50 724

Annex 7: Recommendations from the In-depth Review of Bulgaria in 2001³⁷

Taking note with appreciation of the steps taken to develop energy efficiency policies and legislation, the following recommendations are provided by the review team:

General

- Building on the positive steps taken so far through the 1999 Energy and Energy Efficiency Law, the Government should ensure that new intended changes and secondary legislation will better define the legal framework and the economic conditions for promoting energy efficiency. **A**
- The Government should assess the status of energy efficiency in all sectors of the economy; periodical review of progress in improving energy efficiency should also be undertaken. **A**
- The Government should follow up on the findings of the 1999 "Understanding between the Republic of Bulgaria and the European Commission concerning Kozlodoy NPP" with a view to secure the contribution of energy efficiency measures to increase the country's energy security and balance the effects of closing units in Kozlodoy Nuclear Power Plant. **A**

Energy efficiency policies, strategies and programmes

- The National Strategy for Energy and Energy Efficiency until 2010 should serve as a basis for further developing a National Energy Efficiency Programme, for all end-use sectors, with clear objectives, tasks, targets and monitoring provisions. **A**
- The Government should be committed to integrate energy efficiency in other economic, environmental and social policies. **P**

³⁷ The recommendations from the first review of Bulgaria are evaluated with respect to their achievement in three categories: **A** signifies "largely achieved", **P** signifies "substantial progress was made", **M** recommendation only moderately achieved.

- In the process of developing energy efficiency strategies and programmes, the Government should make use of the work and expertise made already available through the technical assistance of various international institutions and programmes, including those of the European Commission. **A**
- Government institutions responsible for energy efficiency should ensure a better balance between policy development and implementation activities. **P**

Institutional framework

- The Government should secure that the capacity, operational independence and authority built in the State Energy Efficiency Agency are maintained and continuously strengthened to secure proper development and implementation of energy efficiency policies, strategies and programmes. **A**
- The Government should ensure better coordination between the various governmental institutions acting in the area of energy efficiency. **P**
- The Government should take action to support the participation of the private sector and of municipalities in promoting energy efficiency. **P**
- The Government should also encourage professional associations and NGOs in their efforts to promote energy efficiency and related environmental activities. **P**

Energy pricing

- The Government should take action to eliminate subsidies and cross-subsidies in end-use energy prices; social problems arising from market pricing should continue to be addressed by social policies. **A**
- The Government should continue efforts towards introducing market oriented prices and consider the reflection of environmental costs. **P/A**
- The regulatory mechanism for establishing energy prices should be transparent, more independent and take into consideration energy efficiency activities of the energy companies on both supply and demand-side. **P**

Energy efficiency funding and fiscal policies

- A better balance should be secured between energy efficiency objectives and funding at national and regional / municipal level. **P/A**
- The Government should consider allocating special funds at national and municipal level for supporting the implementation of energy efficiency policy objectives. **P**
- The Government should encourage the development of innovative financing mechanism which support implementation of energy efficiency activities by end-users and by specialised service companies. **P/A**
- The Government should further develop fiscal and taxation policies which support improvements in energy efficiency. **P**
- Better information on the planning and operation of the National Environmental Fund should be provided to the market actors in order to facilitate and promote the financing of energy efficiency projects. **A**

Implementation of specific energy efficiency measures

- Priority should be given to implementing low cost measures identified in the industrial sector, including energy management, auditing and training; low cost measures should be also implemented without delay in other sectors of the economy. **P/A**
- Efforts should continue to complete energy efficiency standards and labelling legislation in accordance with the EU legislation in this area. **A**
- The Government should consider allocation of special resources for research and development activities supporting the penetration and deployment of energy efficient and environmental friendly technologies. **P**
- A policy on the use of flexible mechanisms under the Kyoto Protocol should be better defined and promoted; the potential share of energy efficiency projects in such activities should be identified. **P/A**
- Building on the positive experiences undertaken so far, additional efforts should be made to secure completion of the metering programme planned for the district heat consumers. **P/A**

- Priority should be given to the attraction of private investments in the process of rehabilitation of the district heating systems. **M/P**
- Awareness on benefits resulting from energy efficiency improvement should be promoted within all sectors of the economy and society through information and dissemination activities. **A**
- Education and training activities related to energy efficiency should be considered in the various stages of the education process. **P**
- The potential for employment creation through implementation of energy efficiency activities should be investigated and tapped, taking into consideration the experience of other countries in this area. **M/P**

Promotion of renewable energy and cogeneration

- The Government should favour the development of framework conditions for promotion of renewable energy sources and cogeneration, including appropriate tariffs and other instruments, which would support completion and implementation of a national renewable energy programme. **A**

Data collection, monitoring and forecasting

- Every effort should be made to secure that energy data basis and statistics are harmonized with those of Eurostat and IEA. **A**
- In order to facilitate the design and evaluation of energy efficiency policies and programmes, the Government should take the necessary steps to secure that energy efficiency indicators at national, regional and sectoral level are developed. **A/P**
- Technological development and structural changes of the economy should be taken into consideration in developing energy demand and supply scenarios. **A**
- The Government should secure the evaluation of the results obtained by energy efficiency projects implemented under existing pilot and funding schemes; such evaluations should further serve in the process of developing future programmes. **P**

Annex 8: Organisations Contacted by the Review Team

Ministry of Economy and Energy
Ministry of Regional Development and Public Works
Ministry of Environment and Water
Ministry of Transport
Ministry of Finance
Energy Committee of the National Assembly
Energy Efficiency Agency
Bulgarian State Energy and Water Regulatory Commission
Bulgarian Energy Efficiency Fund
EBRD
National Electricity Company EAD
CEZ Bulgaria EAD
E.ON Bulgaria EAD
OVERGAS Inc. AD
District Heating Company Sofia
Association of Bulgarian Energy Agencies (ABEA)
Centre for Energy Efficiency EnEffect
Sofia Energy Agency (SOFENA)
Regional Energy Agency Pazardjik
Black Sea Regional Agency for Energy Management (BSRAEM)
Dobrich Local Agency for Energy Management
Sofia Technical University
University of Architecture, Construction and Geodesy, Sofia
Bulgarian Industrial Association (BIA)
Bulgarian Small and Medium Enterprises Promotion Agency
Energy Centre Sofia
Energoeffect Consult
Termoconsult
TÜV Rheinland Bulgaria EnCon Services Ltd.
EnCon Services Ltd.

Annex 9: General References and Information Sources

BULGARIA – Energy Mix Fact Sheet, January 2007, EC - DG TREN

BULGARIA – Internal Market Fact Sheet, January 2007, EC - DG TREN

Bulgaria, Renewable Energy Fact Sheet, EC - DG TREN

Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL),
<http://www.beerecl.com/>

EBRD Bulgaria Energy Efficiency and Renewable Energy Credit Line Support Rational Energy Utilisation and Financing Plan for Electrostart Plc Energy Efficiency Project, October 2004

Energy Act, Promulgated in the State Gazette No. 107 of 9 December 2003, amended in the State Gazette No. 18 of 5 March 2004, amended in the State Gazette No. 18 of 25 February 2005, amended in the State Gazette No. 95 of 29 November 2005, amended in the State Gazette No. 30 of 11 April 2006, amended in the State Gazette No. 65 of 11 August 2006, amended in the State Gazette No. 74 of 8 September 2006,
<http://www.mee.government.bg/eng/gzakone/gzakone/docs.html?id=187497>

Energy Efficiency Policies and Measures in Bulgaria 2006, Evaluation and Monitoring of Energy Efficiency in the New EU Member Countries and the EU-25 (EEE-NMC), Energy Efficiency Agency, Ministry of Economy and Energy, Sofia, June 2007

Energy Profile Bulgaria, Austrian Energy Agency, enerCEE,
<http://www.energyagency.at/enercee/bg/index.htm>

EUROSTAT: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,30070682,1090_33076576&_dad=portal&_schema=PORTAL

First National Energy Efficiency Action Plan 2008 – 2010, June 2007, Sofia

International Energy Agency IEA: Energy Statistics,
<http://www.iea.org/Textbase/stats/index.asp>

Law on Energy Efficiency, Promulgated in the State Gazette N 18/5 March, 2004, amended SG. 74/8 September 2006; amended SG 55/6 June 2007,
<http://www.mee.government.bg/eng/gzakone/gzakone/docs.html?id=190688>

MURE (Measures for the Rationale Use of Energy) database, <http://www.mure2.com>

Odyssee database on energy efficiency indicators, <http://www.odyssee-indicators.org>

Odyssee-MURE: Country Profile Bulgaria 2007,
<http://www.odyssee-indicators.org/Publication/country%20profiles%20PDF/bgr.pdf>

Odyssee-MURE: Country Report Bulgaria 2007, http://www.odyssee-indicators.org/Publication/PDF/nr_bulgaria_2007.pdf

OPTRES: RES Country Profile Bulgaria 2006

ORDINANCE № 16-1238 of December 28, 2007 for the circumstances to be recorded in the register of persons performing certification of buildings and energy efficiency audits, the rules for receiving information from the register and the conditions and order for achieving and recognition of qualification, Ministry of Energy and Energy Resources (promulgated in State Gazette, issue 7 of January 22, 2008)

ORDINANCE № 18 of November 12, 2004 for energy characteristics of sites, Ministry of Energy and Energy Resources/Ministry of Regional Development and Public Works (promulgated in State Gazette, issue 108/10.12.2004, into force since January 1, 2005) (Word file in English)

ORDINANCE № 19 of November 12, 2004 for certification of buildings for energy efficiency, Ministry of Energy and Energy Resources/Ministry of Regional Development and Public Works (promulgated in State Gazette, issue 108/10.12.2004, into force since January 1, 2005) (Word file in English)

ORDINANCE № 20 of November 12, 2004 for the circumstances and the order of entry into the register of persons performing certification of buildings and energy efficiency studies and for receiving of information, Ministry of Energy and Energy Resources (promulgated in State Gazette, issue 5/14.01.2005, into force since January 14, 2005) (replaced by ORDINANCE № 16-1238 of December 28, 2007)

ORDINANCE № 21 of November 12, 2004 for performing of energy efficiency study (audit), Ministry of Energy and Energy Resources/Ministry of Regional Development and Public Works (promulgated in State Gazette, issue 112/23.12.2004, into force since January 1, 2005) (Word file in English)

ORDINANCE ON LICENSING OF ACTIVITIES IN THE ENERGY SECTOR, Promulgated in the "State Gazette", No. 53 of June 22, 2004

ORDINANCE ON REGULATING THE PRICES OF ELECTRIC POWER, unofficial translation, 4/5/2004

ORDINANCE ON REGULATING THE PRICES OF HEAT SUPPLY, Promulgated in state gazette issue 55/25.06.2004

ORDINANCE ON REGULATING THE PRICES OF NATURAL GAS Adopted by CM Decree No131 on June 15 2004, promulgated in state gazette issue 55/25.06.2004

PEEREA (2001): In depth Energy Efficiency Review of Bulgaria 2001

PEEREA: Regular Energy Efficiency Review of Bulgaria 2004

Regional Urban Heating Policy Assessment, Part I, Alliance to Save Energy, July 2007

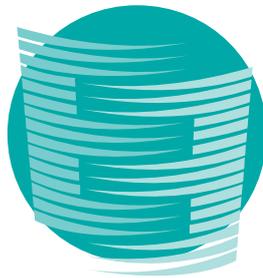
Renewable and Alternative Energy Sources and Biofuels Act, Prom. SG. 49/19.06.2007, <http://www.mee.government.bg/eng/gzakone/gzakone/docs.html?id=212967>

Report on Demonstrable Progress of Republic of Bulgaria to Achieve Commitments under the Kyoto Protocol, Republic of Bulgaria, Ministry of Environment and Water, Sofia, 2006

Republic of Bulgaria, NATIONAL REFORM PROGRAMME (2007 – 2009), Progress Report, Agency for Economic Analysis and Forecasting, October 2007

Second National Action Plan on Climate Change, 2005 – 2008, Republic of Bulgaria, Ministry of Environment and Water

SEWRC Resolutions and Papers, list



Energy Charter Secretariat

Boulevard de la Woluwe, 56 • B-1200 Brussels • Belgium

ISBN 978-905948-000-1

Dépôt légal D/2008/7850/5

2008



**ENERGY CHARTER SECRETARIAT
2008**



9 789059 480001
ISBN 978-905948-000-1
D/2008/7850/5

Energy Charter Secretariat
Boulevard de la Woluwe, 56
B-1200 Brussels, Belgium

Tel: +32 2 775 98 00
Fax: +32 2 775 98 01
E-mail: info@encharter.org

www.encharter.org