



ENERGY EFFICIENCY TRENDS AND POLICIES IN BULGARIA

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EXECUTIVE SUMMARY

By 2008 GDP growth is sustainable at rates above 6% annually. The effect of the crisis was observed from 2009.

There is a steady trend of increasing the use of renewable energy. The share of renewables in primary energy consumption in 2016 reached 10.9% which is more than 2.5 times greater than 4.2 % in 2000.

Strong impact on the volume and structure of the Primary energy consumption (PEC) has the export of significant quantities electricity.

During the period 2000-2016, the ratio between the final and primary energy consumption increased from 45 to 52 %. This growth is primarily due to the reduction of electricity exports and increased use of renewable energy.

The growth of the Final energy consumption from 2000 to 2016 is only 1 Mtoe (14 %) despite significant economic growth of 73 % during the same period and FEI in 2016 is 66% of the level in 2000. The observed reduction in final energy intensity is due practically entirely to 3.9 Mtoe annual energy savings from improved energy efficiency. The positive impact on FEI of structural changes and climate is insignificant.

Energy policy of the Republic of Bulgaria is consistent with the main objectives of energy policy of the European Union for energy security, competitiveness and sustainable development. Directive 2012/27/EC was transposed into national law by the adoption of the new Energy Efficiency Law, promulgated in State Gazette. 35 on 05/15/2015

The Energy Strategy of the Republic of Bulgaria by 2020 is assumed that "energy efficiency is the highest priority in the energy policy of the country." On this basis are set ambitious targets for improving energy efficiency. The National Energy Efficiency Action Plan identifies the following indicative national energy savings targets for 2020:

- Final Energy savings - 716 ktoe/year.
- Primary energy savings - 1590 ktoe/year, of which 169 ktoe/year in the transformation, transmission and distribution in the energy sector.

These are additional final energy savings compared to the reference scenario for Bulgaria provided the implementation of policy with high priority of energy efficiency

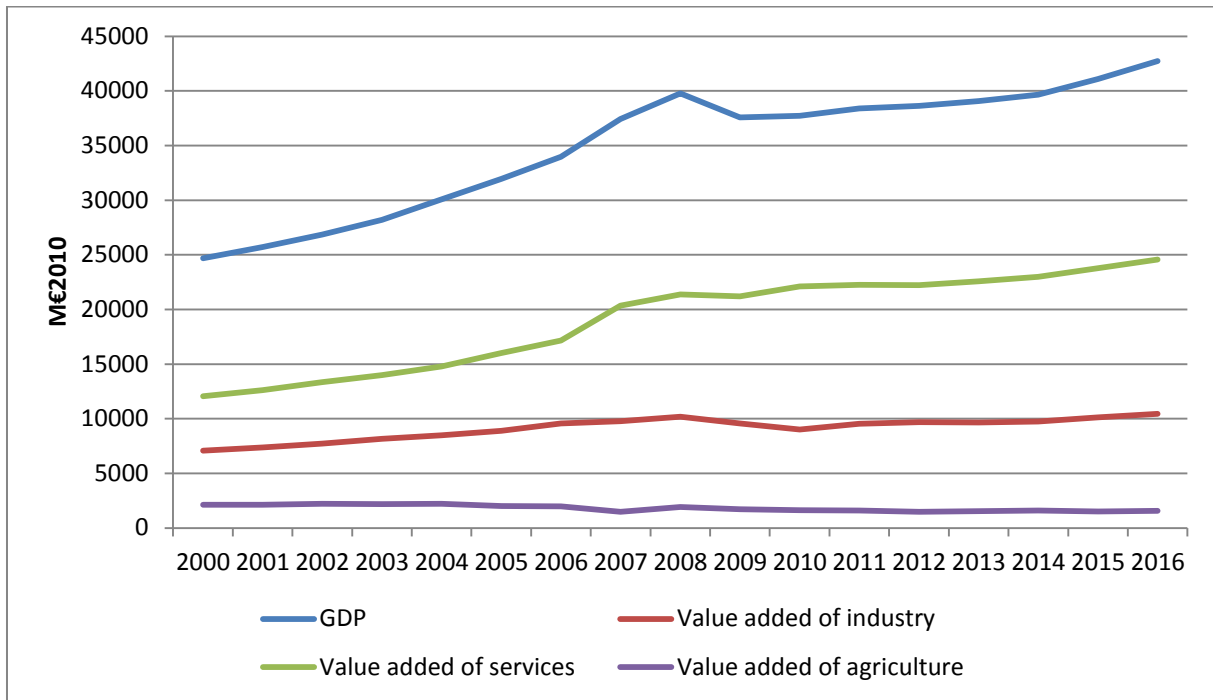
1. ECONOMIC AND ENERGY EFFICIENCY CONTEXT

1.1. ECONOMIC CONTEXT

Figure 1 shows the change in gross domestic product (GDP) and value added by sectors of the economy in the period 2000-2016

Fig. 1: Gross domestic product and value added for the period 2000 - 2016 by sectors of the economy and at constant prices 2010

Source: National Statistical Institute (NSI)



By 2008 GDP growth is sustained at rates about 6% annually.

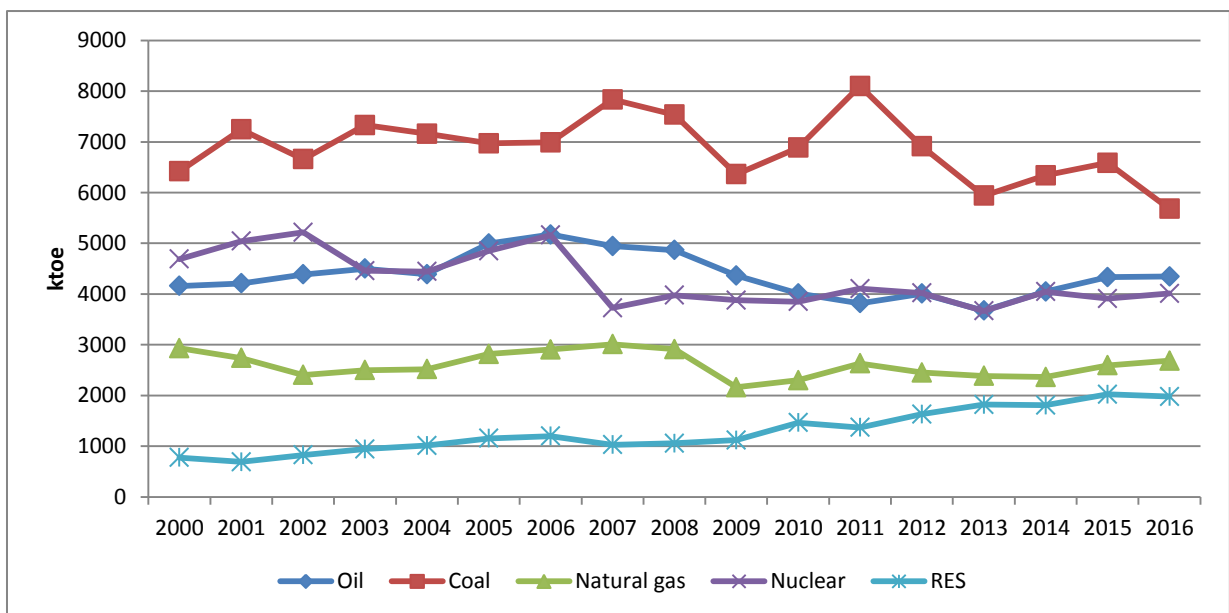
The impact of the crisis was observed from 2009. The average growth from 2008 to 2016 is less than 1 % per year.

After 2008 the average annual growth of Services is 1.8 %, of Industry is insignificant and in Agriculture is negative. The share of services in GDP increased in the period.

1.2. TOTAL ENERGY CONSUMPTION AND INTENSITIES

Fig. 2: Primary energy consumption by energy sources.

Source: NSI



The energy resource with the largest share in the energy consumption in Bulgaria is coal. But the coal

consumption decreased and in 2016 is 5.7 million toe, more than 11 % below the consumption in 2000.

Consumption of oil and oil products decreased steadily from 2006 to 2013, but after the reduction in oil prices in 2014 increased substantially and in 2016 is 4.3 million toe.

The use of nuclear energy after the decline in 2003 and 2007 caused by closure of units of the Kozloduy is relatively constant, about 4 million toe per year.

After the supply crisis in 2009 the natural gas can not restore the level of consumption reached in 2008.

There is a steady trend of increasing the use of renewable energy. The share of renewables in primary energy consumption in 2016 reached 10.9% which is more than 2.5 times greater than 4.2 % share in 2000.

Fig. 3: Indices of GDP, PEC and PEI for the period 2000-2016 r., 2000=100 %.

Source: NSI

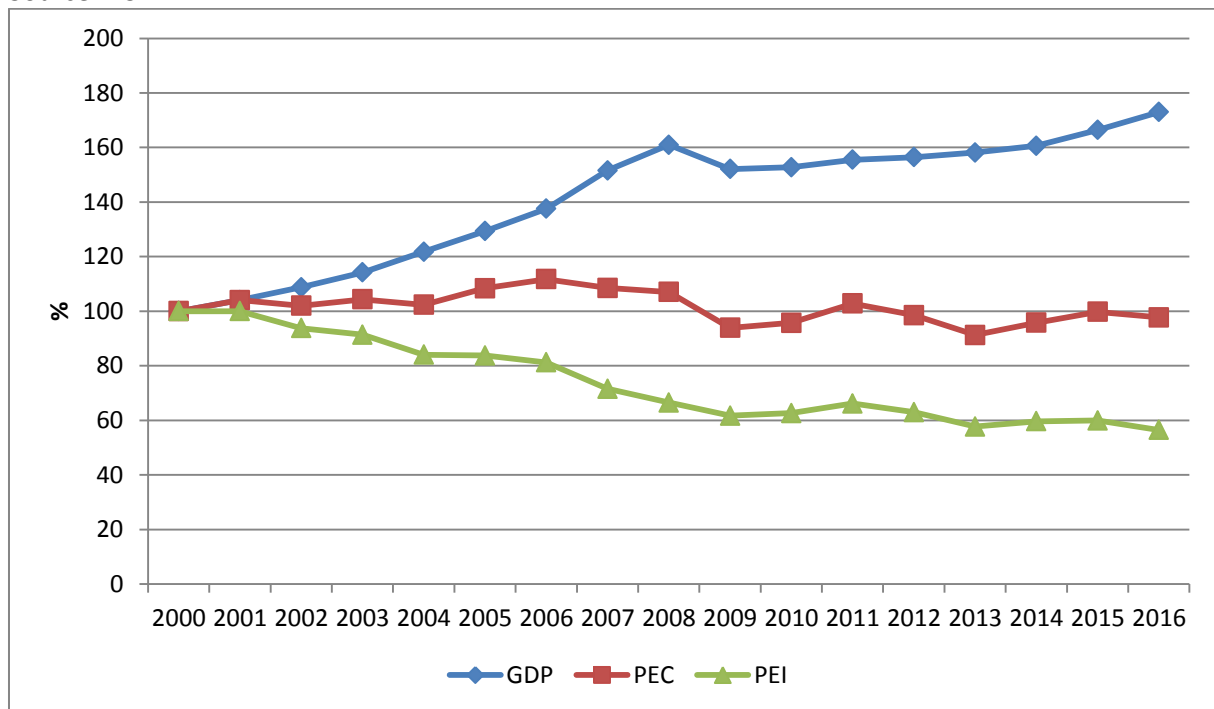


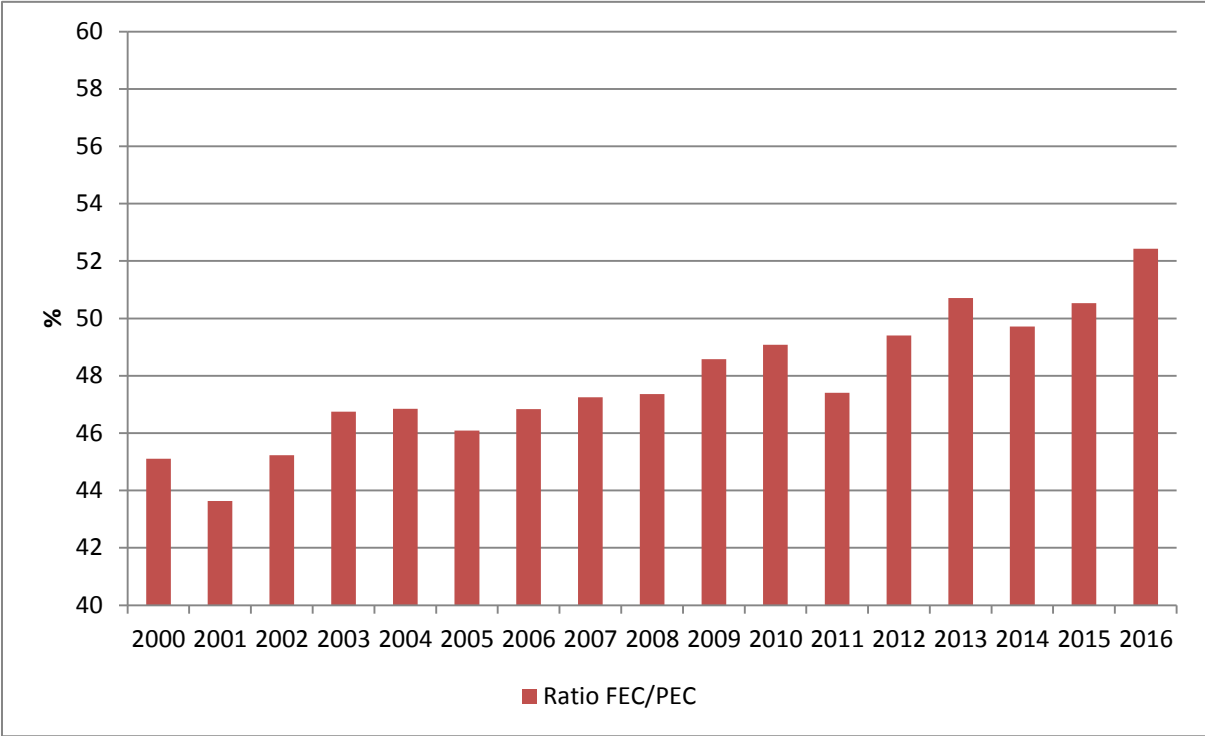
Figure 3 shows the indices of change in gross domestic product (GDP) primary energy consumption (PEC) and primary energy intensity (PEI) in the period 2000-2016, the index of 2000 is 100%.

The general trend over the period is the overall growth of GDP and at the same time constant PEC and a corresponding reduction in PEI, which in 2016 is 56% of the 2000 level.

The average rate of improvement of PEI from 2000 to 2009 is 5.9 % per year.

The crisis has impact after 2009 and the rate of improvement of PEI to 2016 declined to only 1.3 % per year.

Fig. 4: Final to Primary Energy Consumption ratio.
Source: NSI



The ratio between final and primary energy consumption depends mainly on the efficiency in the energy sector, the use of energy from renewable sources, export of electricity, etc. During the period 2000-2016, the ratio between the final and primary energy consumption increased from 45 to 52 %. This growth is primarily due to the reduction of electricity exports and increased use of renewable energy.

Fig. 5: Indices of GDP, FEC and FEI for the period 2000-2016, 2000=100 %.
Source: NSI

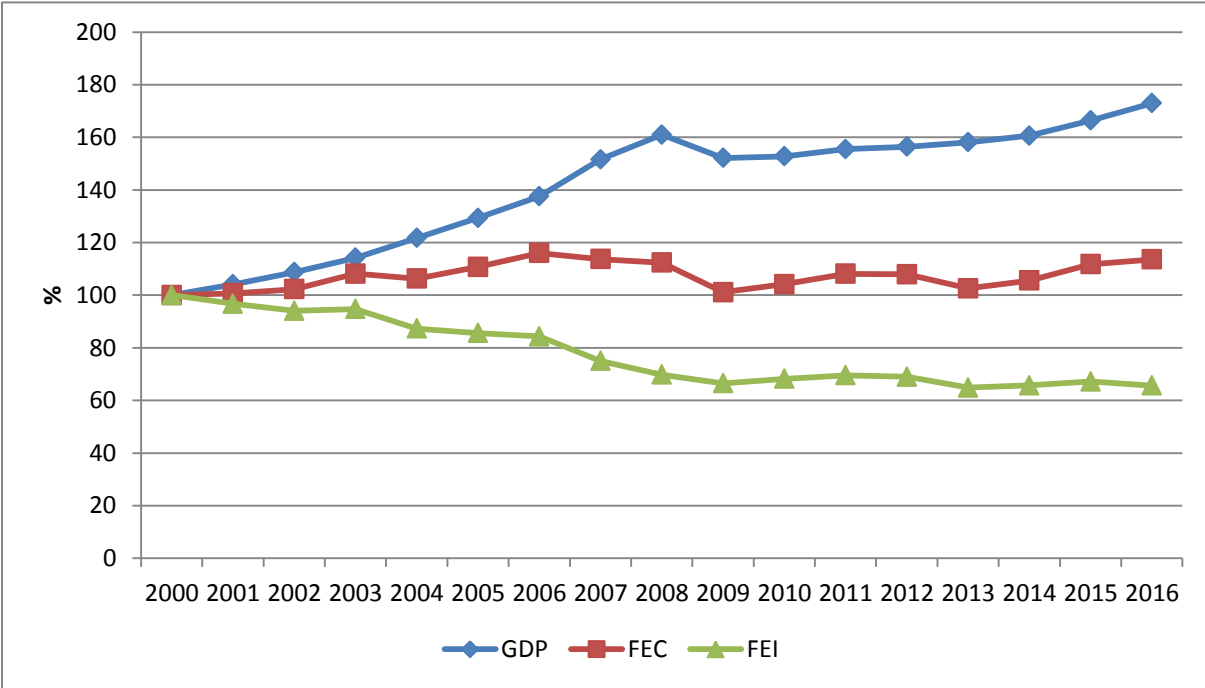
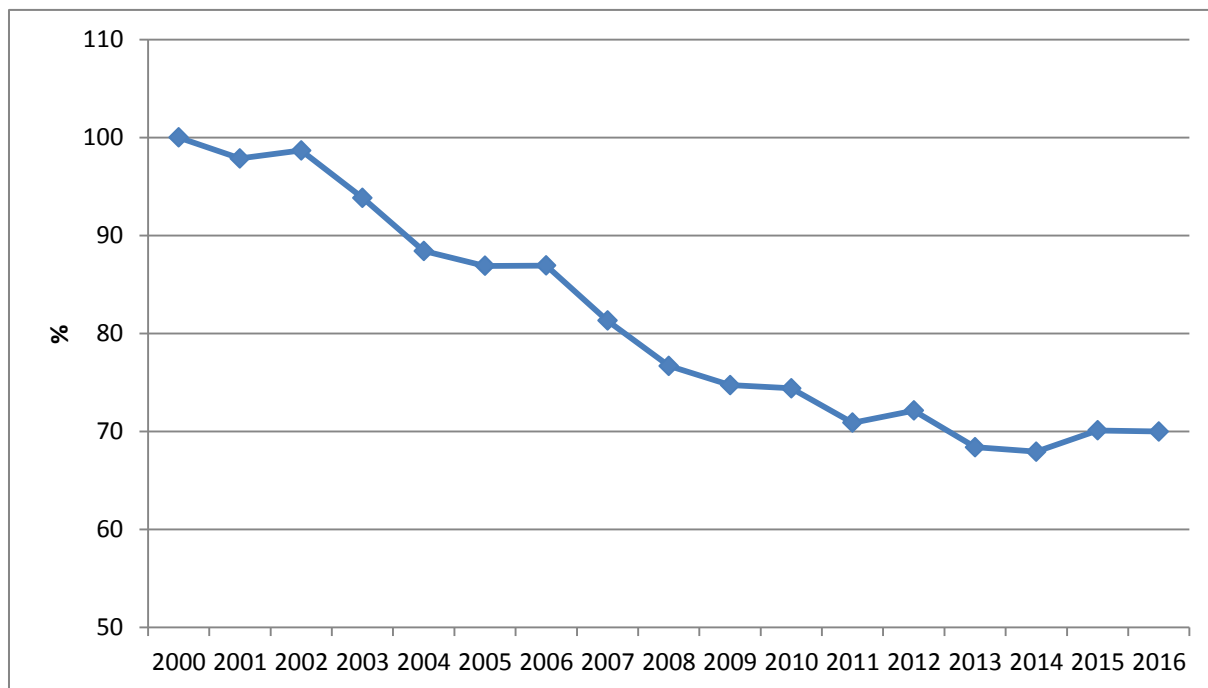


Figure 5 shows the same trends in of the Final energy consumption (FEC) and Final energy intensity (FEI), as the trends of PEC and PEI.

The growth of the Final energy consumption from 2000 to 2016 is only 14 % despite significant economic growth of 73 % during the same period and FEI in 2016 is 66% of the level in 2000.

Fig. 6: Global ODEX for the period 2000-2016 r., 2000=100 %

Source: ODYSEE–MURE project

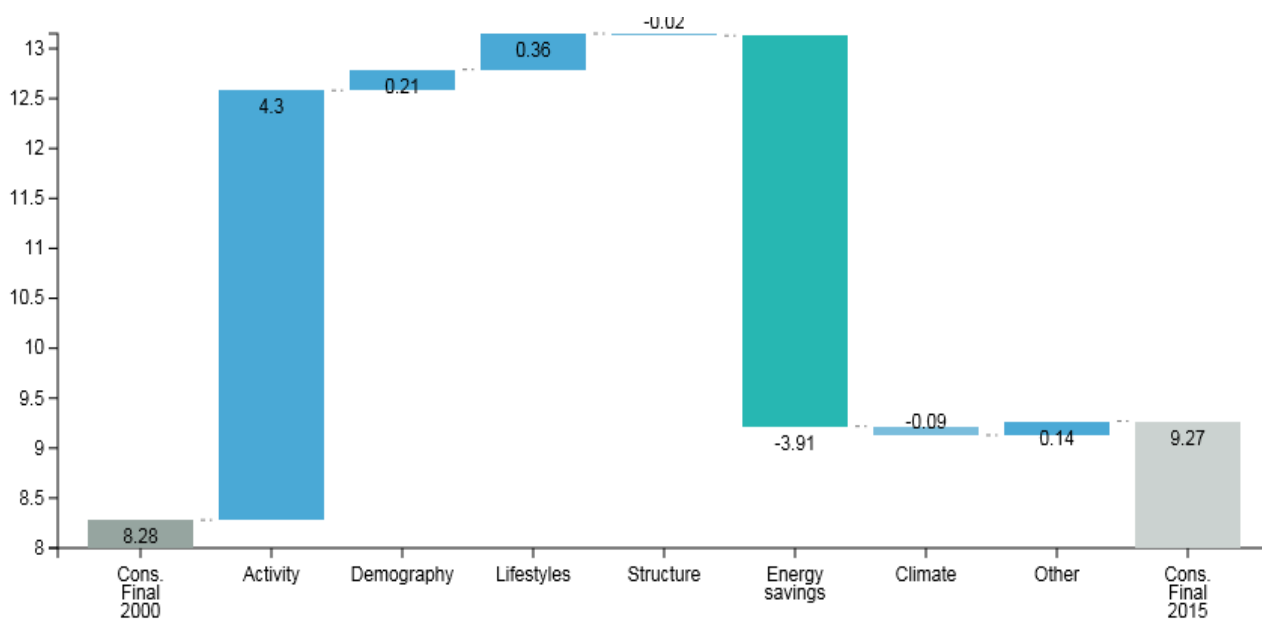


The global energy efficiency index ODEX in 2016 is 70% of the level in 2000 or 30 % improvement of energy efficiency in FEC.

The overall trend was improvement of the ODEX except in 2002, 2012 and 2015.

Fig. 7: Decomposition of the variation in final energy consumption 2000-2015

Source: ODYSEE–MURE project



The Figure 7 show the role of different factors for the variation of annual Final energy consumption in the period 2000-2015:

- The final energy consumption increased by 1 Mtoe.
- Increase in activity contributed to raise of consumption by 4.3 Mtoe, lifestyles and demography by around 0.57 Mtoe.
- Technical energy savings decreased the consumption by 3.9 Mtoe.

1.3. ENERGY EFFICIENCY POLICY BACKGROUND

Directive 2012/27/EC on energy efficiency aims to establish a common framework to promote energy efficiency in the EU, to ensure achieving the 2020 target of 20% primary energy savings, and create conditions for improving the energy efficiency. The measures are aimed at exploiting the potential of energy savings throughout the energy sector of the production, transmission and distribution to final energy consumption in buildings and industry; overcoming regulatory and non-regulatory barriers to the market and raise consumer awareness; set national targets for energy efficiency by 2020. The main points of Directive 2012/27/EC have been transposed into national law by the adoption of the new Energy Efficiency Law, promulgated in State Gazette. 35 on 05/15/2015

Energy policy of the Republic of Bulgaria is fully consistent with the main objectives of energy policy of the European Union energy security, competitiveness and sustainable development. The Energy Strategy of the Republic of Bulgaria by 2020 is assumed that "energy efficiency is the highest priority in the energy policy of the country". On this basis are set ambitious targets for improving energy efficiency.

1.3.1. NATIONAL ENERGY EFFICIENCY TARGETS TO 2020

In the National Energy Efficiency Action Plan Bulgaria defined the following national indicative energy savings targets for 2020:

- Energy savings in Final energy consumption: 716 ktoe/ann.
- Energy savings in Primary energy consumption: 1 590 ktoe/ann., of which 169 ktoe/ann. in the energy transformation, transmission and distribution.

The additional energy savings in FEC are defined with the assumption of implementation of strong policies on energy efficiency and optimal utilization of available additional funds from various sources in Bulgaria, as:

- European funds and programs (programming period 2014-2020);
- Obligated persons (based on energy efficiency obligation scheme for the energy traders);
- Local sources
- State budget.

The Implementation of the above indicative national energy savings targets and energy efficiency for 2020 will reduce the PEC in 2020 from 18 460 ktoe in the reference scenario to 16 870 ktoe.

The indicative national energy efficiency target is calculated based on the implementation of the above mentioned targets for energy savings and is defined as a reduction of PEI of Bulgaria for 2020 by 41% compared to PEI in 2005.

1.3.2. ADDITIONAL ENERGY EFFICIENCY TARGETS

In fulfillment of the requirements of the Energy Efficiency Act and in accordance with the provisions of Directive 2006/32/EC on energy end-use and energy services, Bulgaria adopted a national indicative energy savings target by 2016 in the amount of not less than 9% of the average final energy consumption for the period 2001-2005, i.e. for a period of nine years. In this regard it has been developed and implemented the First (2008-2010) and Second (2011-2013) three-years action plans in the field of EE containing concrete measures for improving energy efficiency in end-use energy.

In accordance with the provisions of the Energy Efficiency Act national target for energy savings was distributed as individual targets for energy savings between three groups of obligated persons:

- Energy traders;
- Owners of public service buildings in operation, with a gross floor area of over 500 m², and on July 9, 2015 - more than 250 m²;
- Owners of industrial systems with an annual energy consumption over 3000 MWh.

The threshold for the group of the energy traders, that have individual targets for energy savings and can implement measures in all sectors, was more than the equivalent of 75 GWh per year sold to the end users.

The adopted in 2012 Directive 2012/27/EC establishes a new scheme for energy efficiency obligations on energy traders, which differs from the existing national scheme.

With the new Energy Efficiency Law (adopted and published in State Gazette № 35/15.05.2015 the obligated parties are only end energy suppliers:

- selling electrical energy to final consumers more than 20 GWh per year;
- sell heat to final consumers more than 20 GWh per year;
- selling natural gas to final consumers more than 1 million m³ per year;
- selling liquid fuels to the end consumers more than 6.5 kt liquid fuels per year, with the exception of fuel for transport purposes;
- solid fuel traders who sell to end consumers more than 13 kt solid fuels per year.

In order to reach their individual targets, the obligated parties may implement energy-saving measures in all final customer sectors - industry, transport, households, commerce, civil society organizations, agriculture, forestry and fishery, services, etc.

In 2016 the analysis of the National EEOS implementation showed that:

- Fuel and energy sellers covered by the National EEOS are expected to fulfil not more than 60% of the savings.
- In the period 2010-2016, Bulgaria had an EEOS, covering more obligated persons – public buildings' owners and Industrial systems' owners
- In 2015 National Energy Efficiency Program for Multifamily Residential Buildings renovation was adopted.

Based on this analysis the National EEOS was changed with the adoption of EE Act amendment from 30 December 2016. According to the changes Bulgaria introduced alternative measures as a supplemented approach to the energy suppliers obligations.

The chosen alternative measures are:

1. Individual energy savings targets for public buildings' owners and Industrial systems' owners – 2014-2016
2. National Energy Efficiency Program for Multifamily Residential Buildings renovation – *ongoing*

Table 1.3.2: Breakdown of the obligation scheme 2014-2020 by year, ktoe/y

Year	EEOS – default approach <i>ktoe</i>	Alternative measure 1 – EE obligations for buildings and Industry <i>ktoe</i>	Alternative measure 2 – National Residential Buildings Renovation Program <i>ktoe</i>	Remainder for the obligated suppliers <i>ktoe</i>
2014	61,7	29,1	-	32,6
2015	61,7	20,8	-	30,9
2016	75,2	20	7,6	47,6
2017	75,2	-	23,44	51,76
2018	77,1	-	16,5	60,6
2019	77,1	-	16,5	60,6
2020	78,3	-	16,5	61,8
Total	506,3			355,86
2014- 2020 Cumulative 2014-2020	1 942,7			1 283,44

2. ENERGY EFFICIENCY IN BUILDINGS

2.1. ENERGY EFFICIENCY TRENDS

The main consumer of energy in buildings are households.

Fig. 8: Energy efficiency index ODEX in the Households for the period 2000-2016, 2000=100%.

Source: ODYSSEE-MURE Project

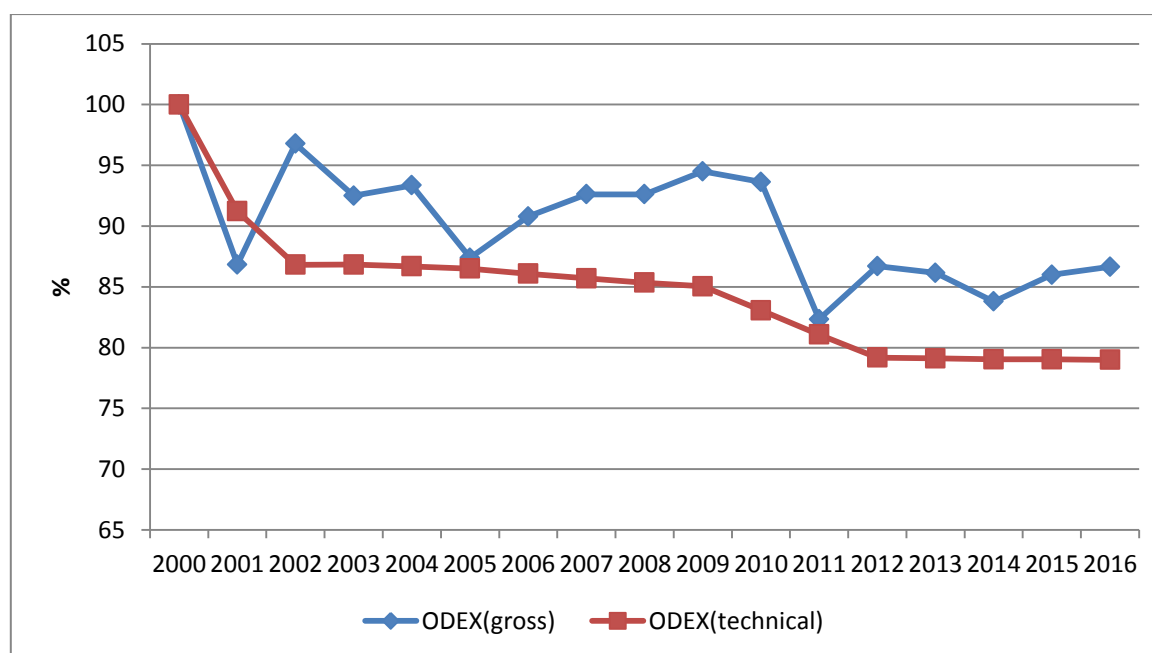


Figure 8 shows the change of the both generalized energy efficiency ODEX indices for Households

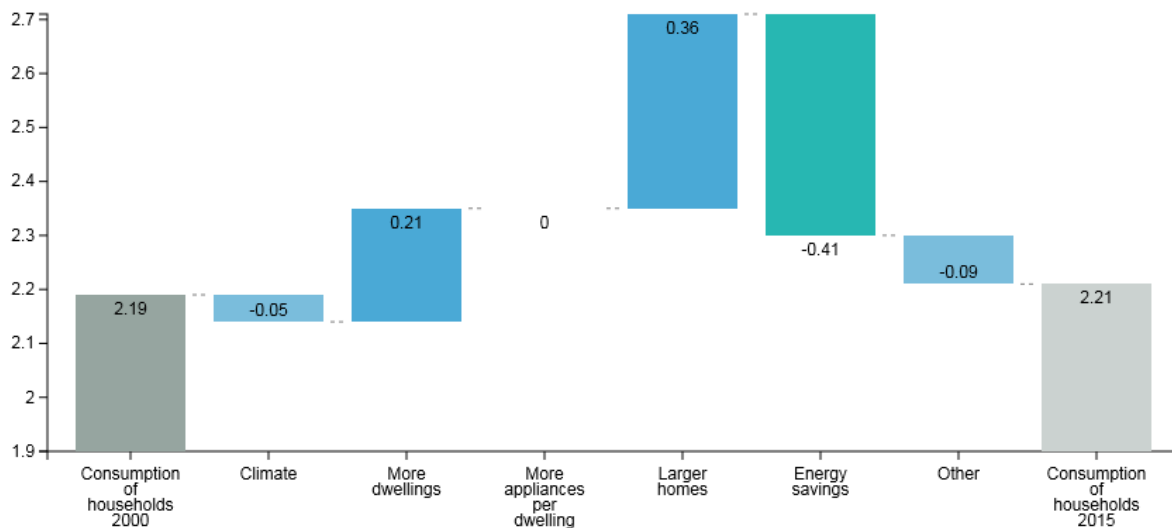
sector.

The technical index records only the increase the efficiency in buildings and household appliances, and the gross index shows the real change of the households' efficiency.

The technical index decreases throughout all the period and in 2016 is 79% of the level of 2000. The gross index decreases to a lesser extent (up to 86.7%), indicating some improvement in the households comfort level.

Fig. 9: Decomposition of the variation in households final energy consumption 2000-2015

Source: ODYSSEE-MURE Project



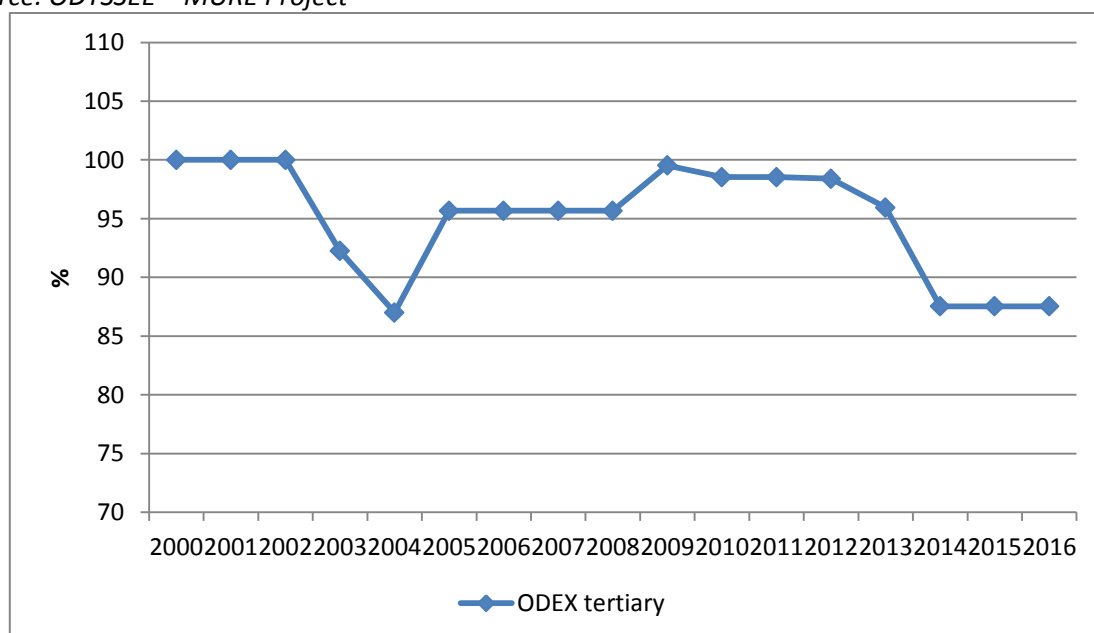
The Figure 9 show analysis of the variation of Final energy consumption in the period 2000-2015:

- The final energy consumption is practically constant.
- Increase in number of dwellings and average area of dwelling contributed to raise of consumption by 0.57 Mtoe.
- Technical energy savings reduced consumption by 0.41 Mtoe.

The second sector, which covers the consumption of public buildings is the Service sector.

Fig. 10: Energy efficiency index ODEX in the Tertiary sector for the period 2000-2016, 2000=100%.

Source: ODYSSEE – MURE Project



During the reporting period the ODEX index in tertiary sector shows changes of the trend – fast improvements from 2002 to 2004 and after 2012 and period of deterioration from 2005 to 2012.

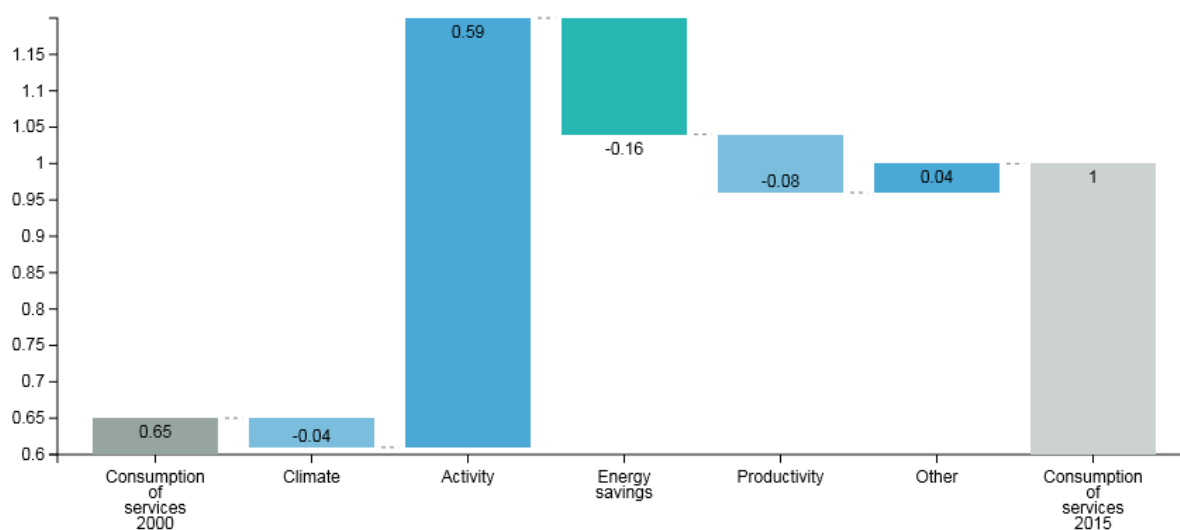
Some reasons for the deterioration of the energy efficiency in this sector after 2004 are:

- Increase of energy intensity from 2007 to 2011 - growth of energy consumption higher than the growth of the gross added value.
- The energy consumption per employee (with climatic correction) from 2004 to 2012, increased despite the effects of policies and measures for energy efficiency, which are aimed primarily at public buildings.

In 2016 the index is 87% of the level of 2000 or improvement of 13 % over the period.

Fig. 11: Decomposition of the variation in services final energy consumption 2000-2015

Source: ODYSSEE-MURE Project



The final energy consumption in the sector increased significantly (54 %) from 2000 to 2015.

This growth of the annual energy consumption is influenced by:

- Increased economic activity contributed to the consumption growth with 0.59 Mtoe
- Energy savings reduced consumption with 0.16 Mtoe.
- Changes in labor productivity reduced consumption with 0.08 Mtoe.
- The climatic difference between years 2015 and 2000 ("climatic effect") reduced consumption with 0.04 Mtoe
- Other effects, i.e behavioral effects increased consumption 0.04 Mtoe..

2.2. ENERGY EFFICIENCY POLICIES IN HOUSEHOLDS

2.2.1 Measures in Households

The current ongoing measures in the Households sector are 18. The breakdown by type of measures is as follows:

- Financial measures - 7
- Legislative measures – 9

- Informative - 2

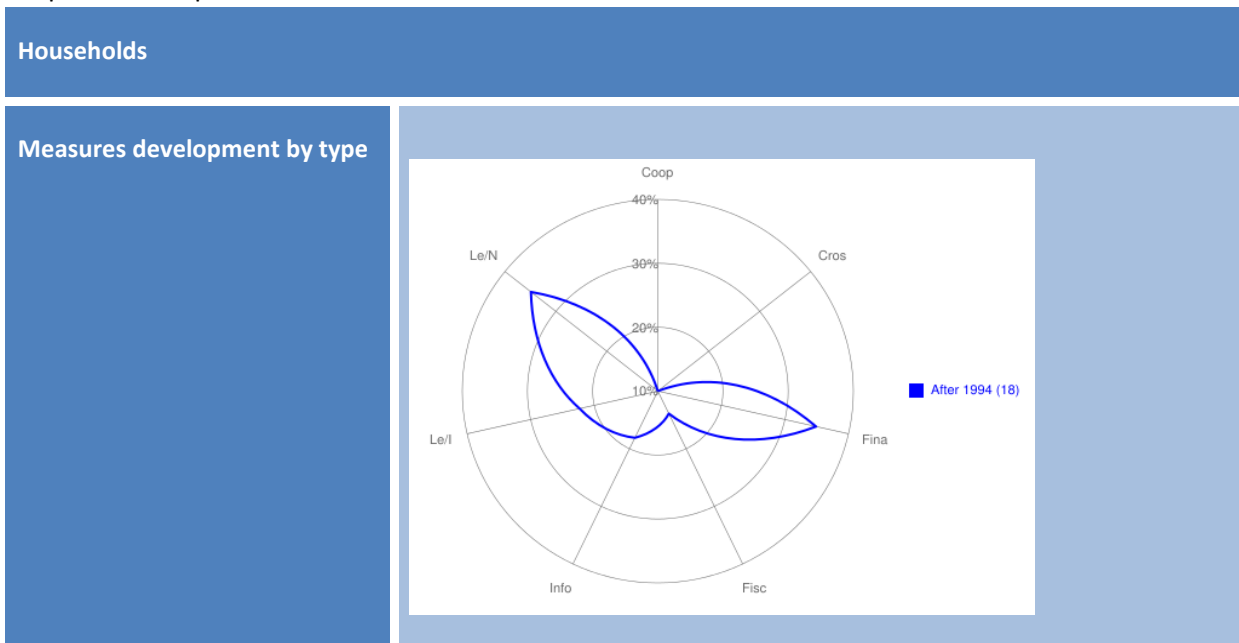
The measures in the Households sector are mostly normative, mandatory certification of buildings, labeling of electrical appliances, energy efficiency standards for electrical appliances, procedures and rules for share distribution of heat energy in multi-family residential buildings, etc.

The innovative measures in force in the sector are the financial measures. Among them is the expansion of the administrative, functional and financial capacity of the EE and RES Fund for finance of projects for utilization of renewable energy and by increasing the grant for energy efficiency measures in households.

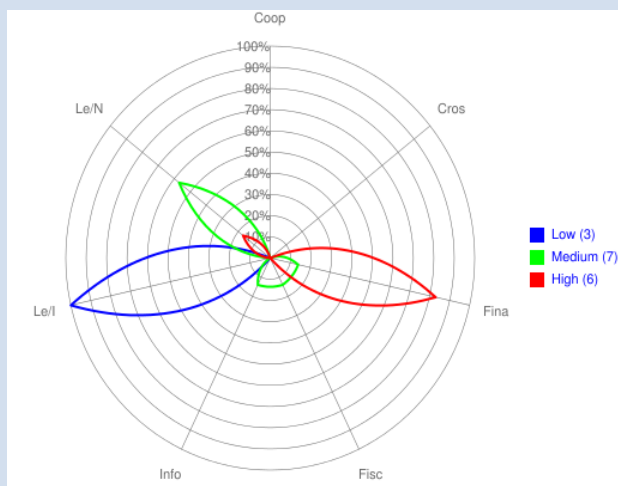
Another new measure with high impact is the National Programme for Energy Efficiency in Residential Buildings. The program aims to carry out renovation of multifamily residential buildings through the implementation of energy efficiency measures and aims to ensure better living conditions for citizens in multifamily buildings, better thermal comfort and higher quality of the living environment. Financial support is 100% grant. There are incentives for the creation of homeowners' associations within the meaning of the Law on Condominium Management to participate in this program. The financial resources of the program are 2 billion BGN to the end of 2017 and its territorial scope includes all the 265 municipalities in Bulgaria.

2.2.2. Models and dynamics of the Households measures

Table 2.2.2: Ongoing measures in the Households sector by type and depending on the quantitative impact for the period 1995-2017



Measures development by type and depending on the quantitative impact



The focus of the measures in the Households sector is on legislative measures as labeling of household appliances, minimum standards for electrical appliances, etc. As it is obvious from the graph after the Energy Efficiency Act (EEA) adoption the number of legislative measures increases. The sector is dominated by measures with medium impact, but immediately followed by those with great influence. The measures relating to European measures are few, but it should be noted that European requirements are largely incorporated into national legislation, i.e. the national measures are consistent with the European.

2.2.3. Examples of measures with significant quantitative impact

Table 2.2.3: Quantitative assessment of some of the most important measures in the Households sector

Households	
Measure	Quantitative assessment of the annual energy savings
BG 3: Residential Energy Efficiency Credit Line REECL	137 GWh (to 2017)
BG 15: Updated requirements for referent values of the heat transition coefficient of the walls, floors, ceilings and windows of new residential buildings.	506 GWh(to 2020)
BG27: National Energy Efficiency Program for Multifamily Residential Buildings renovation	503 GWh (to 2017)

2.3. ENERGY EFFICIENCY POLICIES IN SERVICES

2.3.1. Measures in Service sector

At present in Service sector ongoing are 19 measures. Almost all existing measures (13) are included in the National Energy Efficiency Action Plan.

The distribution of the type of the measures is as follows:

- Financial measures - 2
- Information / training - 3
- Legislative measures - 13
- Cooperative measures - 1

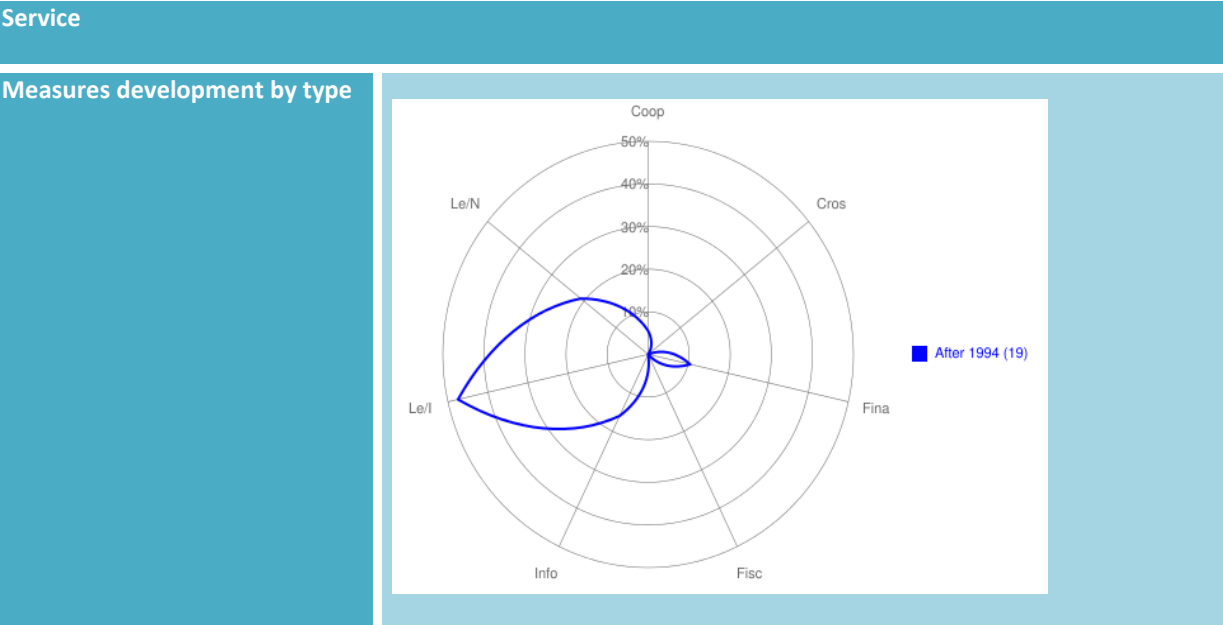
The legislative measures in the sector are aimed at establishing requirements for the mandatory inspection and certification of public buildings, preparation of municipal, regional and departmental

plans for improving energy efficiency, energy efficiency verification of boilers and air conditioning systems in buildings, introduction of requirements for mandatory energy efficiency management in state and municipal buildings, etc. With the transposition of Directive 2012/27/EC in Energy Efficiency Act (prom. SG. 35/05.15.2015) was introduced new measure - 5% of the total area of heated or cooled buildings owned and used by the central administration should be renovated every year. The summary list of public buildings owned by ministries in the country is published in the National Energy Efficiency Action Plan.

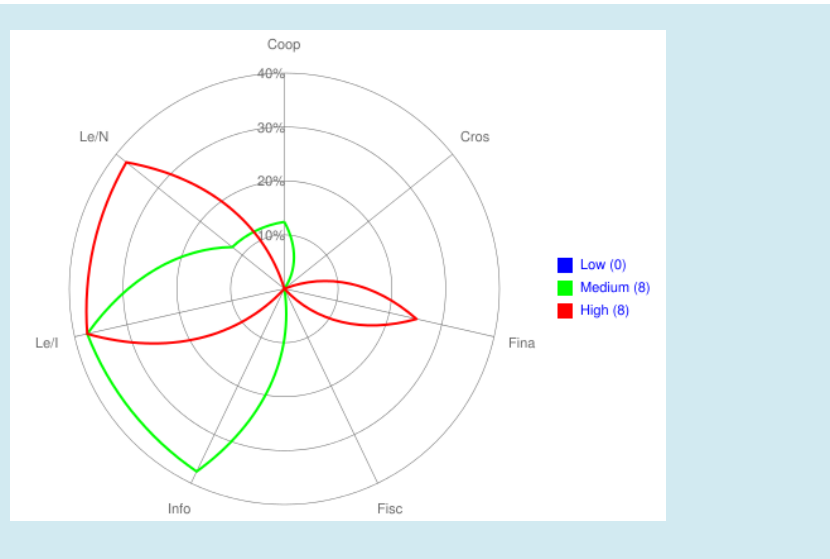
The obligation for procurement procedures that oblige participants to offer products that meet the minimum requirements for energy efficiency was introduced in the country with preparation of special instructions. In connection with the implementation of Art. 6 of Directive 2012/27/EC the central government administration should only purchase products and services with high energy efficiency. The National Green Public Procurements Action Plan also comprises similar measures. Operational Program "Regional Development" provides support for the implementation of energy efficiency measures in municipal educational infrastructure in urban areas and small municipalities.

2.3.2 Models and dynamics of the measures in Service sector

Table 2.3.2: Development of measures in Service sector by type and depending on the quantitative impact for the period 1995-2017



Measures development by type and depending on the quantitative impact



The focus of the measures in the Service sector is the financial and regulatory measures; the impact of almost all the measures in the sector is high. The impact of the financial measures increased after 2007 – the year Operational Program "Regional Development" (OPRD) was introduced. The program is aimed at practical implementation of Priority 4 of the National Strategic Referential Frame - "Balanced Territorial Development" and outlines the main areas in which Bulgaria receives funding for their regions by the European Regional Development Fund. OPRD finances measures to improve energy efficiency in the Service sector and the Households sector.

2.3.3. Examples of measures with significant quantitative impact

Table 2.2.3: Quantitative assessment of some of the most important measures in the Service sector

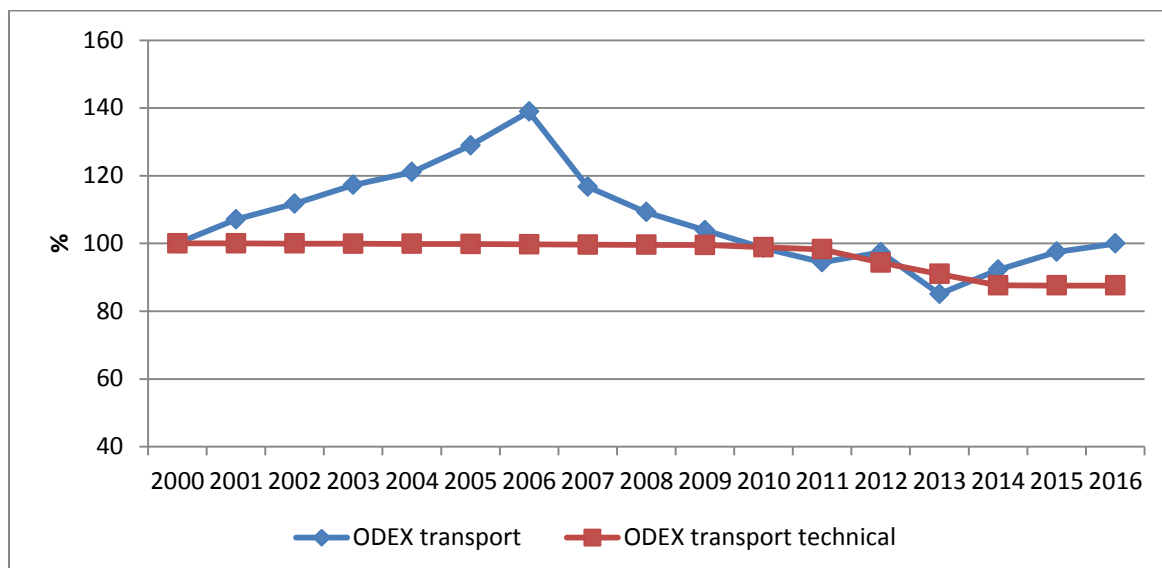
Service	
Measure	Quantitative assessment of the annual energy savings
BG 9: Mandatory energy efficiency certificates and labels for buildings	620 GWh (achieved to 2016)
BG 15: Financing of energy efficiency projects in municipal buildings by Operational Program Regional Development	141.2 GWh (achieved to 2016)
BG23: Mandatory annual renovation of 5% of the total area of the central government buildings	177.8 GWh (foreseen to 2020)

3. ENERGY EFFICIENCY IN TRANSPORT

3.1. ENERGY EFFICIENCY TRENDS IN TRANSPORT

Since 2009 transport has the largest share in final energy consumption. In 2016 this share was 35%.

Fig. 12: Observed ODEX index for Transport and technical ODEX for transport in the period 2000-2016, 2000=100 %. Source: ODYSSEE – MURE Project.

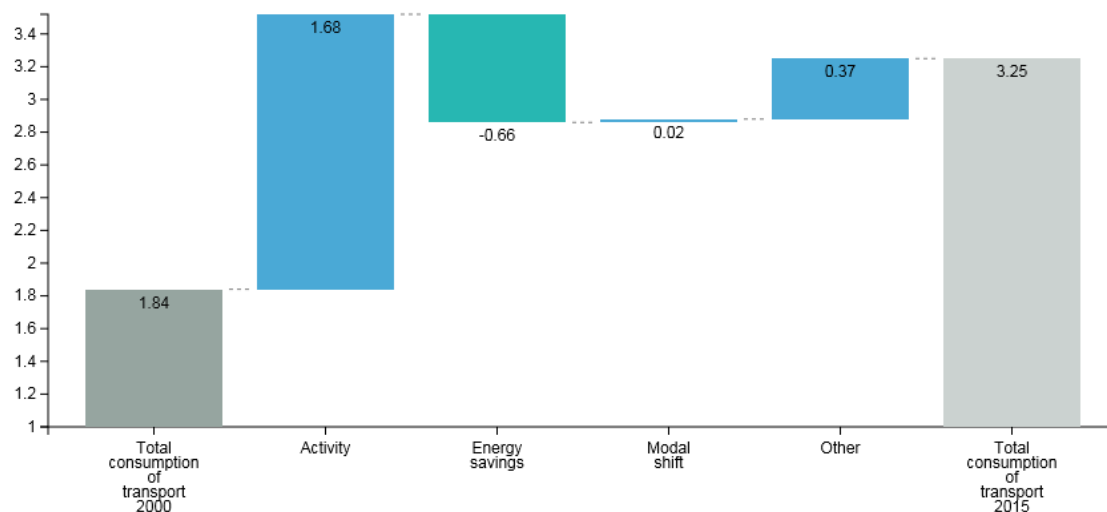


ODEX indices of observed and only technical energy efficiency of transport are shown on Figure 12. The decrease in the index for transport as a whole is due to almost entirely (95%) reduction of the road transport index, which consumes 92% of the fuel in the sector.

The technical index decreases slowly throughout all the period and in 2016 is 88 % of the level of 2000. The gross index in 2016 is exactly the same as in 2000 and the difference in the two indices show the effects of behavioral changes (more travel per person, reduced car occupancy etc.).

Fig. 13: Decomposition of the variation of final energy consumption in transport 2000-2015

Source: ODYSSEE-MURE Project



The final energy consumption of transport sector increased with 1.41 Mtoe from 2000 to 2015.

This significant growth of energy consumption is a consequence of:

- Growth in passenger traffic and traffic of goods ("activity effect") – 1.84 Mtoe consumption growth;
- Technical energy savings (i.e. change in the efficiency of cars, trucks, airplanes etc) – 0.66 Mtoe consumption reduction;
- Behavioral effects and low capacity utilization I freight transport – 0.37 Mtoe consumption

growth.

3.2. ENERGY EFFICIENCY POLICIES IN TRANSPORT

3.2.1 Measures in Transport sector

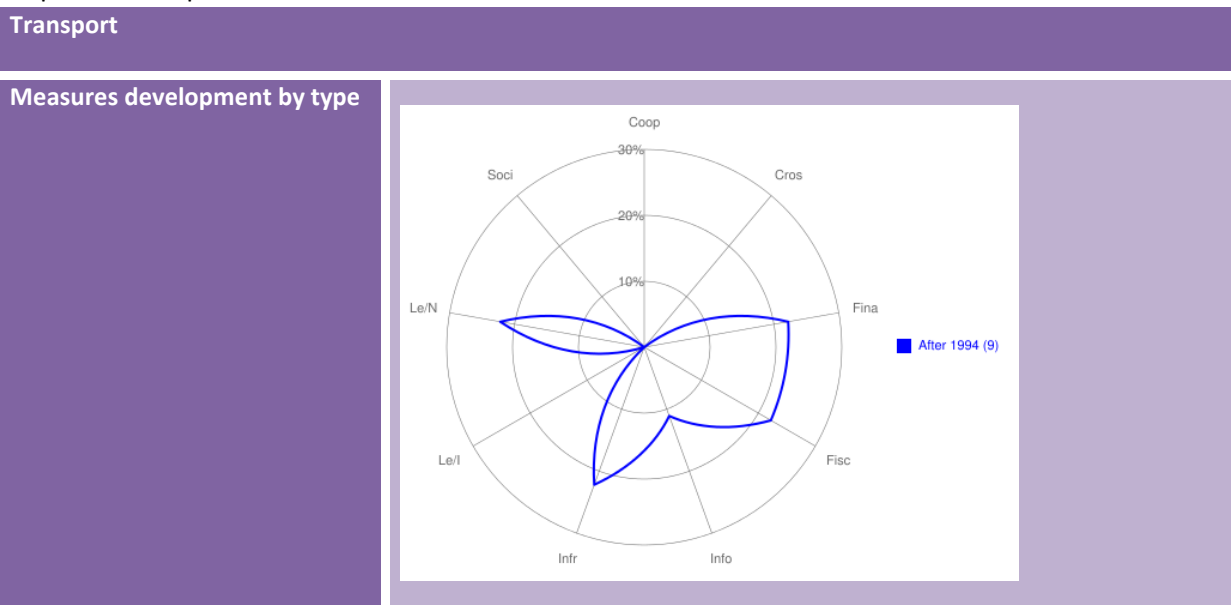
At present in the Transport sector there are 9 ongoing measures in total. The measures are mainly legislative and financial and tax incentives aimed at high-efficient fuels, to encourage the use of bio-fuels and to drivers training for economical driving. In the training for rational driving based are included topics to enhance the ability to optimize fuel consumption.

The responsible institution for the implementation of sectoral policies in transport – Ministry of Transport, Information Technologies and Communications (MTITC) develops various measures aimed at reducing energy consumption. That includes a program for energy efficient modernization and reconstruction of systems using non-traction electricity at train stations and station areas, the introduction of systems to control the fuel consumption and energy management systems, introduction of intelligent transport systems along the national road network and in the urban environment, development and construction of intermodal terminals for combined transport and others.

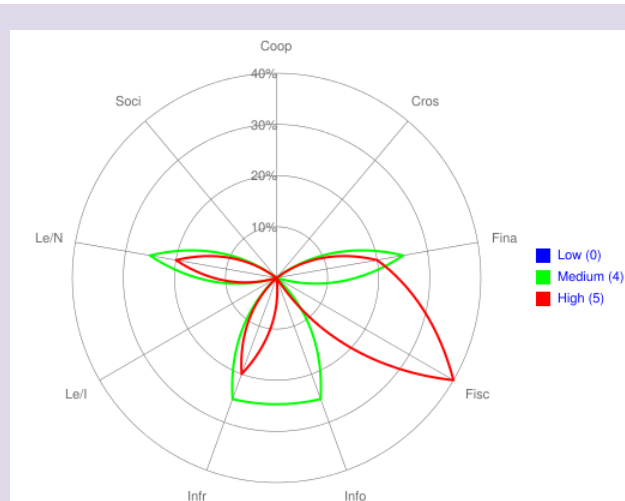
The activities included in the National Action Plan for the Promotion of Environmentally Friendly Vehicles are aimed at providing financial support for the introduction of innovative processes, products and services in environmental friendly vehicles, promoting investments in eco-innovations, and implementing financial support for companies investing in the area. Another important activity is the analysis of the opportunities and impacts of the introduction of preferential fees and discounts on annual taxes for owners of environmentally friendly vehicles and synchronization with the local legislation. The gradual expansion of the charging infrastructure in municipalities and financing of projects and initiatives relating to the energy aspects of transport and electric vehicles and hybrid vehicles. Annually there are many information campaigns for informing the public about the postures of penetration of clean vehicles in order to promote sustainable mobility. In some municipalities were introduced discounts for electric vehicles, as they are exempt from the fee for parking in downtown.

3.2.2. Models and dynamics of the measures in Transport sector

Table 3.2.2: Development of measures in Transport sector by type and depending on the quantitative impact for the period 1995-2017



Measures development by type and depending on the quantitative impact



Before the adoption of Energy Efficiency Act the emphasis on measures in the sector was mainly on regulatory measures - various ongoing programs to reduce the consumption of transport fuels. Following the adoption of the Energy Efficiency Act, the focus shifts to information and financial measures especially after the beginning of the Operational Programme Transport (OPT) in 2007. OPT is one of the seven operational programs of the Republic of Bulgaria, financed by the Structural and Cohesion Funds of the European Union and the operational program with the largest budget in Bulgaria - 2 billion Euros. The goal of OPT is development of railway, road and water infrastructure, as well as stimulating the development of combined transport in accordance with the transport policy of the European Union.

Within the Operational Program "Regions in Growth" 2014-2020 there is specific objective "Development of ecological and sustainable urban transport". To achieve this, it is envisaged to finance the development of traffic management plans and the deployment of Intelligent Transport Systems (ITS), including automated traffic management and control systems, vehicle detection and localization and motor vehicle advantage by public transport systems, real-time passenger information systems, automated ticketing systems, connection subsystems, video surveillance systems for urban mobility centres, etc.

3.2.3. Examples of measures with significant quantitative impact

Table 3.2.3: Quantitative assessment of some of the important measures in the Transport sector

Transport	
Measure	Quantitative assessment of the annual savings
BG3: Mandatory annual inspections of vehicles	667 GWh
BG17: Development and stimulation of the bicycle traffic	476.2 GWh (to 2020)
BG18: Introduction of Intelligent Transport Systems on the National Road Network and in the Urban Environment	544.2 GWh(to 2020)

4. ENERGY EFFICIENCY IN INDUSTRY

4.1. ENERGY EFFICIENCY TRENDS IN INDUSTRY

At the beginning of the period the Industry was the sector with the largest share in the final energy consumption. After 2009 it is second after Transport sector.

In 2016, the share of industry is 28%.

Fig. 14: Energy efficiency index ODEX of the industry in the period 2000-2016, 2000=100%. *Source: ODYSSEE – MURE Project.*

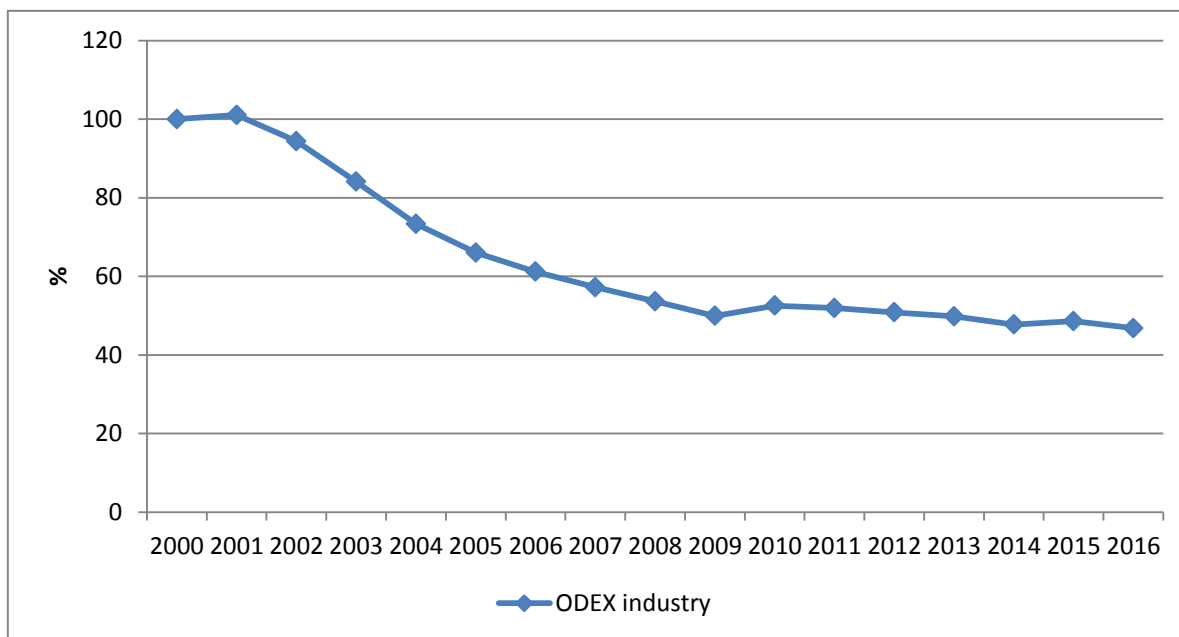
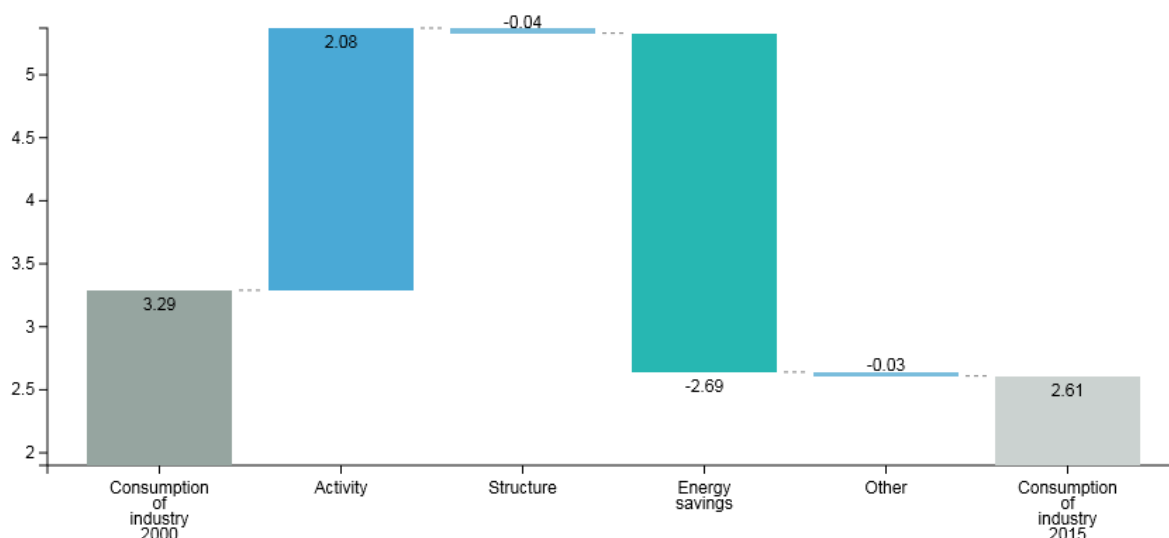


Figure 14 shows the change of the energy efficiency index ODEX for Industry sector in general. From 2000 to 2009 there is sustainable trend of rapid reduction energy efficiency index. ODEX in 2009 is only 50% of the level of 2000. After 2009, under the impact of the economic crisis, the positive trend of improving energy efficiency slow down. In 2016 energy efficiency index ODEX of industry is 47 % in comparison with 2000 level and industry is the sector with the most significant improvement in energy efficiency in this period.

Fig. 15: Decomposition of the variation of final energy consumption in transport 2000-2015 *Source: ODYSSEE-MURE Project*



The final energy consumption of industry decreased by 0.68 Mtoe from 2000 to 2015. This reduction of energy consumption is a consequence of:

- Growth in industrial activity (measured with the production index) – 2.08 Mtoe;
- Energy savings calculated from changes in energy consumption per unit of production at branch

- level – 2.69 Mtoe reduction of consumption;
- All other effects are insignificant.

Industry is the sector with the most significant energy savings in the period 2000-2015.

4.2. ENERGY EFFICIENCY POLICIES IN INDUSTRY

4.2.1. Measures in Industry sector

The ongoing measures in the Industry sector are 7. The distribution of the type of measures is as follows:

- Financial measures - 4
- Legislative/Informative - 2
- Legislative/Normative - 1

Substantial support for the implementation of the measures in the Industry sector provides Operational Programme "Innovation and Competitiveness" 2014-2020 (OPIC) co-funded by the European Union through the European Regional Development Fund.

The implementation of energy efficiency projects under this program falls under investment priority 3.1 "Energy Technologies and Energy Efficiency" under priority axis 3 "Energy and resource efficiency" in line with thematic objective 4 "Support for the transition to a low carbon economy in all sectors ". A specific objective of this priority axis is to reduce the energy intensity of the economy. Support under the investment priority will be concentrated in an indicative set of actions to increase energy efficiency in enterprises. Beneficiaries are existing enterprises on the territory of the country, outside the commerce and services sectors.

Support for increasing energy efficiency in enterprises includes the following:

- Energy efficiency audits in enterprises;
- Implementation of the measures recommended in the audit reports;
- Investments in tangible and intangible fixed assets, energy management systems, incl. energy efficiency management systems based on information and communication technologies;
- Reuse of residual heat in industry and support of high-efficiency micro and small cogeneration and modernization of networks, etc.;
- Accompanying and renewable energy related activities for own consumption (electricity, heating and cooling);
- Complementary support for construction activities to improve the energy and thermal performance of the building stock of factory buildings will also be provided in demonstrating the effect of these activities;

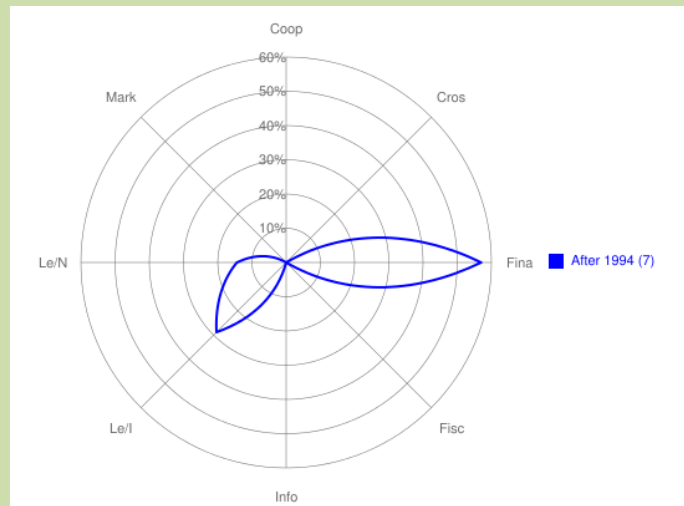
For the implementation of the energy efficiency projects under OPIC 2014-2020 ERDF assistance is foreseen amounting to EUR 227,8 million, which will allow the realization of investments of the total project value of approx. EUR 490,1 million.

4.2.2. Models and dynamics of the measures in Industry sector

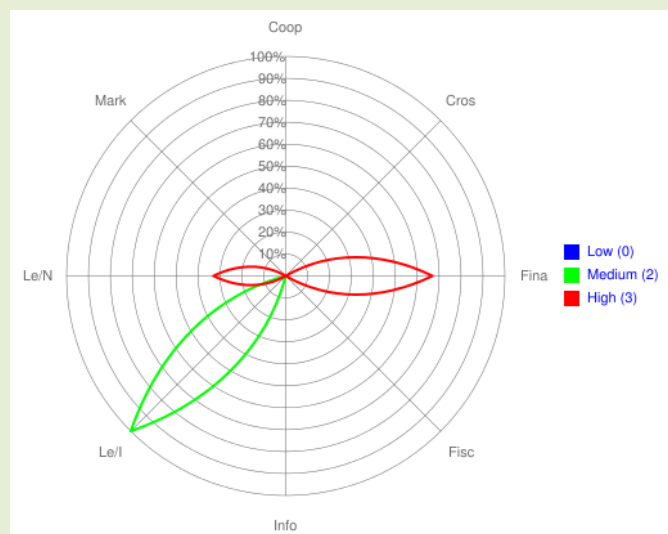
Table 4.2.2: Development of measures in Industry sector by type and depending on the quantitative impact for the period 1995-2017

Industry

Measures development by type



Measures development by type and depending on the quantitative impact



Industry sector is the sector with the most improvements in the period of over 20 years. Before adoption of Energy Efficiency Act in the sector there were almost no regulatory measures. With the adoption of the law obligations to owners of industrial systems in the country were set - mandatory energy efficiency audits, mandatory implementation of the measures for a specified period, mandatory energy management in enterprises, fulfillment of individual targets for energy savings, etc.

In the sector there are no measures with minor impact. All measures are with medium and high impact, focusing on financial and regulatory measures. Since 2007 to 2013 started the financing of energy efficiency measures under the Operational Programme "Development of the Competitiveness of the Bulgarian Economy". This program was followed by Operational Programme "Innovation and Competitiveness" 2014-2020 (OPIC) - one of the seven operational programs financed by the Structural Funds of the European Union. The program is funded by the European Regional Development Fund and the National budget.

Other operating financial measure with great influence in the sector is the credit line for energy efficiency and renewable energy (BEERECL). The credit line was established by the European Bank for Reconstruction and Development in cooperation with the Bulgarian government and the EU. It provides financing for energy efficiency and renewable energy projects, as well as consulting services for implementation of the project, preparation of business plans, etc.

4.2.3. Examples of measures with significant quantitative impact

Table 4.2.3: Quantitative assessment of some of the most important measures in the Industry sector

Industry	
Measure	Quantitative assessment of the annual energy savings
BG 1: Mandatory Industrial Audits for Energy Efficiency – expected savings in the audits	805.6 GWh(to 2017)
BG 5: Individual energy saving targets for industrial enterprises with more than 3000 MWh annual energy consumption	650 GWh(achieved to 2016)
BG 14: Financing of projects for energy saving technologies and RES by Operational Programmes Competitiveness	247.6 GWh (achieved to 2017)

5. GENERAL CROSS-CUTTING MEASURES

5.1. Cross-cutting measures in force

The active ongoing cross-cutting measures are 11 and mostly legislative, fiscal and financial. Among the measures are the Energy Efficiency Act, Energy Efficiency Obligation Scheme and individual energy saving targets, Bulgarian Energy Efficiency and Renewable Sources Fund, Preferential feed-in tariffs for CHP and RES and others. The measure with the greatest cross-cutting impact is the obligation scheme with individual energy efficiency targets for energy suppliers. In the first scheme(to 2014) 52 companies, that annually sell to end-user energy and fuels more than the equivalent of 75 GWh, received individual targets. For the period from the beginning of the obligation scheme from 2008 to the end of 2014 the implementation reached 48.2% of the target.

A new obligation scheme including alternative measures and new individual targets for energy suppliers, was adopted for the period 2014-2020 in accordance with Article 7 of Directive 2012/27/EC on energy efficiency. In preparing this new obligation scheme was used the frame contained in Annex V, Part 4 of the Directive.

Based on the analysis of implementation of the National EEOS the obligation scheme was changed with the adoption of EE Act amendment from 30 December 2016. According to the changes Bulgaria introduced alternative measures as a supplemented approach to the energy suppliers' obligations.

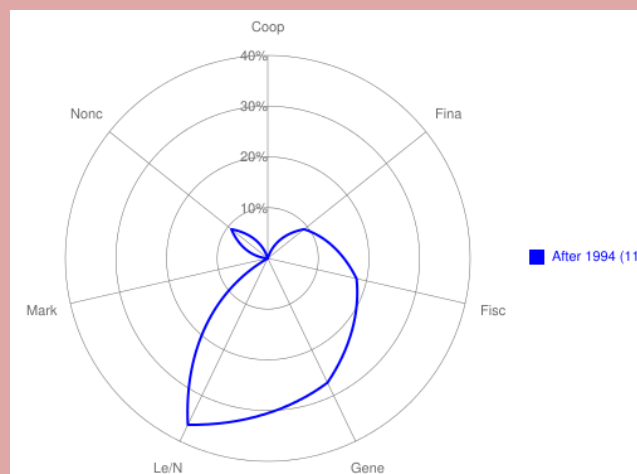
The total annual volume of energy savings in new scheme is 506,3 ktoe(5887,3 GWh) in 2020 with the share of the energy suppliers 355,9(4138 GWh) ktoe or 70 %. The calculation of the new obligation scheme is shown in Table 1.3.2 "Breakdown of the obligation scheme by year (2014-2020)" in this national report.

5.2. Models and dynamics of the cross-cutting measures

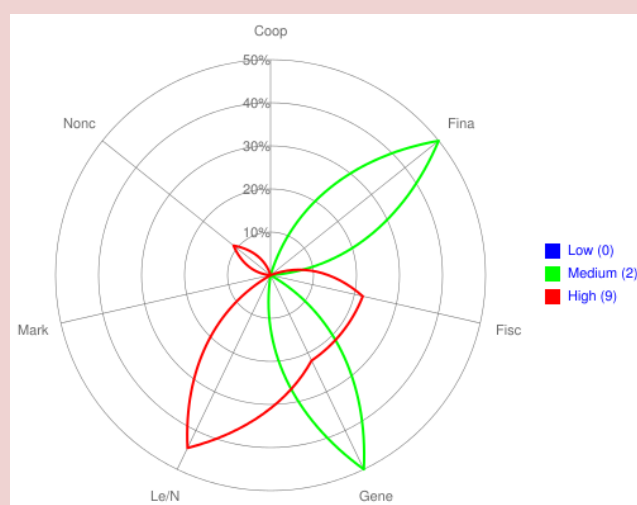
Table 5.2: Development of cross-cutting measures by type and depending of the quantitative impact for the period 1995-2017

Cross-cutting measures

Measures development by type



Measures development by type and depending on the quantitative impact



Before the adoption of the Energy Efficiency Act the focus of the cross-cutting measures was on national and sectorial programs to improve energy efficiency. After adoption of the law the focus shifts to the regulatory measures. One of the completed cross-cutting measures in the country with the greatest impact is the distribution of part of the national target for energy savings, set up under Directive 2006/32/EC as individual targets of energy traders. The measure acts as cross-cutting because for the performance of its individual target energy traders can implement measures to improve energy efficiency in all sectors of the economy.

The latest ongoing cross-cutting measure with high impact is the introduction of the obligation scheme for energy traders who must achieve energy savings in the period 2014-2020 under the requirements of Art. 7 of Directive 2012/27/EC.

5.3. Examples of measures with significant quantitative impact

Table 5.3: Quantitative assessment of some of the most important cross-cutting measures

Cross-cutting measures	
Measure	Quantitative assessment of the annual energy savings
BG 15: Bulgarian Energy Efficiency and Renewable Sources Fund	141.7 GWh(achieved to 2017)
BG 17: Individual targets for the obligated under Energy Efficiency Law persons – energy suppliers (2008-2016)	2301 GWh(achieved to 2016)
BG 25: Energy Efficiency Obligation Scheme 2014 - 2020	5889 GWh(foreseen to 2020)