Interreg
EUROPEAN UNION
Danube Transnational Programme
EcoInn Danube

NATIONAL REPORT ON O&O– BULGARIA

Project co-funded by European Union funds (ERDF and IPA)
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2017

WP3	Strategy for eco-knowledge
ACTIVITY 3.2	Analysing the environment for ecoinnovation in partner countries
DELIVERABLE 3.2.2	National report on obstacles and opportunities

Project number	DTP1-191-1.1
Title of the project	Eco-innovately connected Danube Region (EcoInn Danube)
Version	Final
Author	ERDF PP1 Chamber of Commerce and Industry Vratsa
Country	Bulgaria
Date	2017

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1. ABSTRACT

Bulgaria's transition to a more open and flexible economic system has been facilitated by substantial restructuring. Competitive flat tax rates and an open trade regime, supported by a relatively efficient regulatory framework, have encouraged development of a growing private sector. The financial sector demonstrated a relatively high level of resilience during the 2014 liquidity crisis

The country continues to be categorised in the modest innovator group, although a key objective is to reach the moderate innovators group by 2020. The main challenges for eco - innovation in Bulgaria are related to increasing domestic and foreign investment opportunities in eco - innovation and circular economy, promoting efficient use of resources by achieving high energy efficiency (especially in homes and building infrastructure), further developing renewable energy sources, and improving sustainability practices within the transport sector. Increased national investments from government and industry would significantly encourage more support for eco-innovation and circular economy initiatives. Furthermore, the legislative framework could be further improved to encourage more investment in the sector.
Economic, financial, administrative and socio-cultural barriers were identified that slow the advancement of eco-innovation in the country. Important barriers include limited investment and funding opportunities, high energy prices and inefficient energy infrastructure. Nonetheless, several significant drivers were also identified; the most significant were: a rise in awareness from both business, citizens and government on the benefits of green products and technologies, high skilled human resource and knowledge capital and Bulgaria's leading regional position in the information and communications technology (ICT) sector. Despite the growing demand for environmentally-friendly products and services, stakeholders remain reluctant to invest in these areas due to consequences of the economic crisis. To meet the objectives of promoting energy efficiency, renewable energy sources, waste management and green transport, local stakeholders are taking advantage of funding options set up by the European funded Operational Programmes.

The relative strengths of the country's innovation system are in the innovation-friendly environment, and the human resources, while the relative weaknesses are in the innovation activities, and in the public and private investment in research and innovation. Due to the existing innovation policies and financing mechanisms, which Bulgaria is actively implementing at the moment, the trend is that Bulgaria will improve its performance by means of all innovation indicators.

2. OVERALL NATIONAL RANKING

This section provides an overview of the national ranking according to 2 main composite indexes applied:

- Innovation index
- Eco innovation index

Innovation index

Based on its average performance scores, in view of the 27 identified innovation indicators, Bulgaria is still considered a Modest Innovator, as it has not relatively changed its performance to that of the EU in 2010. It is followed only by Romania in the ranking.

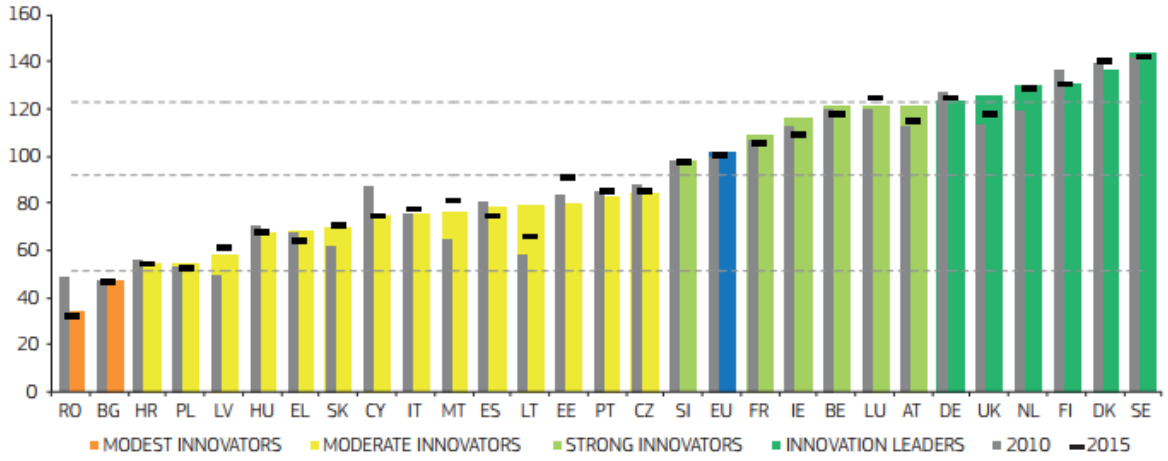


Figure : Performance of EU member states innovation system

The scheme below presents a comparison between Bulgaria and EU 28, by means of innovation indicators performance:

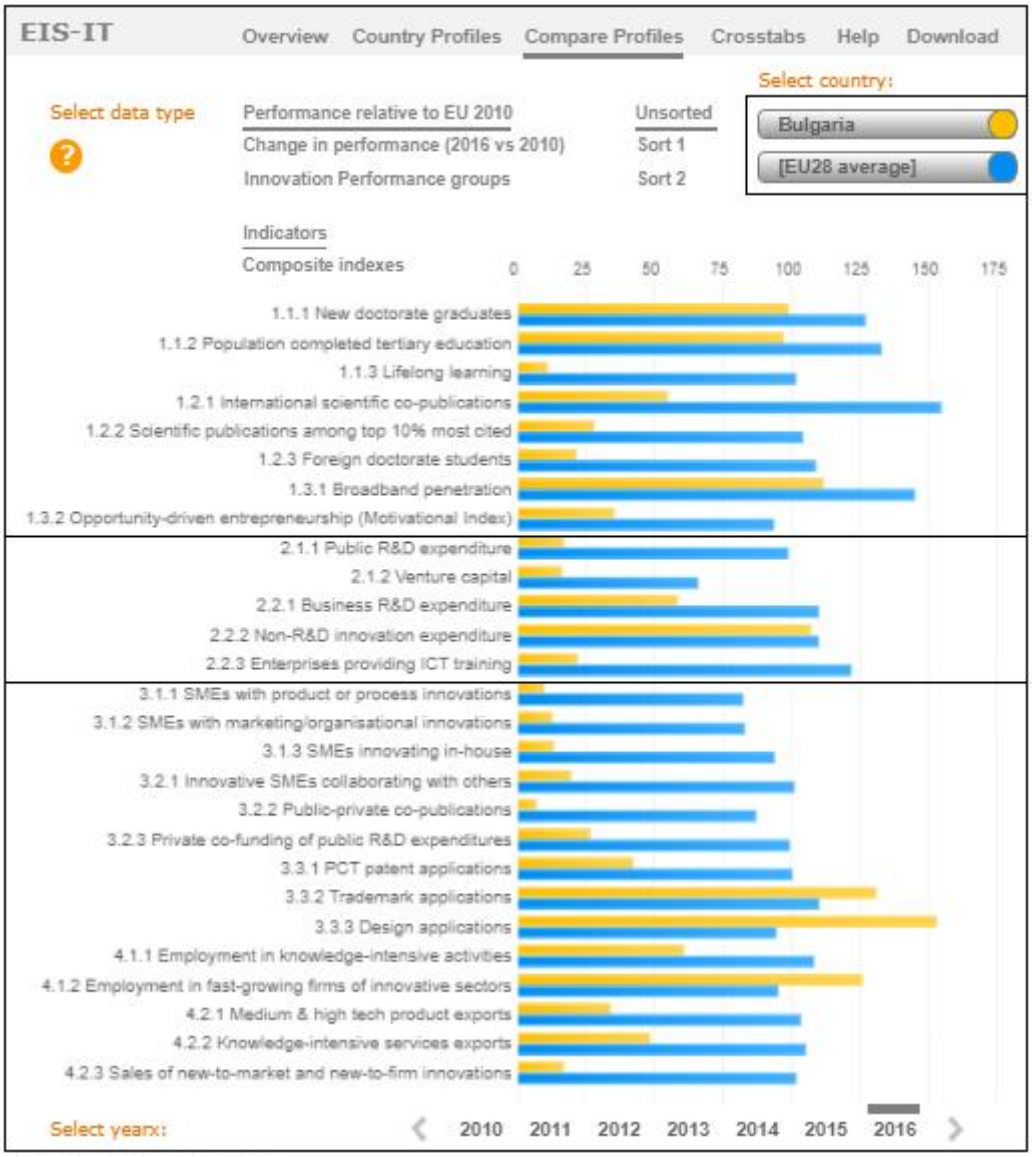


Figure: Innovation indicators for Bulgaria compared to EU 28

The relative strengths of the innovation system are in Intellectual assets, Employment impacts, and Human resources. Relative weaknesses are in Innovators, Finance and support, and Attractive research systems.

The notable structural differences are a larger share of employment in Agriculture & Mining and in Manufacturing, a smaller share of employment in High and Medium high-tech manufacturing and in Knowledge-intensive services, a larger share of Micro enterprises and SMEs in turnover, a smaller share of Large enterprises in turnover, a larger share of foreign controlled enterprises, a larger share of enterprise births, lower GDP per capita, a higher growth rate of GDP, a lower and negative growth rate of population, and lower population density.

Taking into consideration the above not satisfactory picture, Bulgaria is using strong efforts to make a huge step forward by implementing ambitious policies and strategies in terms innovations. The strategic document in the sphere is the **Innovation Strategy for Smart Specialisation,** which declares its vision for a policy change and overcoming of the existing socio-economic challenges by means of:

- Low labour productivity;

- Low share of high-tech production;
- Demographic crisis – aging of population;
- Providing high quality and healthy life.

There are also developed other financing mechanisms, such as financing engineering tools, Operational Programme for Innovation and Competitiveness, which aim to create the necessary environment, so that Bulgaria makes a huge step forward and becomes at least a Moderate innovator. Currently, the trend is that Bulgaria will improve its performance in all indicators, especially Research and Development and innovation activities.

Eco innovation index

Regarding the Eco-Innovation Scoreboard, Bulgaria is last in the ranking, and is classified a country **catching up with Eco-innovations.** The figure below presents the ranking in the field of eco-innovations of EU 28.

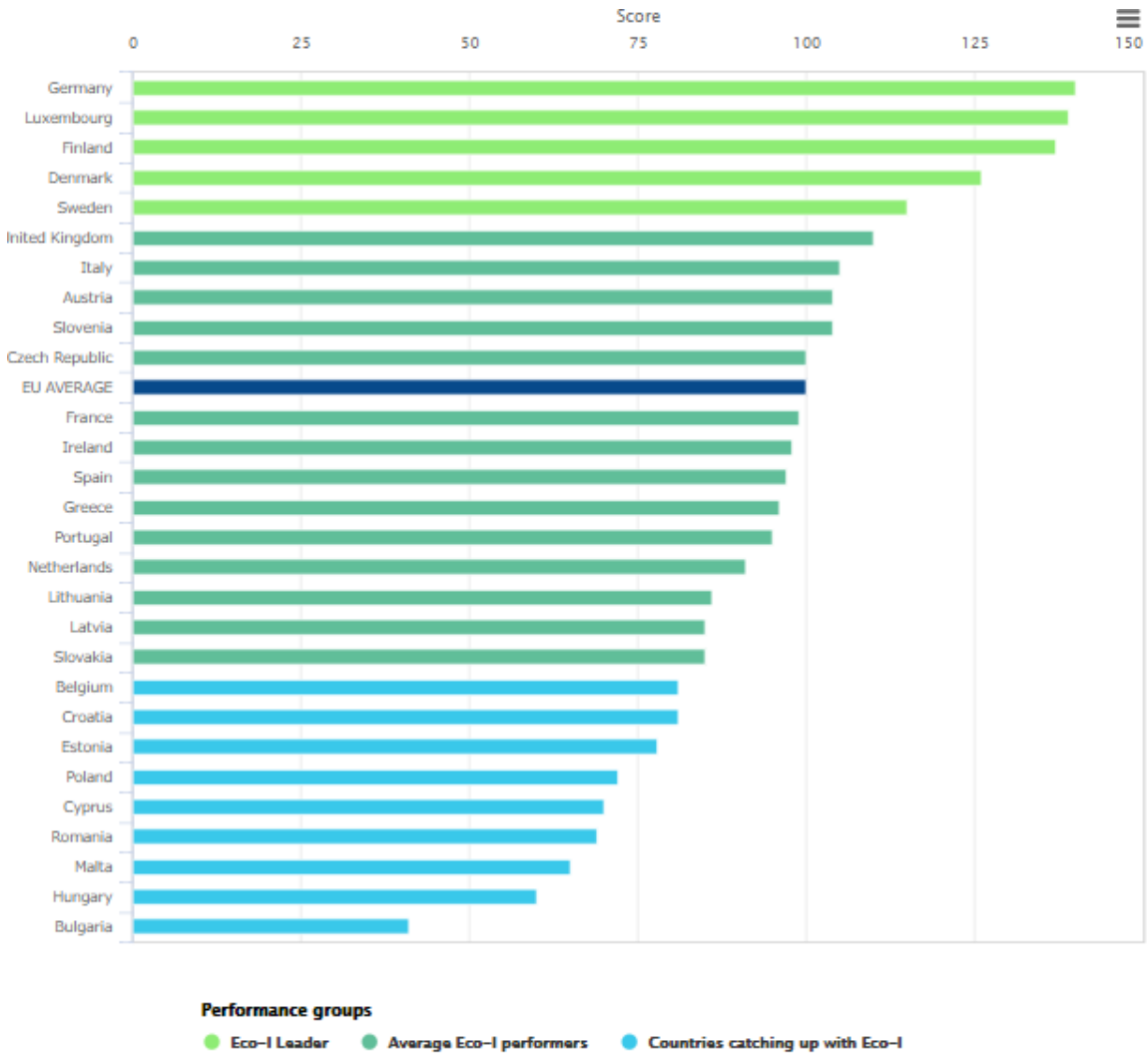


Figure: Eco innovation performance of EU 28

In the field of eco-innovation, the performance of Romania (Bulgaria's benchmark country) scores significantly better, being still in the same category **catching up with Eco-Innovations.**

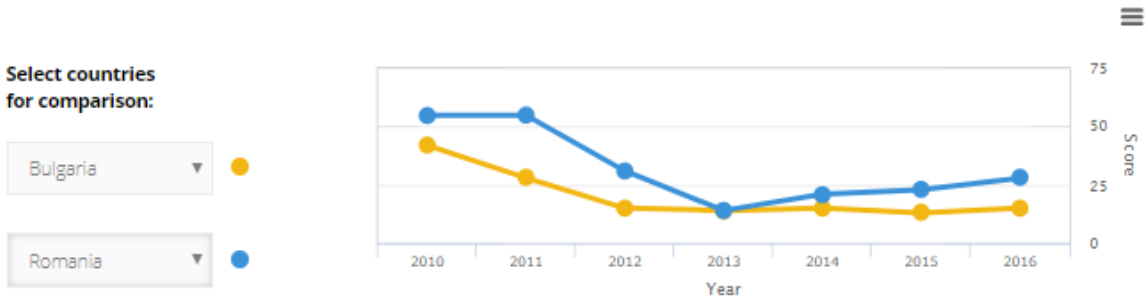


Figure 4: Eco innovation performance of Bulgaria compared to the one of Romania

Despite the low performance of the country in the field of eco-innovations, Bulgaria has made efforts to improve its eco-innovation performance through the implementation of several Operational Programmes, eco-innovation policy measures and funding schemes, including:

- The Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014 – 2020
- National Waste Management Plan 2014-2020
- The Ordinance on construction and demolition waste management and use of recycled construction materials
- The Operational Programmes 2014 –2020
- National Trust Ecofund

Considering the above, the overall trend is that Bulgaria will improve and encourage the eco-innovations, facing the main challenges related to increasing domestic and foreign investment opportunities in eco-innovation and circular economy, promoting efficient use of resources by achieving high energy efficiency (especially in homes and building infrastructure), further developing renewable energy sources, and improving sustainability practices within the transport sector. Increased national investments from government and industry would significantly encourage more support for eco-innovation and circular economy initiatives. In addition, as significant drivers of eco-innovation in Bulgaria, can be considered the rise in awareness from both business, citizens and government on the benefits of green products and technologies, high skilled human resource and knowledge capital and Bulgaria's leading regional position in the information and communications technology (ICT) sector.

3. INNOVATION

3.1 INNOVATION

Being characterized as modest innovator, Bulgaria scores behind the average performance of the EU countries in achieving most of the innovation indicators. To overcome this disbalance and ensure smooth environment for development of innovations, Bulgaria elaborated **The Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014 – 2020,** which aim at improving all innovation spheres, and goals to achieving the following main objectives till 2020:

- to stimulate industrial R&D and the cooperation between the company R&D departments, universities and research and technological organizations;
- to increase available financing for innovation through establishing mechanisms for attracting private investments;
- to encourage companies to introduce new technologies and to improve their innovation activity;
- to encourage the establishment of clusters in traditional sectors;
- to support start-ups and well-functioning companies in order to increase their innovative potential;
- to build up mechanisms for attracting foreign investments towards scientific areas.

The figures below visualize the implementation of the main innovation indicators in Bulgaria compared to the EU and Danube region, regarding the following pillars:

- EUROPEAN INNOVATION SCOREBOARD SUMMARY INNOVATION INDEX (EIS)
- ECO INNOVATION SCOREBOARD AND ECO-INNOVATION INDEX (Eco-IS)
- THE INNOVATION OUTPUT INDICATOR (IOI)

EUROPEAN INNOVATION SCOREBOARD SUMMARY INNOVATION INDEX (EIS)

Indicator: New doctorate graduates per 1000 population aged 25-34

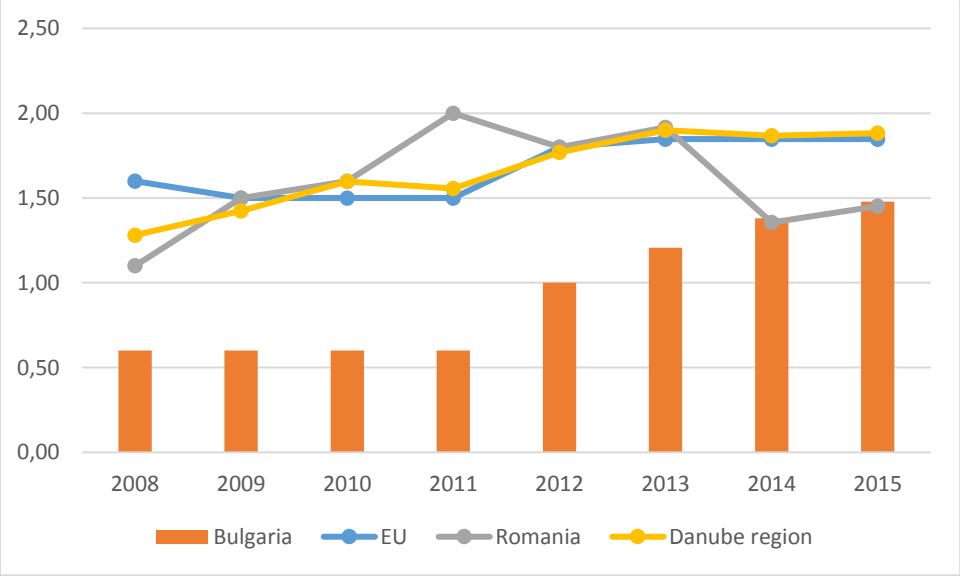


Figure: New doctorate graduates per 1000 population aged 25-34 indicator in Bulgaria compared to the benchmark Romania, and the average of the EU and Danube region

The percentage of new doctoral graduates is gradually increasing, however, it is still far below the average performance of the EU and the Danube region.

Obstacle

The completion of educational-qualification degree bachelor, master or educational and scientific

doctoral degree (PhD) does not result in a higher remuneration on the labour market. Moreover, the persons, who have acquired PhD, earn less compared with their colleagues in all European countries with the exception of Romania. This difference in the remunerations and the limited possibilities for a scientific carrier forces the young talents go to other European countries or USA. The loss of a viable talent is one of the most sensitive problems in the Bulgarian scientific environment, since it leads to a dramatic ageing of the scientific community.

The building of highly qualified and trained cadres is of key importance for improving the economy competitiveness, increasing the potential for realization of innovations and making the country more attractive for investments.

Indicator: International scientific co-publications per million population

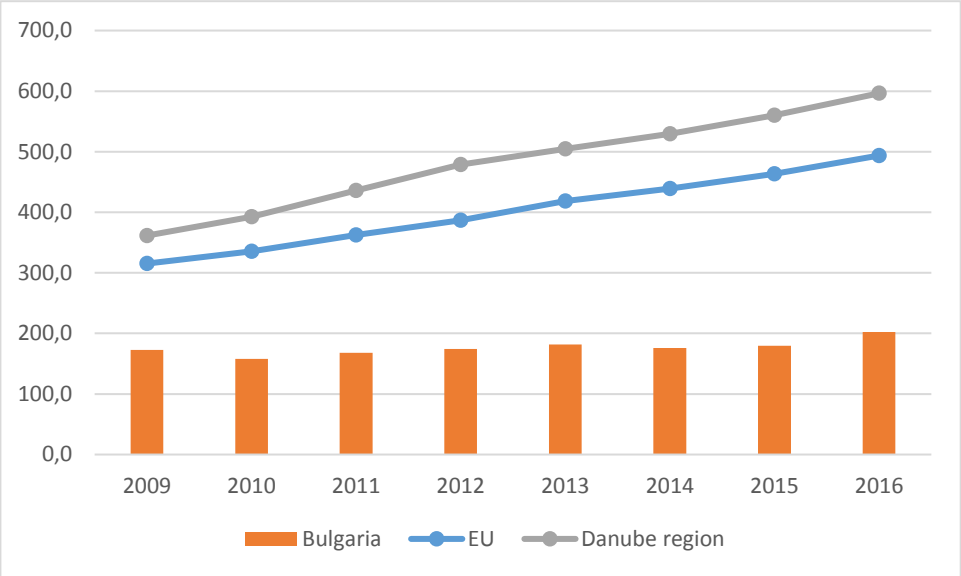
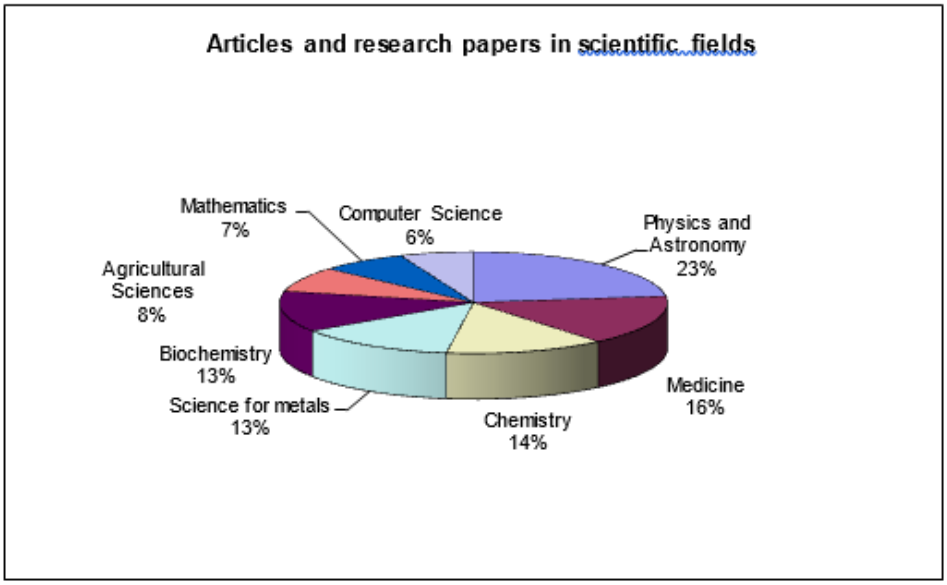


Figure: International scientific co-publications in Bulgaria compared to the EU and Danube region

The level of scientific co-publications in Bulgaria seems to stay even through the years, however, in 2016 it has slightly Increased. It is still far behind the EU and Danube region performance. Below is presented a diagram showing the fields of scientific publications in Bulgaria.



Source: Innovation BG

Figure: Articles and research papers in scientific fields in Bulgaria

Opportunity:

The changes in the global trends suggest the occurrence of new high impact technologies through convergence of scientific subjects. According to studies, the biotechnologies, nanotechnologies and clean technologies will be of highest interest for the investors.

Indicator: Scientific publications among the top 10% most cited publications worldwide (percentage of total scientific publications of the country)

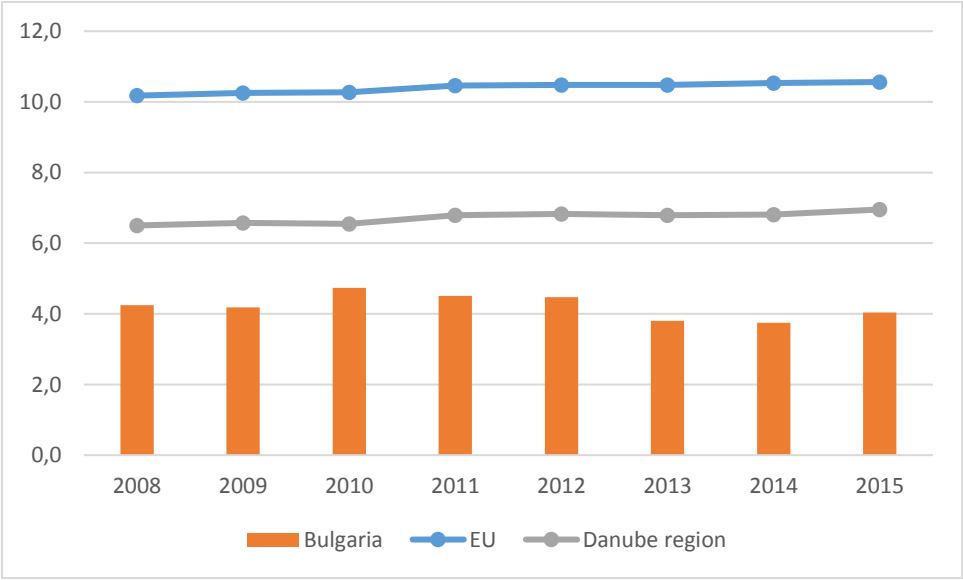


Figure: Scientific publications among the top 10% most cited publications worldwide in Bulgaria compared to the EU and Danube region

The share of scientific publications from Bulgaria, included in the top 10% of the most cited works has

dropped by more than one-third from year 2008 to year 2015, respectively from 4.2% to 4 %, having its peak in 2010, 2011, 2012.

Obstacle

The reduction in the field of scientific research is clearly seen in the participation of Bulgaria in the EU framework programs. Bulgaria has received 12.8 Euro per person of the population from the 7th Framework program, while the average value for EU is six times higher - 78.9 Euro1. The success of the projects with Bulgarian participation is also lower, compared to the average success for EU, respectively 15.4% and 20.4%. The tendency during the first two years of the "Horizon 2020" framework program is even more negative. The funds received by the Bulgarian participants are 1.55 Euro per person of the population, while the average value for EU is almost ten times higher - 14.60 Euro2. For 2015, the success of the projects with Bulgarian participation is 5.6%, and the average value for the program is 11.6%

Indicator: Opportunity-driven entrepreneurship (Motivational index)

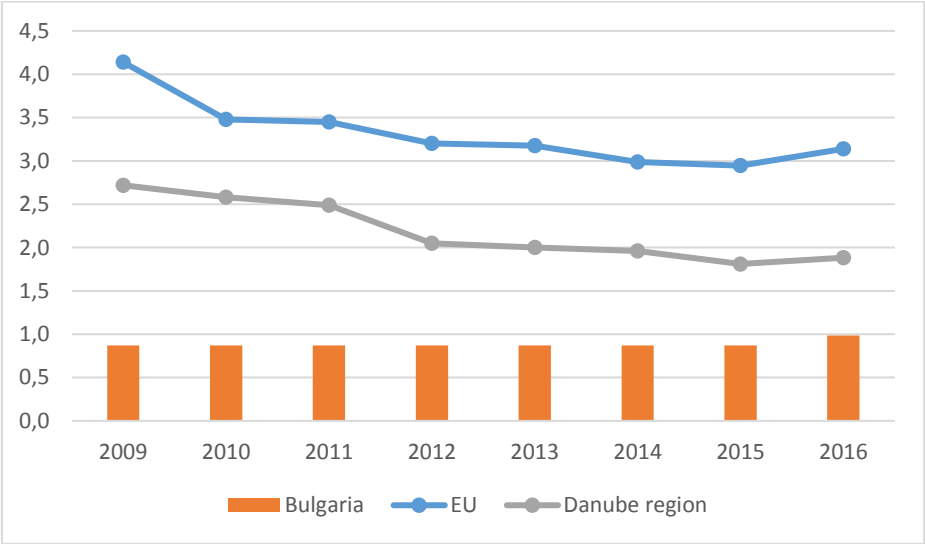


Figure: Opportunity driven entrepreneurship in Bulgaria compared to the EU and Danube region

This indicator shows a slight improvement for Bulgaria in 2016, still it is far behind the EU and Danube region.

Obstacle

The entrepreneurship education at the primary and secondary levels is not well developed and there is lack of targeted government support and initiatives that turn entrepreneurship into a government priority [3]

[1] European Commission, JRC-IPTS (2015), Stairway to Excellence Facts and Figures: Bulgaria
[2] Report Horizon 2020 Two years on, 2016
[3] 2016/17 GEM NATIONAL REPORT ON ENTREPRENEURSHIP IN BULGARIA

Indicator: Public R&D expenditure as % of GDP

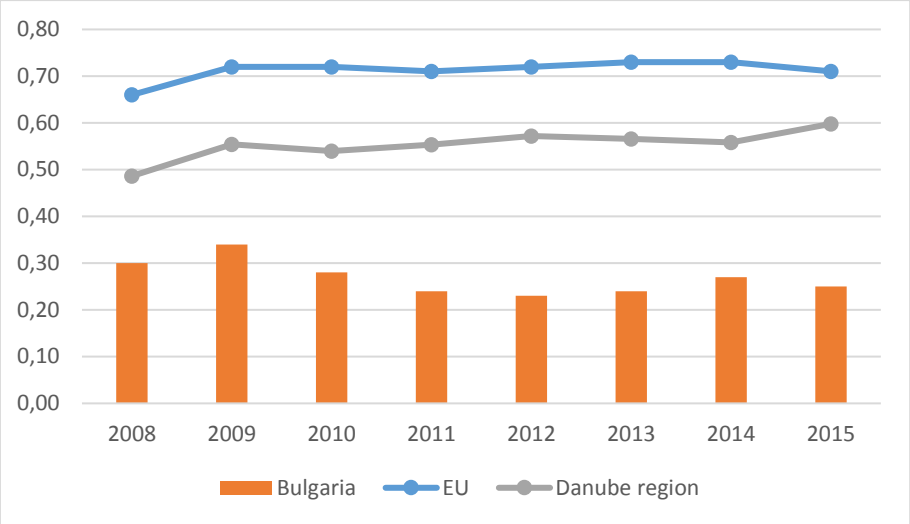


Figure: Real GDP growth (%) in Bulgaria, compared with the EU and the Danube region

Compared to EU and Danube region, the level of public R&D expenditure is very low.

Obstacle

Insufficient funding both at institutional and project levels. The above predetermines the utilization of funds from the institutional funding predominantly for salaries and general running costs and leads to a chronic insufficiency of funds for maintenance, capital expenditures and scientific research. On the other hand, the shortage of funds for project funding and their irregular provision leads to reduction of the quality of the scientific research, of the qualification of the scientists and as a consequence to lower quality of the preparation of students and PhD students.

Opportunity

Major instrument for funding of scientific research based on a competition principle, in the country is the "National Science Fund (NSF). In a series of competition sessions of the Fund for the period 2008-2012 a lot of mistakes and violations were made. Problems with compliance with the EU norms in relation to state aid were found out due to these problems, the funding of projects from that period was not continued and during 2013 and 2015 no competition sessions were announced and the budget of the fund was not utilized. All of the above resulted in distrust by the scientific society and the public as a whole towards the activities of the Fund and the procedures` transparency in the provision of funding by the Fund.

Indicator: Private sector R&D expenditure as % of GDP

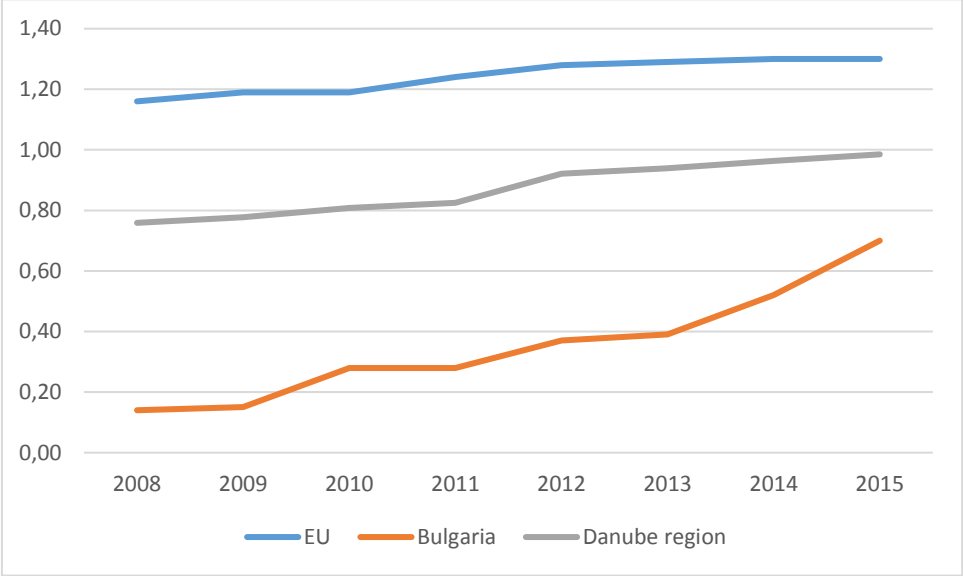


Figure: R&D expenditure of the private sector as % of GDP in Bulgaria, compared with EU and the Danube region.

The private sector R&D expenditure is improving, yet it is too low compared to EU and Danube region.

Obstacle:

The restructuring of the industry, the shutting down of major industrial complexes and the absence of intensive trans-border trade relations are among the prerequisites for the delayed economic development of the country, which reflects in the lack of interest of the business to invest in science. This problem becomes more prominent by the absence of normative base encouraging the real private investments in scientific research. The demographic collapse and massive brain-drain from the country, which has very negative impact over the existing human resources in science must be counted among the reasons.

Indicator: Venture capital (percentage of GDP)

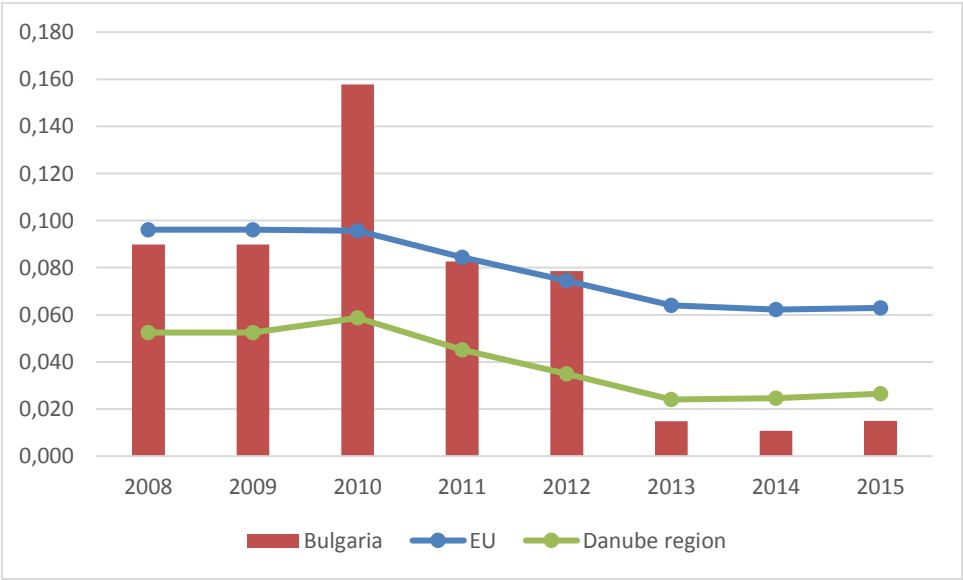


Figure: Venture capital in Bulgaria, compared with EU and the Danube region

The existing data for 2013, 2014 and 2015 shows a decrease in venturing, but currently Bulgaria is implementing mechanisms for stimulation of venture capital in the country.

Opportunity:

Even though the decreasing tendency, the Innovation Strategy for Smart Specialization 2014 – 2020 in Bulgaria, puts as a main goad that in 2020, Bulgaria is a country where creative industries make a significant contribution to value added and employment. They have technological parks, private equity capital for start-ups in this area, venture investment funds, funds for growth and a system of financial incentives to promote entrepreneurship in the sector and attract foreign investors. Currently, the country is preparing a procedure for manager of the investment fund.

Indicator: SMEs introducing product or process innovations (percentage of SMEs)

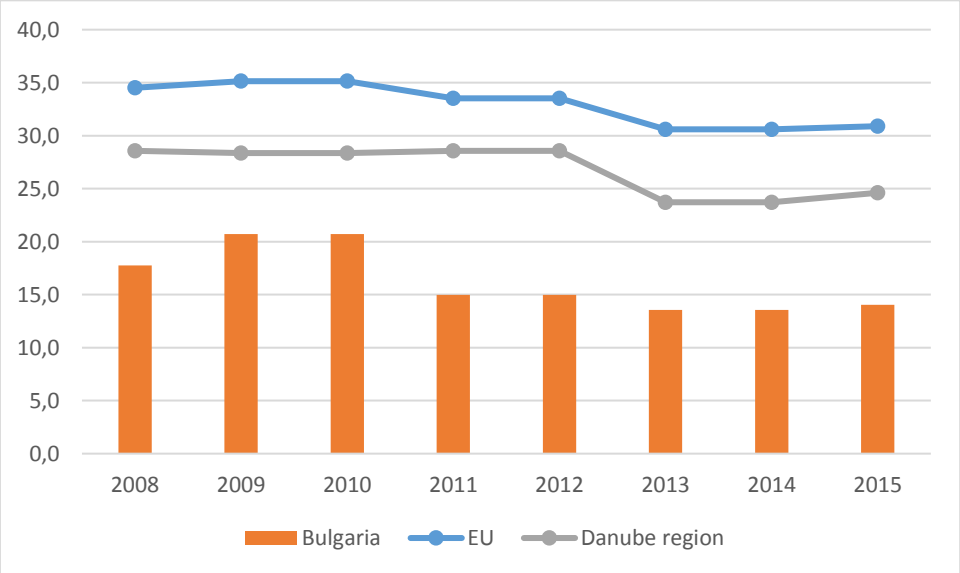


Figure: SMEs introducing product or progress innovations in Bulgaria, compared with EU and the Danube region.

Indicator: SMEs introducing marketing or organisational innovations (percentage of SMEs)

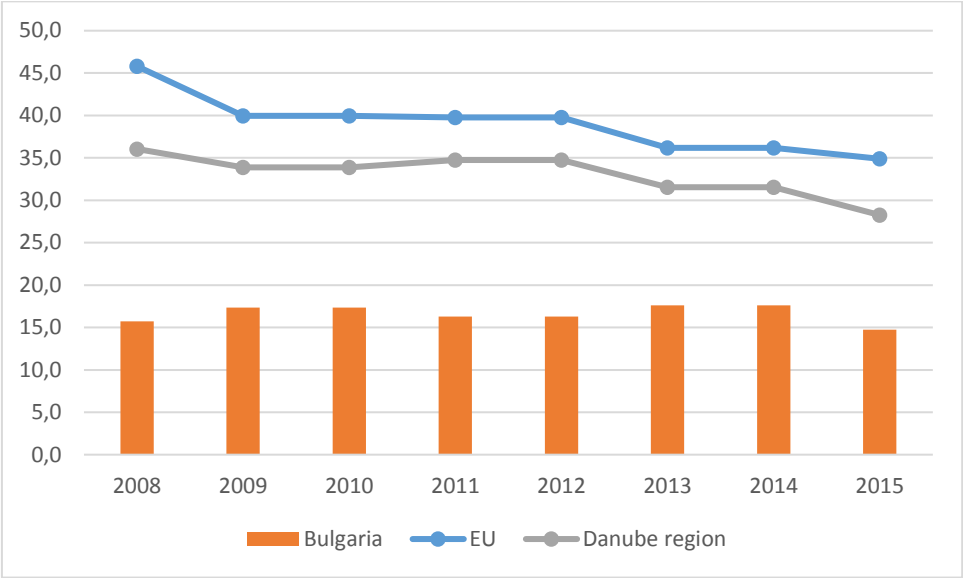


Figure: SME introducing marketing or organizational innovations in Bulgaria, compared with EU and the Danube region

Indicator: SMEs innovating in-house (percentage of SMEs)

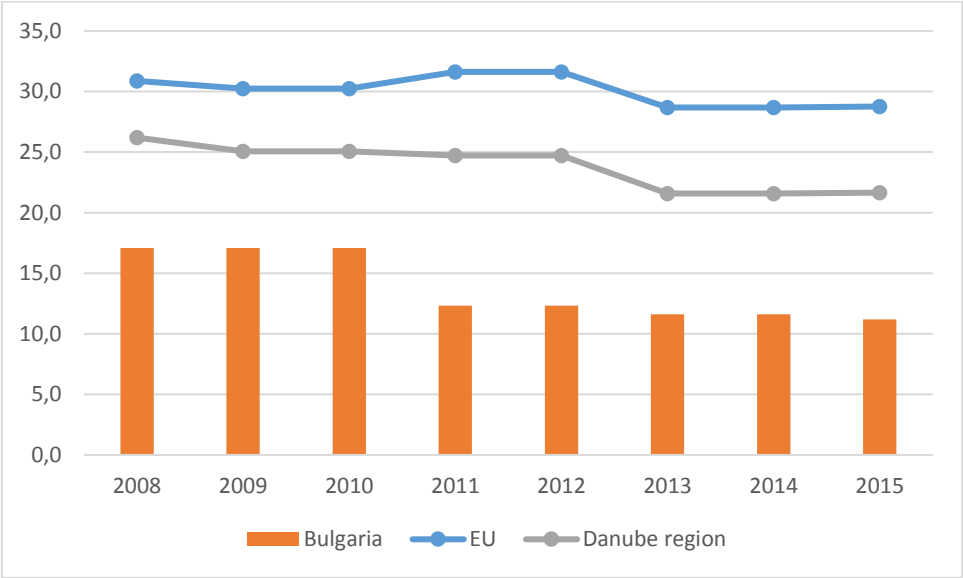


Figure: SMEs innovating in-house in Bulgaria, compared with EU and the Danube region

Indicator: Innovative SMEs collaborating with others (percentage of SMEs)

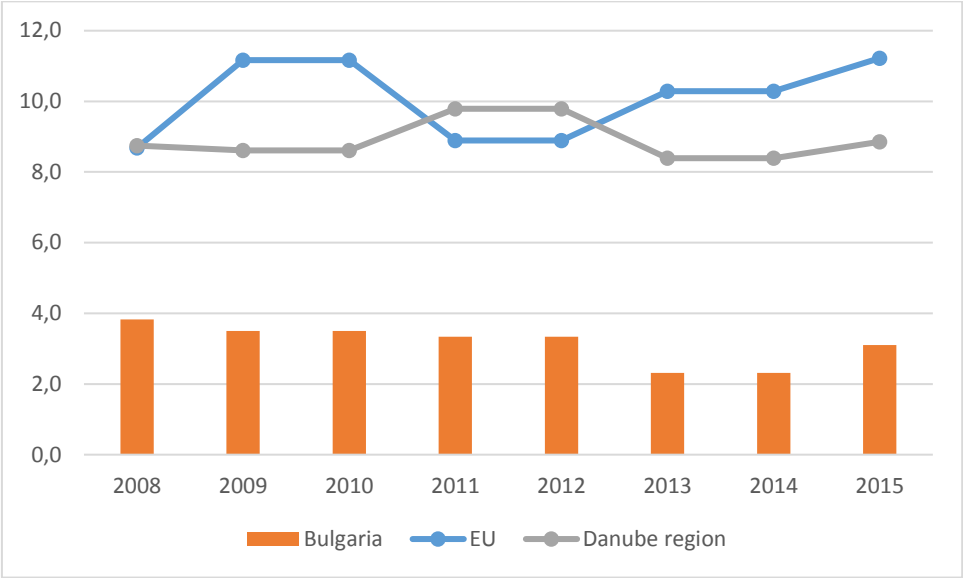


Figure: Innovative SMEs collaborating with others in Bulgaria, compared with EU and the Danube region

The performance of Bulgaria in the above indicators (3.1.1, 3.1.2, 3.1.3, 3.2.1) is far behind EU and the Danube region.

Opportunity:

However, the existing financing mechanism, focused at encouraging of innovations, as well as the Innovation Strategy for Smart Specialization 2014 – 2020 in Bulgaria and Operational Programme for Innovations and Competitiveness, provide the needed environment to the SMEs to improve their innovation performance.

Indicator: PCT patent applications per billion GDP (in PPS)

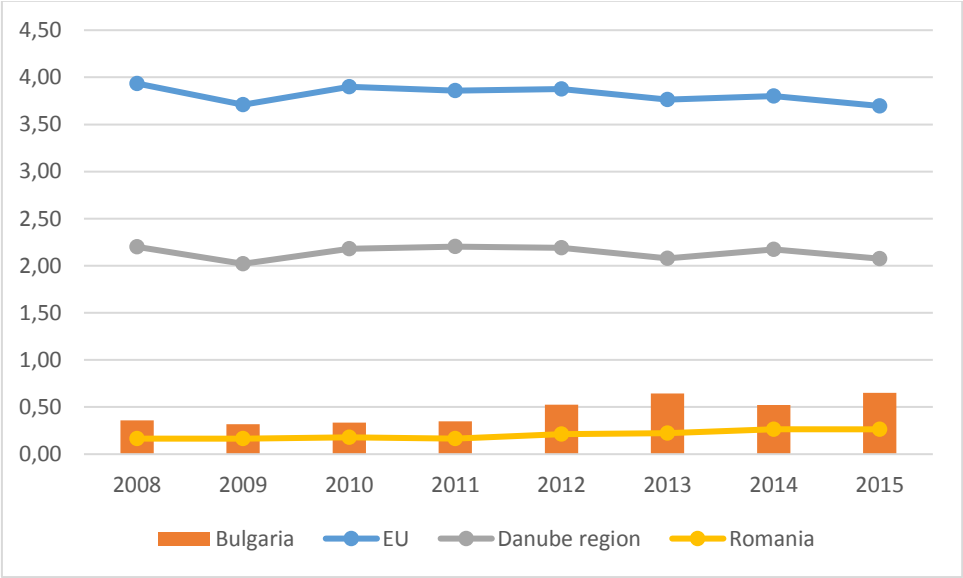


Figure: PCT patent applications per billion GDP in Bulgaria, compared with EU and the Danube region

Compared to the EU and Danube region, the patenting activity in Bulgaria is very low, however significantly high than the benchmark – Romania.

According to the analysis on the Innovation Strategy for Smart Specialization 2014 – 2020[4], the structure of the patents of the Bulgarian patent holders shows the highest activity of the group of the physical persons, who own 765 patents (68.3 %), followed by the business sector with 276 patents (23.3 %), state sector - 89 patents (6.8%) and "Tertiary Education" sector - 18 patents (1.6 %). The share of the Bulgarian Academy of Science (BAS) in the total number of Bulgarian patents amounts to 5.2 % and is 3.5 times higher than the share of the "Tertiary Education" sector.

Indicator: Exports of medium and high technology products as a share of total product exports

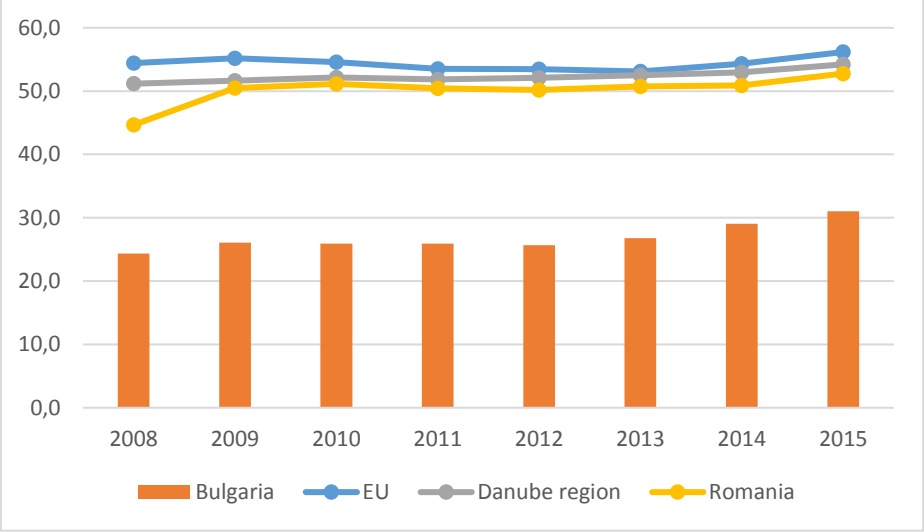


Figure: Exports of medium and high technology products as a share of total products export in Bulgaria, compared with EU and the Danube region

Compared to the EU and Danube region and the benchmark country – Romania, the exports of medium and high tech products in Bulgaria, as a share of the total product exports is significantly low, however it shows slight increase in 2015.

Opportunity:

However, the existing financing mechanisms, focused at encouraging of innovations, as well as the

[4] Innovation Strategy for Smart Specialization 2014 – 2020

Innovation Strategy for Smart Specialization 2014 – 2020 in Bulgaria and Operational Programme for Innovations and Competitiveness, will improve the overall environment for production of high technology items.

Indicator: Knowledge-intensive services exports as percentage of total services exports

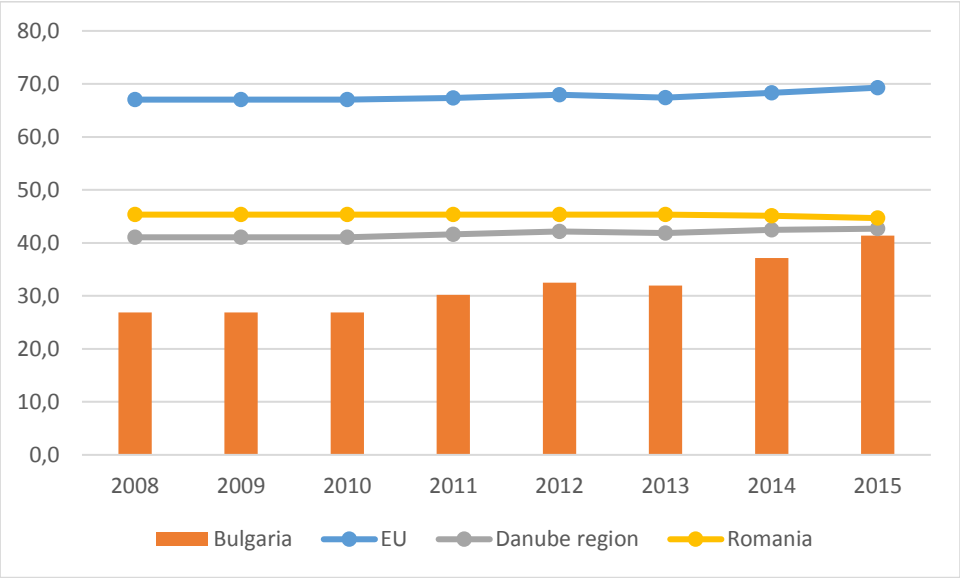


Figure: Knowledge intensive services exports as a percentage of total services exports in Bulgaria, compared with EU and the Danube region

Compared to the EU and Danube region and the benchmark country – Romania, the exports of knowledge intensive services in Bulgaria, as a share of the total services exports is lower, but it shows significant increase in 2015, when it reaches the performance of the Danube region.

Opportunity:

However, the existing financing mechanisms, focused at encouraging of innovations, as well as the Innovation Strategy for Smart Specialization 2014 – 2020 in Bulgaria and Operational Programmes in Bulgaria will improve the overall environment of the production of high technology items.

Indicator: Sales of new-to-market and new-to-firm innovations as percentage of turnover

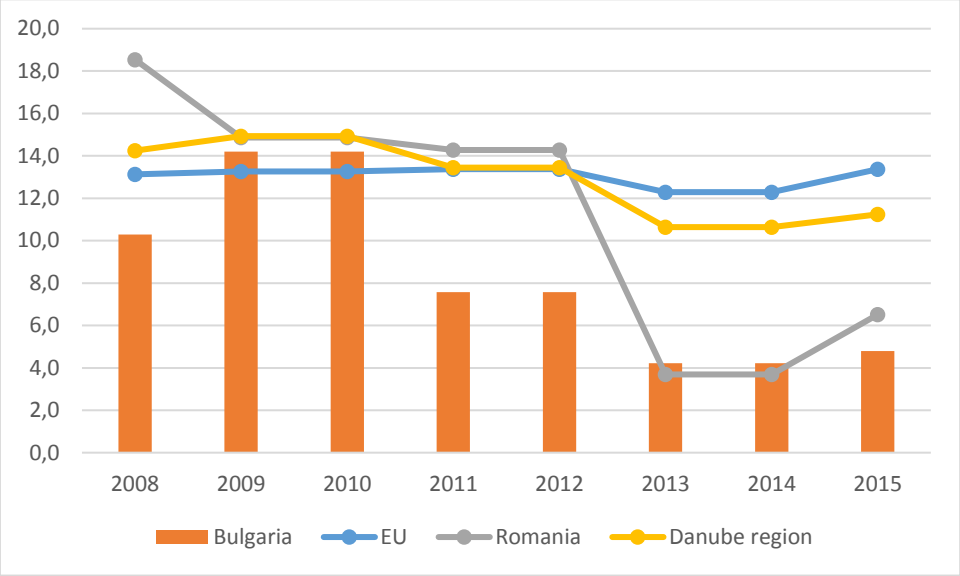


Figure: Sales of new to market and new to firm innovations as a percentage of turnover in Bulgaria, compared with EU and the Danube region

Compared to the EU and Danube region and the benchmark country – Romania, the sales from new to market and new to firm innovations as a percentage of turnover is lower, however almost even with the benchmark country – Romania for years 2013 and 2014.

Opportunity:

However, the existing financing mechanisms, focused at encouraging of innovations, as well as the Innovation Strategy for Smart Specialization 2014 – 2020 in Bulgaria and Operational Programme for Innovations and Competitiveness in Bulgaria will improve is focused at improving the new to market and new to firm innovations.

3.2 ECO INNOVATIONS

The main challenges for eco-innovation in Bulgaria include shifting towards a low carbon economy and promoting resource efficiency. Since 2013, energy efficiency and the use of renewable energy has improved, slowly reaching the level agreed upon with the European Commission for 2020, that is to say: a 50% reduction in energy intensity of gross domestic product (GDP) by 2020, resulting in approximately 25% improved energy efficiency. Regarding renewable energy, the objective of 16 % share of RES energy in the gross end energy consumption by 2020 has already been reached. The challenges related to the transport sector and the development of green technologies include achieving the objective of 10 % share of the energy from renewable sources in transport as of 2020, and developing the R&D sector so that it represents 1,5% of GDP by 2020

The analysis in this section is based on the EU 28 Eco-innovation scoreboard (Eco-IS) for the year 2015. Eco-IS via its composite Eco-innovation index demonstrates the eco-innovation performance of a country compared with the EU average and with the EU top performers. Eco-IS is based on 16 indicators which are aggregated into five components: eco-innovation inputs, eco-innovation activities and eco-innovation

outputs as well as environmental outcomes and socio-economic outcomes.

Eco-innovation inputs (index)

The component Eco-innovation input consists of aggregated figures of three indicators: "Governments environmental and energy R&D appropriations and outlays" (Share of GDP) with a value of 3 for Bulgaria; "Total R&D personnel and researchers" (Share of total employment) with a value of 41 for Bulgaria and "Total value of green early stage investments" (USD/cap) with a value of 0 for Bulgaria. In the three categories, the performance of Bulgaria is far below EU and Danube region. Below is shown a visual presentation of indicators performance for year 2015 for Bulgaria, compared to EU and Danube region.

Indicator: Governments environmental and energy R&D appropriations and outlays

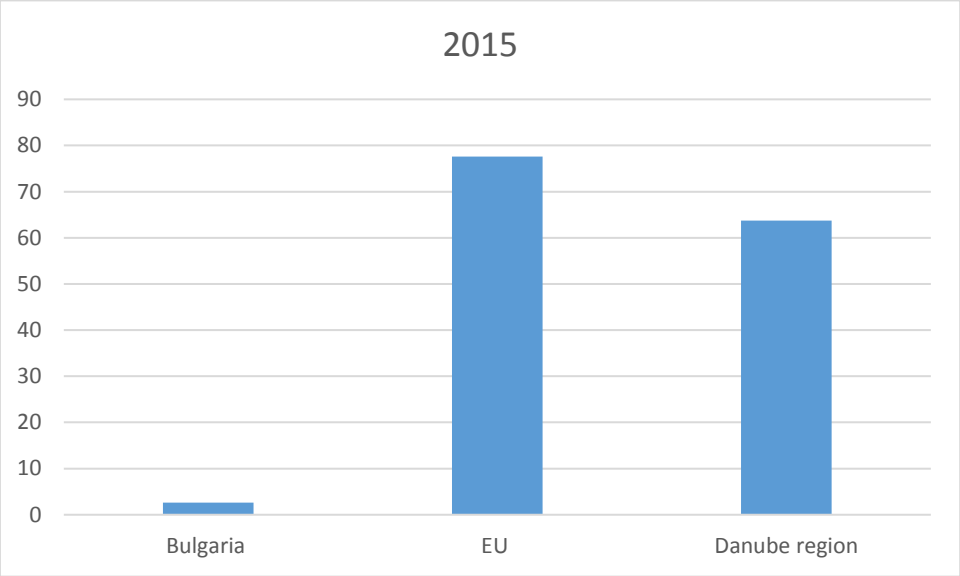


Figure: Governments environmental and energy R&D appropriations and outlays for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Total R&D personnel and researchers

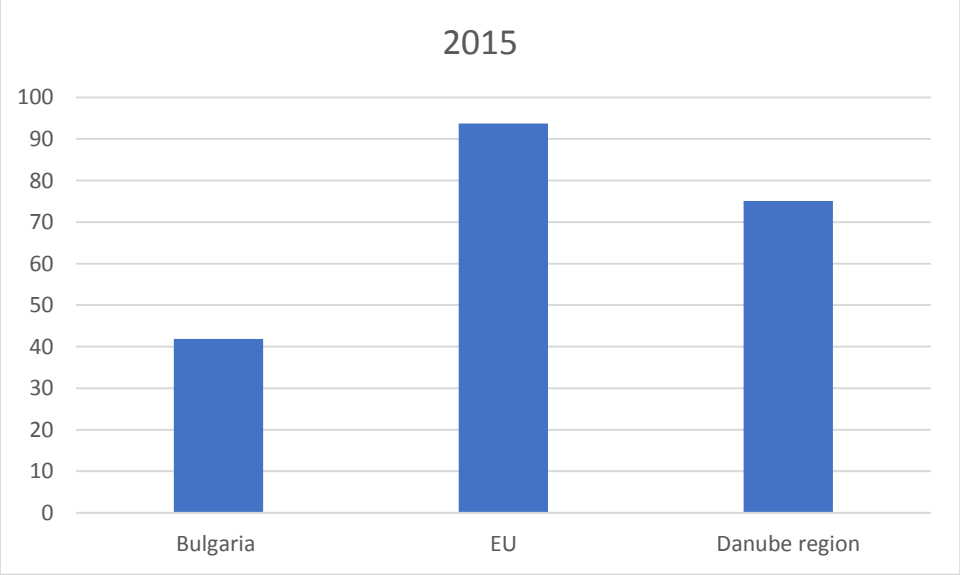


Figure: Total R&D personnel and researchers for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Total value of green early stage investments

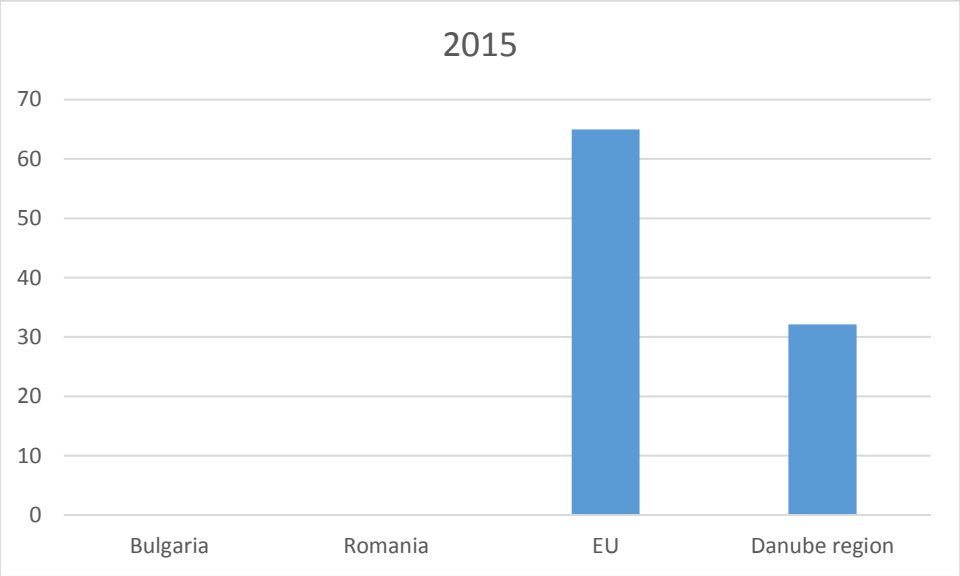


Figure: Total value of green early stage investments for 2015 in Bulgaria compared to Romania, EU-28 and the Danube region

Eco-innovation activities (index)

Compared to the other components Bulgaria is better positioned here due to the relatively high value for the indicator "ISO 14001 registered organizations". The performance of Bulgaria for the other two indicators "Firms having implemented innovation activities aiming at a reduction of material input per unit output" (% of total firms) and "Firms having implemented innovation activities aiming at a reduction of energy input per unit output" (% of total firms) is again lower than the EU and the Danube region, however a support was provided from government and European funds to improve eco-innovation initiatives and the rise in awareness about the benefit of such initiatives.
Below is shown a visual presentation of indicators performance for year 2015 for Bulgaria, compared to EU and Danube region.

Indicator: Firms having implemented innovation activities aiming at a reduction of material input per unit output

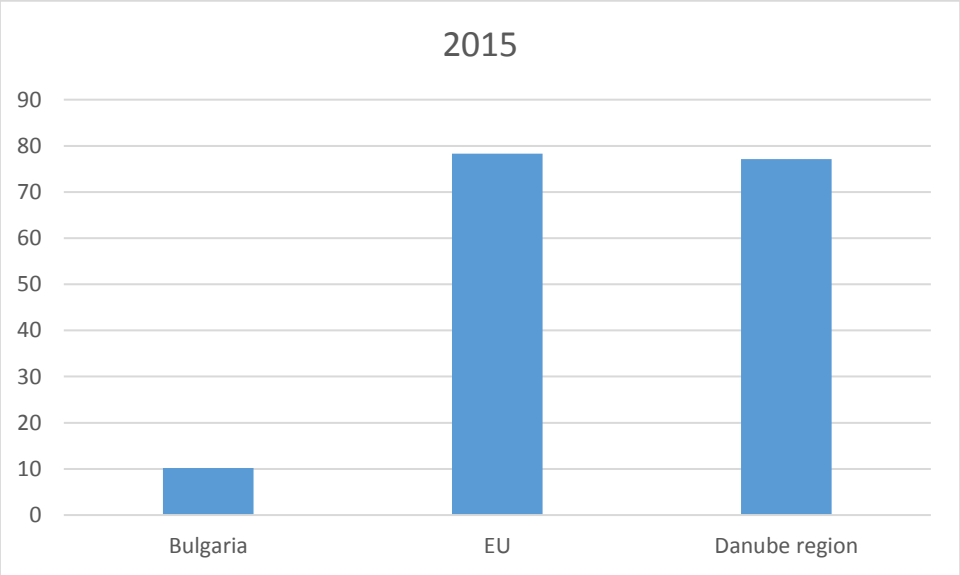


Figure: Firms having implemented innovation activities aiming at a reduction of material input per unit output for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Firms having implemented innovation activities aiming at a reduction of energy input per unit output

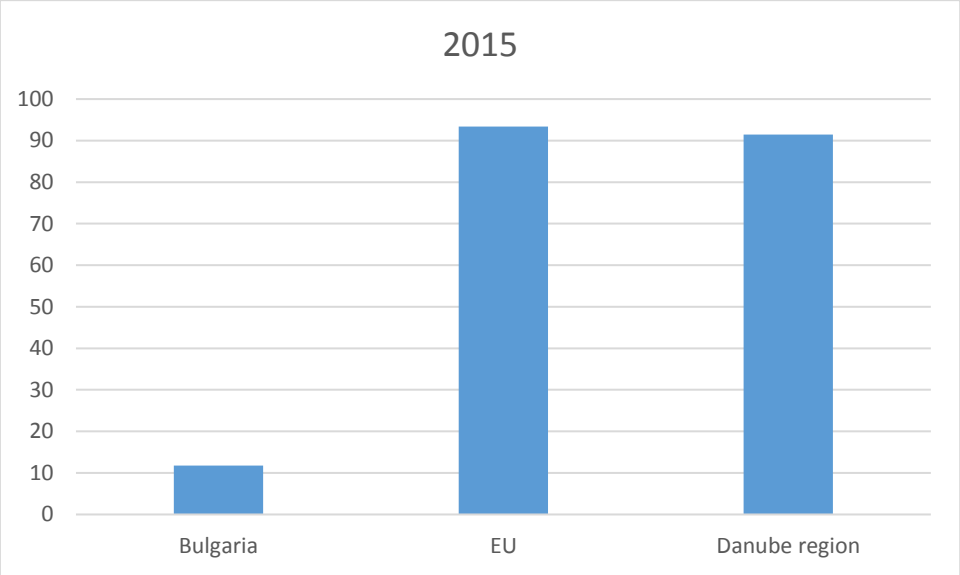


Figure: Firms having implemented innovation activities aiming at a reduction of energy input per unit output for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: ISO 14001 registered organisations

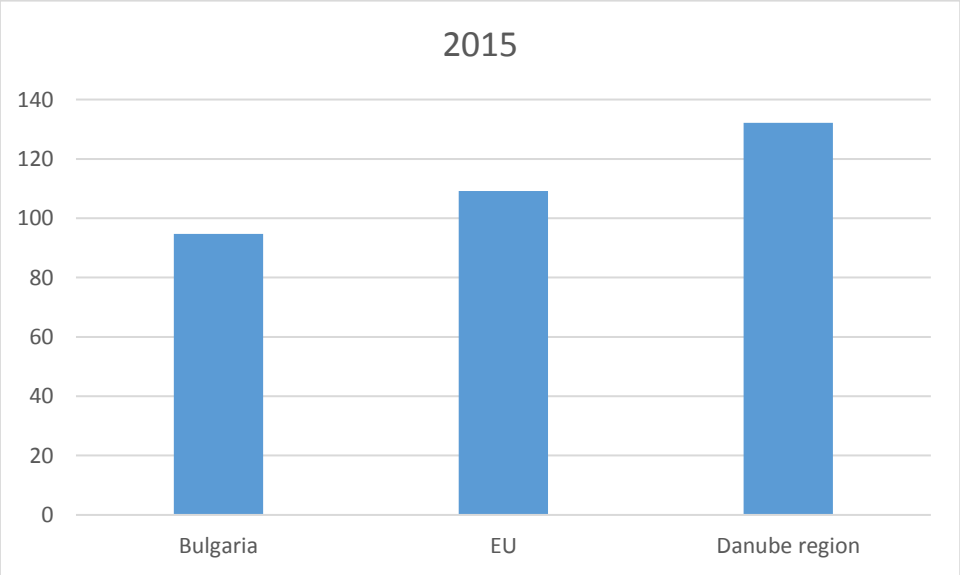


Figure: ISO 14001 registered organisations for 2015 in Bulgaria compared to EU-28 and the Danube region

Eco-innovation outputs (index)

The component Eco-innovation output is an aggregated figure of three indicators: “Ecoinnovation related patents” (per mln pop), “Eco-innovation related publications” (per mln pop), and “Eco-innovation related media coverage” (per number of electronic media). The performance of Bulgaria is a lot lower than the EU and the Danube region for the first two indicators. As for the performance of indicator Eco-innovation

related media coverage, the performance of Bulgaria significantly reaches the one of Danube region and EU. Below is shown a visual presentation of indicators performance for year 2015 for Bulgaria, compared to EU and Danube region.

Indicator: Eco-innovation related patents

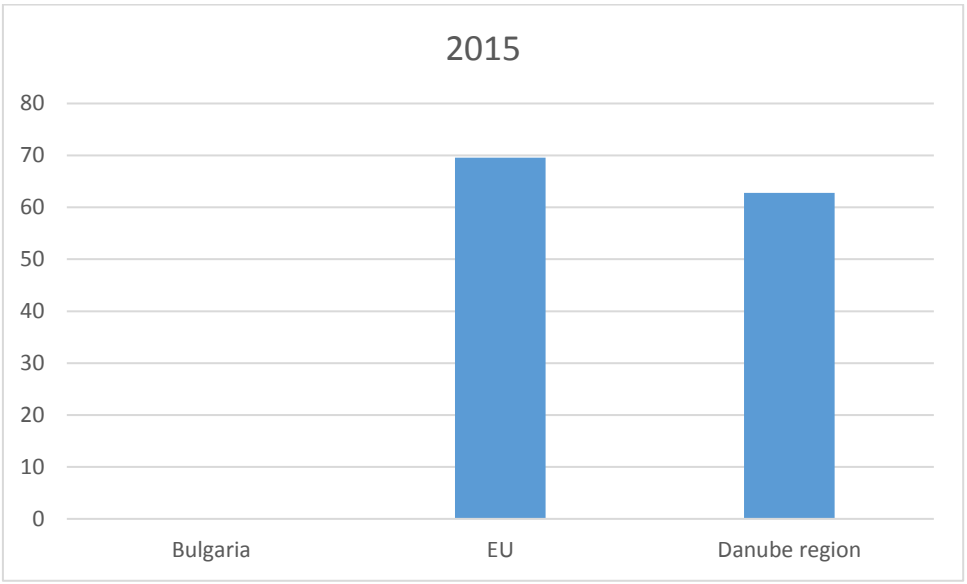


Figure: Eco-innovation related patents for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Eco-innovation related academic publications

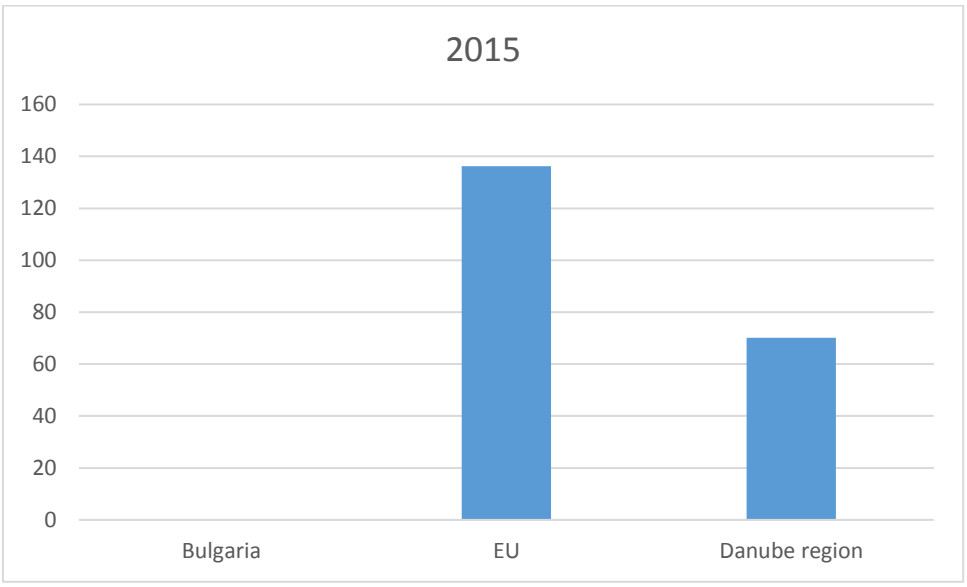


Figure: Eco-innovation related academic publications for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Eco-innovation related media coverage

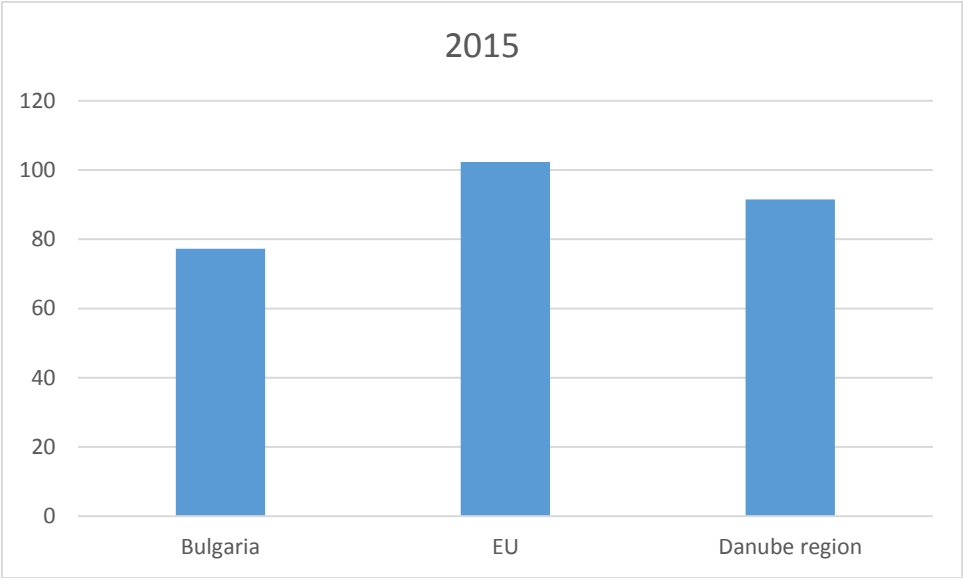


Figure: Eco-innovation related media coverage for 2015 in Bulgaria compared to EU-28 and the Danube region

Resource efficiency outcomes (index)

The component Resource efficiency outcomes is an aggregated figure based on four indicators: "Material productivity" (GDP/Domestic Material Consumption, €/kg), "Water productivity" (GDP/Water Footprint, €/m³), "Energy productivity" (GDP/gross inland energy consumption, €/toe), and GHG emissions intensity (CO2e/GDP). According to this component, Bulgaria's performance in very low compared to EU and Danube region. Below is shown a visual presentation of indicators performance for year 2015 for Bulgaria, compared to EU and Danube region

Indicator: Material productivity

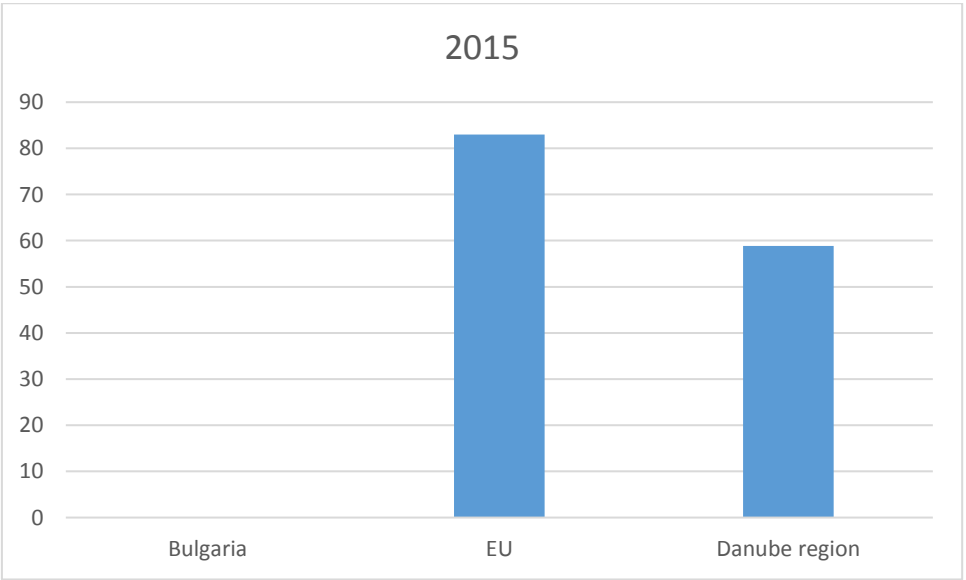


Figure: Material productivity for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Water productivity

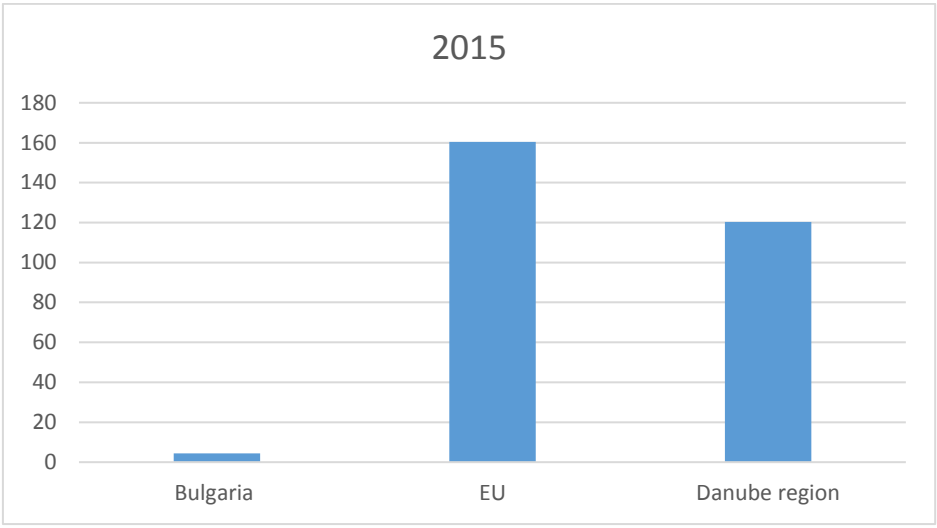


Figure: Water productivity for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Energy productivity

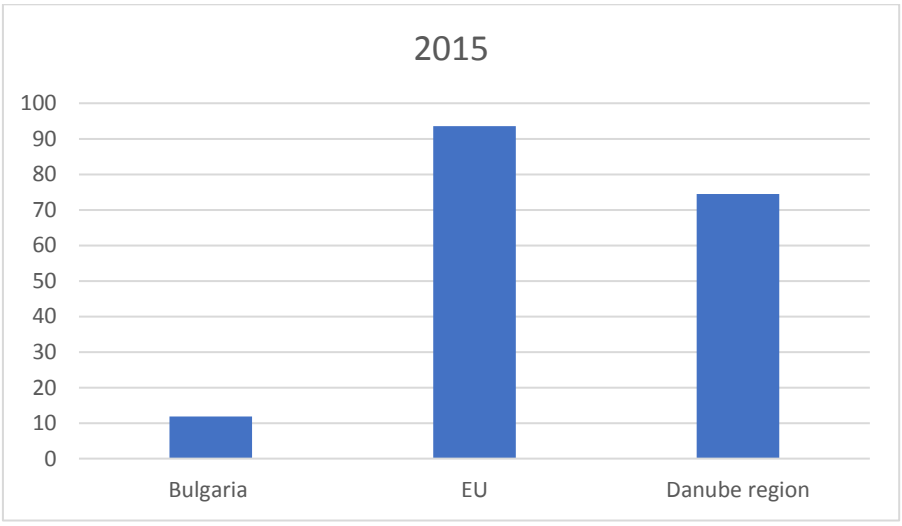


Figure: Energy productivity for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: GHG emissions intensity

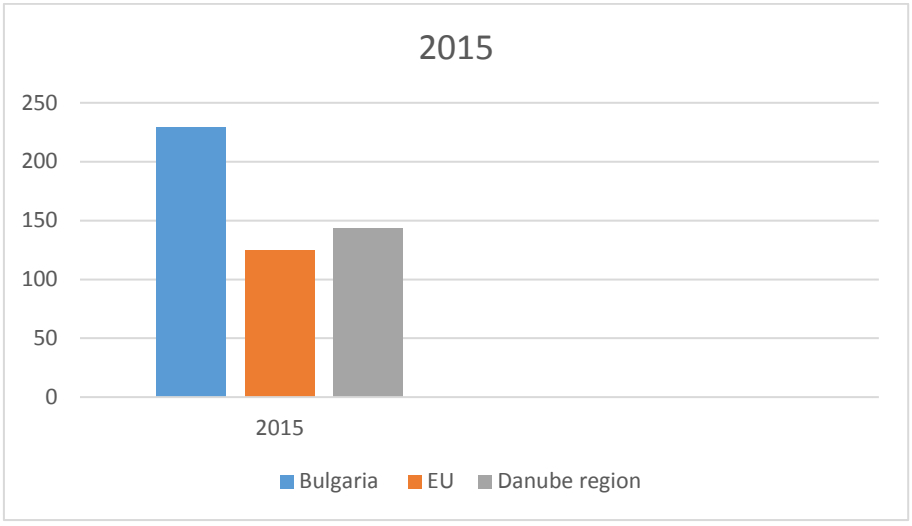


Figure: GHG emissions intensity for 2015 in Bulgaria compared to EU-28 and the Danube region

Socio-economic outcomes (index)

This component is comprised of the indicators Exports of products from eco-industries Employment in eco-industries and circular economy Revenue in eco-industries and circular economy. Under this component Bulgaria's performance shows good performance, which puts the country close to EU. Below is shown a visual presentation of indicators performance for year 2015 for Bulgaria, compared to EU and Danube region

Indicator: Exports of products from eco-industries

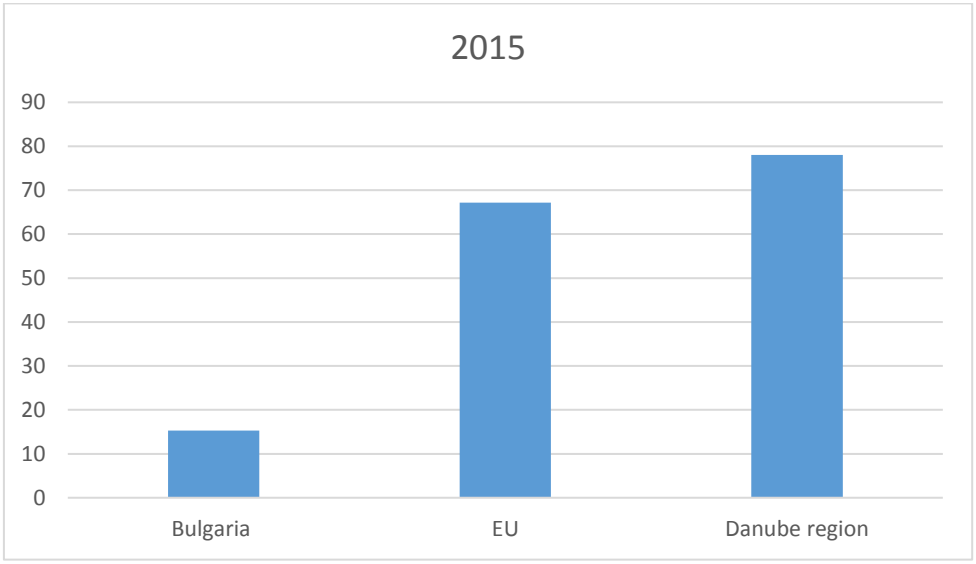


Figure: Exports of products from eco-industries for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Employment in eco-industries and circular economy

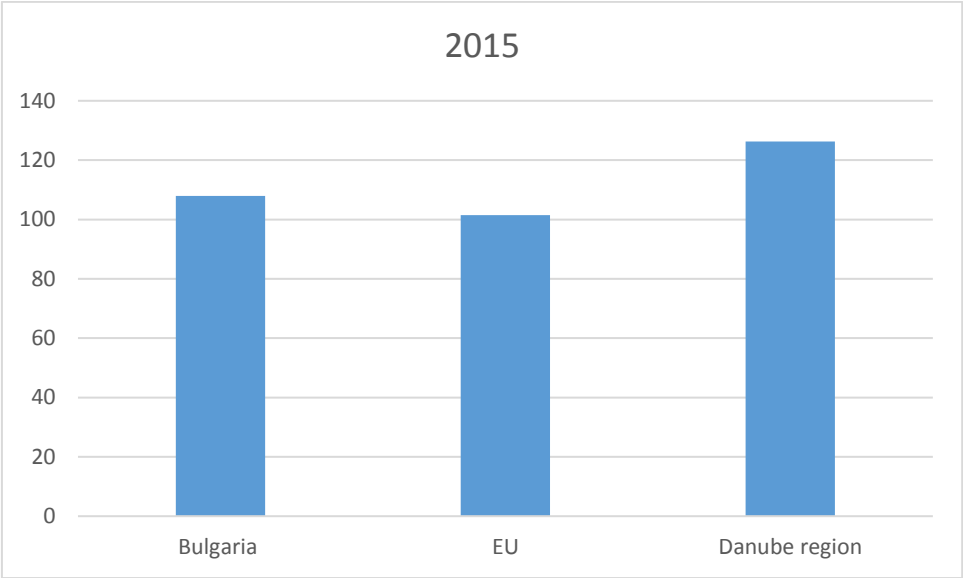


Figure: Employment in eco-industries and circular economy for 2015 in Bulgaria compared to EU-28 and the Danube region

Indicator: Revenue in eco-industries and circular economy

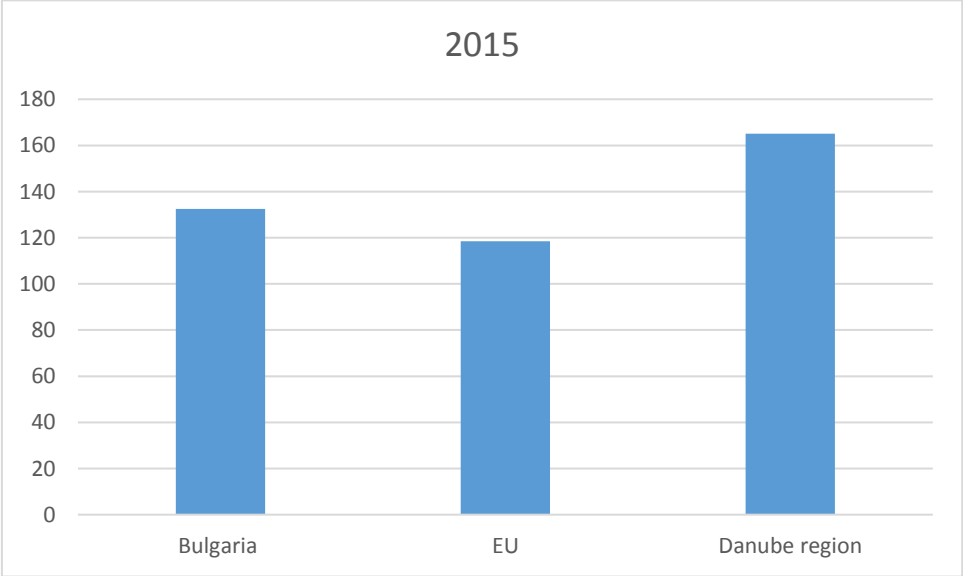
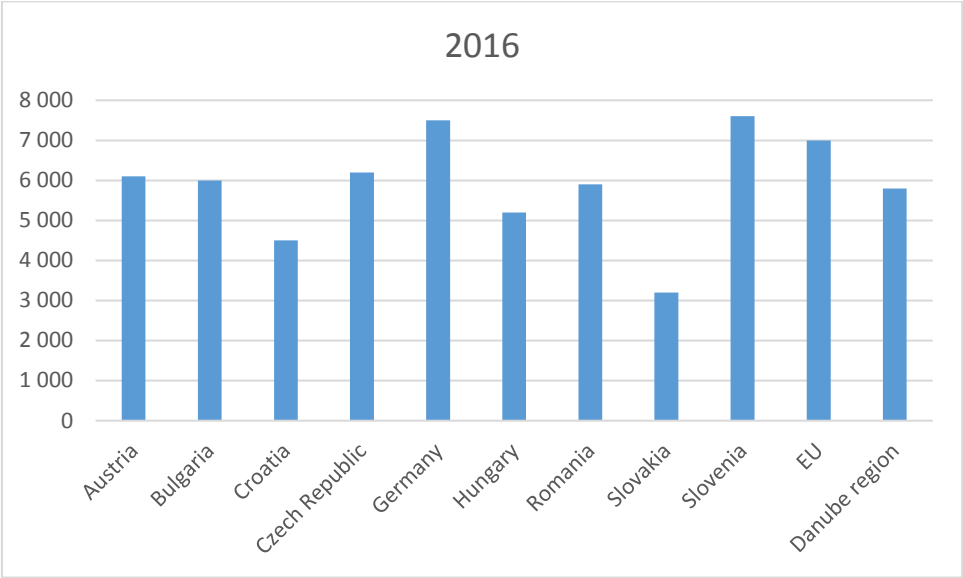


Figure: Revenue in eco-industries and circular economy for 2015 in Bulgaria compared to EU-28 and the Danube region

Innovation output indicators

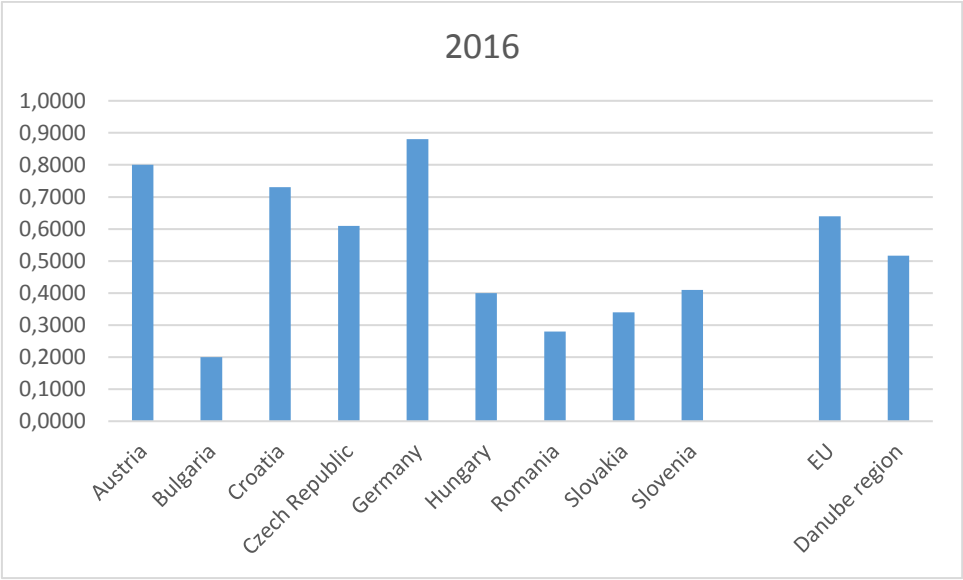
In this section is provided visual presentation of the performance of selected innovation output indicators in Bulgaria, according to the data available for the last year, in comparison to the EU and Danube region

Indicator: Scientists and engineers as a share of active population (%)



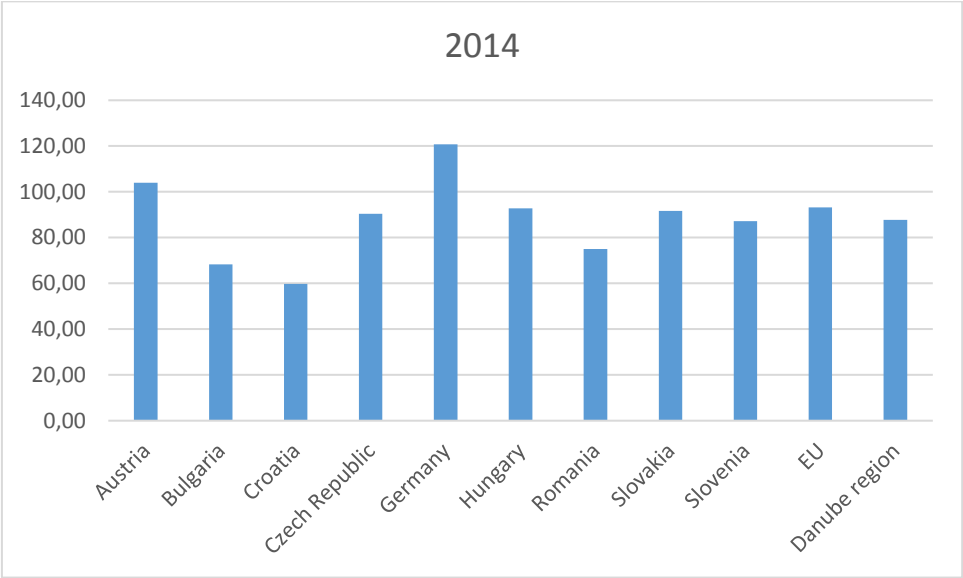
The performance of Bulgaria of this indicator for 2016 is a bit below the performance of the indicator for the EU, yet a bit higher than the average performance of the Danube region, with value 6, compared to Danube region 5,8 and EU 7.

Indicator: Government budget appropriations or outlays on R&D (GBAORD) as % of general government expenditure



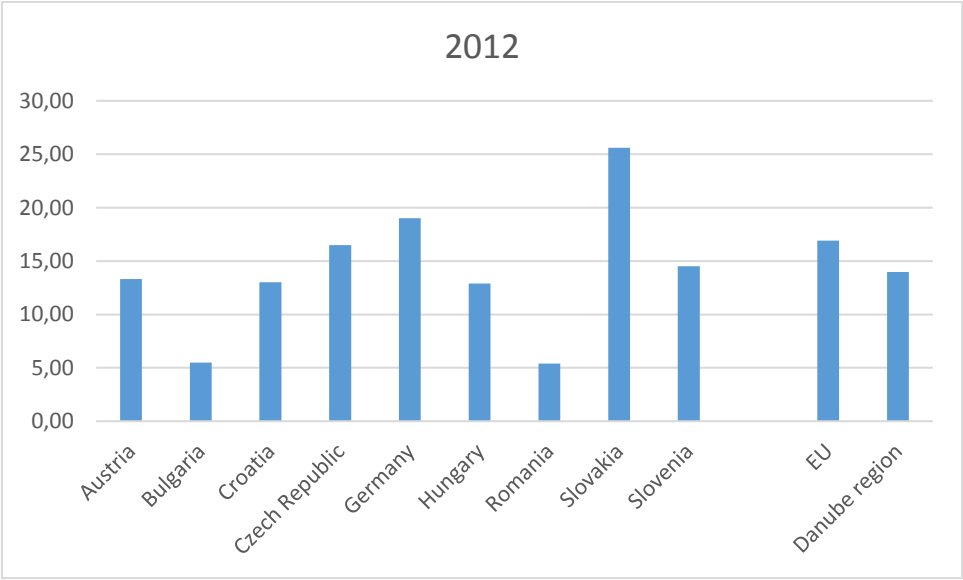
The performance of Bulgaria of this indicator for 2016 is a far below the performance of the indicator for the EU. It has the lowest performance from the countries in the Danube region, with values 0,2 for Bulgaria, 0,5167 for Danube region and 0,6400 for EU.

Indicator: Innovation output indicator



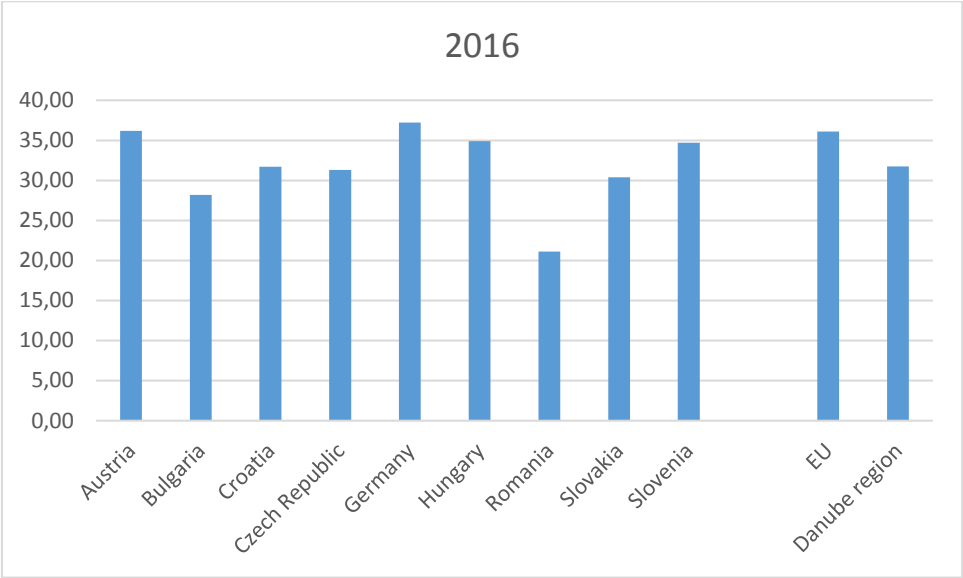
The performance of Bulgaria of this indicator for 2014 is a below the average performance of the indicator for the EU and the Danube region. From the countries in the Danube region, only Croatia is behind Bulgaria, with values 68,27 for Bulgaria, 59,81 for Croatia, 87,75 for Danube region and 93,21 for EU.

Indicator: Turnover from innovation (% of total turnover Services/ Industry)



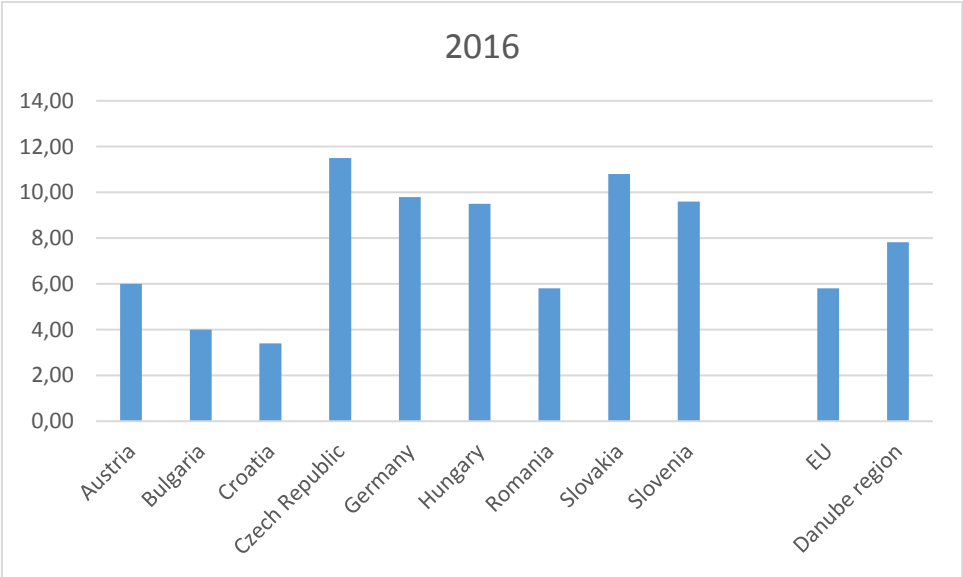
The performance of Bulgaria of this indicator for 2012 is far below the average performance of the indicator for the EU and the Danube region. From the countries in the Danube region, only the benchmark country Romania is behind Bulgaria, with values 5,50 for Bulgaria, 5,40 for Romania, 13,97 for Danube region and 16,90 for EU

Indicator: Employment in Knowledge Intensive Activities (KIA) - both manufacturing and services - as a share of total employment



The performance of Bulgaria of this indicator for 2016 is a bit below the average performance of the indicator for the EU and the Danube region. From the countries in the Danube region, only the benchmark country Romania is behind Bulgaria, with values 28,20 for Bulgaria, 21,10 for Romania, 31,74 for Danube region and 36,10 for EU

Indicator: Employment in medium-high and high-tech manufacturing as share in total employment



The performance of Bulgaria of this indicator for 2016 is a below the average performance of the indicator for the EU and the Danube region. From the countries in the Danube region, only Croatia is behind Bulgaria, with values 4,0 for Bulgaria, 3,40 for Croatia, 7,82 for Danube region and 5,80 for EU.

4. ENERGY

4.1 General overview of energy sector

Bulgaria's energy generation includes nuclear energy, solid fuels, such as lignite, as well as small quantities of gas. The role of renewable energy sources (wind, solar, biomass, and hydro) has increased dramatically in recent years; renewables make up nearly 20 percent of Bulgaria's electricity production. Energy prices on the regulated market are fixed, by reference, or formula- based, indicating low levels of competition in the energy sector. The country's strategic geographical location makes it a major hub for transit and distribution of oil and gas from Russia to Western Europe and other Balkan states.

Gas: Bulgaria's domestic market for natural gas is only 3 billion cubic meters (bcm) per year, of which 90 percent is currently provided by Russia. Gas production in Bulgaria dropped to an estimated 82mn cubic meters in 2015, down from 181mn in 2014.
Oil: Domestic oil resources in Bulgaria are limited to about 15 million barrels; production is marginal. Import, export, and trade in crude oil and refined products are completely liberalized. All the crude oil and considerable quantities of refined products are imported from Russia.
Smart Grids: Bulgaria's energy strategy foresees the replacement of ordinary power transmission networks with smart grids by seeking EU funds for the replacement of conventional electricity meters with smart ones.
Nuclear Energy: As part of the agreement for EU accession Bulgaria closed two nuclear reactors in Kozloduy. Plans to construct one or possibly two new nuclear power plants started to emerge.
Biomass: With recent changes to the law and strong government support for the biomass sector, Bulgaria could become a promising biomass energy market in the next few years. Bulgaria's total installed biomass capacity for electricity generation is less than 7 MW, presenting huge growth opportunities, however legal challenges have cut support for biomass with the exclusion of biomass from waste.

Below is a visual presentation of the performance of selected indicators in energy sector for Bulgaria, compared to the one in EU and Danube region.

Indicator: Energy dependence

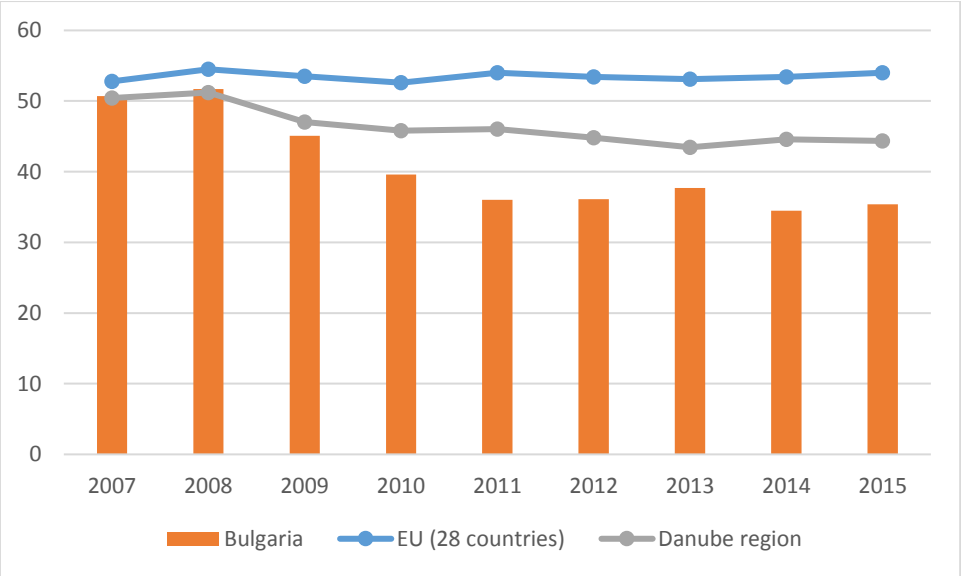


Figure: Energy dependence of Bulgaria compared to EU-28 and the Danube region

Bulgaria recorded a fall in its energy dependency rates between 2007 and 2015, with rates from 50,7 in 2007 to 35,4 in 2015, which is a result of the combination of energy efficiency gains and/or a switch in the energy mix to promote primary production from renewable sources.

4.2 Indicator: Energy intensity of the economy

Bulgaria's energy intensity remains the highest in the EU, four times the EU average. Energy saving opportunities exist across the whole economy and energy chain, but challenges to the efficient transformation and use of energy have been persistent in the transport, residential, and industrial sectors. Bulgaria is currently ranked as number 44 on the Energy Architecture Performance Index Report 2016 with a benchmark of 126 countries, and Bulgaria has improved its energy efficiency compared to previous years.[5]

Indicator: Gross inland consumption of energy divided by GDP (kg of oil equivalent per 1 000 EUR)

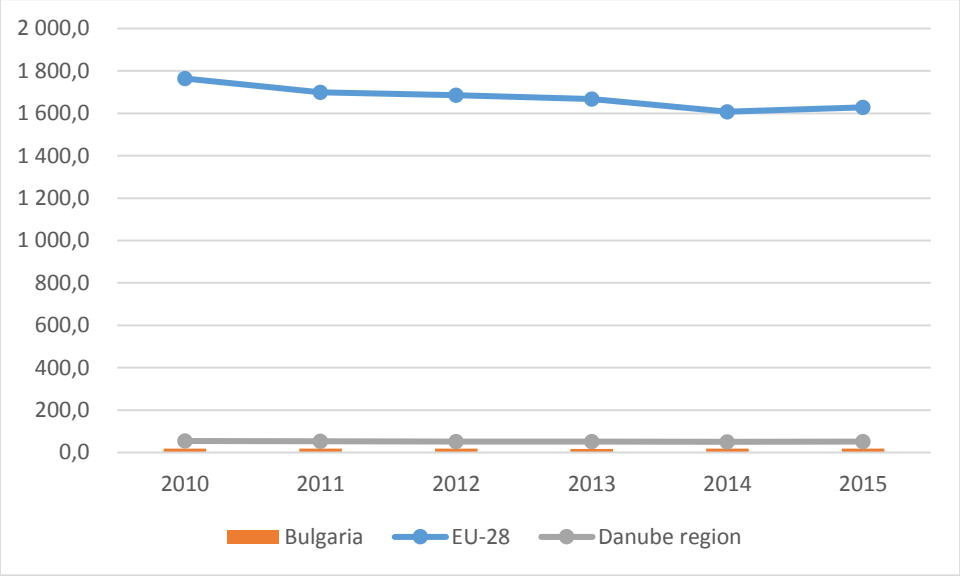


Figure: Gross inland consumption of energy in Bulgaria compared to EU-28 and the Danube region

The gross inland consumption of energy in Bulgaria coincides with the levels of consumption in the Danube region, which are significantly low compared to EU.

4.3 Indicator: Share of renewable energy in gross final energy consumption (%)

[5] https://www.export.gov/article?id=Bulgaria-Power-Generation-Oil-and-Gas-Renewable-Sources-of-Energy-and-Energy-Efficiency

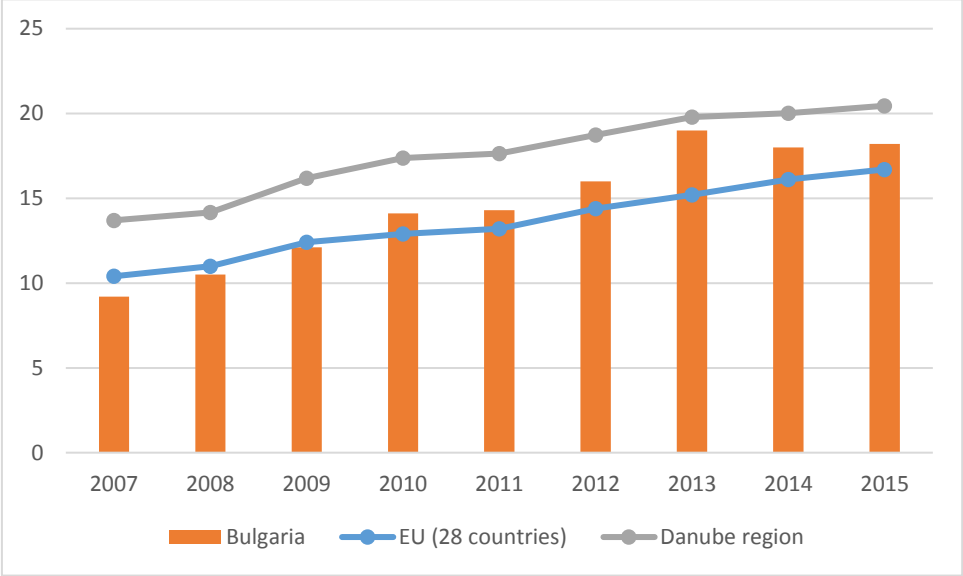


Figure: Share of renewable energy in gross final energy consumption in Bulgaria compared to EU-28 and the Danube region

The share of renewable energy consumption in gross final energy consumption drastically increased from 2017, as it peak was in 2013. The performance of this indicator for Bulgaria is better than EU, but still lower compared to the Danube region

According to official figures, Bulgaria has fully achieved – and well in advance – the objectives of the "Europe 2020" strategy on the consumption of energy from renewable sources.

Obstacle:
This sector is facing crisis, administrative confusion. Investors, especially foreigners, were quick to show interest. Many projects, though unrealistic ones were realized. A long-term, sustainable strategy is necessary.

Indicator: Share of renewable energy in gross electricity consumption (%)

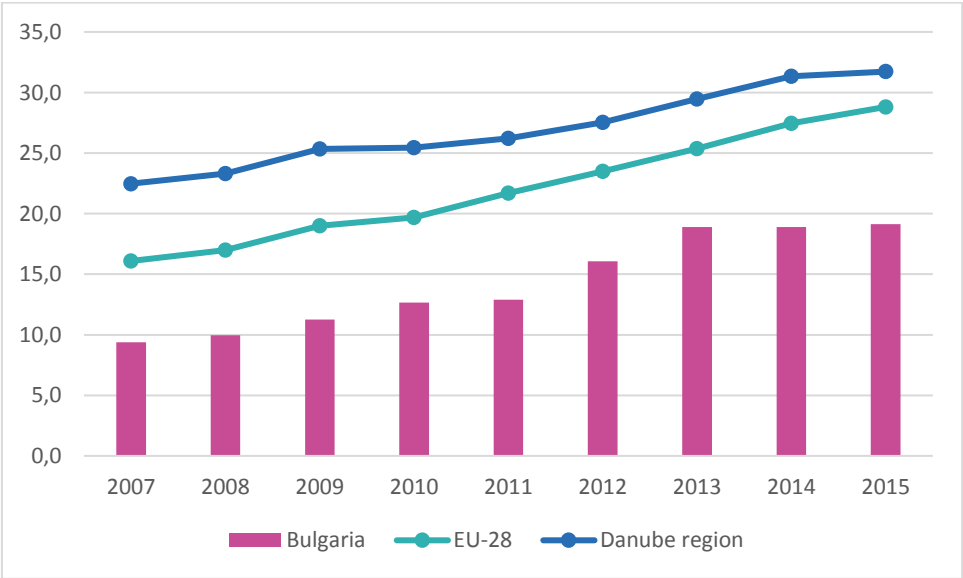


Figure: Share of electricity from renewable energy in gross energy consumption in Bulgaria compared to EU-28 and the Danube region

The share of renewable energy in gross electricity consumption for Bulgaria in significantly growing, reaching its peak in 2013. However, the performance of this indicator, compared to EU and Danube region is significantly lower.

Obstacle: This sector is facing crisis, administrative confusion. Investors, especially foreigners, were quick to show interest. Many projects, though unrealistic ones were realized. A long-term, sustainable strategy is necessary.

Indicator: Share of CHP in gross electricity generation (%)

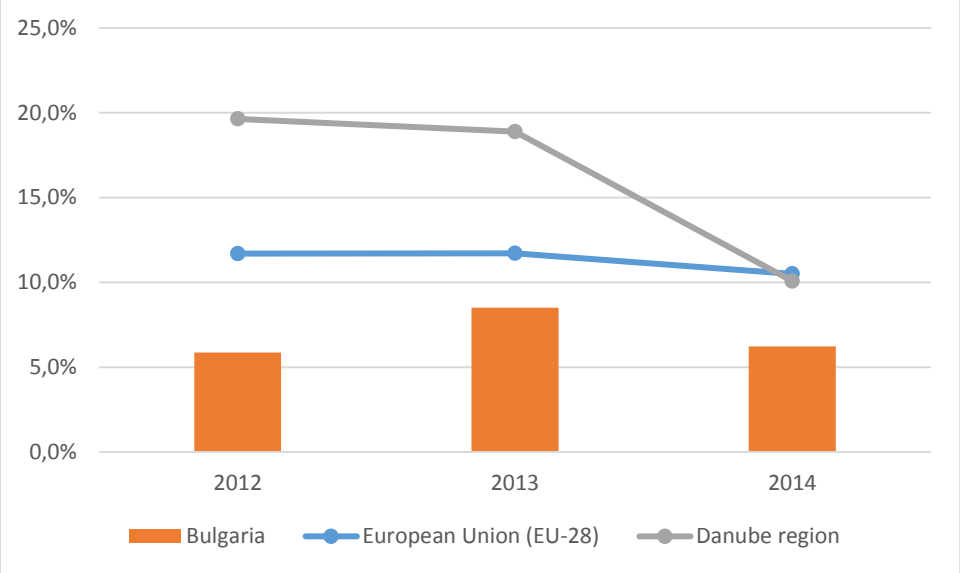


Figure: Share of CHP in gross electricity generation in Bulgaria compared to EU-28 and the Danube region

The share of CHP in gross electricity generation in Bulgaria, compared to the one in EU and Danube region is significantly lower.

Indicator: Greenhouse gas emissions intensity of energy consumption (index)

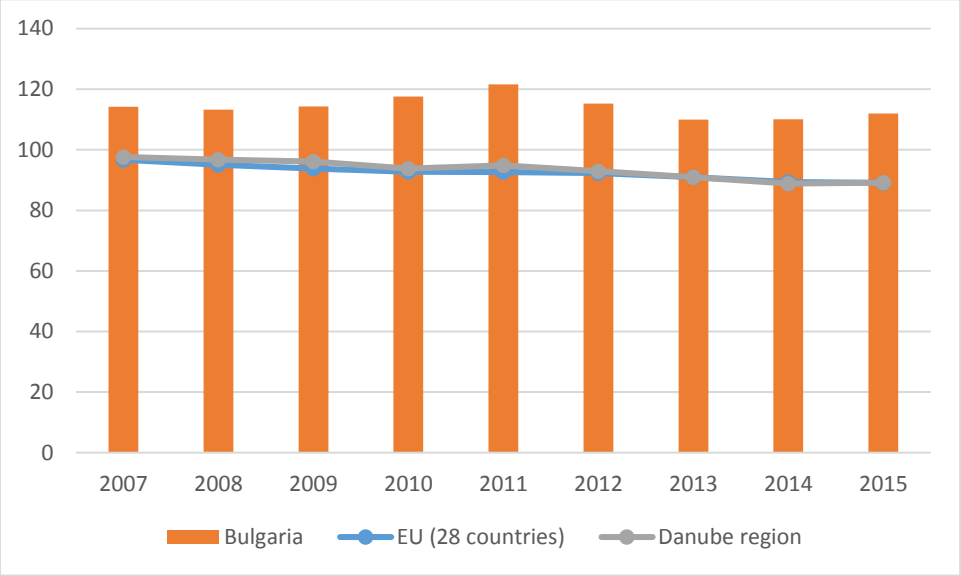


Figure: Greenhouse gas emissions intensity in energy consumption in Bulgaria compared to EU-28 and the Danube region

The greenhouse emissions for Bulgaria are higher, compared to EU and Danube region.

Opportunity: Bulgaria, as all member states, shall meet its legally binding targets concerning greenhouse emissions covered by the Effort Sharing Decisions from 2013 to 2020.

Indicator: Total primary production of energy (in 1 000 tonnes of oil equivalent – ktoe per capita)

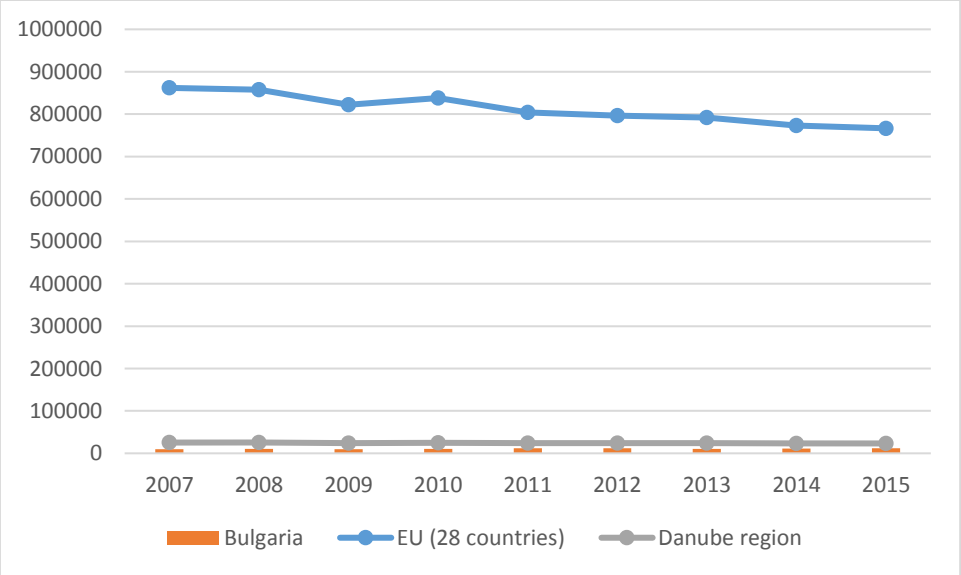


Figure: Total primary production of energy in Bulgaria (in 1 000 tonnes of oil equivalent – ktoe per capita) compared to EU-28 and the Danube region

The total primary production of energy on Bulgaria coincides to the one of Danube region, while it is significantly low compared to EU.

Indicator: Total primary production of renewable energy (in tonnes of oil equivalent – toe

per capita)

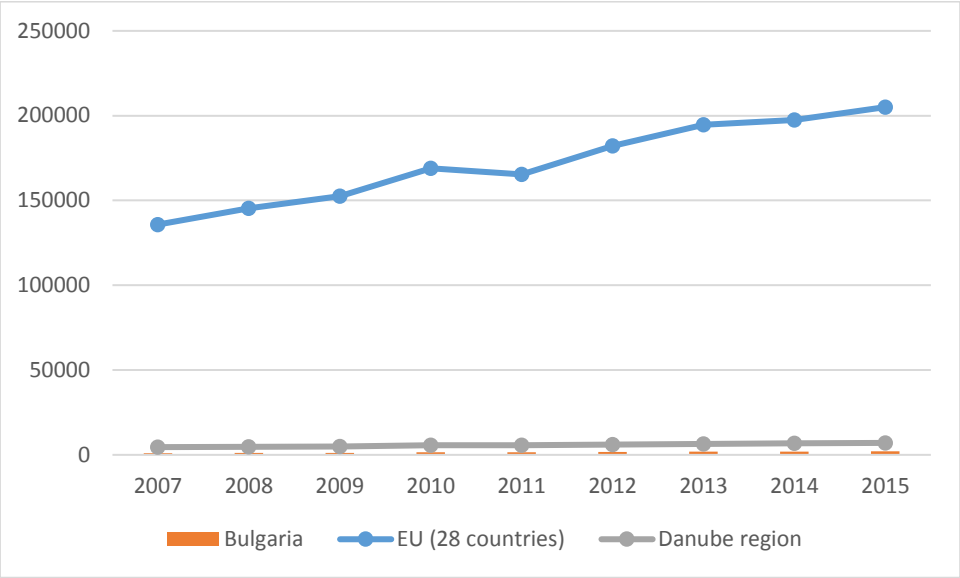


Figure: Total primary production of renewable energy in Bulgaria (in tonnes of oil equivalent – toe per capita) compared to EU-28 and the Danube region

Total primary production of renewable energy is slightly lower than the one in Danube region and significantly lower compared to EU.

Indicator: Energy consumption of transport relative to GDP (index)

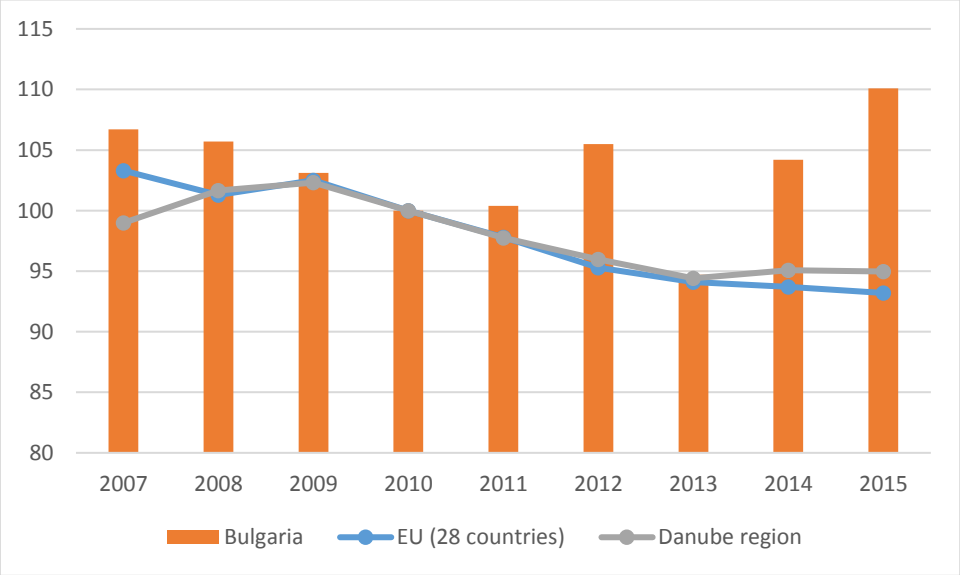


Figure: Energy consumption of transport relative to GDP in Bulgaria compared to EU-28 and the Danube region

While energy consumption of transport was decreasing until 2013, in years 2014 and 2015 it significantly increased, and for these two years it is significantly bigger compared to EU and Danube region.

Opportunity: making more effective transport system (i.e. from the same unit of energy more tonnes of goods to be transported and/or on shorter distances and/or the filling factor of goods in freight vehicles to be lower).

Indicator: Electricity consumption by households (in tonnes of oil equivalent – toe per capita)

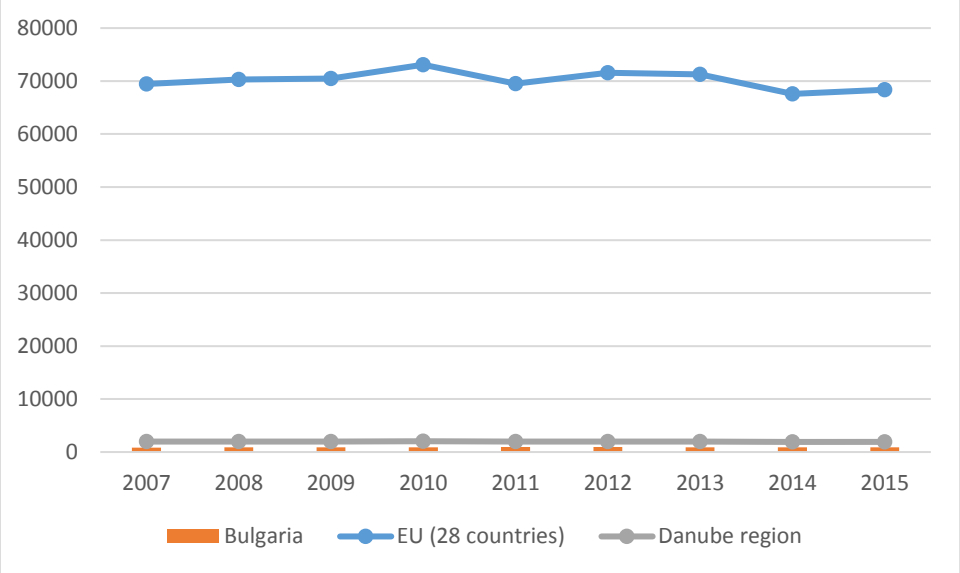


Figure: Electricity consumption by households (in tonnes of oil equivalent – toe per capita) in Bulgaria compared to EU-28 and the Danube region

Specific energy consumption by households is significantly below EU average, and almost the same as the one of the Danube region.

Obstacle: This can be partially explained by the amplitude of fuel poverty in the country as well as by a lower welfare level than the EU average.

Indicator: Energy productivity (in EUR per kilogram of oil equivalent – kgoe)

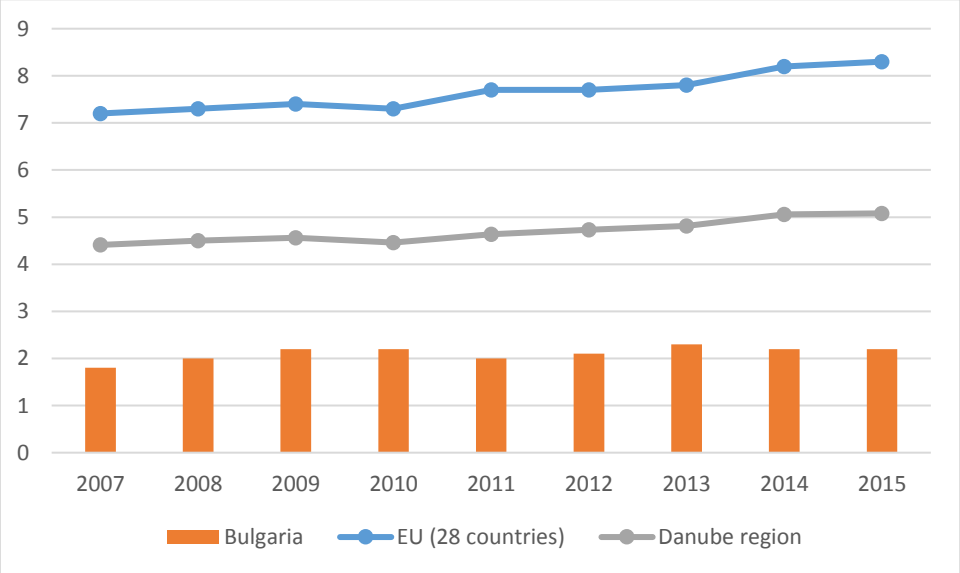


Figure: Energy productivity (in EUR per kg of oil equivalent – ktoe) in Bulgaria compared to EU-28 and the Danube region

The energy productivity in Bulgaria is significantly lower than the of Danube region, and well behind the EU.

Obstacle: Bulgaria showed a trade deficit in energy products in 2014. The overall energy deficit is mainly driven by oil and gas, while the coal deficit is close to zero and trade in electricity shows a surplus.

Indicator: Electricity prices in households (EUR per kWh)

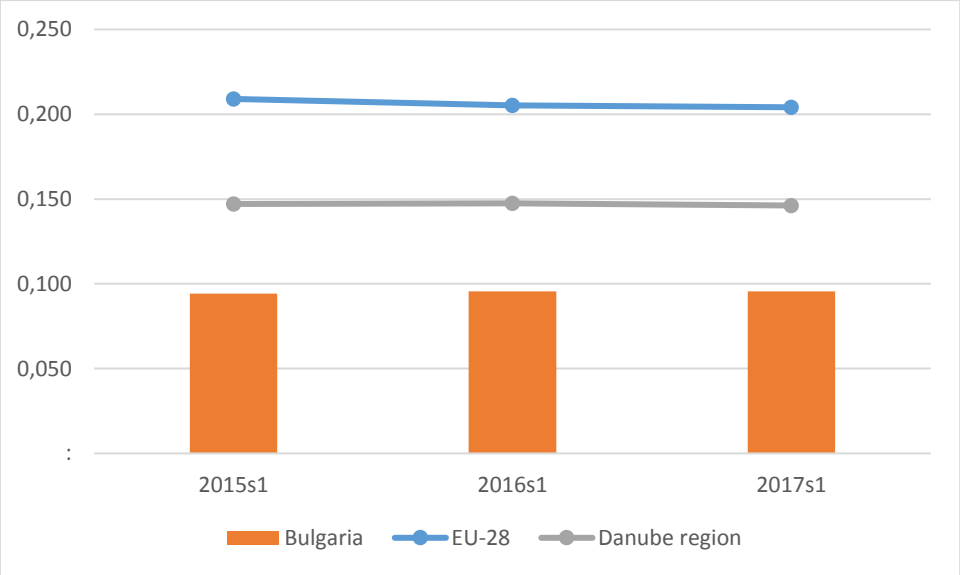


Figure: Electricity prices in households in Bulgaria compared to EU-28 and the Danube region

Electricity prices for households in Bulgaria are the lowest compared to other Eastern European countries in transition, and lower than the prices for the industry.

Obstacle: This distorted ratio impedes the development of market structures and encourages the excessive consumption of energy for heating.

Indicator: Electricity prices in industry (EUR per kWh)

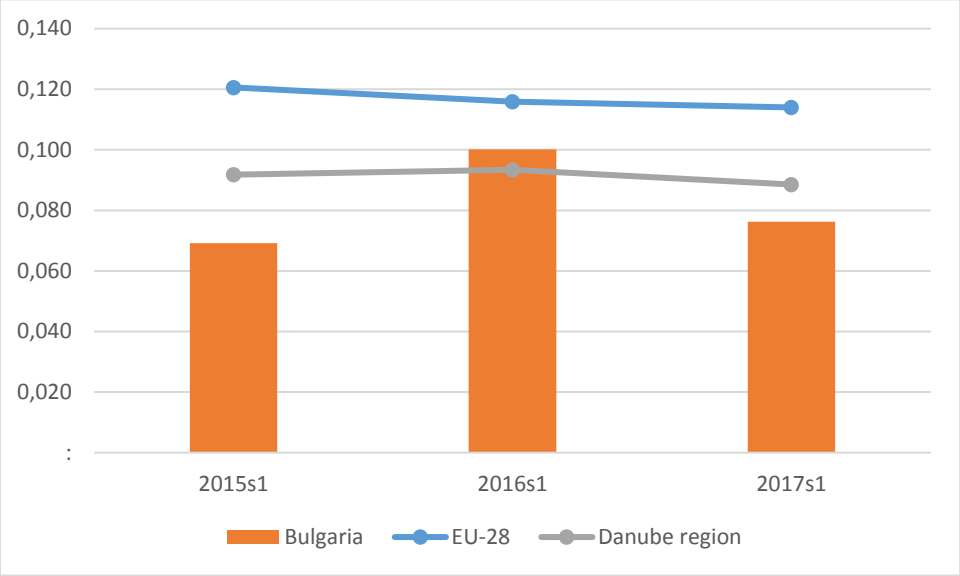


Figure: Electricity prices in non-households in Bulgaria compared to EU-28 and the Danube region

Electricity prices for industry are lower than the ones in Danube region and EU, while in 2016, the average prices were a bit higher, compared to the Danube region.

Opportunity: Observing energy prices, Bulgaria has among the lowest electricity and gas prices for industrial users. When considering large industrial users, electricity prices are comparable to US prices.

4.4 National energy policy

THE ENERGY STRATEGY OF THE REPUBLIC OF BULGARIA TILL 2020

The Energy strategy is worked out by the Ministry of Economy, Energy and Tourism and approved by the Council of Ministers in accordance with the Energy law.

The Energy Strategy is a fundamental document of the national energy policy that is approved by the Council of Ministers and passed by the National Assembly of the Republic of Bulgaria.The National Energy Strategy till 2020 reflects the political vision of the Government of European Development of Bulgaria pursuant to the up-to-date European energy policy framework and the global trends in the development of energy technologies.

The main priorities in The Energy Strategy can be summarized in the following five directions:

- to guarantee the security of energy supply;
- to attain the targets for renewable energy;
- to increase the energy efficiency;
- to develop a competitive energy market and policy for the purpose of meeting the energy needs;
- to protect the interests of the consumers.

These priorities also determine the Government's vision for development of the energy in the coming years, namely:

- Maintaining of a safe, stable and reliable energy system;
- The energy sector remains a leading branch of the Bulgarian economy with definite orientation to foreign trade;
- Focus on clean and low-emission energy – nuclear and from renewable sources;
- Balance between quantity, quality and prices of the electric power produced from renewable sources, nuclear energy, coal and natural gas;
- Transparent, efficient and highly professional management of the energy companies.

5. ENVIRONMENTAL PROTECTION

5.1 Environmental challenges

In Bulgaria emphasis is increasingly placed on national environmental protection and the prevention and adaptation to climate change. The main environmental challenges for Bulgaria are:

Protection and improvement of water resources status

Providing further development and implementation of specific economic principles such as "polluter pays" and the principle of cost recovery in the water sector. Creating a strategic framework to reduce and prevent the adverse effects of flooding on human health, on the environment, on economy and on cultural heritage of the country and the development of Plans for Flood Management.

Sustainable waste management

Building a comprehensive infrastructure for waste treatment in the country and creating a strategic framework for waste management to determine future measures for waste generation prevention, promote recycling and reuse of waste and more efficient use of resources, the development of sustainable systems for management of specific waste streams and investment promotion activities associated with waste management.

Improve air quality

Implementation of the measures of the national programme to reduce total annual emissions of sulfur dioxide, nitrogen oxides, volatile organic compounds and ammonia in ambient air and methodological support to municipalities in developing programs to improve air quality and the implementation of already developed ones.

Limitation and halt the loss of biodiversity and the degradation of ecosystem services

Completion, maintenance and management of the national ecological network of protected areas and zones in order to ensure territorial protection, conservation, strengthening and restoration of ecosystems, habitats, species and genetic material, development and adoption of action plans for plant and animal species and management plans for protected areas and protected zones.

5.2 Environmental legislation

Below is presented the main environmental legislation in Bulgaria. The list does not claim to be exhaustive

- Environmental Protection Act, Transitional and Final Provisions
- Liability Act to Prevent and Eliminate Environmental Damage
- Ordinance on the Terms and Procedure for Determining the Responsibility of the State and for Removing the Environmental Damage Caused by Past Actions or Inactions in Privatization
- Ordinance No. 1 of 29.10.2008. the type of preventive and remedial measures in the cases provided for by the Liability Prevention Act is the removal of environmental damage and the minimum amount of costs for their implementation
- Ordinance on the public register of the operators who carry out the activities under Annex 1 to Art. 3, item 1 of the Liability for the Prevention and Remedy of Environmental Damage
- Environmental Protection Act
- Energy Act
- Biodiversity Act
- Environment and Climate Change law
- Energy Effectiveness Law
- Law on Renewable Energy
- Waste management Act
- Law on limiting climate change

5.3 Environmental taxes

In Bulgaria there are the following types of environmental taxes:
- Energy taxes;
- Transport taxes;
- Pollution taxes;
- Resource taxes.

The energy taxes – energy taxes include taxes on energy products used both for stationary (e.g. coal, fuel oil, natural gas and electricity) and transport purposes. By convention, CO2 taxes are also included in this tax category.

The transport taxes – transport taxes mainly include taxes related to the ownership and use of motor vehicles.

The resource and pollution taxes cover different types of taxes: taxes on extraction of raw materials, on measured or estimated emissions to air (as NOx and SO2) and water, on noise and on the management of waste.

Indicator: Environmental protection expenditure of the public sector (% of GDP)

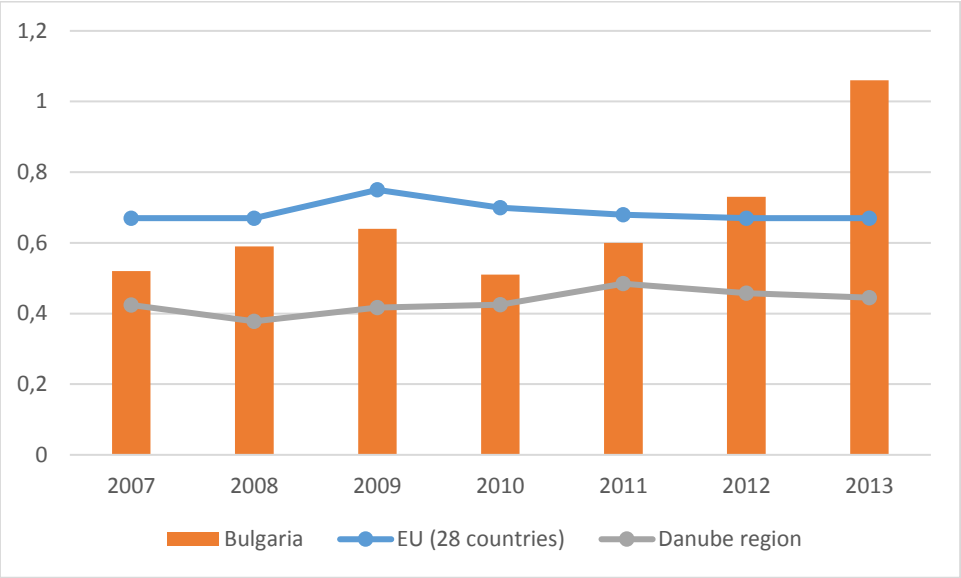


Figure: Environmental protection expenditure of the public sector in Bulgaria compared to EU-28 and the Danube region

There is a tendency of increasing the environment protection expenditure in Bulgaria in recent years, reaching its peak in 2013, according to the existing data. Compared to Danube region, from 2017 to 2013, Bulgaria has spent more money on environmental investments, and in 2012 and 2013, it made more environmental investments, compared to the EU.

Opportunity: The existing Operational programmes provide the necessary opportunities for environmental protection, prevention of natural disasters, reduction of pollution, etc.

Indicator: Greenhouse gas emissions (Tones of CO2 equivalent per capita)

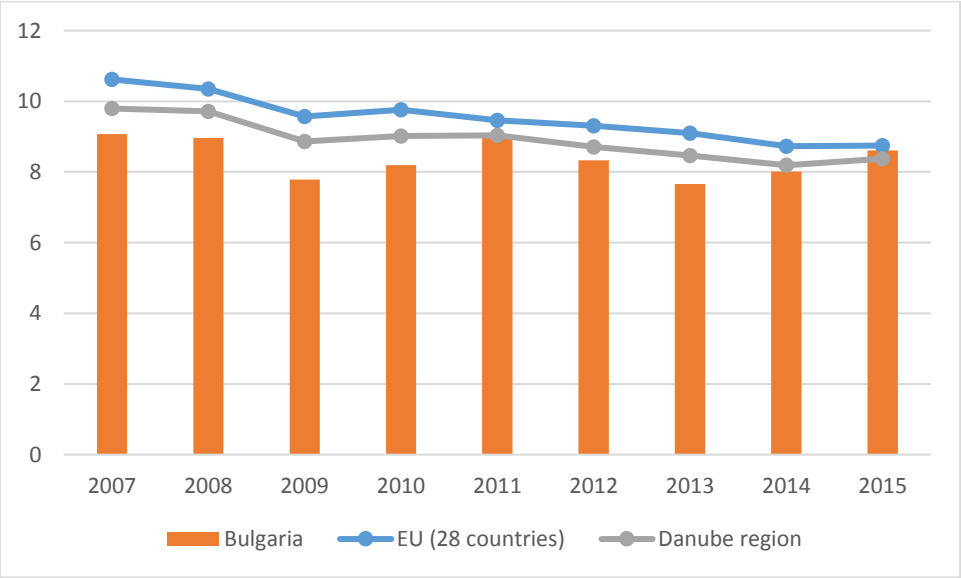


Figure: Greenhouse gas emissions in Bulgaria compared to EU-28 and the Danube region

Bulgaria increased its renewable energy share starting from 2007, which resulted in reducing the greenhouse emissions and increasing the energy effectiveness at the same time. For years 2014 and 2015,

the greenhouse gas emissions for Bulgaria are almost the same with the ones for the Danube region, and a bit higher than EU.

Opportunity: To reduce the greenhouse emissions by 40 percent till 2030.

Indicator: Environmental tax revenues (% of GDP)

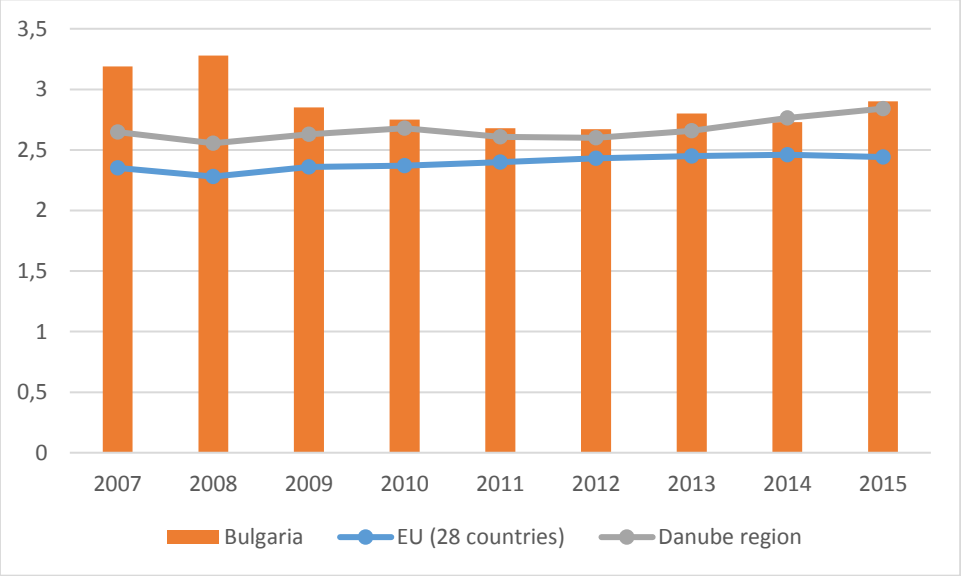


Figure: Environmental tax revenues in Bulgaria compared to EU-28 and the Danube region

The environmental taxes in Bulgaria have a higher share compared to EU, and follow the tendency of the Danube region, being almost the same with the ones for the Danube region for years 214 and 2015.

Obstacle: Increasing revenues from environmental taxes should be interpreted with caution. The increases may be caused by the introduction of new taxes or an increase in tax rates, or alternatively may be linked to an increase in the tax base caused, for instance, by a higher consumption of energy products.

Indicator: Energy taxes – absolute (million EUR)

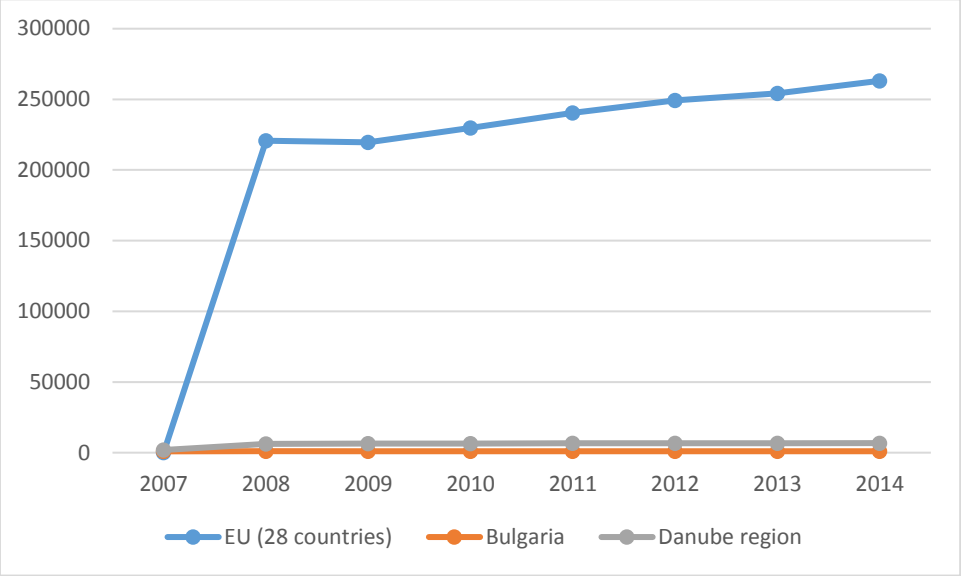


Figure: Energy taxes in Bulgaria compared to EU-28 and the Danube region

Compared to the EU, the energy taxes in Bulgaria as well as the ones in the Danube region, are drastically lower, and a bit lower than the ones in the Danube region.

Opportunity: The tax policy is one of the instruments for stimulating the development of energy efficient economic branches and for encouraging investment in cleaner eco technologies and eco industry.

Indicator: Implicit tax rate on energy (EUR per tonne of oil equivalent)

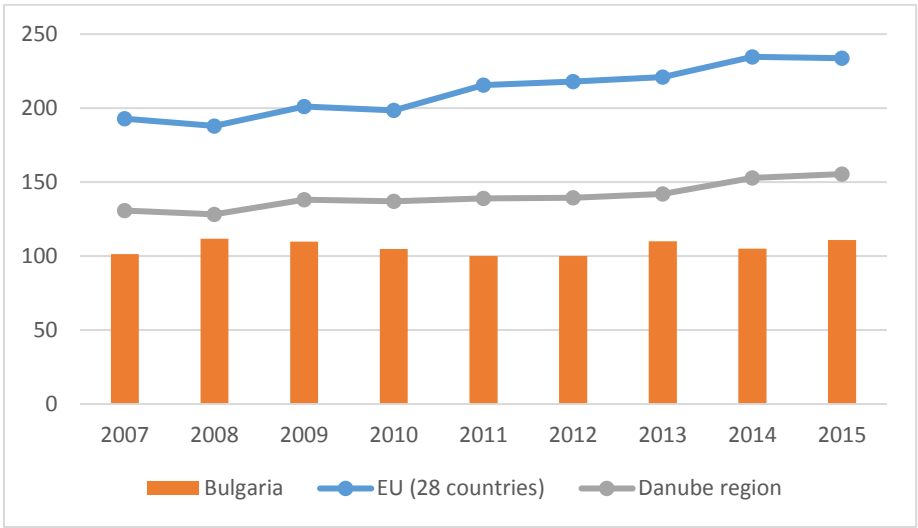


Figure: Implicit tax rate on energy in Bulgaria compared to EU-28 and the Danube region

Concerning the implicit tax rates on energy, Bulgaria lags behind compared to EU and Danube region.

Obstacle: The burden on energy bills is considerable for a large number of consumers in Bulgaria.

Indicator: Resource productivity

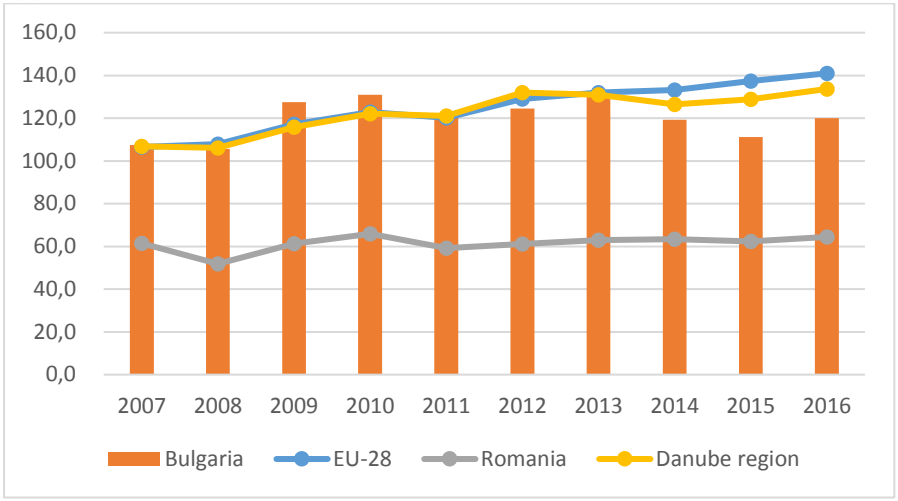


Figure: Resource productivity in Bulgaria compared to EU-28, the Danube region and the benchmark country – Romania.

The resource productivity in Bulgaria follows the tendency of EU and Danube region, while a slight decrease is notice in years 2015 and 2016. Compared to the benchmark country – Romania, the resource productivity in Bulgaria is twice higher.

Indicator: Domestic material consumption

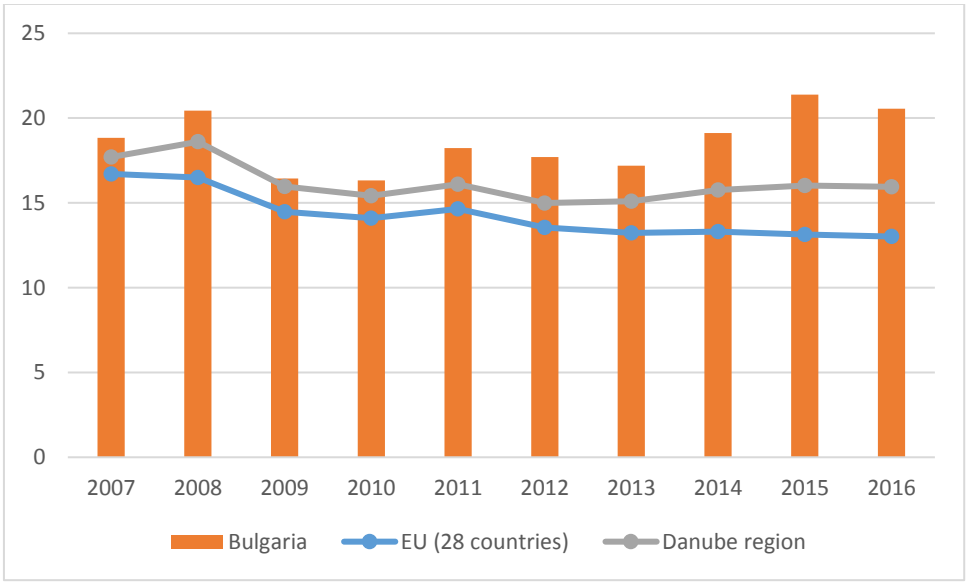


Figure: Domestic material consumption in Bulgaria compared to EU-28 and the Danube region

The domestic material consumption for Bulgaria is a bit higher than the one in EU and Danube region, while it slightly increased in 2015 and 2016. Bulgaria follows the tendency of EU and Danube region, while a slight decrease is notice in years 2015 and 2016. Compared to the benchmark country – Romania, the resource productivity in Bulgaria is twice higher.

Indicator: Recycling rates for packaging waste

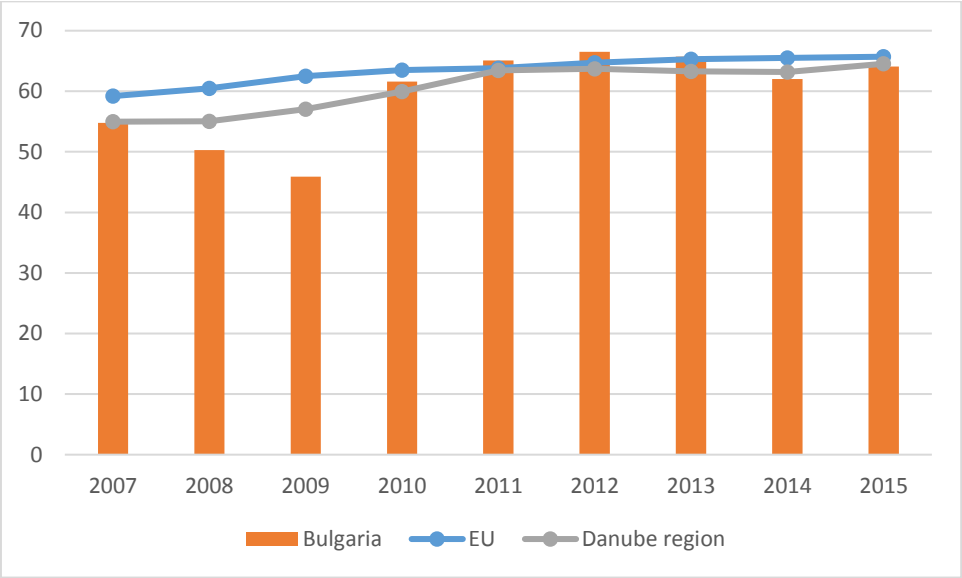


Figure: Recycling rates for packaging waste in Bulgaria compared to EU-28 and the Danube region

The recycling rates for packaging waste in Bulgaria stay relatively stable since 2010, and is almost as high as the levels for EU and Danube region for these years.

Indicator: Recycling rates for municipal waste

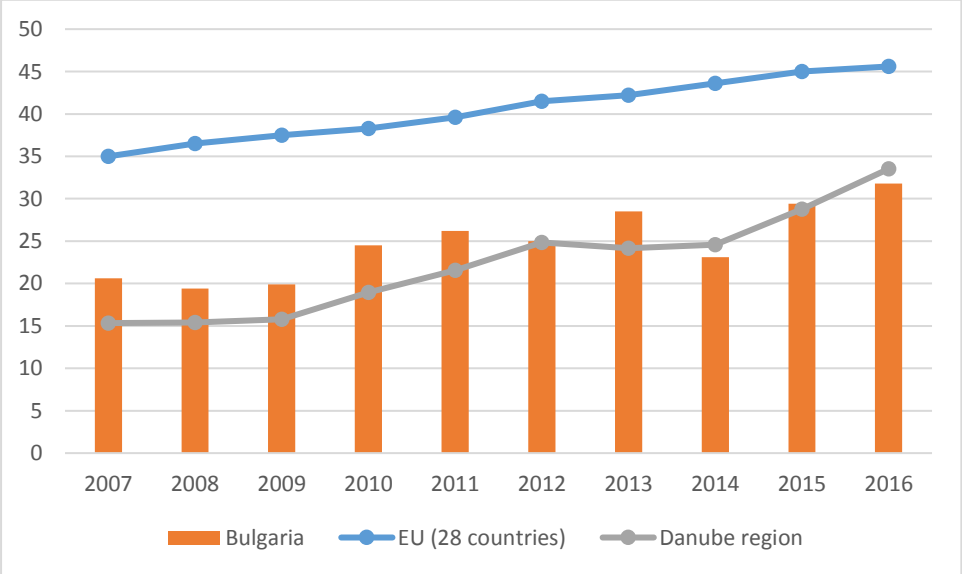


Figure: Recycling rates for municipal waste in Bulgaria compared to EU-28 and the Danube region

The recycling rates for municipal waste in Bulgaria almost follow the tendency of the ones for the Danube region, being relatively low compared to EU.

Indicator: Recycling rates for e-waste

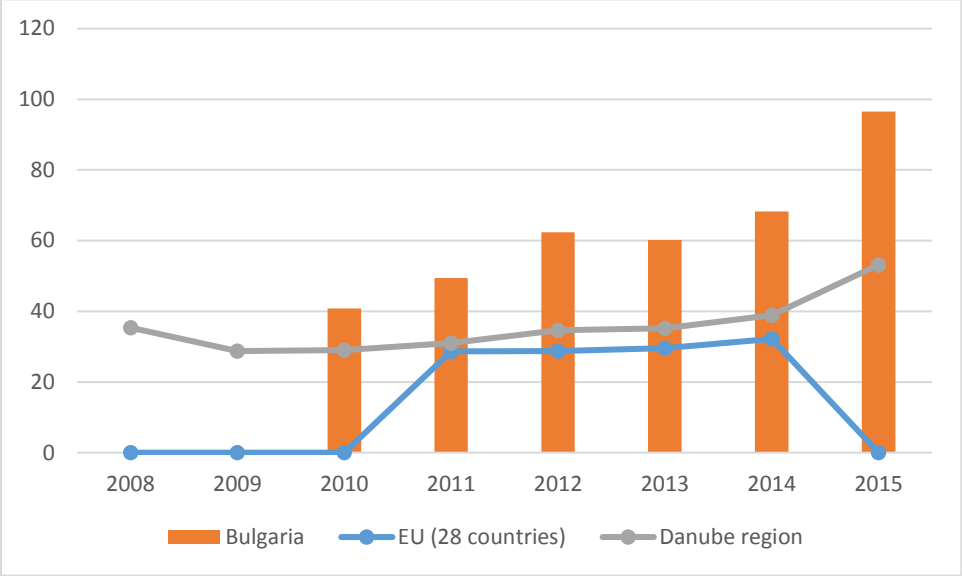


Figure: Recycling rates for e-waste in Bulgaria compared to EU-28 and the Danube region

The recycling rates for e-waste in Bulgaria are significantly high than the ones in EU and Danube region.

6. ECONOMY AND DEMOGRAPHY

Bulgaria has undergone a significant transformation over the past three decades. It has changed from a highly centralized, planned economy to an open, market-based, upper-middle-income economy securely anchored in the EU. In its initial transition, the country went through a decade of slow economic restructuring and growth, high indebtedness, and a loss of savings.

However, the advancement of structural reforms starting in the late 1990s, the introduction of the currency board, and the expectations of EU accession unleashed a decade of exceptionally high economic growth and improved living standards. Nevertheless, some legacies from that early period, the 2008 global economic crisis, and a period of political instability in 2013 - 14 undid some of those gains. Now, in its pursuit of boosting growth and shared prosperity, Bulgaria is moving to address these issues.

Today, Bulgaria faces the two inter-related challenges of raising productivity and addressing the country's rapid demographic change. Higher productivity growth is critical to accelerating convergence, as Bulgaria's income per capita is only 47% of the EU average, the lowest in the EU. Productivity will need to grow by at least 4% per year over the next 25 years for Bulgaria to catch up with average EU income levels and thus boost shared prosperity.[6]

Stronger domestic demand contributed to an acceleration of GDP growth to 3.9 and 4.2% y-o-y- in the first and second quarters of 2017, respectively, from 3.4% in 2016. Private consumption continued to improve on the basis of rising incomes, employment, and credit growth. Unemployment declined to an eight-year low (5.9% of the labour force in July 2017). Exports expanded at a robust rate, supported by strong demand from the EU, but imports grew faster.

Prospects for 2017 are better than initially expected, with GDP projected to grow at 3.8%. Household consumption is likely to continue expanding on the back of further improvements in labour market and credit conditions. Investment is likely to remain strong in the second half of the year. Going forward, GDP is

[6] http://www.coface.com/Economic-Studies-and-Country-Risks/Bulgaria

projected to pick up to 4% in 2019. Poverty reduction is expected to continue at a modest pace in the near term. Continued improvements in employment and wages, as well as scheduled increases in pensions and minimum wages, should support real incomes and therefore further reductions in poverty among the elderly and working poor. The external current account is expected to continue to be in surplus though decline by 2019. Export growth is projected to be robust, in line with Bulgaria's improved competitiveness on

EU markets and higher commodity prices. Import growth is expected to be driven by higher oil prices and strengthening domestic demand for consumer and investment goods. The fiscal position is likely to weaken slightly in 2017 compared to 2016 but to improve in the medium term. In 2017, fiscal accounts are set to be in a deficit of 0.6% of GDP (based on the European System of Accounts [ESA] 2010 methodology), as expenditure growth is likely to accelerate by the end of the year due to pension increases in effect since July and the faster pace of implementation of EU-funded capital projects.

Despite the return of inflation, household consumption will probably remain the main driver of growth. Their incomes are boosted by the lack of skilled labour, resulting from both inadequate training and emigration. The rise in the minimum wage and in employment, particularly in manufacturing and retail, are also having a positive impact. Thanks to the upturn in lending in the 2nd half of 2016, in the wake of the results of stress tests confirming the consolidation of the banking sector, private investment should continue to grow. After falling because of the transition between two European funding programmes, public investment seems set to rise again. However, there are still scars from the excesses and the associated over indebtedness, culminating in the bankruptcy of the country's fourth-largest bank in 2014, and they will encourage households and businesses to be prudent. Exports, which are diverse, encompassing cereals, oleaginous products, tobacco, clothing, medicines, machines, metals and electricity, should maintain their moderate rate of growth. They are still competitive, because salaries, despite having risen more than productivity since 2013, remain low.[7]

Bulgaria's population is 7.1 million. Approximately 85% of the population is Bulgarian, with other major ethnic groups being Turkish (8.8%), Roma (4.9%) and about 40 small minority groups totaling 0.7%.

Bulgaria experienced a decline in population from the official figures from 2011 to estimates taken in 2015. In 2011, it was noted that Bulgaria was experiencing a "demographic crisis." This has been attributed to declines that began in the 1990s following an economic collapse. As many as one million people left the country by 2005 because of this. The country also has a low fertility rate of 1.43, with a birth rate that's one of the lowest in the world. Emigration, low birth rates, and a high death rate are all contributing factors to the declining population in this country. The progressive decrease of the Bulgarian population is hindering economic growth and welfare improvement, and the management measures taken to mitigate the negative consequences do not address the essence of the problem. The Government Program for the period 2017 - 2021 is the first one that aims at overturning the trend. The program also identifies the priority means for achieving this goal: measures to increase the birth rate, reduce youth emigration, and build up regulatory and institutional capacity to implement a modern immigration policy tailored to the needs of the Bulgarian business.

Bulgaria's population continues to decline since its peak of 9 million in 1986. With a high death rate, low birth rate, and negative net migration, the decline is expected to continue throughout the 21st century. Interestingly, Bulgaria (along with Latvia) is one of only two countries with a lower population today than in 1950.

Despite the demographic crisis in Bulgaria, some indicators are increasing slowly their performance. The

[7] http://www.coface.com/Economic-Studies-and-Country-Risks/Bulgaria

unemployment rate has decreased to 7.6% of the active population in 2016 compared to the 2013 when it was 13%. It is occurred its lowest rate since the world economic crisis in 2008 has begun and the unemployment rate in Bulgaria than was only 5.6% and lower than average rate for European Union which was 6.4%.

Indicator: Gross domestic product at market prices (Current prices, million purchasing power standards)

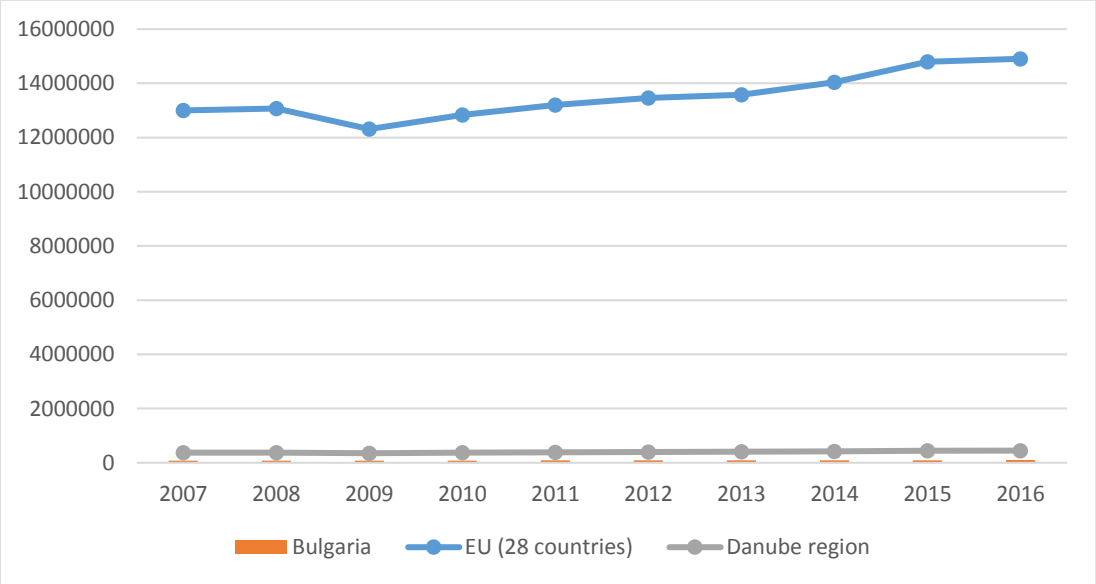


Figure: Gross domestic product at market prices (Current prices, million purchasing power standards) in Bulgaria, the EU and the Danube region

GDP (gross domestic product) is an indicator for a nation´s economic situation. Expressing GDP in PPS (purchasing power standards) eliminates differences in price levels between countries, and calculations on a per head basis allows for the comparison of economies significantly different in absolute size.
The scale according this indicator shows that there is not a significant difference in the value comparing Bulgaria to the Danube region. When comparing Bulgaria to the EU-28 countries average a huge difference could be seen. Despite the increase recorded for Bulgaria from modest 79613.9 EUR in 2007 until 101345.7 EUR in 2016, still the discrepancies with EU-28 countries average remain significant.

Indicator: Real GDP growth rate – volume (Percentage change on previous year)

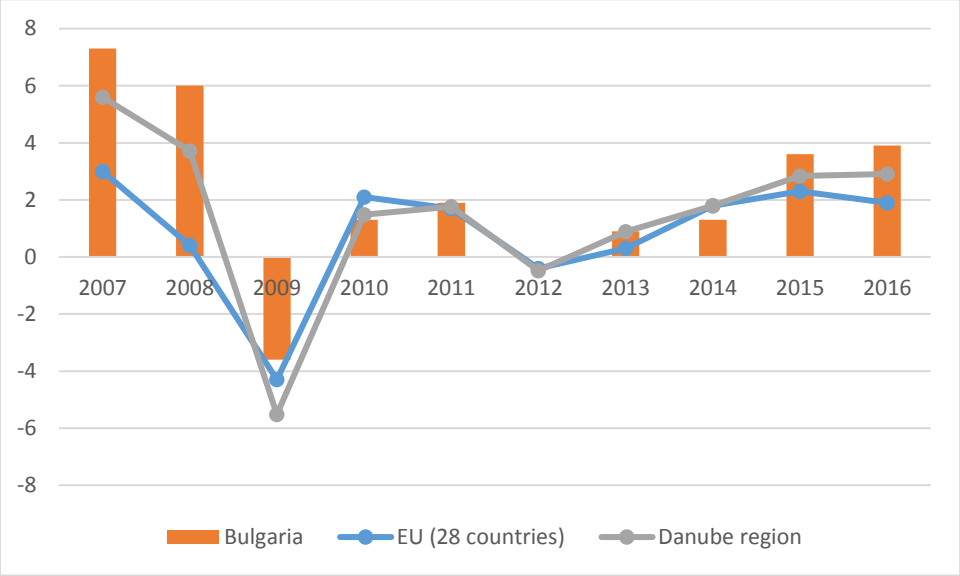


Figure: Real GDP growth rate – volume (Percentage change on previous year) in Bulgaria, the EU-28 countries and the Danube region

Real GDP growth rate shows more or less the same trend when comparing Bulgaria's to the rate for EU-28 countries average and Danube region average. Nevertheless, Bulgaria recorded positive growth in 2016 with 3.9% compared to the EU-28 countries average growth with 1.9% and the Danube region average with 2.9%. On the other side, recorded a negative growth rate in 2009 with -3.6% but it was still over the average for the EU-28 countries - -4.3% and the Danube region average growth rate in 2009 – -5.5%.

Indicator: Employment rate as a share of total population of age group 20-64

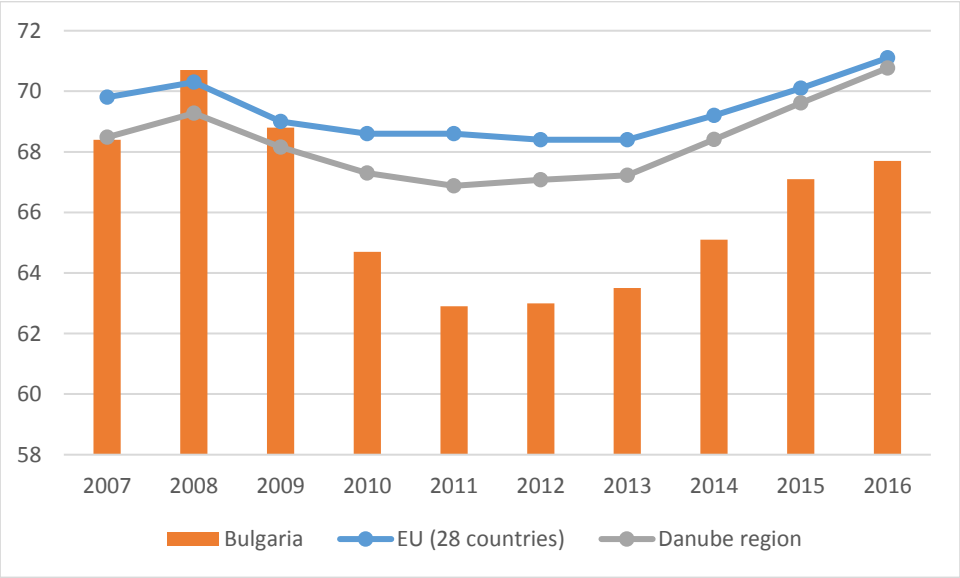


Figure: Employment rate as a share of population age 20-64 in Bulgaria compared to EU (28 countries) and Danube region

Despite the increasing growth registered in Bulgaria from 2011 until 2016, the Employment rate as a share of total population of age group 20-64 is lower than the average for this indicator for the EU-28 countries and the Danube region countries. The rate for Bulgaria registered a peak in 2008 when the average with 70.7% was over the average with 70.3% for EU-28 countries and the average rate with 69.3% for the Danube region.

Indicator: Unemployment rate as a share of active population (%)

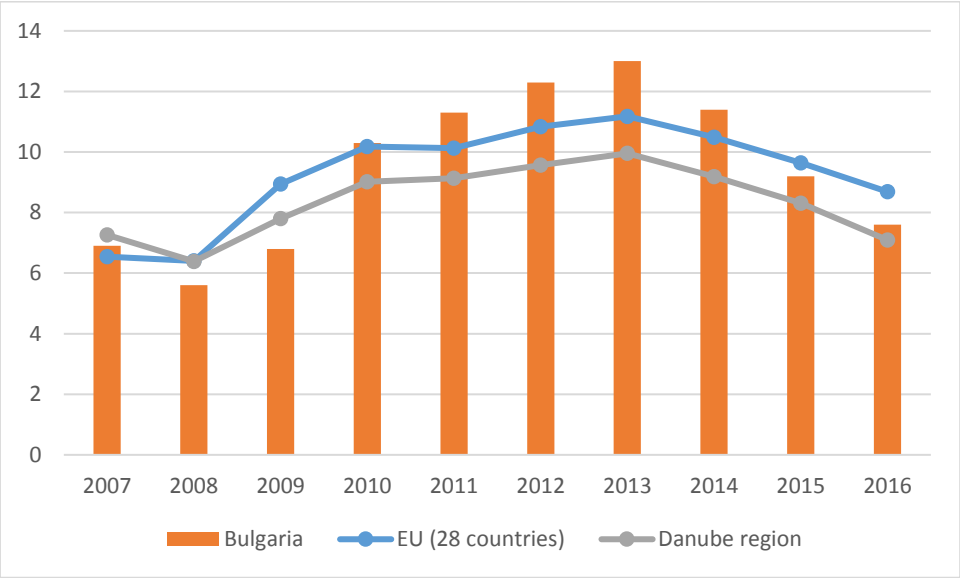


Figure: Unemployment rate as a share of active population in Bulgaria compared to EU (28 countries) and Danube region

The unemployment rate is the number of unemployed persons as a percentage of the labour force. The labour force is the total number of people employed and unemployed. Unemployed persons comprise persons aged 15 to 74. When it comes to unemployment rate, Bulgaria shows a positive trend as a whole and has registered decreasing rate. The figures show this positive trend when it starts from 2013 when the average rate for Bulgaria with 13% was over the average for EU-28 countries with 11.2% and over the average for the Danube region countries with 10% until 2016 when the rate with 7.6% for Bulgaria is lower compared the average rate for EU countries with 8.7%.

Indicator: Long-term unemployment rate (% of active population aged 15-74)

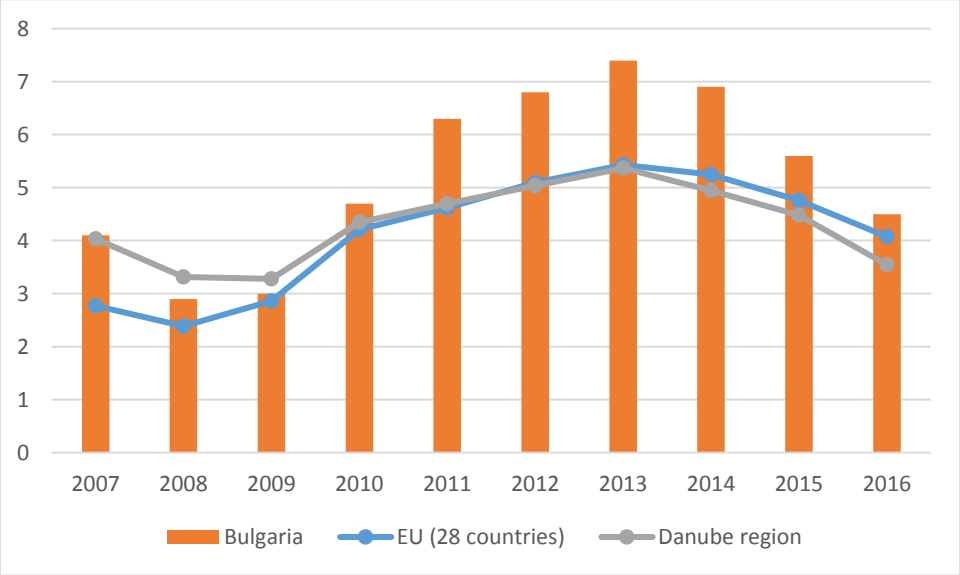


Figure: Long-term unemployment rate as a share of active population in Bulgaria compared to EU (28 countries) and Danube region

The performance of this indicator follows the tendency of EU and Danube region regarding the peaks and decreases, while the unemployment rates for Bulgaria s higher. The indicator had its peak years 2012, 2013

and 2014, since then it started slowly to decrease, reaching the value of 4,5 for 2016. The values for the same year for EU and Danube region are respectively 4,1 and 3,5.

Indicator: Youth unemployment rate (% of active population aged 15-24)

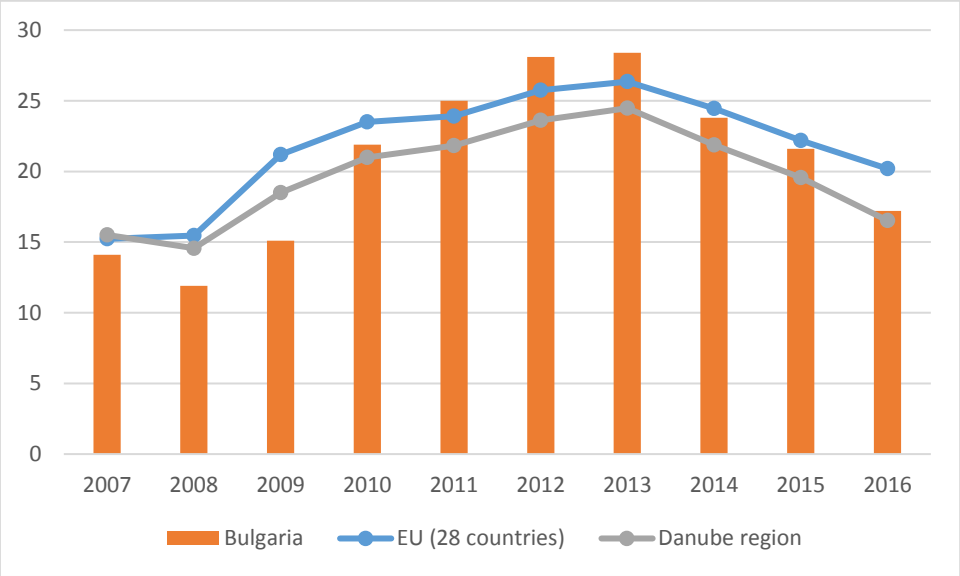


Figure: Youth unemployment rate (% of active population aged 15-24) in Bulgaria, EU and Danube region

The performance of this indicator follows the tendency of EU and Danube region and almost coincides with their values. It reached its peak in years 2012 and 2013, since then it started slowly to decrease, reaching the value of 17,2 for 2016. The values for the same year for EU and Danube region are respectively 20,2 and 16,52

Indicator: Labour costs annual data - NACE Rev. 2 (EUR per hour)

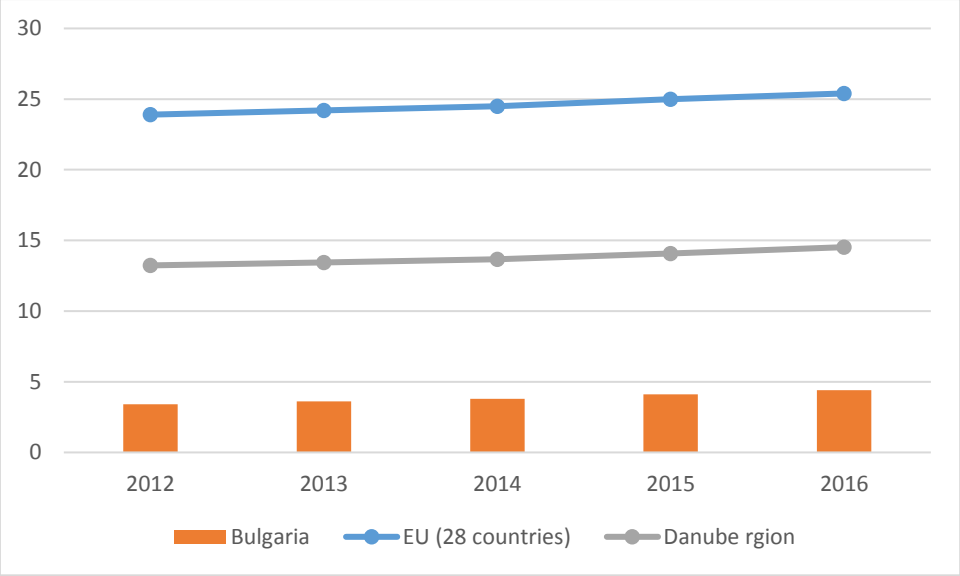


Figure: Labour costs (EUR per hour) in Bulgaria compared to EU (28 countries) and Danube region

The performance of this indicator follows the tendency of EU and Danube region and a significant gap between the figures for Bulgaria compared to the average figures for EU-28 countries and the Danube region countries is to be seen. The figures on this indicator are increasing slowly from 2012 until 2016 in Bulgaria when the labour costs are registered as 4.4 EUR per hour. Comparing Bulgaria to the EU-28 countries with its average value 25.4 EUR per hour and the average for the Danube region with 14.5 EUR per hour there is a significant difference between Bulgaria and the both regions.

Indicator: Job vacancy rate (%)

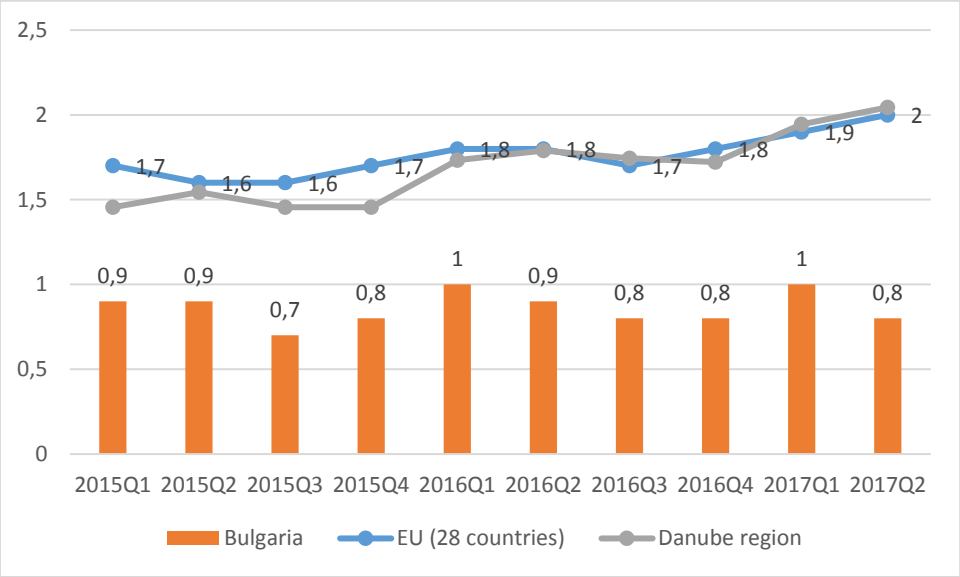


Figure: Job vacancy rate in Bulgaria compared to EU (28 countries) and Danube region

The performance of this indicator for Bulgaria is significantly lower than EU and Danube region. It showed its peak in the first quarter of 2017, with value 1.

Indicator: Minimum wages (EUR/month)

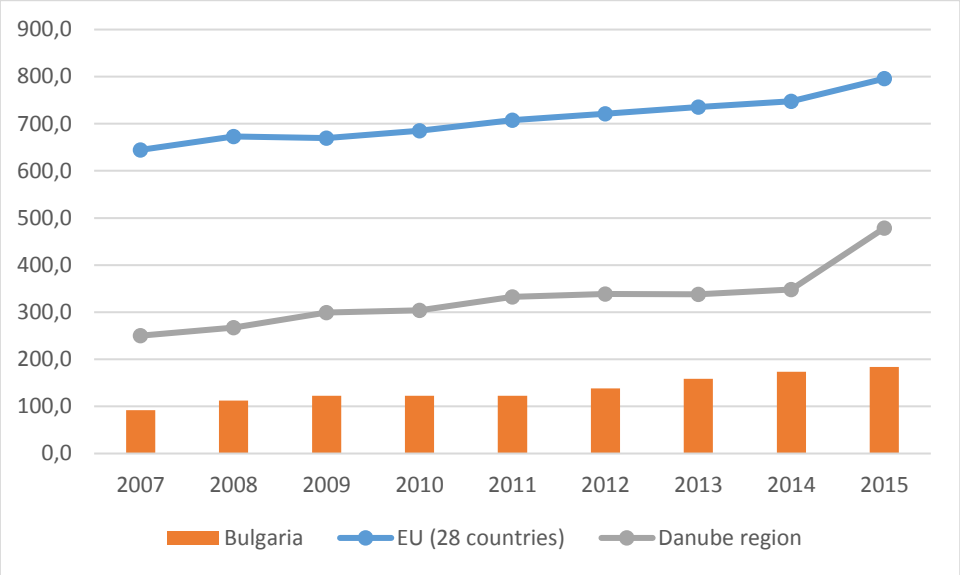


Figure: Minimum wages (EUR/month) in Bulgaria compared to EU (28 countries) and Danube region

While slightly increasing, the monthly wedges in Bulgaria are twice as low compared to Danube region, and drastically low compared to EU. The average values for 2015 for Bulgaria, Danube region and EU are respectively 184,1; 478,6 and 795,8.

Indicator: Labour productivity per hour worked (ESA 2010) Index, 2010=100

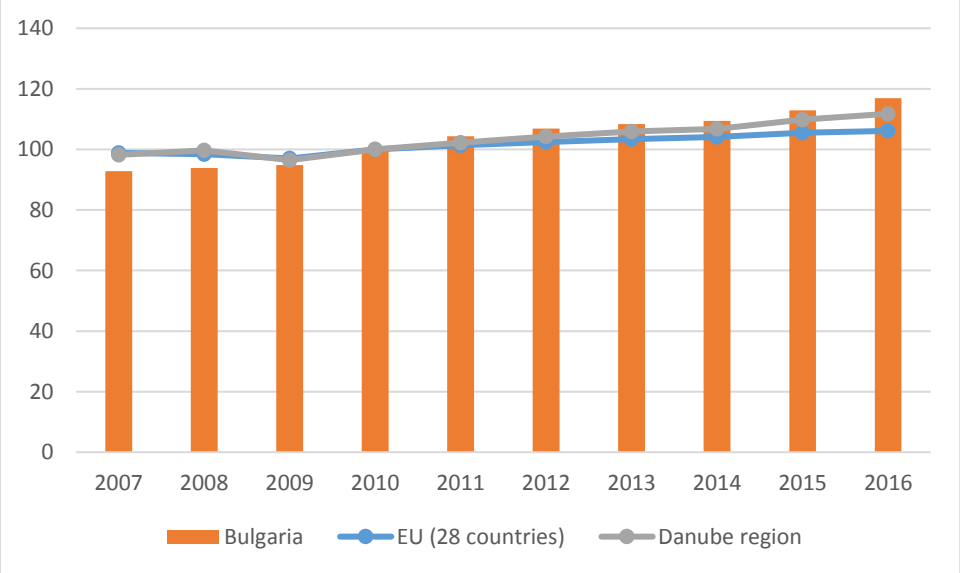


Figure: Labour productivity per hour worked (index) in Bulgaria compared to EU (28 countries) and Danube region

Bulgaria's performance of this indicator almost coincides with its average performance on behalf of EU and Danube region, which is increasing, and reaching its peak in 2016.

Indicator: Industrial confidence indicator (Seasonally adjusted data, not calendar adjusted data for 2017)

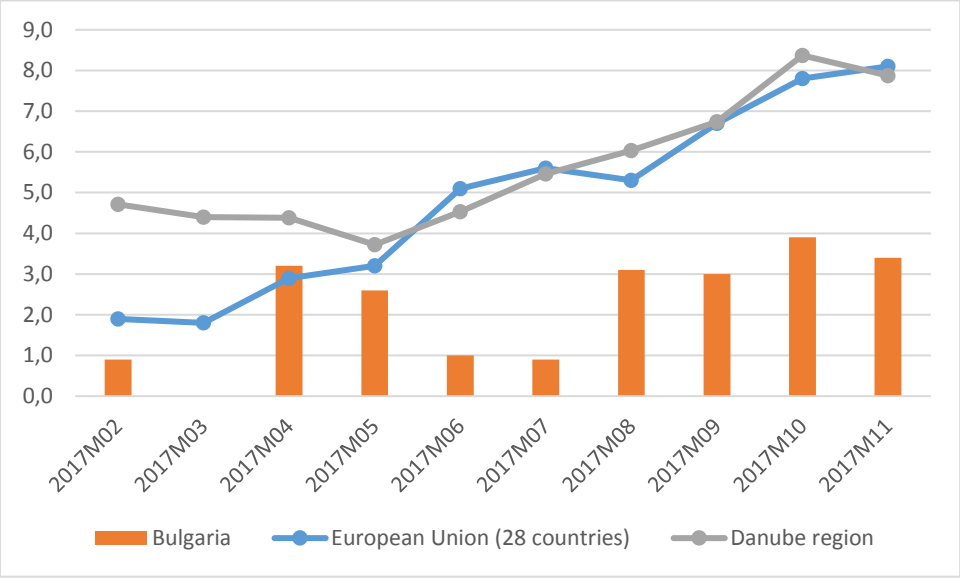


Figure: Industrial confidence indicator for 2017 (index) in Bulgaria compared to EU (28 countries) and Danube region

Bulgaria's performance of this indicator is slightly increasing in the last months of 2017, though significantly below the average performance of EU and Danube region.

Indicator: Services Confidence Indicator (Seasonally adjusted data for 2017)

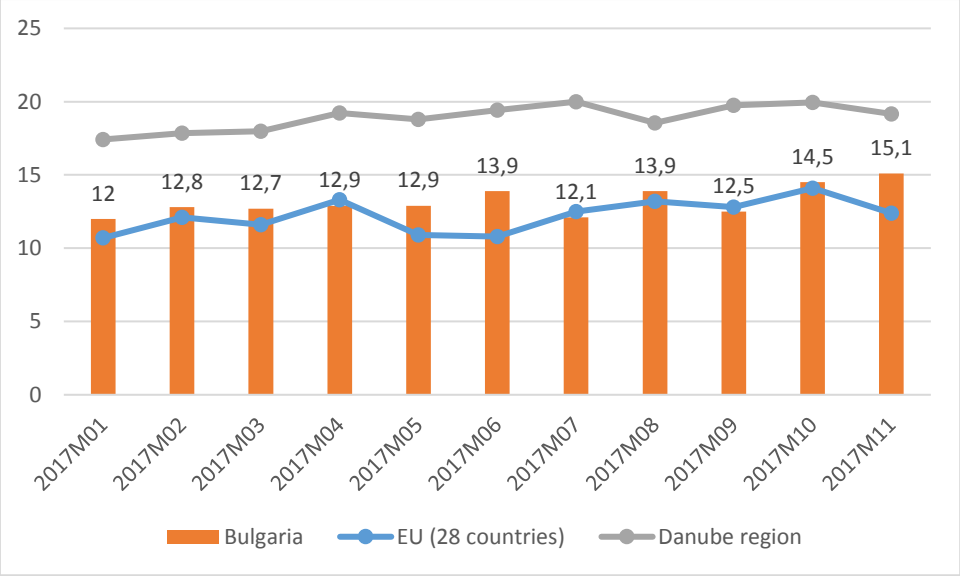


Figure: Service confidence indicator for 2017 (index) in Bulgaria compared to EU (28 countries) and Danube region

Bulgaria's performance of this indicator is slightly increasing starting form value 12 for January, 2017 and reaching its peak in November 2017. Compered to EU, Bulgaria shows a better performance of this indicator, while the performance of Danube region is better.

Indicator: Economic sentiment indicator (index)

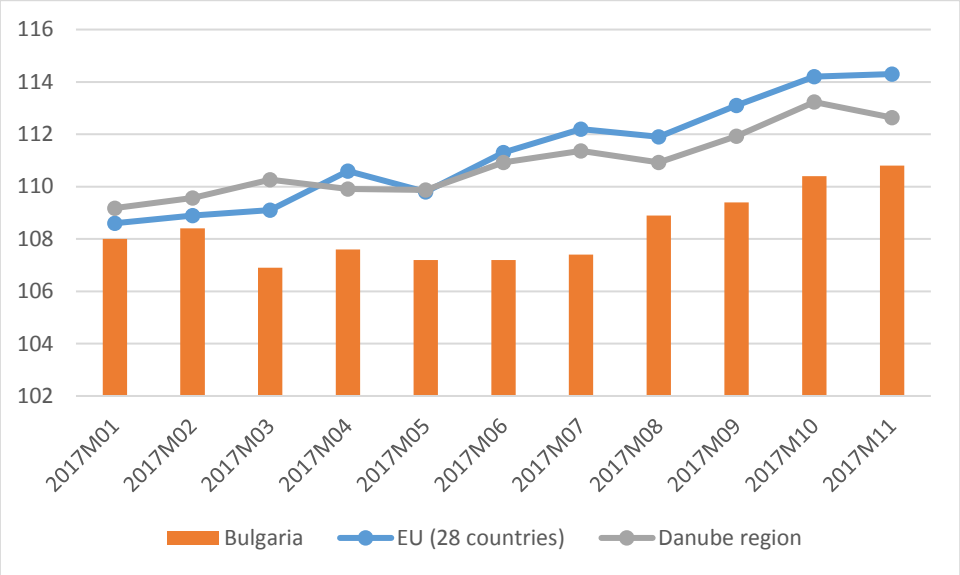


Figure: Economic sentiment indicator for 2017 (index) in Bulgaria compared to EU (28 countries) and Danube region

The Economic Sentiment Indicator (ESI) is a composite indicator made up of five sectoral confidence indicators with different weights: Industrial confidence indicator, Services confidence indicator, Consumer confidence indicator, Construction confidence indicator Retail trade confidence indicator.
Bulgaria's performance of this indicator is increasing starting form value 108 for January, 2017 and reaching its peak 110, 8 in November 2017. Compered to EU and Danube region, Bulgaria still shows a low performance.

Indicator: Real effective exchange rate index (2010=100)

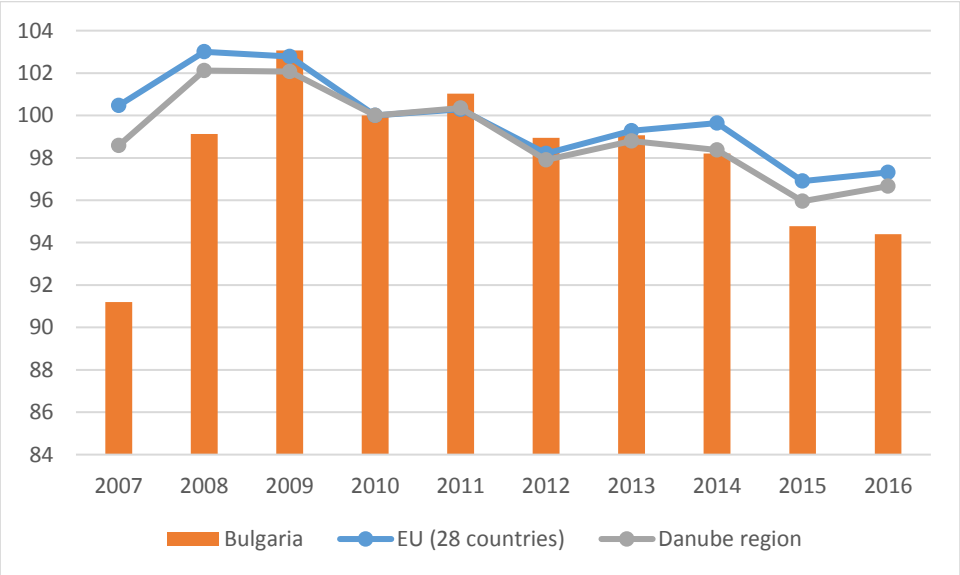


Figure: Real effective exchange rate index (2010=100) for Bulgaria compared to EU (28 countries) and Danube region

Bulgaria shows a decrease in performance of this indicator for the years 2014, 2015 and 2016, but this is a tendency for it average performance if EU and Danube region. Bulgaria's performance of the indicator is almost similar to the one of EU and Danube region, showing lower valued only for years 2015 and 2016.

Indicator: Corruption Perceptions Index (source: Transparency International) - score scale of 0 (highly corrupt) to 100 (very clean)

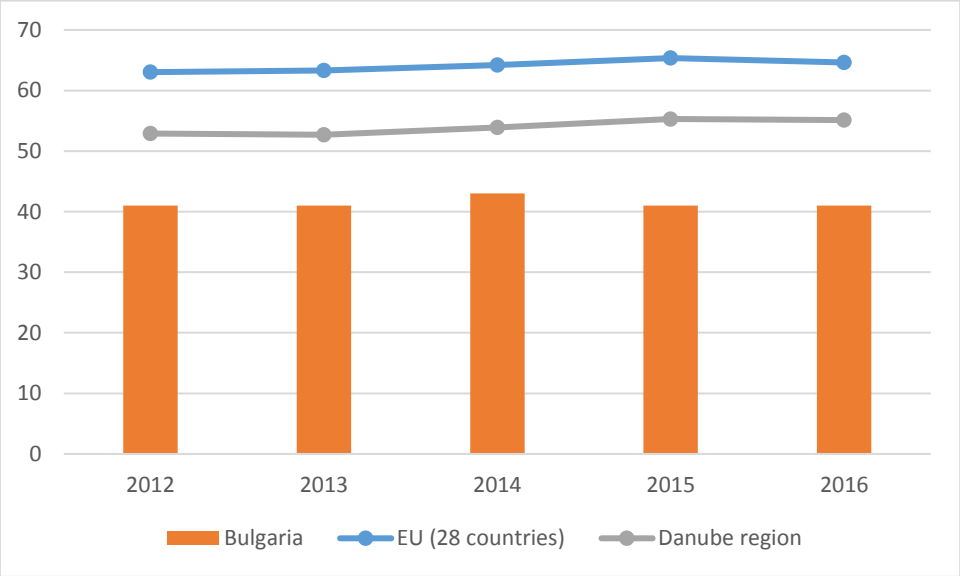


Figure: Corruption Perceptions Index for Bulgaria compared to EU (28 countries) and Danube region

The corruption perception index for Bulgaria is almost stable through the years 2012 – 2016, having a peak in 2014 with value 43 and slightly decreasing, reaching the value 41 for 2016. Under this indicator Bulgaria is below the average values for EU and Danube region.

Indicator: Total tax revenue (% of GDP)

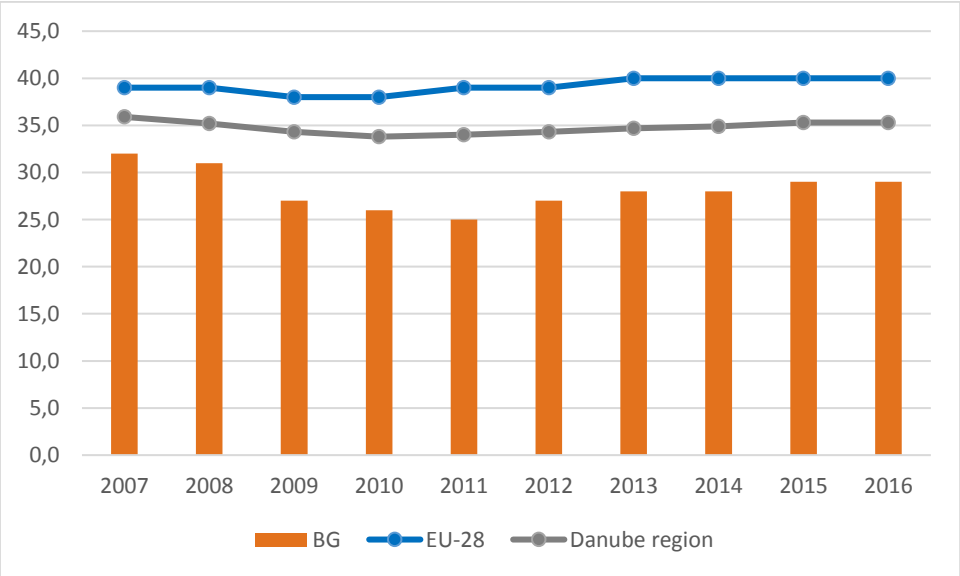


Figure: Total tax revenue (% of GDP) for Bulgaria compared to EU (28 countries) and Danube region

Bulgaria's performance of this indicator is lower compared to the one of EU and Danube region. It started with value 32 in 2017, showed a slight decrease in 2011, with value 25, and increased in 2015 and 2016 with respective values 29 and 29.

Indicator: Expenditure on education as % of GDP, for all levels of education combined

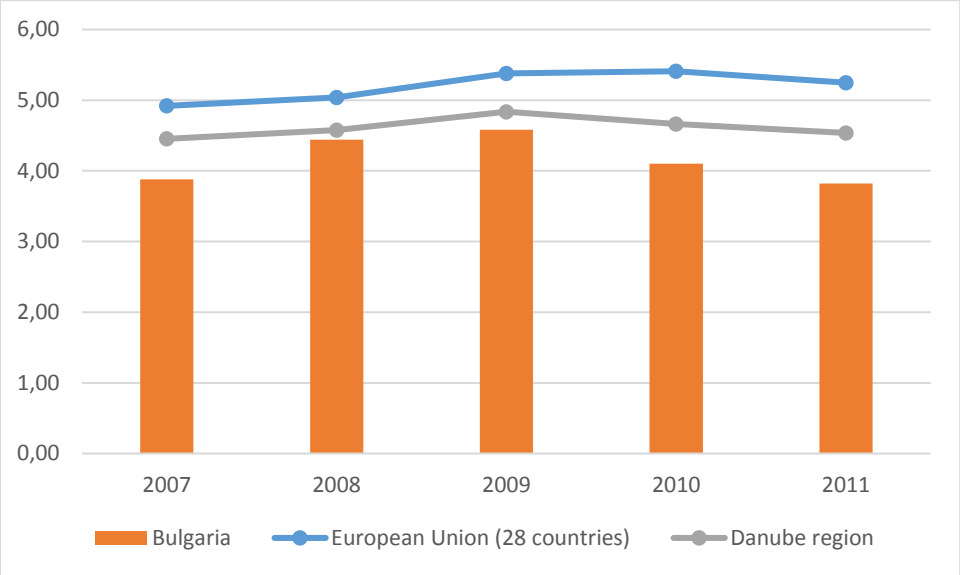


Figure: Expenditure on education (% of GDP) for Bulgaria compared to EU (28 countries) and Danube region

Bulgaria's spends less money on education compared to EU and Danube region. The data shows that Bulgaria invested most in education in 2009, since then, the values are decreasing, which is a tendency of EU and Danube region.

Indicators according PISA score and compared to OECD

The OECD administers and publishes the Programme for International Student Assessment (PISA), which is a regular assessment of the attainment of 15-year-olds in three areas of knowledge, which, it is said, allows the performance of educational systems to be examined and compared on a common measure across countries.

The Organisation for Economic Co-operation and Development is an intergovernmental economic organisation with 35 member countries, founded in 1960 to stimulate economic progress and world trade. It is a forum of countries describing themselves as committed to democracy and the market economy, providing a platform to compare policy experiences, seeking answers to common problems, identify good practices and coordinate domestic and international policies of its members. Most OECD members are high-income economies with a very high Human Development Index (HDI) and are regarded as developed countries.

Indicator: Mathematical performance PISA score (average performance)

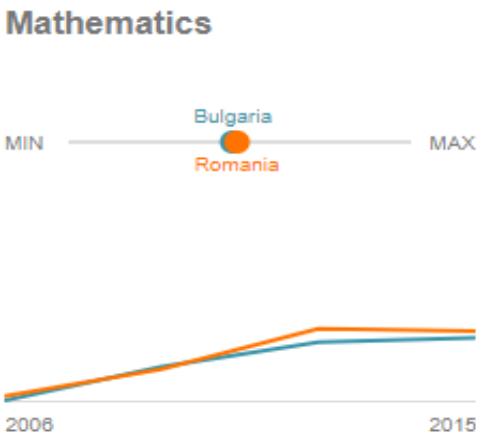


Figure: Mathematical performance PISA score (average performance) for Bulgaria compared to the benchmark Romania

Average performance refers to all 15-year-old students in a country/economy regardless of the school type and grade attended. Compared to the Bulgarian's benchmark Romania, the average performance of the country in mathematics shows more or less the same tendency.

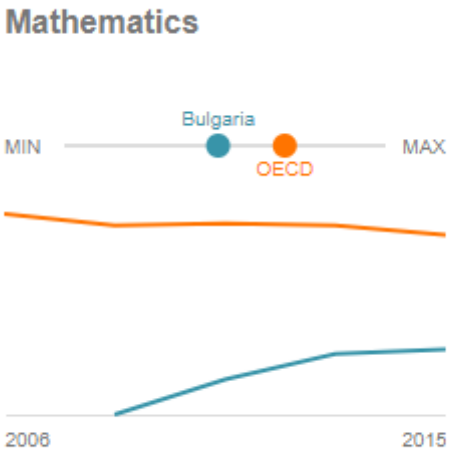


Figure: Mathematical performance PISA score (average performance) for Bulgaria compared to OECD

Performance in the sphere in Bulgaria is not as good as OECD average. An improvement is occurred since 2006.

Indicator: Scientific performance PISA score (average performance)

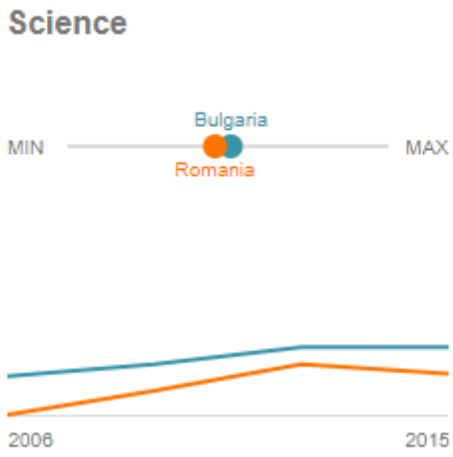


Figure: Scientific performance PISA score (average performance) for Bulgaria compared to the benchmark Romania

Compared to the Bulgarian's benchmark Romania, the average performance of the country in science shows more or less the same tendency but still stable and over the average performance of Romania.

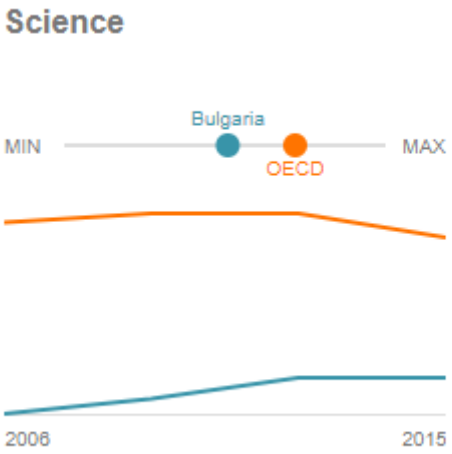


Figure: Scientific performance PISA score (average performance) for Bulgaria compared to OECD

Performance in the sphere in Bulgaria is not as good as OECD average, but stable since 2006.

7. CONCLUSION

Considering the finding this report, it can be judged that Bulgaria has an overall low performance of innovation indicator compared to EU, while some aspects, close or similar to the indicators performance compared to the Danube region.

It is a goal of the country to improve its status and step forward form modest innovator to moderate innovator by 2020. The main document, regulating the implementation of innovations in Bulgaria is the Innovation Strategy for Smart Specialisation.

Resources:

- http://ec.europa.eu/eurostatability
- 2016/17 GEM NATIONAL REPORT ON ENTREPRENEURSHIP IN BULGARIA
- Research and Innovation Observatory of the EU – key indicators
- ENVIRONMENT MAIN INDICATORS database_FINAL.xls
- National strategy for development of scientific research in the Republic of Bulgaria 2017 – 2030
- https://www.export.gov/article?id=Bulgaria-Power-Generation-Oil-and-Gas-Renewable-Sources-of-Energy-and-Energy-Efficiency
- https://ec.europa.eu/energy/sites/ener/files/documents/2014_countryreports_bulgaria.pdf
- http://data.consilium.europa.eu/doc/document/ST-14015-2015-ADD-5/en/pdf
- https://iclg.com/practice-areas/environment-and-climate-change-law/environment-and-climate-change-law-2017/bulgaria
- file:///D:/Downloads/Taxation_and_enegry_efficiency.pdf
- https://ec.europa.eu/environment/ecoap/sites/ecoap_stayconnected/files/field/field-country-files/bulgaria_eco-innovation_2015.pdf
- http://www.heritage.org/index/country/bulgaria
- http://www.coface.com/Economic-Studies-and-Country-Risks/Bulgaria
- http://www.coface.bg/en/News-Publications
- The Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014 – 2020
- https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?view=chart