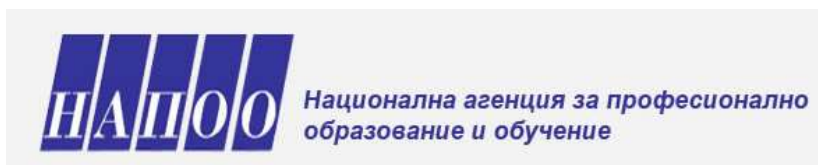




BUILD UP Skills – BULGARIA –
Analysis of the national status quo



June 2012



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Further information

More details on BUILD UP Skills can be found at www.buildupskills.eu

More details on the IEE programme can be found at <http://ec.europa.eu/intelligentenergy>

TABLE of CONTENTS

- 0. Executive summary**
- 1. Introduction**
- 2. Objectives and methodology**
- 3. Characterisation of the building sector**
- 4. National policies and strategies to contribute to the EU 2020 energy targets in buildings**
- 5. Statistics on building and energy sectors**
- 6. Existing VET provisions**
- 7. Skills gaps between the current situation and the needs for 2020**
- 8. Barriers**
- 9. Conclusions**
- 10. Authors/contributors**
- 11. References**
- 12. Glossary**

0. Executive summary

This report has been prepared on the basis of statistical data and forecasts for the future development of the building sector and more specifically in the field of energy efficiency and building workforce qualification in Bulgaria. The summary lays emphasis upon the secondary vocational training and education in the vocational high schools on civil engineering and the licensed by NAVET vocational training centers for adult vocational training. It has been compiled in accordance with the requirements of the EU Executive Agency for Competitiveness and Innovations.

The energy consumption in the country for 2009 is 8475 TOE, encompassing 95 TOE for the building sector. For 2010 the figures are 17 829 TOE national total and 64 TOE for the building sector.

The present national energy strategy until 2020 reflects the political vision of the Government on the European development of the country, aligned to the current European framework of the energy policy and the global trends in the development of energy technologies. The energy strategy is oriented towards overcoming the major challenges facing the Bulgarian energy sector at this point of time, namely:

1) High energy intensity of GDP. Despite the positive improvement trends, the energy intensity of the national GDP is 89% higher than the EU average (with due account taken on the purchasing power parity).

2) The high dependence on imported energy resources. Bulgaria ensures 70% of its gross consumption through import. The dependence on the import of natural gas, crude oil and nuclear fuel is practically complete and is characterized by traditionally one-sided orientation towards the Russian Federation.

3) The need of environment-friendly development:

The main priorities of the Bulgarian Energy Strategy in the context of the European energy policy are reflected in five directions:

- To guarantee the security of energy supply;
- To achieve the targets for renewable energy;
- Energy efficiency improvement;
- Development of a competitive energy market and policy oriented towards meeting energy demand;
- Protection of consumers' interests.

According to the National Action Plan on RES the forecast RES potential of Bulgaria is about 4500 MTEP. Biomass (36%) and hydro energy (31%) account for the highest shares in it.

		BASELINE SCENARIO	TARGET SCENARIOS
COMPARISON INDICATORS	2005	2020	2020

Gross Domestic Product (000 M€05)?	21.9	34.7	34.7
Gross domestic consumption (MTOE)	20	21.6	15.8
Renewable energy (MTOE)	1.1	1.71	1.96
Share of RES (%)	9.4	13	18.8

The contribution of the building sector is measured by activities that improve the energy efficiency in the building stock and more particularly in the multi-family residential buildings.

The mandatory national target for the Republic of Bulgaria until 2020 is 16% total share of renewable energy in the gross final energy consumption. The intermediate national targets are set for 2-year periods as follows:

1. From 2011 till 2012 including: 10.72 %;
2. From 2013 till 2014 including: 11.38 %;
3. From 2015 till 2016 including: 12.37 %;
4. From 2017 till 2018 including: 13.69 %.

It is assumed that the final energy consumption in households amounts to 100% in total for the sector "Buildings" and in the final consumption in the "Services" sector the consumption of buildings is in the range of 70%-90%. For calculation purposes we assume a share of 80% and that all the sectors participate proportionally in the achievement of the 9% target.

Under these assumptions and bearing in mind the above mentioned objectives of the National Action Plan on Energy Efficiency, the national target for the building sector is 2938.8 GWh.

Taking due account of the anticipated savings, presented in the Second National Action Plan on Energy Efficiency by sectors, the implementation for the building sector would be 2806.2 GWh. The reason for this is the lower implementation in the household sector as compared to the figures laid down as a target for the sector.

The number of employed workers possessing second level of professional qualification in construction in 2010 was 63 886, including 42 840 craftsmen and 21 046 installers, whereas the total number of those employed in the building sector for the same year was 156 327.

In compliance with the expectations concerning the workforce dynamics , to date no clearly manifested shortage of workers in the traditional professional activities has been noted (concrete-worker, reinforcement worker, mason, carpenter, plumber, electrician, roofer, installer of window frames, thermal insulation installer, water-proofing installer, shuttering-worker). In perspective towards 2020 dropping off of a certain portion of the workers is presumed, leading to the assumption for pending need of training of 20% new workers, whenever possible preferentially young people from socially vulnerable strata of the population. However, due to the stable penetration of low-energy solutions in the mainstream construction practice, it is supposed that nearly all workers would be engaged (although at different levels) in

continuing vocational training activities dedicated to the so called “green skills”, either on-site or through specialized training programs.

The matters in the study of the supply of specialists in installation and maintenance of the main systems for renewable energy in buildings and the level of qualification of the workforce look quite different. There is a clearly manifested shortage of installers in each of the studied systems (small biomass-fired boilers, photovoltaic and solar thermal systems, geothermal systems and heat pumps, mini wind turbines). New specialized training schemes should be developed and introduced in the training system, with growth rate similar or slightly exceeding the expected rate of introduction of the specified systems.

With respect to the teachers/trainers it can be stated that in a few years there will be acute shortage of well trained trainers in civil engineering professions and practical classes. The reasons are that the teaching profession is unattractive for young graduates and that a significant number of the present teachers will retire in the next years. The number of teacher trainings until 2020 period should be at least 1000 trainers educated in practice and theory for all classic construction works, energy efficiency, and installers. Training of trainers has to be realized before that with the support of stakeholders with respect to the advanced countries in the energy savings and RES and through transfer of knowledge.

1. Introduction

Climate changes are already taking place and represent one of the biggest environmental, social and economic threats facing the planet. EU works actively for reaching a global agreement for mitigation of climate change and conducts its own active policy in this respect. The human activities, which contribute to climate change, are mainly fossil fuel combustion, agriculture and deforestation. As a consequence of these there is a marked increase of the level of emissions of carbon dioxide and GHG emissions in general. In order to reduce the impacts of climate change it is necessary to achieve drastic reduction of GHG emissions. The EU has been for a long time now playing a leading role in international efforts for mitigation of climate change, as well as in the working out of the two major agreements in that field, namely the UN Framework Convention on Climate Change (UNFCCC)/1992 and the Kyoto Protocol/1997.

Since 1990 the EU has been undertaking serious steps as regards its own emissions. In the year 2000 the European Commission launched a European Climate Change Programme (ECCP). The European Climate Change Programme led to approval of a broad range of policies and measures. They comprise also the newly created EU Emissions Trading System, which is a major component of the EU Member States' efforts for emissions reduction at the most favorable possible costs, and the legislation concerning the fluorine containing greenhouse gases.

On January 23, 2008 the European Commission launched an exclusively ambitious package, whose major objective was to reduce the level of CO₂ emissions by 20% till 2020 as compared to the 2005/1991 levels. This plan will support the transformation of Europe into a low-carbon economy and will increase its energy security. The 20-20-20 plan envisages achievement of the following results:

- Reduction of CO₂ emissions by 20% till 2020;
- Increase of the share of energy from RES by 20% till 2020;
- Improved energy efficiency by 20% till 2020.

The building sector is of strategic importance for the European Union, since it provides buildings and infrastructure to the benefit of society. According to data of the National Statistical Institute (NSI) it has an important place in the economy of Bulgaria. It has been generating nearly 9% of the national GDP in recent years and ensuring employment for 7% of all the employed persons and in this way the construction sector is turning into the biggest industrial employer in the country. In 2010 in Bulgaria the sector comprised according to NSI data 22 078 enterprises, which in terms of categories of employment according to the Law on Small and Medium-size Enterprises may be distributed as follows: 18 508 micro, 2 890 small, 621 medium-size and 59 big companies. The trend of increase of the share of construction in the national economy remains till 2009 at levels above 9% and in 2010 marked a drop to 7.5%.

Energy efficiency is referred to in a number of directives, laws, ordinances, strategies, programmes and projects. A multitude of projects have been implemented under different national and European programmes. However, despite the level of implemented measures in the existing building stock in Bulgaria its energy efficiency level lags far behind the objectives of the 2020 Strategy.

2. Objectives and methodology

The study “Current Status, Practices and Trends in the Building Sector in Bulgaria” is part of the activities under the project “Roadmap for Training and Qualification for Intelligent Energy Efficient Solutions in Buildings In Bulgaria till 2020” (BUILD UP Skills Bulgaria), prepared by a consortium comprising EnEffect Consult SP Ltd. (Coordinator), the National Agency for Vocational Education and Training (NAVET) and the Bulgarian Construction Chamber.

This report has been prepared on the basis of statistical data and forecasts for the future development of the building sector and more specifically as related to energy efficiency and the qualification of building workforce with an emphasis on secondary vocational education in the vocational civil engineering high schools and the licensed NAVET centers for vocational training of adults. It has been compiled in compliance with the requirements of the report of the EU Executive Agency on Competitiveness and Innovations. The presented information originates from sources running national level databases: the Ministry of Finance, the Ministry of Regional Development and Public Works, the Ministry of Economy, Energy and Tourism, the Ministry of Education, Youth and Science, the National Statistical Institute, Eurostat, the European Federation of the Construction Industry with headquarters in Brussels, NAVET, analyses and databases of the “Analyses and Forecasts” Division, data from the Bulgarian National Bank, the Public Procurement Agency, the “Eurofunds” Agency, the Employment Agency, excerpts from publications of the European Economic Commission, information from the “Professional Qualification” Division of the Bulgarian Construction Chamber, and a paper of the “Risk Analysis” Foundation under the PHARE Programme.

The study was planned on the basis of established research methodologies in compliance with the methodological requirements for reliability of the collected empirical information.

The analyses and conclusions made might be used as a basis for undertaking specific management activities for upgrading of the quality of vocational training in the field of construction, for improvement of the dialogue between business entities (the construction companies) and educational institutions (vocational high schools and vocational training centres) in the search for effective paths for improvement of the qualification of the building workforce and maintaining of a permanent high level of skills and capacity to adapt of those employed in the building sector.

The major objective of the study is to analyze the demand and supply in the building sector in quantitative terms and to identify the shortage of specific skills byprofessions, as well as the respective main barriers, related to the application of intelligent energy efficient solutions and the integration of renewable energy in buildings. The possibilities for improvement of the professional skills of the building workforce will be analyzed, including through enforced cooperation between the construction companies and the vocational high schools and vocational training centres. The outcomes will serve for working out of strategic policy documents in the field of the building sector and vocational education.

Phases of the research process

Phase 1. Analysis of documents and secondary analysis of existing sociological data

The purpose of Phase 1 of the study is to outline the current situation in the building sector from the point of view of the applied solutions in the field of energy efficiency and the use of RES and in connection with the practices and trends in the field of professional qualification of the workforce while laying the emphasis on the:

- characteristics of the building sector, comprising the available statistical data;
- national policies and strategies, related to the EU 2020 targets for energy consumption in buildings;
- current supply of vocational education and training.

On the basis of the achieved results will be worked out hypotheses related to any identified gaps in the qualification levels between the current situation and the 2020 requirements and to the barriers affecting the qualification of the building workforce. The hypotheses will be then checked in the course of the next phases of the study.

The collected information will be analyzed and presented in the form of an analytical report to the Steering Committee and the participants in the Platform. Whenever necessary expert assessment by an independent body will be ensured.

Phase 2. Conducting of an empirical sociological study in independent modules

After the elaboration in the course of the previous phase of the hypotheses and determination of the target groups subject to investigation, adequate methodological approaches for collection of the necessary empirical information will be selected. It is assumed that for ensuring reliability of the information in compliance with the objectives and tasks of the study *a survey* will be conducted among the construction companies members of the Bulgarian Construction Chamber (responsible partner: Bulgarian Construction Chamber).

Phase 3. Conducting of a qualitative sociological study through structured in-depth interviews

If necessary, templates for structured in-depth interviews with key representatives of the defined target groups will be developed on the basis of the conclusions from the preceding two phases. They will serve for enhancing more profound analysis of the crucial problem areas and collection of the missing information. The structuring of the interviews will allow comparing of the obtained data and will help identify trends, which will be described in the final version of the study (responsible partners: Bulgarian Construction Chamber and EnEffect).

The collected information will be analyzed and presented in the form of an analytical report to the Steering Committee and the participants in the Platform.

3. Characterisation of the building sector

The building sector is one of the sectors worst hit by the economic crisis in the recent three years. According to data from the national statistics the drop in the construction output alone during last year was some 2/3 as compared to the preceding year. Foreign investments in construction account to about 8-11% of the total investments in the country. However, all investments, irrespective whether directly in construction or in other sectors, are in one way or another related to construction, since in practical terms the investments are connected with construction of some kind of capacities, building stock, infrastructure etc. For that reason it is particularly important at that moment of financial restrictions that the state should create favorable prerequisites for re-winning foreign investments back to this country. The great hope of the building guild for revival of the branch is enticed by the numerous tender procedures for projects to be financed by European funds, since that would help ensure work for the construction companies and their employees. At the same time, not so long ago were published the results from the regular survey, conducted by the National Statistical Institute among the managers of enterprises in the fields of construction, services and industry, which serve to “measure” the business climate in the country. It turned out that the majority of the respondents anticipate new drops for their businesses and personnel lay-offs during the next three months of 2012.

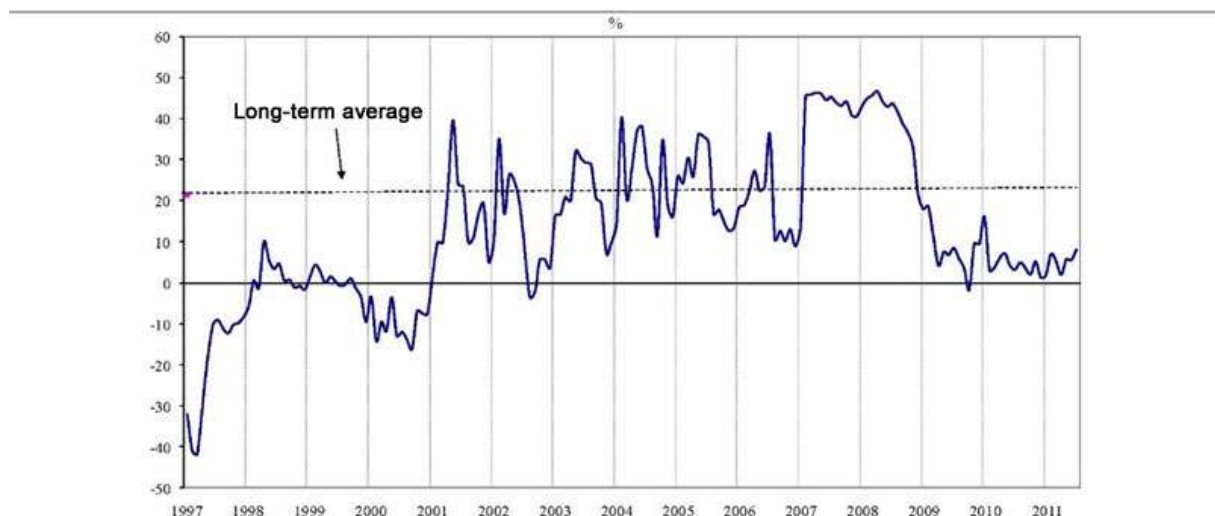


Fig.1 Results from the regular survey conducted by the NSI to measure the business climate in the building sector (%). Source: NSI

According to data from the National Statistical Institute, the Ministry of Finance and the Employment Agency in 2010 the Bulgarian economy had marked GDP growth by 0.2% and has reached a volume of about BGN 70.5 billion. The industrial sector had generated approximately 1/3 of the Value Added of the economy, which was by 0.5% more than the figure for the preceding year, and in the construction sector the 2010 turnover was at levels, which were similar to those recorded during 2007, indicate the NSI data.

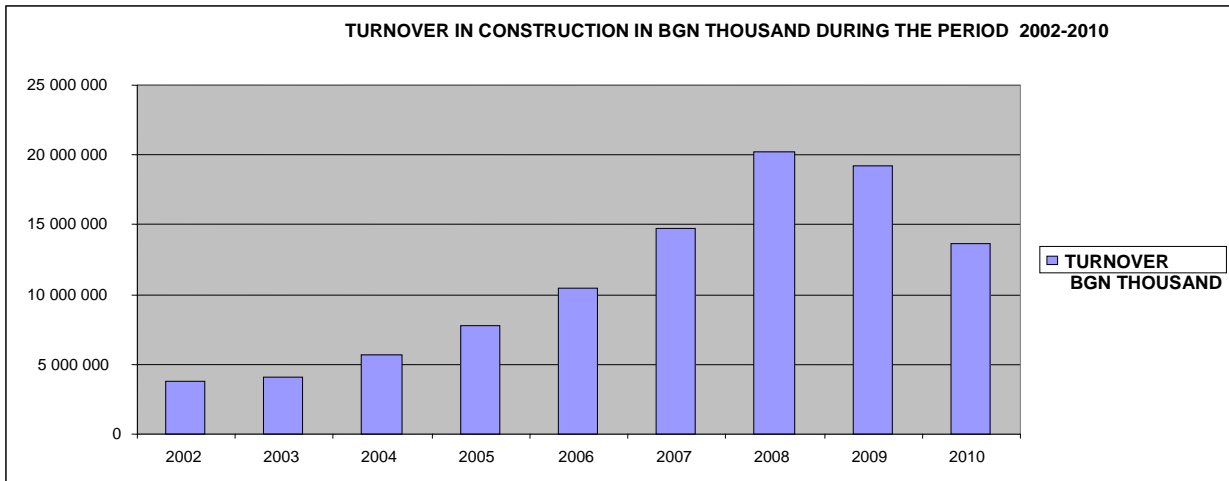


Fig. 2. Turnover in construction. Source: NSI

Also according to data of the National Statistical Institute the construction industry engages about 7% of the employed persons and in this way construction stands out as the biggest industrial employer in the country.



Fig. 3. Employment in construction. Source: NSI

At the same time, according to studies conducted by the Centre for Liberal Strategies, during the period 2000-2008 (when Bulgaria was going through a period of economic growth) the GDP growth was 66.2% and the annual size of direct foreign investments amounted to approximately 15-20% of the GDP, the contribution of the building sector to the economic growth in the country was found to have been surprisingly not very substantial and the growth of the national economy had been due to fields having little in common with construction.

The growth rates of the generated Value Added in the building sector as compared to the Gross Value Added (GVA) for the entire economy are as follows: marked growth for the entire period 2000-2009, whereas during the initial years 2000-2004 the growth levels demonstrate trends of fluctuation in the range of 5%. The growth trend

remains steady until 2009 at levels above 9% to strike a drop to 7.5% in 2010. The share of the turned out construction output as related to the output of the industrial enterprises demonstrates a trend of smooth almost threefold increase from the year 2000 to the peak year 2008. For the two past years since the beginning of the crisis there has been a significant decrease of the volume of production output by 38.3% - from 9.3% GVA in 2008 to 7.5% GVA in 2010.

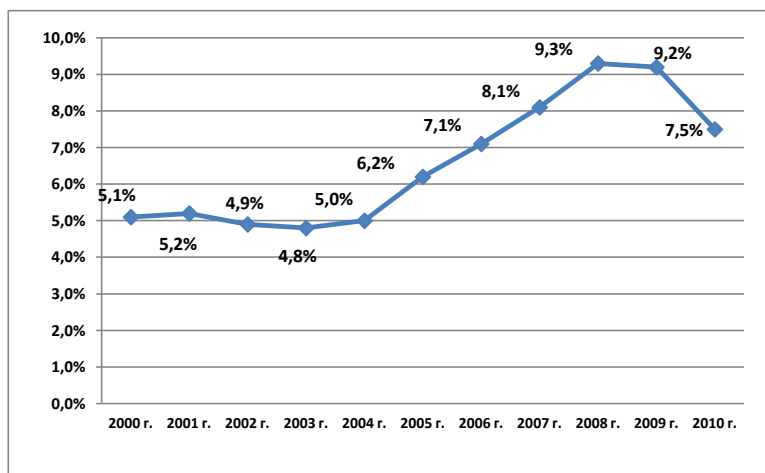


Fig. 4. Share of GVA generated in construction of the GVA total of the national economy. Source: Centre for Liberal Strategies

The informal sector in construction

According to data from the Ministry of Finance of last year the share of the shadow economy after the year 2000 amounts to about 20% of the GDP. In 2010 the National Statistical Institute made officially public for a first time data about the share of the non-formal economy from 2000 till 2008. According to the national statistics the shadow economy accounted in 2001 and 2002 for 14.7% of the GDP and in 2003, 2004, 2005 and 2006 for respectively 14%, 12.7%, 12.4% and 11.4%. The NSI experts evaluate to 10.4% the GDP share of the non-formal economy in 2007 and 2008. The NSI would like to draw attention to the fact that these figures have been determined on the basis of expert opinions and are approximate – for orientation only.

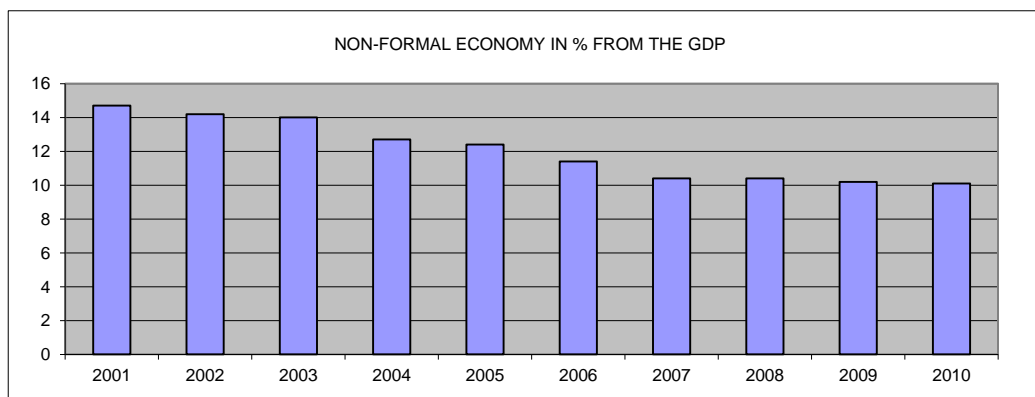


Fig. 5. Data about the non-formal economy during the period 2000-2010. Source: NSI

According to data from the yearly “Study of the Hidden Economy in Business” of the Centre for Research of Democracy, published in 2010, the Bulgarian businesses indicate the construction branch as the sector with the biggest share in the shadow economy, whereat almost every third respondent had declared to share that opinion.

The Association of Industrial Capital in Bulgaria (AICB) also conducts studies in that domain using as a primary method sociological surveys, based on the opinions and estimates of employees and employers concerning the share of the non-formal economy in the country, which is quite a subjective estimate and represents rather people’s assumptions than an actual measuring of the scale of that phenomenon. The AICB study also points to the building sector as one of the three “the most affected by that evil” branches of the economy, along with tourism and health care.

According to the Bulgarian Construction Chamber the relative share of construction companies, which operate in the non-formal sector, had reached the levels of 15-20% within a period of 10 years. On this issue the biggest construction organization as well as similar branch associations in the country pursue a policy of zero tolerance toward this negative phenomenon and stand up firmly for application of the requirements for prevention, control and compliance with the measures for combating unregulated labour.

The founding of the Construction Chamber by law is one of the major regulation acts related to the building sector.

4. National policies and strategies to contribute to the EU 2020 energy targets in buildings

4.1. National policies and strategies in the field of energy

The energy strategy is a fundamental act of the national energy policy, which is approved by the Council of Ministers and is passed by the National Assembly of the Republic of Bulgaria.

The present national energy strategy till 2020 reflects the political vision of the Government concerning the European development of Bulgaria in alignment with the current European framework of the energy policy and the global trends in the development of the energy technologies.

The energy strategy is oriented towards overcoming of the main challenges for the Bulgarian energy sector at the present moment, namely:

- 1) The high energy intensity of GDP. Despite the positive trend of improvement, the energy intensity of the national GDP is by 89% higher than the EU average (with due account taken of the purchasing capacity parity).
- 2) The high dependence on import of energy resources: Bulgaria provides 70% of its gross consumption through import. The dependence on imported natural gas, crude oil and nuclear fuel is practically overall and there is a traditionally one-sided orientation to the Russian Federation.
- 3) The need of environmentally-friendly development.

The major **priorities** of the Energy Strategy of the Republic of Bulgaria in the context of the European energy policy have been reflected in five directions:

- to guarantee the security of energy supply;
- to achieve the targets for renewable energy;
- to improve energy efficiency;
- to develop of a competitive energy market and policy aimed at meeting the energy needs;
- to protect consumers' interests.

On the basis of the above mentioned priorities is formulated also the vision of the Government for development of the energy sector during the coming years, oriented as follow:

- To maintain a secure, stable and reliable energy system;
- The energy sector remains a leading branch of the Bulgarian economy with a clear cut export orientation;
- Emphasis on clear and low-emission energy – nuclear and from RES;
- Balance in terms of quantity, quality and prices of electricity produced from RES, nuclear energy, coal and natural gas;
- Transparent, effective and highly professional management of energy companies.

Policies and objectives related to the priorities of the Energy Strategy

To guarantee the security of energy supply

Major directions

- Reduction of the dependence on imported energy resources, especially of such with unstable and uncontrollable prices;
- Diversification of suppliers and sources;
- Diversification of routes.

To reduce GHG emissions

Major directions

- Reduced energy consumption, i.e. improvement of energy efficiency at energy generation and energy end-use;
- Use of cleaner energy, i.e. improvement of the energy mix through increase of the share of low-emission energy;
- Rapid technology advance, i.e. introduction of innovative (clean coal) energy technologies;

The common European objective for reduction of GHG emissions by 20% till 2020 as compared to the baseline 1990 will be realized through:

- Reduction by 10% as compared to 2005 of emissions from installations, which are excluded from the European GHG Emissions Trading Scheme (buildings, light industry, transport, agriculture and solid waste);
- Reduction by 21% as compared to 2005 of emissions from installations participating in the Emissions Trading Scheme (all the large industrial and energy sources of emissions, as well as the aviation sector).

To increase the share of RES in the total energy end-use

Major directions

The support policies have been introduced by the new Law on Renewable Energy. They are predominantly related to overcoming of the existing barriers.

The national mandatory target, which Bulgaria should achieve, is that in 2020 16% of the total energy end-use in the country should be renewable energy, noting that the country has been assigned the lowest additional increase (6.6%) as compared to the other Member States.

The national target should be achieved through increase of electricity production from renewables, increase of renewable energy end-use for space heating and cooling and renewable energy consumption by transport. From the target by sectors only that of renewable energy consumption in the transport sector is mandatory – 10% share of energy from renewables in energy consumption by transport by 2020.

To improve energy efficiency

Major directions

- Introduction of regulatory and market incentives for implementation of energy efficiency measures for both the energy companies and the end-users;
- Creation of conditions for access to the gas distribution network for 30% of the households in the country;
- Decentralized, including in households, energy production from RES. Decentralized generation results in complex benefits, since it helps avoid energy losses in transmission, avoid the costs for construction of transmission networks and uses a clean and infinite resource;
- Improvement of the energy performance of buildings – private and public, comprising also an accelerated, as regards the European norms, introduction of the requirements for buildings with nearly zero net energy consumption in the public sector;
- Support for combined heat and power generation (cogeneration);
- Elaboration of an Energy Efficiency Strategy by the Council of Ministers;
- Enhancement of the role of the Energy Efficiency Agency (EEA);
- Ensuring a growing flow of funding from the EU Operational Programmes, the *Kozloduy* International Fund, as well as from the sale of the national surplus of assigned emissions units (ASUs) for greenhouse gases.

- Energy-related criteria (with respect to efficiency, the use of RES and intelligent networks) will be strictly observed in the process of assignment of all public procurement orders for construction, services or products.

Bulgaria aims at reducing by 50% the energy efficiency of the GDP by 2020 by achieving for that indicator a value of 456 тне/М€05 as compared to its 2005 value (913.3 тне/М€05). The implementation of the measures and policies with respect to improvement of energy efficiency, whose approval with the Energy Strategy of Bulgaria 2020 is pending, is intended to lead to improvement of energy efficiency by approximately 25% or saving of more than 5 million тне of primary energy as compared to the baseline development scenario by 2020.

Independent, regulated and competitive energy market

Major directions:

- Ensuring adequate supply and a larger number of suppliers;
- Free and indiscriminate access to the grid for every market actor;
- Separation of the transmission operators from the generation and supply activities;
- Announcement of the available capacity of the grid and its equitable distribution among all the users;
- Meeting the requirements of the Common European Policy concerning creation of a unified market and its expansion in Pan-European energy community.

The concrete targets, the measures for their attainment and the stakeholders in this process are the subject of the **National Energy Efficiency Action Plan**. The second 3-year Energy Efficiency Action Plan formulates an intermediate target for the period 2011-2013, namely fuel and energy savings by 2013 to the amount of the averaged value of final energy consumption within the scope of the Directive for the period 2001-2005. This target amounts to 4860 GWh (418 ktoe) annual savings of fuels and energy.

The above mentioned targets are related to final energy consumption. The European policy pays an ever growing attention to primary energy consumption, since it reflects the efficiency of use of the energy sources in the entire process from their extraction through their conversion into energy, transportation and end use of that energy.

The target for primary energy saving is laid down in the Energy Strategy of Bulgaria till 2020, promulgated in the State Gazette, Vol. 43/07 June 2011. The target proposed in that document is reduction of primary energy sources by 50% by 2020 as compared to the figures for 2005. The implementation of that target is expected to lead to saving of 5.8 Mtoe primary energy as compared to the baseline development scenario by 2020. The result achieved so far is reduction of primary energy sources from 0.563 koe/BG00 in 2005 to 0.429 koe/BG00 in 2009 or by more than 23 %. The national target for end-use under Directive 2006/32/EU was quoted in the Draft National Energy Efficiency Action Plan. This target is saving of 7291 GWh (627 ktoe)

energy from final energy consumption (in the framework of the Directive) till 2016 and the intermediate target is saving of 2430 GWh (209 ktoe) till 2010.

The achieved energy savings by 2009, alone in the framework of the Energy Management Directive, calculated using the *top-bottom* method, are not less than 5168 GWh/year (444.3 ktoe), which considerably exceeds the intermediate target of 2430 GWh (209 ktoe) for the first intermediate period (2008-2010).

The forecast for the final energy consumption and the indicators for comparison based on the baseline and the target scenarios is illustrated in the table below.

Period	Final energy consumption		
	Directive 2006/32/EU		Directive 2010/31/EU
	Energy savings target	Energy savings achieved (2010) and expected (2016)	Target to achieve a specified share of buildings with nearly zero energy consumption
–	GWh	GWh	%
2010	2 430	3 549	–
2013	4 860	5 892	
2015	–		1÷1.5 *(estimate)
2016	7 291		
2020			100

* Percentage of the total floor area of buildings of new construction occupied by bodies of the authorities

Table 1. Forecast about the final energy consumption and indicators for comparison under the baseline and the target scenarios. Source: Energy Strategy of Bulgaria till 2020

After processing of the information submitted to the EEA an assessment of the achieved and expected savings of fuels and energy in the framework of Directive 2006/32/EU was also performed using the *top-bottom* method. The forecast for primary energy consumption and the indicators for comparison under the baseline and target scenarios is shown in the table below.

		BASELINE SCENARIO	TARGET SCENARIO
COMPARISON INDICATORS	2005	2020	2020
Gross Domestic Product (000 M€05)	21.9	34.7	34.7
Gross domestic consumption (MТне)	20	21.6	15.8
Dependence on imported oil and natural gas (%)	38	36.7	48
Final consumption (MТне)	9.6	11.1	9.16
Ratio final/total (%)	48	51	58
Energy intensity (Тне/ M€05)	913.3	623.6	456
Energy from RES (MТне)	1.1	1.71	1.96
Share of RES (%)	9.4	13	18.8

Table 2. Forecast about primary energy consumption and indicators for comparison under the baseline and target scenarios. Source: Energy Strategy of Bulgaria till 2020

Summary of the planned activities with respect to the implementation of the Energy Performance of Buildings Directive recast and the RES Directive

It is expected that Bulgaria will receive in the framework of the current year the methodology for calculation of cost-optimal nearly-zero energy buildings. Its use will help calculate the respective performance for different types of standard buildings, which will be laid down in the Law on Structure of the Territory and in the new Law for Amendment and Supplementing of the Energy Efficiency Act, as well as the rest of the requirements of the Directive. The requirements and preconditions concerning the construction of nearly zero buildings will also be reflected. Their real application will start at the end of 2013.

The National Energy Efficiency Action Plan envisages development of a strategy for increase of the buildings with nearly zero-energy consumption.

In compliance with the requirements of Directive 2010/31/EU Bulgaria will try to support the construction of new buildings with nearly zero energy consumption, as well as achievement of the same energy performance levels in the event of rehabilitation of existing buildings. The regulatory documents will be analyzed and revised with a view to introduction of harmonized European requirements concerning the energy performance of buildings with nearly zero net energy consumption. It is envisaged to establish specific digital reference values for the indicators for annual energy consumption as national parameters, which will serve to formulate a regulatory requirement concerning the energy performance of these types of buildings.

On this basis will be worked out a National Plan for increasing the number of buildings with nearly zero energy consumption. The plan will comprise an analysis of the status qui in the building sector (growth rate of the construction process, business environment, financial and administrative barriers, socio-economic conditions, market principles, etc.), establishment of the baseline year for reporting of the laid down

targets and formulation of the national targets for buildings with nearly zero energy consumption.

Incorporation of specific texts concerning the Directive in the new amendments to the Energy Efficiency Act is envisaged.

National target for buildings with near zero energy consumption

When defining the national target for buildings with near zero net energy consumption the Republic of Bulgaria will stick to the “2-phase” approach, proposed by the European Commission with respect to target setting. In this ambitious undertaking the country envisages to pay particular attention on the adequacy of the measures for attainment of the national target, however not only because of the fact that these measures will be duly evaluated by the Commission in connection with the targets of Directive 2010/31/EU and the general targets of the “Europe 2020” Strategy, but also because the country still possesses a significant potential for energy conservation.

Meanwhile the Bulgarian regulatory framework on energy efficiency has been many a time highly evaluated by the European Union.

Phase One

During Phase One, which will almost entirely coincide with the period of validity of the Second National Energy Efficiency Action Plan 2011-2013, the Republic of Bulgaria formulates as its basic objective setting up of the national parameters for buildings with near zero energy consumption.

Phase One is preparatory phase and comprises two intermediate preparation periods.

The first preparatory period started in 2010 and comprised the years 2010-2011. During that time the following measures had to be planned and implemented:

Measure 1. Package review of the existing legal framework through application of an analytical approach in the evaluation of all measures with positive legal substance, which form the good national practice for improvement of energy efficiency in buildings and might serve as a basis for successful introduction of the harmonized European requirements concerning the energy performance of buildings with near zero net energy consumption.

Measure 2. Formulation, assignment and implementation of research tasks for determination of the national parameters (digital reference values of the indicators for annual energy consumption) for setting up a regulatory requirement concerning the energy performance of buildings with near zero net energy consumption.

Measure 3. Preparation of projects, approval and promulgation of laws, by-laws and administrative ordinances, necessary for the full harmonization with the requirements of Directive 2010/31/EU, including setting up of the national parameters for energy performance of building with near zero net energy consumption.

Phase Two

The second phase is based on measures binding it to Phase One and covers the period 2012-2013. On the basis of the overall preparatory work during Phase One

and the persistent implementation of the tasks laid down in it, it will be possible to define during Phase Two (with certain approximation) an intermediate target for improvement of the energy performance of certain categories of buildings till 2015 to levels corresponding to near zero energy consumption and meeting the parameters set up in digitally expressed indicators (kWh/m²) for Bulgaria in the course of Phase One.

At the most optimistic forecast for implementation of the targets laid down during the preparatory phase, the national intermediate target till 2015 might be identified to be approximately between 1% and 1.5% of the total floor area of new buildings, occupied by bodies of the national government and local self-governments during the selected baseline year. The baseline year might be determined more precisely at the beginning of Phase Two. After evaluation of the impact of the plan, the national target, including the intermediate target, may be corrected, if necessary.

The approximately defined target for 2015 is based on the analysis of energy consumption for reconstruction of buildings in EU-27, presented in Official Notice dated 8 March 2011 concerning the Energy Efficiency Plan 2011, as well as on the emphasis on the leading role of public bodies to serve as models for the best energy performance of their buildings.

As regards the setting up of targets during Phase Two the following measures are envisaged:

Measure 4. Working out of a Draft National Plan for increase of the number of buildings with near zero net energy consumption.

Measure 5. Implementation of pilot projects for new buildings from the public sector with near zero net energy consumption during the period 2011-2013 and reporting of their contribution to the implementation of the laid down intermediate target till 2015.

The use of RES

According to the National Action Plan on RES the forecast RES potential of Bulgaria is about 4500 Mtoe. Biomass (36%) and hydro energy (31%) account for the biggest shares in it. The mandatory target of Bulgaria is 16% renewable energy in the final energy consumption.

With respect to the building sector the measures comprise mainly incentives for the use of renewable energy. At the local level the Mayors are required to work out long-term and short-term programmes related to RES. In these plans in addition to the provisions concerning energy generation from renewables on the territory of the municipality contain also a requirements to implement measures involving the use of RES and energy efficiency measures in the event of implementation of projects for rehabilitation, refurbishment, overhaul or reconstruction of buildings municipal or mixed (municipal and governmental) property.

For the introduction of Directive 2010/31 the National Energy Efficiency Action Plan envisages legislatively provided requirements for introduction of RES in the event of construction of new buildings or rehabilitation, refurbishment, overhaul or reconstruction of existing buildings. In these cases the Law on RES requires commissioning of installations for energy production from RES when that is technologically possible and economically feasible. It is envisaged that at least 15% of the total heat and cooling energy demand of the building should be met from

renewable energy through introduction of centralized space heating running on biomass or geothermal energy, 120 individual biomass-fired systems, solar heat systems, heat pumps and surface geothermal systems.

In addition, a mandatory analysis of the possibilities for use of energy from RES is envisaged also in preparation of investment projects for new buildings or rehabilitation, refurbishment, overhaul or reconstruction of existing buildings. This possibility should be taken into consideration also in the course of energy efficiency audits of existing building.

4.2. National policies and strategies in the field of lifelong VET

National policy and strategy related to the “green” skills and jobs

“Green jobs” are jobs set up in economic activities connected with the manufacture of goods and provision of services supporting environmental protection according to a list of such economic activities endorsed by the Minister of Environment and Waters and the Minister of Labour and Social Policy. The definition of “green job” is given in the Additional Provisions of the Law on Promotion of Employment, Paragraph 1, Item 35 (new – SG, Vol. 59/2010): For the implementation of the commitment made under the “Bulgarian path” for achievement of better flexibility and security on the labour market 2009-2011 to **“promote creation of employment in the so-called “green” jobs”** and more specifically **“to define the sectors, branches and activities possessing potential for development of the so-called “green jobs”** amendments have been made at the end of July 2010 in the Law on Promotion of Employment by virtue of a new Article 55e (State Gazette, Vol. 59/31 July 2010) and a measure for promotion of employment in the so-called “green jobs” was introduced. According to the measure it is envisaged that for every newly opened “green job”, on which an unemployed person possessing an intermittent registration as unemployed for not less than 6 months, nominated by the Employment Agency, the employer shall be granted monetary refund for the period the said person has been employed, however for a period not longer than 6 months.

For implementation of that measure a total of BGN 3,024,000 for subsidizing 2,100 jobs were envisaged in the National Action Plan on Employment for 2011. According to data from the Employment Agency in the period January-September 2011 49 employers joined the promotional measure. Three of them were from sector F – “Construction”. Applications for 795 “green jobs” have been submitted. Of his total 284 were females, 74 were young people and 221 were persons above 50 years of age.

The National Action Plan on Employment for 2012 envisages BGN 1,226,956 for providing employment for 722 unemployed persons, including 400 for new employment. The condition for employers’ obtaining subsidy for providing employment above the average number of employees on payroll for the last 6 months is changed. The employer is required not to have discharged during the last three months workers and officials employed on the same jobs for which he/she has employed unemployed persons as subsidized employment. For the persons employed on “green jobs” (Article 55e of the Law on Promotion of Employment) the social insurance costs will be covered as well. This provision will facilitate employers and minimize their costs for the employed unemployed.

From the above presented data it is evident that there is no marked activeness among employers to take advantage of the proposed measure – we may only guess

what is the reason for that: either the measure is not attractive or employers are not informed about its existence, or employers do not connect the jobs in their enterprises with the definition “green jobs”, or the list of positions and economic activities is too narrow.

National and regional implementation of the European framework on qualifications and other EU policies related to education and training in the building sector

The qualification, object of this analysis, comprises the professional fields ‘Construction’, ‘Electrical engineering’ and ‘Energy sector’, ‘Machine tools engineering’, ‘Metal processing’ and ‘Metallurgy’ (the fields are in compliance in terms of title and code with the International Standard Classification of Education ISCED 1997). Education and certification on these professions is realized in compliance with the Law on Vocational Education and Training (VET). The list of professions (professional qualification levels) is enclosed in a separate table.

Place of qualifications in construction in the National Qualification Framework

The draft of the National Qualification Framework (NQF) was worked out in implementation of Recommendation 2008/C 111/01/EU of the European Parliament and the EU Council concerning approval of a European Qualification Framework for Lifelong Education”.

It is expected that the National Qualification Framework will create prerequisites for transition among the educational subsystems, will facilitate the validation of non-formal and independently acquired competencies, will motivate the citizens to participate more actively in different forms of lifelong learning and will contribute for comparison and recognition of qualifications acquired in the different European countries.

The draft of the NQF has been worked out by an interinstitutional working group (composed of representatives of the social partners) and presented in June 2011, whereat an opportunity was given for submission of position papers and proposals to the Ministry of Education and Science till October 2012. After that deadline the Draft NQF will be submitted to the Council of Ministers for approval and afterwards it will be submitted, together with a Reference Report, to the European Commission.

On the basis of an analysis of the learning process (knowledge, skills, competences), the degree of self-control and responsibility in the practicing of a given profession, the bend of mind with respect to upgrading of one’s competence, the social and communicative skills, have been defined the qualification levels acquired in Bulgaria as compared to the definitions stated in the Recommendation concerning the European Qualification Framework.

The Bulgarian National Qualification Framework (NQR), as well as the European one, comprise 8 levels (including an additional Zero level). The levels in the sphere of higher education (6 and 7) are divided into sublevels depending on the preliminary background and the admission to the respective educational system – it is possible that in the final draft of the Bulgarian NQF there will be no sublevels, since the preliminary training should not be taken into consideration as a criterion in the elaboration of the NQF (according to the recommendation).

The levels of qualifications acquired in the framework of the system of VET as per the NQF shall be determined in compliance with the definitions for professional qualification level provided in the Law on VET – every profession, acquired under the conditions laid down in the Law on VET, is related to a specific qualification level – 1st, 2nd, 3rd or 4th, whereat Level 1 is the lowest (worker) and Level 4 (organizer, manager, logistics expert) is the highest.

The existence of qualifications in the building sector at all levels from 2 to 8 according to the NQF is a prerequisite for ensuring negotiability among the educational subsystems within the framework of the national system for acquiring qualification, but also for comparison of the qualifications acquired in Bulgaria, with those acquired in other countries.

The Law on Trades

The trades, incorporated in this law in the construction sector, are as follows: building of fireplaces and glazed tile-stoves; fabrication of components for and installation of eave sheathings; roofing works – roof tile arrangement; installation of drain pipes; chimney building. Although the education in these trades is regulated by law (the Law on Trades), it is not recognized as part of the system of formal education and training because of the absence of clear regulations and transparency with respect to the method of training, evaluation and certification of the acquired competences, as well as because of the absence of whatever elements of a system for guaranteeing the quality of the training proposed under this law. For these reasons the qualifications acquired under the Law on Trades do not form an object of the National Qualification Framework (a procedure is envisaged, according to which for every qualification, acquired outside the system of formal education, a specific level under the NQF may be assigned, provided the training and certification comply with specific conditions).

On-site acquiring of competences

Construction is one of the sectors, in which many individuals without professional qualification get a job and acquire competences for performing masonry works, concrete works, sheathing, water supply and sewerage systems etc. on-site under supervision by more skilled craftsmen. This training is not part of the formal system of VET. With a view to the large number of such individuals it is necessary to introduce a system for validation of the non-formally acquired competences.

Introduction of system of credits in the VET and a mechanism for validation of competences acquired in a non-formal way in the building sector

The introduction of a system of credits aims at recognition and accumulation of knowledge and skills irrespective of the manner, in which they have been acquired, and assignment of credits. The introduction of the system of credits may be realized only provided in the country there are well established standards. The professions in the building sector are best described in the State Educational Requirements by Professions – for all professions there are state educational requirements (with the exception of the professions “furnace builder” and “stoker”). The State Educational Requirements contain a detailed description of the results from the learning process – knowledge, skills and competences as a basic precondition for comparison of qualifications acquired in different countries, as well as a condition for introduction of a system of recognition, validation and assignment of credits irrespective of the manner of acquiring of the professional competences. Description of the learning

results in “Scores” is not introduced as yet, although it would facilitate the training institutions in the development of curricula oriented towards acquiring of skills for resolution of concrete work tasks and would also facilitate the certification of competences acquired outside the training institutions.

Ensuring the quality of VET in the building sector

In the system of VET in Bulgaria there is no unified system for ensuring the quality, so it would not be correct to make conclusions about the quality of training in the building sector. The training institutions make independent efforts, with support from their partners (businesses, municipal and state institutions) and with funding from the State Budget and the European Social Fund (through the Operational Programme “Human Resources Development”) to create conditions for good-quality training with respect to the process of management of the centre, maintaining of partnerships, due consideration of the requirements of the business and provision of material stock for conducting of training.

The evaluation of the quality is performed in two ways – for the centres for vocational training of adults through the licensing procedure and follow-up control by the NAVET and for the schools – through the system for evaluation of quality (through the regional inspectorates on education and the Ministry of Education, Youth and Science).

Application of the EUROPAS Initiative

Officially the Europas documents are recognized in Bulgaria, but it appears that they are used and required in the event of application mainly by governmental and municipal institutions.

Europas CV and *Europas Language Passport* are not popular among employers in the building sector (but their preparation is incorporated in the training programme of vocational high schools in construction). *Europas Annex to the Certificate* is neither used nor issued by the training institutions and is not recognized by the employers. *Europas Annex to the Diploma* – according to the Law on Higher Education the higher educational establishments are entitled to issue it but they do not do it (except for graduates, who have submitted an application that they explicitly require the issue of such document). *Europas mobility* is issued only by the vocational high schools implementing projects in the field of mobility in the framework of the “Leonardo da Vinci” Programme with the “Lifelong Education” Programme.

European framework for key competences

According to the State Educational Requirements in order for a person to acquire qualification for professions from the range of vocational education and training he/she should master also part of the key competences – a foreign language specific to the profession, digital competence (most often a specialized software), communication skills, leadership skills (in so far as the profession requires such), entrepreneurship, competences in the domain of the exact sciences (mathematics, physics, etc.), civil competences (including protection of the environment). Correctly worked out training plans and curricula ensure mastering of part of these competences (foreign languages, computer skills, mathematics), but unfortunately the rest of the competences, the training in which requires the use of specific training methods and specifically trained trainers, cannot be reported as successful.

5. Statistics on building and energy sectors

5.1. Statistics on the building sector

Building stock, namely type of buildings (residential, commercial, industrial, public), annual rate of new construction and renovation

Building construction comprises construction of covered construction sites, which may be used independently for the purposes of long-term use and depending on their designation they are divided into:

- Residential buildings - buildings, in which at least one half of the total floor area is designated for residential purposes: single-family houses, apartment blocks and cooperative building and condominiums/hostels, boarding houses;
- Non-residential buildings - buildings designated for different activities: administrative, manufacturing, commercial, transport, health care, education, culture, agriculture, facilities for recreation and short-term stay – hotels, motels, holiday homes, chalets etc.
- The construction of facilities /civil construction/ comprises new construction and upgrading of engineering facilities related to the construction of:
 - Transport infrastructure – road network, railroads, airplane runways, bridges, tunnels and hydro-engineering facilities;
 - Pipelines, power transmission lines and trunk-communication lines;
 - Miscellaneous – it comprises construction facilities of industrial designation, power plants, sports and recreation facilities.

Residential buildings by type of building structure as by 1 February 2011

	Total	Building structure				Not specified
		Large-panel reinforced steel	Skeleton reinforced steel	Solid brick	Other	
Buildings	2060745	21641	48618	1727202	263267	17
Dwellings	3887149	710733	413179	2502946	256639	3652
Residents	7068963	1566442	712040	4473514	316967	-

Table 3. Residential buildings by type of building structure as by 1 February 2012. Source: NSI

COMMISSIONED NEW BUILDINGS AND DWELLINGS								
Period: 2004 – Sept. 2011 incl., number								
	2004 r.	2005 r.	2006 r.	2007 r.	2008 r.	2009 r.	2010 r.	9-month. 2011
New residential buildings, number	1 500	1 843	2 074	2 697	2 926	2 975	2 350	2 033
New dwellings, number	8 267	12 059	13 270	18 864	20 924	22 058	15 771	10 402
Floor area of the new dwellings, m2*	728 947	994 110	1 087 661	1 521 047	1 635 299	1 612 332	1 189 736	805 346

Table 4. Commissioned new residential buildings and dwellings

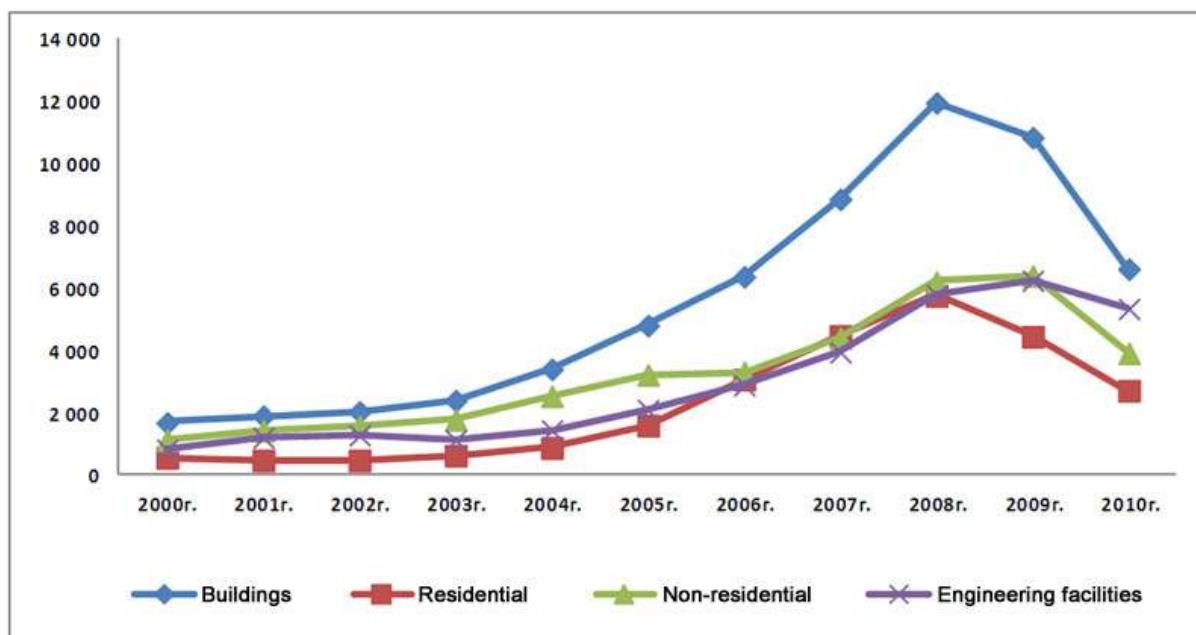


Fig. 6. Net revenue from sales by types of construction, BGN million. Source: NSI

3.1.2. Number of low energy buildings, annual rate of new construction of energy efficient buildings and energy efficient renovations

By 2011 some 50 multi-family residential buildings or 1 093 dwellings have been renovated. The annual savings as a result of the renovation activities amount to 8 488 575 kWh (40-60 %) energy and 6 672 t reduced harmful CO₂ emissions in the atmosphere.

It is difficult to comment data about the number of low energy buildings, annual rate of new construction of energy efficient buildings and energy efficient renovations. What may be affirmed is that buildings of new construction should possess an energy

passport, in which the energy performance class of the building is stated. The new buildings are fitted with heat insulation and glass packages featuring higher energy efficiency.

3.1.3. Companies (SMEs) operating in the building sector

Operating on the construction market are the following types of companies according to the definition in the Law on Small and Medium-size Enterprises: micro-companies with less than 9 employees (83.8%); small companies with 10-49 employees (13%); medium-size companies with 50-249 employees (2.8%). The large companies with more than 250 employees account for hardly 0.3%.

In the Central Professional Registry of Builders, kept by the Bulgarian Construction Chamber, are registered the companies covering approximately 92% of the volume of construction works and employing 85% of the total number of those employed in the sector. The majority of the registered companies are small and medium-size enterprises.

Sector/subsector under the Classification of Economic Activities (CEA) 2008	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SECTOR Construction – EU total											
Companies ('000)	1 929	1 978	2 370	2 492	2 612	2 485	2 741	2 886	2 970	3 157	3 110
Employees ('000)	14 086	14 122	14 199	14 321	14 532	14 962	15 387	15 991	15 938	14 643	13 935
SECTOR Construction – Bulgaria total											
Companies ('000)			16 986	16 824	14 250	12 463	14 318	18 167	22 628	24 323	22 078
Employees ('000)	134	133	134	137	147	171	214	251	297	271	221

Table 5. Number of enterprises and employees in the building sector. Source: Central Professional Registry of Builders with the Bulgarian Construction Chamber

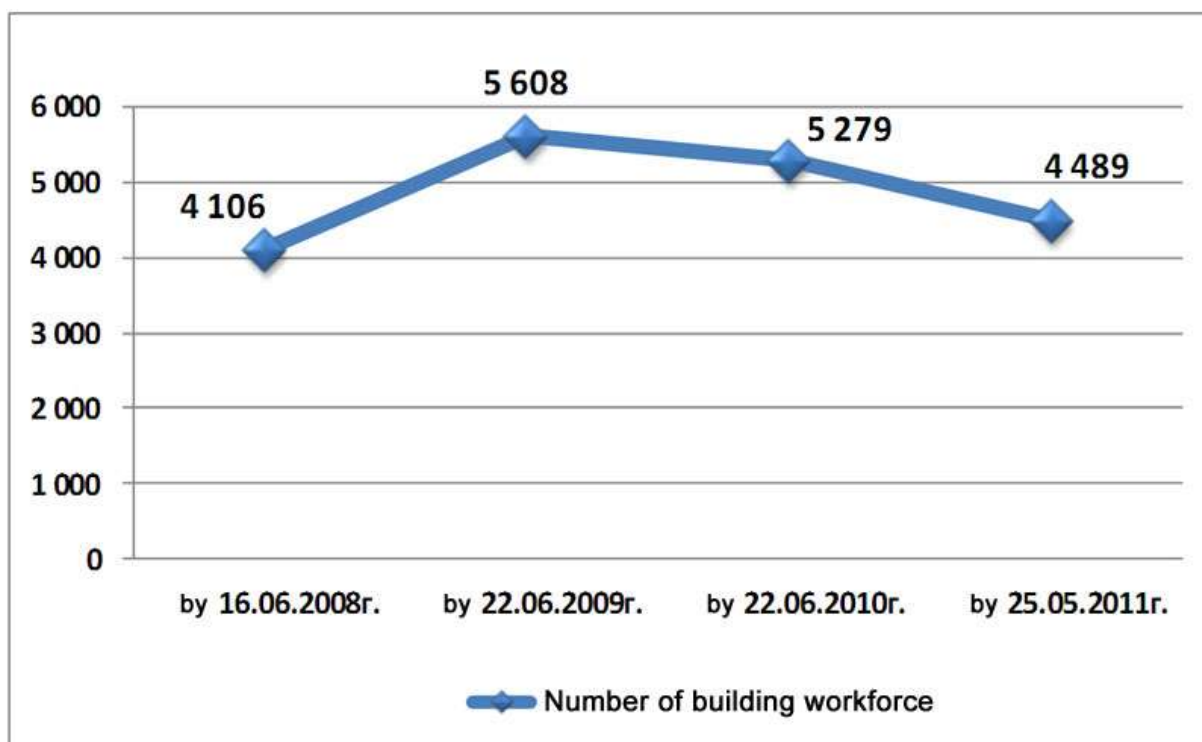


Fig. 7. Number of employees in construction. Source Central Professional Registry of Builders with the Bulgarian Construction Chamber

5.2. Statistics of the current workforce in the building sector

The average monthly number of employees on payroll for the nine months of 2011 is 131 000 people, which represents a reduction by 11.5% as compared to the same period of 2010.

According to analyses of the Bulgarian Construction Chamber the number of the unemployed in the building sector is more than 100 000 people. According to the NSI the number of the unemployed for the first half of the year is 59 thousand. Unemployment in the building sector bears the marks and seasonal nature typical for the sector. The economic crisis has to a certain extent screened the positive and negative characteristics of the sector.

The distribution of the employed persons by labour contract and position arrangements in the building sector as per the classes of occupied positions according to the National Classification of Professions and Positions and subsectors according to CEA for the period 2008-2009 is illustrated in the table below.

Subsectors of CEA 2008 / National Classification of Professions and Positions classes	Number of employed persons by classes of the National Classification of Professions and Positions									
	1	2	3	4	5	6	7	8	9	TOTAL
2008 National total	117 641	305 821	256 099	222 618	373 721	20 281	315 542	337 842	368 640	2 318 205
F Construction	10 532	9 180	14 853	14 951	7 191	771	71 734	27 868	78 975	236 055

Subsectors of CEA 2008 / National Classification of Professions and Positions classes	Number of employed persons by classes of the National Classification of Professions and Positions									
	1	2	3	4	5	6	7	8	9	TOTAL
41. Construction of buildings	5 453	4 804	7 922	8 008	4 111	401	43 832	9 799	49 523	133 853
41.1 Activities for implementation of investment projects for buildings	148	196	171	209	169	4	80	90	239	1 306
41.2 Construction of residential and non-residential buildings	5 305	4 608	7 751	7 799	3 942	397	43 752	9 709	49 284	132 547
42. Construction of facilities	2 345	1 883	3 171	2 522	925	77	9 571	11 062	11 402	42 958
42.1 Construction of roads, incl. railroads	1 381	971	1 798	1 319	522	24	3 782	7 935	6 780	24 512
42.2 Construction of transmission and distribution lines and networks	395	316	630	517	167	23	2 508	1 281	2 070	7 907
42.9 Construction of other facilities	569	596	743	686	236	30	3 281	1 846	2 552	10 539
43. Specialized building activities	2 734	2 493	3 760	4 421	2 155	293	18 331	7 007	18 050	59 244
43.1 Clearing and preparation of construction site	297	277	235	419	172	12	721	1 924	805	4 862
43.2 Construction of installations	1 105	1 155	1 921	1 756	721	121	8 806	1 898	5 466	22 949
43.3 Finishing construction activities	564	386	757	1 190	764	81	4 560	1 090	6 782	16 174
43.9 Miscellaneous specialized construction activities	768	675	847	1 056	498	79	4 244	2 095	4 997	15 259
2009 National total	122 983	308 660	251 714	230 442	391 093	16 330	275 812	315 484	347 115	2 259 633
F Construction	10 927	9 566	14 052	14 055	6 561	424	59 746	26 445	66 957	208 733
41. Construction of buildings	5 206	4 663	6 796	7 034	3 477	196	31 787	8 546	37 667	105 372
41.1 Activities for implementation of investment projects for buildings	191	209	186	213	180	0	86	43	332	1 440
41.2 Construction of residential and non-residential buildings	5 015	4 454	6 610	6 821	3 297	196	31 701	8 503	37 335	103 932

Subsectors of CEA 2008 / National Classification of Professions and Positions classes	Number of employed persons by classes of the National Classification of Professions and Positions									
	1	2	3	4	5	6	7	8	9	TOTAL
42. Construction of facilities	2 808	2 278	3 482	2 773	965	52	12 222	11 360	11 723	47 663
42.1 Construction of roads, incl. railroads	1 403	1 043	1 664	1 228	495	29	3 517	7 412	5 909	22 700
42.2 Construction of transmission and distribution lines and networks	611	472	833	639	213	15	3 447	1 745	2 773	10 748
42.9 Construction of miscellaneous facilities	794	763	985	906	257	8	5 258	2 203	3 041	14 215
43. Specialized building activities	2 913	2 625	3 774	4 248	2 119	176	15 737	6 539	17 567	55 698
43.1 Clearing and preparation of the construction site	294	259	244	345	109	13	557	1 565	687	4 073
43.2 Construction of installations	1 208	1 233	1 821	1 743	681	75	7 838	1 889	5 083	21 571
43.3 Finishing building activities	672	444	842	1 262	919	61	3 747	1 163	7 181	16 291
43.9 Miscellaneous specialized building activities	739	689	867	898	410	27	3 595	1 922	4 616	13 763

Table 6. Distribution of the employed persons by labour contract and position in the building sector by classes of the National Classification of Professions and Positions for the period 2008-2009

Data about employment in the building sector

Year	Employed persons	Investments per 1 employee	Value Added per 1 employee
	Thousand people.	BGN.	BGN.
2000	134	426	9 045
2001	133	283	10 459
2002	134	521	10 806
2003	137	66	11 015
2004	147	1 087	11 592

2005	171	1 963	13 947
2006	214	4 579	14 411
2007	251	6 351	16 335
2008	297	4 028	18 135
2009	271	2 007	19 967
2010	221	886	20 466

Table 7. Data about the employment in the building sector. Source: NSI and the Bulgarian National Bank

The trend in the number of employed persons in the building sector as compared to the total employment in the economy during the period 2000-2010 is demonstrated by the data below:

Employed persons												
2000 – September 2011*, incl. thousand people												(*Preliminary NSI data)
years												
Employed persons	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	Sept 2011*
National economy total, thousand people	3 239	3 215	3 222	3 317	3 403	3 495	3 612	3 727	3 825	3 725	3 506	3 434
Construction sector, thousand people	134	133	134	137	147	171	214	251	297	271	221	199

Table 8. Employed persons – total for the national economy and in the building sector, 2000-2010, in thousand people (according to NSI data).

5.3. Statistics about energy consumption and renewable energy in buildings

Structure of energy production and energy consumption

	Percent					
	2004	2005	2006	2007	2008	2009
Production of primary energy	100,0	100,0	100,0	100,0	100,0	100,0
Coal	44,2	39,6	39,1	49,0	48,4	47,6
Crude oil	0,3	0,3	0,3	0,3	0,2	0,3
Natural gas	2,6	3,6	3,4	2,4	1,6	0,1
Other solid fuels	7,0	6,6	6,7	7,1	7,0	7,5
Nuclear and hydroenergy	45,9	49,9	50,5	41,2	42,8	44,1
Heat						0,4
Gross consumption of primary energy	100,0	100,0	100,0	100,0	100,0	100,0
Coal	37,2	34,2	33,1	37,9	37,6	36,1
Other solid fuels	4,3	4,0	4,4	4,6	4,1	4,6
Crude oil and feedstocks	30,3	32,6	35,1	35,3	36,9	36,7
Petroleum products	-7,2	-7,8	-10,1	-10,8	-12,4	-11,7
Natural gas	13,2	14,0	14,0	14,9	14,6	12,4
Nuclear and hydroenergy	24,8	26,1	26,8	19,9	21,4	24,2
Electricity	-2,7	-3,2	-3,2	-1,9	-2,3	-2,5
Heat						0,2
Final energy consumption - total	100,0	100,0	100,0	100,0	100,0	100,0
Coal	5,5	5,2	4,8	5,4	4,9	3,8
Fuels from coal and lignite	5,1	3,4	3,2	3,1	1,8	0,8
Crude oil and petroleum products	38,7	39,5	39,8	38,9	37,8	38,6
Natural gas	9,0	10,0	11,1	11,3	11,0	9,3
Electricity	23,8	23,8	23,8	24,5	26,1	27,2
Heat	9,7	9,7	8,9	8,6	9,8	11,0
Renewable fuels and energy, and wastes	8,3	8,4	8,5	8,1	8,5	9,3

Final energy consumption in households	100,0	100,0	100,0	100,0	100,0	100,0
Coal	7,2	7,9	8,5	7,8	8,4	7,0
Fuels from coal and lignite	6,8	4,7	4,2	3,0	1,5	1,0
Petroleum products	1,3	1,3	1,3	1,3	1,1	1,2
Natural gas	0,3	0,7	1,1	1,6	1,8	2,4
Electricity	35,1	36,6	36,6	38,9	40,6	41,2
Heat	19,8	20,6	19,2	18,2	16,5	16,8
Renewable fuels and energy, and wastes	29,5	28,2	29,1	29,3	30,1	30,4

Table 9. Structure of energy production and energy consumption. Source: NSI

Final energy consumption by types of energy resources

	2004	2005	2006	2007	2008	2009
Total	8915	9293	9721	9528	9419	8475
Industry	3413	3432	3530	3611	3320	2428
Transport	2396	2642	2801	2678	2830	2774
Others	3107	3217	3391	3239	3269	3273
Agriculture, forestry and fishing	273	297	295	265	186	183
Households	2146	2127	2183	2073	2125	2149
Coal	486	481	462	516	466	318
Industry	325	303	266	346	278	160
Transport	-	-	-	-	-	-
Others	161	178	196	170	188	158
Agriculture, forestry and fishing	1	3	4	7	4	3
Households	155	169	185	161	179	150
Fuels from coal and lignite	452	318	308	296	174	69
Industry	304	214	214	231	139	43
Transport	-	-	-	-	-	-
Others	148	104	94	65	35	26
Agriculture, forestry and fishing	1	2	2	1	2	3
Households	146	101	91	63	32	22

Crude oil and petroleum products	3453	3669	3869	3705	3561	3271
Industry	804	777	802	818	596	365
Transport	2354	2588	2737	2607	2763	2687
Others	295	304	330	280	202	219
Agriculture, forestry and fishing	233	244	237	204	119	126
Households	27	27	28	26	23	26
Natural gas	799	933	1078	1081	1035	791
Industry	736	831	933	911	845	599
Transport	6	19	25	37	35	49
Others	58	83	120	133	155	143
Agriculture, forestry and fishing	22	27	32	32	35	26
Households	6	14	25	33	39	51
Electricity	2122	2208	2310	2339	2462	2309
Industry	835	846	863	875	899	725
Transport	36	35	34	32	30	38
Others	1251	1326	1413	1432	1533	1546
Agriculture, forestry and fishing	13	16	17	18	24	21
Households	754	778	800	806	862	886
Heat	866	906	866	815	925	931
Industry	318	335	318	313	463	455
Transport	-	-	-	-	-	-
Others	548	571	549	502	462	476
Agriculture, forestry and fishing	-	-	-	1	-	-
Households	424	438	419	377	351	361
Renewable fuels and energy, and wastes	737	778	828	776	796	786
Industry	91	126	134	117	100	81
Transport	-	-	5	2	2	-
Others	646	651	689	657	694	705
Agriculture, forestry and fishing	3	5	3	2	2	4
Households	634	600	635	607	639	653

Table 10. Final energy consumption by types of energy resources. Source: NSI

Final energy consumption

	2004	2005	2006	2007	2008	2009
Total	8915	9293	9721	9528	9419	8475
Industry	3413	3432	3530	3611	3320	2428
Mining of ores	64	67	72	74	74	71
Other mining and quarrying	39	44	38	39	43	16
Foods, beverages and tobacco	286	294	289	276	286	261
Textiles	84	85	86	79	60	49
Wearing apparel	33	32	33	28	38	30
Leather, leather and fur clothes, footwear and products	4	4	4	4	4	3
Wood and products of wood, and cork, plaiting materials	59	56	64	60	48	57
Pulp, paper and paper products	188	190	168	165	165	70
Publishing and printing	4	4	5	5	6	6
Petroleum products	438	432	422	436	380	172
Chemicals, chemical products and man-made fibres	538	554	575	555	511	435
Rubber and plastic products	67	65	69	94	133	138
Other non-metallic mineral products	590	613	673	778	706	524
Ferrous metals	649	597	616	609	450	202
Non-ferrous metals	158	154	157	146	158	165
Casting	10	12	12	15	22	14
Metal products, machinery and equipment	90	97	96	98	101	65
Electrical and optical equipment	23	25	25	27	27	27
Transport equipment	10	10	9	10	11	12
Manufacturing n.e.c.	14	17	17	16	17	16
Construction	53	70	90	85	80	95
Transport	2396	2642	2801	2678	2830	2774
Households, commerce, public authorities, etc.	3107	3217	3391	3239	3269	3273
Households	2146	2127	2183	2073	2125	2149

Table 11. Final energy consumption. Source: NSI

Renewable energy sources for 2010 – energy consumption

	Total	Hydro energy (less Pumping HPP)	Wind energy	Solar (photovoltaic) energy	Solar (thermal) energy	Geothermal energy	Firewood, wood waste and miscellaneous solid urban waste	Charcoal	Biogas from sewerage sediments	Biodiesel	Miscellaneous liquid biofuels
Gross domestic consumption	1437	435	59	1	10	33	882	1	3	10	3
Available for end-use	925	-	-	-	10	33	878	1	1	-1	3
Construction	-	-	-	-	-	-	-	-	-	-	-
Other industries	2	-	-	-	-	-	2	-	-	-	-
Transport	3	-	-	-	-	-	-	-	-	-	3
Railway transport	-	-	-	-	-	-	-	-	-	-	-
Road transport	3	-	-	-	-	-	-	-	-	-	3
Air transport	-	-	-	-	-	-	-	-	-	-	-
Domestic water transport	-	-	-	-	-	-	-	-	-	-	-
Households, commerce, public organizations and other	767	-	-	-	10	33	721	2	1	-	-

Households	716	-	-	-	6	-	710	-	-	-	-
Agriculture	3	-	-	-	-	-	3	-	-	-	-
Fishing industry	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous	48	-	-	-	4	33	8	2	1	-	-

Table 12. Renewable energy sources for 2010 – consumed energy. Source: NSI

Missing data

There is no available data about:

- The energy efficiency of new and old buildings, as well as about the undertaken measures for energy efficiency improvement;
- Energy from RES produced during the past 3 years;
- The building stock in terms of public, commercial and industrial buildings;
- RES installations in buildings.

6. Existing VET provisions

6.1. National system for VET of craftsmen and other on-site workers in buildings

6.1.1. Responsible authorities

The Ministry of Education, Youth and Science:

- approves the State Educational Requirements for acquiring of qualification by professions,
- endorses the List of Professions for VET;
- proposes for approval by the Council of Ministers of a List of Regulated Professions in the Republic of Bulgaria;
- endorses the state plan for admission to the state and municipal schools;
- ensures conditions for implementation of the State Educational Requirements in the system for VET
- endorses the qualification programmes in the system for VET;
- organizes professional orientation;
- distributes the financial means for VET approved in its budget and controls their implementation;
- analyzes the results from and effectiveness of VET.

The regional inspectorates on education with the Ministry of Education, Youth and Science implement the state policy in the field of VET in the respective region by:

- coordinating the interaction between the schools, the vocational training centres and the centres for information and professional orientation and the regional employment offices and labour bureaus, with the regional inspectorates for protection of and control on public health, the bodies of local self-government and the regional structures of the social partners;
- Submitting for review by the Commission on Employment and later by the Ministry of Education, Youth and Science, proposals of the schools concerning the state plan for admission.

The commissions on employment with the districts commissions on regional development coordinate the state plan for admission to the vocational high schools on the territory of the respective region. Members of the commissions on employment are representatives. Of the social partners, including employers.

The Ministry of Labour and Social Policy (including the Employment Agency, the Regional Employment Office Directorates, and the Labour Office Directorate) participate in the implementation of the governmental policy in the field of vocational education and training by:

- determining the need of VET through analysis of the trends in the labour market development;

- participating in the working out, coordination and updating of the State Educational Requirements concerning acquisition of qualification by professions;
- participating in the coordination of the List of Professions for VET.
- formulating the requirements concerning healthy and safe conditions in the event of practical training and controls their implementation through the regional labour inspectorates;
- participating in the coordination of the state plan for admission to the schools through the regional employment offices;
- participating in the arrangements for professional orientation.

The Ministry of Health Care:

- participates in the coordination of the List of Professions for VET;
- identifies the chronic illnesses and physical injuries, which are counter-indicative with respect to VET;
- determines, jointly with the Ministry of Education, Youth and Science, the professions, for which VET is suitable in the case of trainees with chronic diseases and physical handicaps, with sensor damages and mental handicap;
- determines the requirements concerning healthy conditions during practical training and the medical and physiological requirements concerning the weekly timetables and controls their implementation through the State Health Control.

The branch ministries (the Ministry of Regional Development and Public Works, the Ministry of Economy and Energy, etc.):

- participated in the working out, coordination and updating of the State Educational Requirements for acquiring of qualification by professions;
- participated in the working out, coordination and updating of the List of Professions for VET;
- participate in the coordination of the state plan for admission in the schools financed by them;
- distribute the financial means approved in their budgets for VET and control their use.

The municipalities participate in the formation of the policy in the field of VET on their territory with respect to:

- human resources needs;
- professional orientation of pupils, unemployed persons and other individuals;
- distribution of the financial means approved in their budgets for VET and professional orientation and control on their use;
- development of the material stock of schools, vocational training centres and centres for information and professional orientation through financial means from municipal budgets.
- determination of the state plan for admission to schools.

The national representative organizations of employers nominate their representatives for participation in the:

- Working out, updating and coordination of the List of Professions for VET;
- working out, coordination and updating of the State Educational Requirements for acquiring of qualification by professions;
- organization and conducting of exams for acquiring of professional qualification and nominate their representatives to sit as members of the examination commissions.

The national representative organizations of workers and public servants:

- participate in the updating of the State Educational Requirements for acquiring of qualification by professions;
- participate in the working out, updating and coordination of the List of Professions for VET;

The branch trade union organizations:

- protect the interests of the trainees before the employers on issues related to:
 - work and insurance relationships during conducting of practical training in enterprises;
- participate in the organization and conducting of exams for acquiring of professional qualification and nominate their representatives to sit as members of the examination commissions.

The National Agency for Vocational Education and Training (NAVET) coordinates the institutions related to professional orientation, education and training.

The NAVET (through its Management Board) operates on a tripartite principle – equal quotas of the state, employers and workers-and-staff organizations. Expert commissions by professional directions, whose membership is formed also on the tripartite principle, are set up with the Management.

According to the Law on VET the functions of NAVET are as follows:

- it works out criteria and procedures on licensing;
- it issues or withdraws licenses for vocational training and professional orientation;
- it performs control on the activities of the licensed institutions in the vocational training system;
- it works out and proposes to the Minister of Education, Youth and Science a List of Professions for VET and State Educational Requirements for acquiring of qualification by professions;
- it participates in the working out of the State Educational Requirements for the documents for the national education system and the system for evaluation in their portion related to VET;
- it creates and maintains a registry of vocational training centres and the centres for information and professional orientation with respect to the issued and withdrawn licenses.

In reality, through its work on international and national projects and its representation in different structures (commissions, working groups) NAVET disseminates and adapts the EU recommendations in the field of VET on the national level.

The National Trade Chamber supports and defends the joint interests of craftsmen in Bulgaria, provides assistance for the development of trades/crafts and for establishment of their prestige. The Chamber helps for the preservation and development of the traditional Bulgarian trades. The National Trade Chamber:

- participates in the working out of projects and prepares position papers on regulatory acts related to trades/crafts and training in trades/crafts;
- prepares standards for training on individual trades from the Law on Trades and coordinates the training programmes on individual trades/crafts, prepares rules for conducting of exams;
- issues craftsmen certificates and maintains a national registry on craftsmen on the basis of the regional registries.

According to the Law on Trades the standards, training programmes and rules for conducting exams should be endorsed by NAVET.

The regional trade chambers:

- support craftsmen from the region in the arrangement and conducting of trade/crafts training, they organize exams for recognition of qualification in trades/crafts and issue certificates for journeymen;
- cooperate with institutions from the VET system and the system of higher education;
- work out programmes for training of craftsmen depending on the needs of the specific region and coordinate them with the National Trade Chamber, which submits them for endorsement by NAVET; and finally they post the approved programmes on their respective websites;
- through the National Association “Work Co-operative of Folk-art-craftsmen” and the branch organizations members of the National Trade Chamber they assist for the practical training of craftsmen and creation of jobs for acquiring of experience and qualification of journeymen from the branch organizations.

6.1.2. Accreditation bodies and training providers

NAVET issues licenses to the centres for vocational training of adults (above 16 years of age) applying criteria and procedure approved by its Management Board. The criteria are related to:

- legal compliance of the candidate;
- existence of a system for management of the centre;
- existence of a system for guaranteeing good quality of the training (including worked out training plans and programmes);
- existence of measures for in-house surveillance (monitoring);
- available resources (trainers, material stock for teaching theory and practice).

The vocational training centres perform professional training (for acquiring of profession or training on some part of a given profession) to persons above 16 years of age in professions of 1st, 2nd and 3rd Level of professional qualification under the List of Professions for VET (assistant in building, welder, builder, energy system installer, building technician, electrician), for which they possess a license. The training is conducted on the basis of the training plans and programmes submitted to NAVET in the framework of the licensing procedure, which are in compliance with the State Educational Requirements by professions. The training ends with the issue of recognized nationwide document (after successful passing of exams in theory and practice) – Certificate for professional qualification or Certificate for professional training.

The Ministry of Education, Youth and Science opens, reconstructs and closes vocational schools, vocational high schools and vocational colleges following the procedure envisaged in the Law on Peoples' Education (by virtue of order of the Minister of Education, Youth and Science). In order to open an institution (class) for vocational training it is necessary to submit to the Ministry of Education, Youth and Science arguments about the need of such act (regional need of people with such qualification), as well as evidence about the existence of the resources necessary for training (trainers and material stock for training in theory and practice).

Vocational schools provide elementary professional education with acquirement of 1st and 2nd Level of professional qualification and qualification on part of a given profession for a length of study 4 years. Admitted are pupils, who have graduated at least the 6th grade in public schools. Vocational schools may provide also vocational training on the grounds of an order of the Minister of Education, Youth and Science if they comply with the requirements formulated in the State Educational Requirements. Vocational schools may organize education of people of more than 16 years of age as well. Training in professions for the building sector is currently provided by 2 vocational schools.

Vocational high schools provide professional education for acquiring of 2nd Degree of professional qualification for length of study 4 years or 3rd Degree professional qualification for length of study 4 or 5 years. Admitted to them are pupils, who have graduated elementary school or 7th grade in a public school. Vocational high schools may provide also professional training leading to acquirement of 1st, 2nd and 3rd Degree of professional qualification and qualification on part of a profession. Vocational high schools may provide also professional training for acquirement of 4th Degree of professional qualification on the grounds of order by the Minister of Education, Youth and Science, if they comply with the conditions specified in the State Educational Requirements. Vocational high schools for training in construction-related professions (more than 29), as well as professions related to electrical engineering and the energy sector exist in all the district centres.

Vocational colleges perform professional training for acquirement of 4th Degree of professional qualification for a study period of 2 years, depending on the already possessed degree of professional qualification. Admitted to them are individuals, who have graduated secondary education. In the field of construction **there is no** training in vocational colleges, one of the reasons for that being the absence of a profession with 4th Degree of professional qualification in that sector. Vocational colleges declare to the Minister of Education, Youth and Science their wish to provide training by submitting to the Ministry the required documentation, evidencing the availability of material stock, teaching body, training plans and programmes. College training is

usually of 2-year duration and comprises, beside professional training, also general knowledge, and necessary for successful practicing of the profession. The vocational training is realized entirely in compliance with the Law on VET.

Training under the Law on Trades of apprentices, journeymen and craftsmen in the respective trade (from the list of trades with the Law on Trades) is performed in enterprises organized in the trade manner or in the National Association “Work Co-operative of Folk-art-craftsmen” on the basis of programmes and under conditions endorsed by the National Trade Chamber. The exams for acquiring a certificate for journeymen and craftsmen are conducted by commissions (nominated by the regional or respectively national trade chamber). Opportunity is provided for acquiring a journeyman certificate by individuals, who have not done apprenticeship in an enterprise organized in the trade manner, under the following two conditions: individuals, who have practiced the trade for at least 3 years and have successfully passed the journeyman exam; individuals, who possess 2nd or 3rd Degree of professional qualification under the Law on VET, if it corresponds to a given trade from the list with the Law on Trades.

There are training centres (schools, universities). which organize training in implementation of Ordinance No. 2 of 17 January 2001 concerning the conditions and procedures for acquiring and recognition of the right to practice the profession of steam or water heating boiler service technician for the purpose of issue of **Professional Certificate** for: operator of low-pressure boilers, operator of high pressure boilers 3rd, 2nd and 1st Level, operator of energy boiler or operator of energy block. The quoted professions are regulated professions, whereat training for mastering the competences necessary for their practicing might be provided also in institutions governed by the Law on VET. Possession of Professional Certificate in strict compliance with the requirements of Ordinance No. 2 is required for practicing the profession.

Vocational training may be performed also in other ways and by other institutions not mentioned above. It is, however, not subject to supervision and control by the responsible institutions. It might not be in compliance with the State Educational Requirements, might not end with the issue of governmentally recognized document and is not financed with funds from the State Budget, national or EU programmes.

EXPANDED LIST OF PROFESSIONS FOR VOCATIONAL EDUCATION AND TRAINING under the BUILD UP Skills Project

The professions on brown background are very closely related to energy efficiency

	Professional direction	Title of the profession	Title of the subject field	Degree of professional qualification				Positions and isolated groups in the National Classification of Professions and Positions
				I	II	III	IV V	

1	2	3	4	5	6
34	BUSINESS MANAGEMENT AND ADMINISTRATION				
	341	Wholesale and retail trade			
		341030	Broker	3410301	Real estate transactions
				<input type="checkbox"/>	3413-3001 3413-3002
52	TECHNOLOGY				
	521	Machine tools engineering, metal processing and metallurgy			
		521030	Machine tool operator		
			5210303	Welding machines and equipment	<input type="checkbox"/>
					Stand-alone group 7212
		521090	Welder	5210901	Welding
				<input type="checkbox"/>	Stand-alone group 7212
	522	Electrical engineering and energy sector	522010	Electrician	
				5220109	Electrical wiring systems
					<input type="checkbox"/>
					3113-3006 3113-3005 3113-3015 3118-3006
		522020	Electric fitter / installer		
				5220210	Electrical wiring systems
					<input type="checkbox"/>
					Stand-alone group 7245

1	2	3	4	5	6		
			5220211	Electric household appliances	<input type="checkbox"/>	Stand-alone group 7241	
			5220212	Power engineering	<input type="checkbox"/>	Stand-alone group 7241	
		522030	Technician in energy equipment and systems				
			5220306	Gas-fired equipment	<input type="checkbox"/>	3313-3012	
			5220308	Renewable energy sources	<input type="checkbox"/>	8161-2018	
			5220309	Thermal engineering	<input type="checkbox"/>	3115-3015 3115-3042 3115-3038	
		522040	Installer of energy equipment and systems				
			5220406	Gas-fired equipment	<input type="checkbox"/>	3115-3006 3313-3012 7136-2010 7233-2033 7233-2034	
			5220408	Renewable energy sources	<input type="checkbox"/>	8161-2018 7233-2033 7233-2034 7233-2036	
			5220409	Thermal engineering	<input type="checkbox"/>	7233-2011 7233-2011 7233-2014 7233-2022 7233-2030 7134-2004	
		522060	Stoker	5220601	Boiler operation	<input type="checkbox"/>	7233-2022
543	Manufacturing technologies – wood-working, pulp and paper, plastics and glass	543010	Technician – production line operator in wood-working				
			5430107	Manufacture of doors and windows	<input type="checkbox"/>	7124-2001 7124-2009 3119-3002	
			5430109	Wood-cutting and packaging	<input type="checkbox"/>	Stand-alone groups 8240 8141	
			5430110	Manufacture of timber boards and bonded timber	<input type="checkbox"/>	Stand-alone groups 8240 8141	
			5430111	Production of building products from wood	<input type="checkbox"/>	7124-2009	

1	2	3	4	5	6				
		543020	Operator in wood processing						
				5430202	Production of doors and windows		<input type="checkbox"/>		7124-2001 7124-2002 7124-2004 7124-2006 7124-2009 Stand-alone groups 8240 8141
				5430206	Wood-cutting, packaging and production of parquet		<input type="checkbox"/>		7124-2002 7132-2003 Stand-alone groups 8240 8141
				5430207	Manufacture of timber boards		<input type="checkbox"/>		7124-2002 Stand-alone groups 8240 8141
				5430208	Manufacture of veneer and bonded timber		<input type="checkbox"/>		7124-2002 Stand-alone groups 8240 8141
		543090	Worker in wood-processing						
				5430905	Production of doors and windows		<input type="checkbox"/>		Stand-alone groups 7421, 7422

58 ARCHITECTURE AND CONSTRUCTION

581	Architecture, urbanism and geodesy	581010	Geodesist	5810101	Geodesy			<input type="checkbox"/>	3112-3003 3112-3006 3112-3007 3118-3002 3118-3008 3118-3016 1223-3006
582	Construction	582010	Building technician	5820101	Construction and architecture			<input type="checkbox"/>	3112-3004 3112-3007 3112-3009 3118-3002 3118-3005 3118-3014 1223-3006 3413-3001 3413-3002
				5820103	Water construction			<input type="checkbox"/>	3112-3001 3112-3002 3112-3007 3118-3005 3118-3014 1223-3006
		582030	Builder	5820302	Shuttering			<input type="checkbox"/>	7129-2001 7129-2003 7129-2012 7129-2016 7124-2011 7123-2004 7129-2001 7129-2002
				5820303	Rainforcement and concrete			<input type="checkbox"/>	7123-2001 7123-2003 7123-2005 7123-2006 7129-2012 7129-2016 7129-2005
				5820304	Masonry			<input type="checkbox"/>	7122-2001 7122-2002 7122-2003 7122-2005 7122-2008 7122-2010 7122-2011 7129-2012
				5820305	Plasters and gypsun wall plaster			<input type="checkbox"/>	7133-2001 7133-2002 7133-2003 7133-2004 7129-2004 7129-2012
5820306	Indoor sheathing and floor coverings			<input type="checkbox"/>	7132-2001 7132-2002 7132-2003 7133-2004				

1	2	3	4	5	6	
					7134-2002 7134-2003 7134-2005 7134-2006 7134-2007 7134-2008 7129-2004 7129-2012	
			5820307	Outdoor sheathing and pavements	<input type="checkbox"/>	7134-2002 7134-2003 7134-2005 7134-2006 7129-2005 7134-2007 7134-2008 7122-2010 7129-2004 7129-2012
			5820309	House-painting works	<input type="checkbox"/>	7141-2002 7141-2003 7141-2004 7141-2005 7141-2006 7141-2007 7142-2001 7129-2004 7129-2012
			5820310	Building carpentry	<input type="checkbox"/>	7124-2001 7124-2002 7124-2003 7124-2004 7124-2005 7124-2006 7124-2009 7124-2010 7124-2011 7129-2004 7129-2012
			5820311	Building tinsmith works	<input type="checkbox"/>	7131-2002 7213-2006 7129-2004 7129-2012
			5820312	Roofs	<input type="checkbox"/>	7131-2001 7131-2002 7123-2002 7129-2004 7129-2012
		582040	Building assembly worker	5820401	<input type="checkbox"/>	7129-2001 7129-2002 7129-2003 7129-2004 7129-2015 7129-2016 7215-2013 7215-2011 7129-2009
		5820402		Metal structures	<input type="checkbox"/>	7214-2007 7214-2008 7214-2009 7129-2015 7129-2004
		5820403		Dry construction	<input type="checkbox"/>	7129-2015 7129-2004
		5820404		Window frames and glazing	<input type="checkbox"/>	7124-2001 7135-2001 7135-2003 7135-2004 7135-2005 7129-2004
		5820405		Insulations in construction	<input type="checkbox"/>	Stand-alone group 7134
		582050	Installer of water supply and sewerage networks	5820501	<input type="checkbox"/>	7136-2002 7136-2003 7136-2004 7136-2007 7136-2009 7136-2017 7129-2004
		5820502		Outdoor water supply and sewerage networks	<input type="checkbox"/>	7136-2001 7136-2003 7136-2004 7136-2007 7136-2009 7129-2005 7129-2004
		582070	Furnace builder	5820701	<input type="checkbox"/>	7122-2002 7122-2004 7122-2006 7122-2007 7122-2013 7129-2008
		582080	Assitant in	5820801	<input type="checkbox"/>	9313-0001 9313-0002 9312-0001 9312-0002

1	2	3	4	5	6
		construction			9312-0003 9312-0004 9312-0005 9312-0006 9312-0007 9312-0008 9312-0009 9312-0010 9312-0012 9312-0013

Table 13. Expanded list of professions for VET under the BUILD UP Skills Project Bulgaria

6.1.3. By craft/profession: number of courses/year, implementing body/organisation, number of workers taking the courses/year, content of courses, certification, funding sources

Training in the national education system

The training in the system of national education is performed using funding from the State Budget. Payment of fees by the students is not required.

The number of students, who have acquired professional qualification 2nd Level in professions in the sphere of construction in 2010 is 906 (total for all professions 14 834). As compared to 2000 a total of 1278 people have received Professional Qualification Certificate in professions 2nd Degree in the field of construction (according to NSI data).

The number of students, who have acquired professional qualification 3rd Level in professions in the sphere of construction in 2010 is 641 (total for all professions 9366), which is less than the number of graduates in the 2000 academic year, when 1680 people have received Professional Qualification Certificate in professions 3rd Degree (NSI data).

A trend of diminishing of the number of people taking and graduating training in professions in the field of construction (especially professions of low – 1st and 2nd – Level of professional qualification) has been noted.

Currently in the system of school education in the professions object of this analysis the following numbers of pupils are taking training:

Professional direction “Electrical engineering and energy sector”

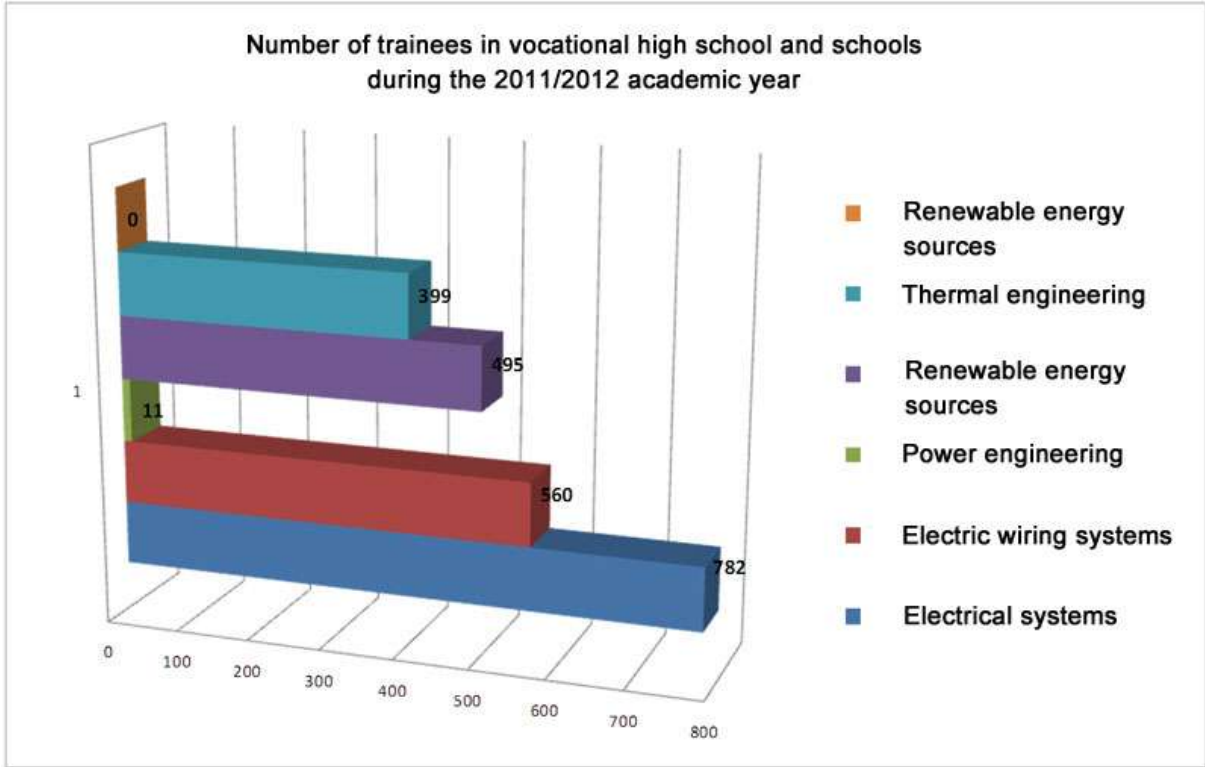


Fig. 8. Number of trainees in vocational high schools and schools during the 2011/2012 academic year, professional direction electrical engineering and energy sector.

Professional direction “Construction”

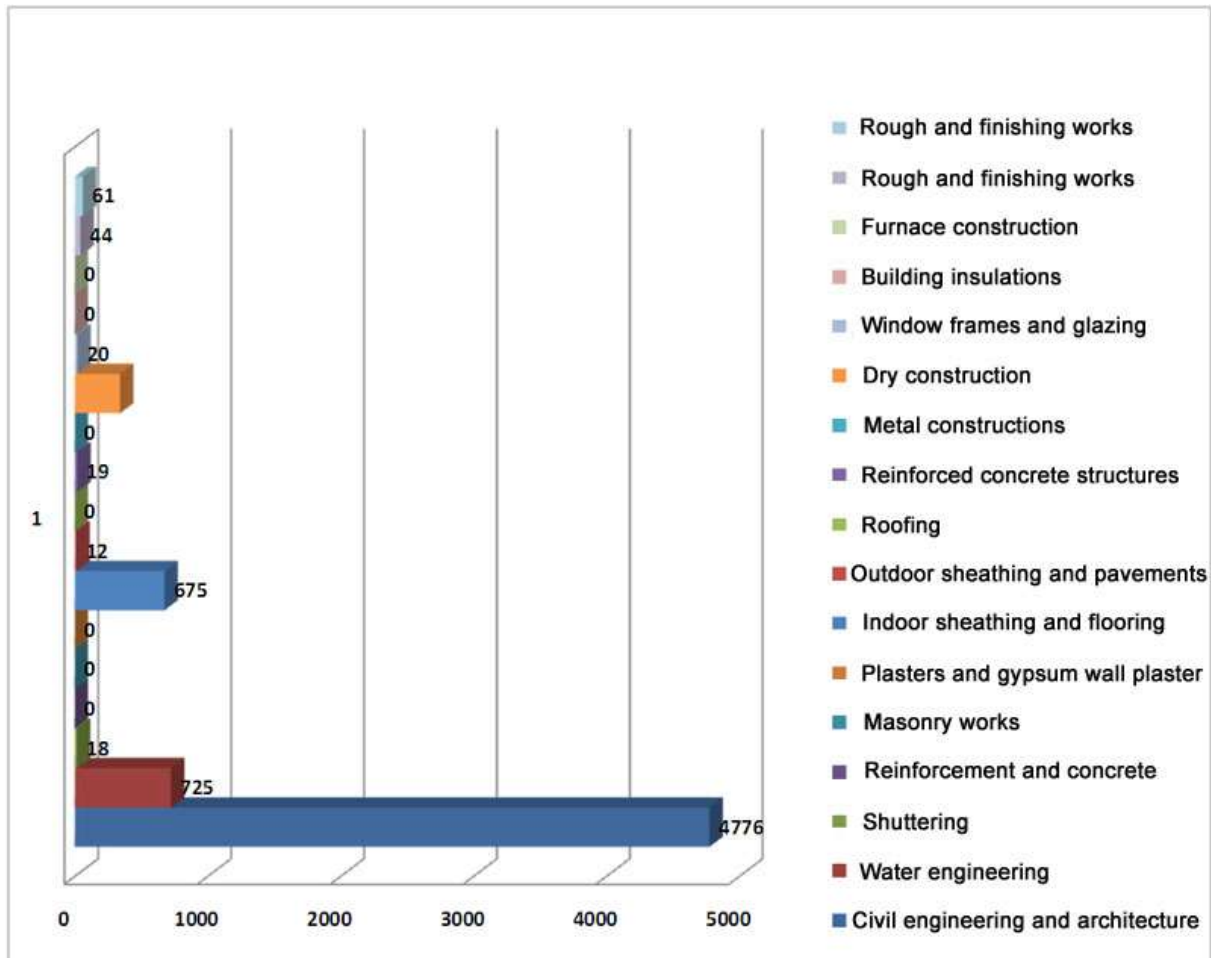


Fig. 9. Number of trainees in vocational high schools and schools during the 2011/2012 academic year, professional direction “Construction”.

The number of trainees taking courses in professional directions “Electrical engineering and energy sector” and “Construction” in the vocational training centres is available below.

In how many schools and vocational training centres is offered training in these professions?

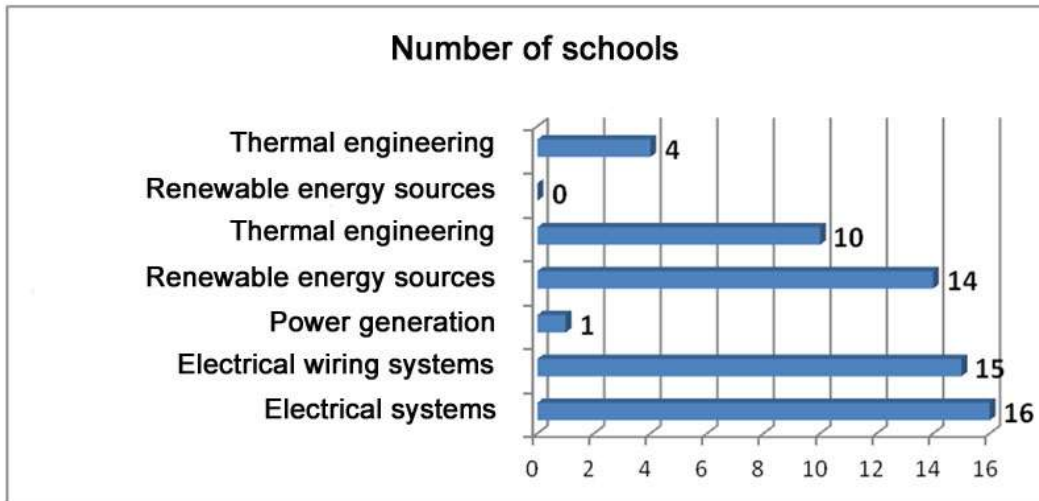


Fig. 10. Number of schools offering training in professions in professional direction “Electrical engineering and energy sector”.

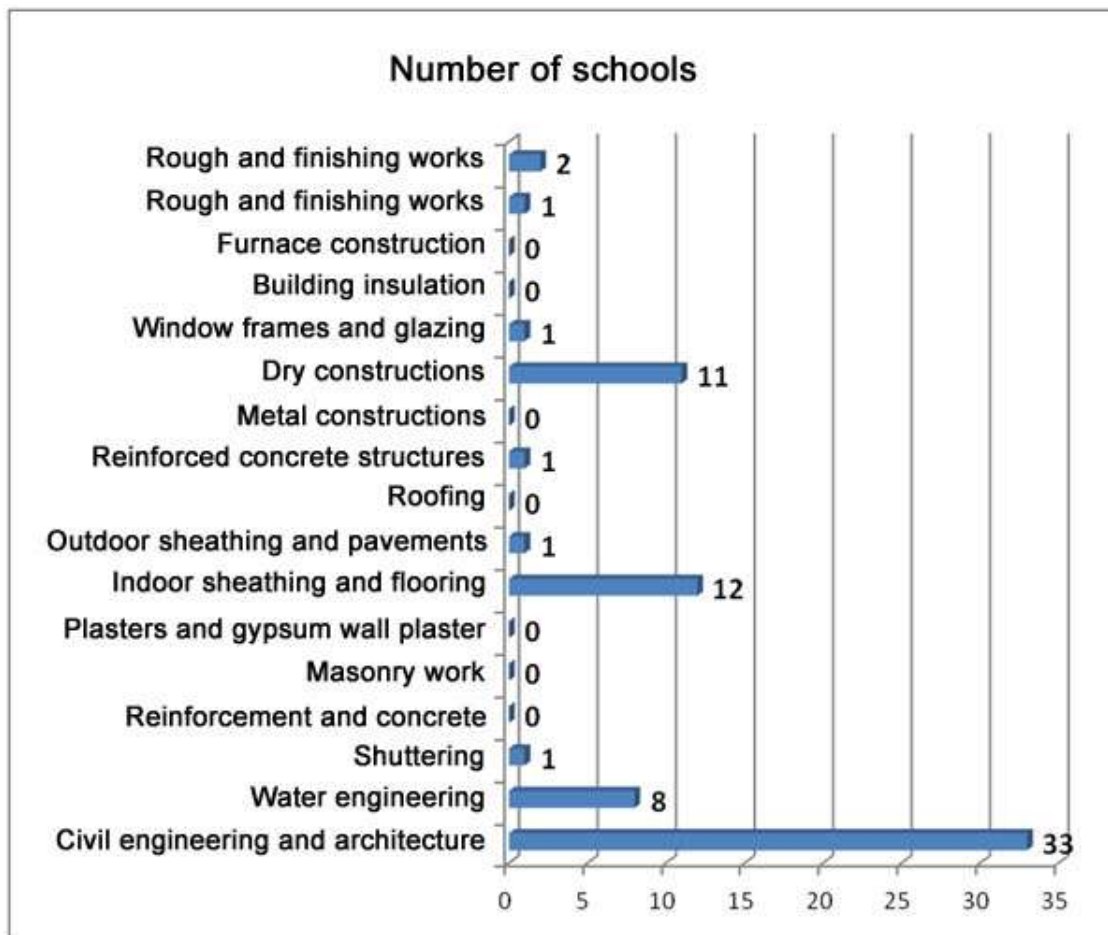


Fig. 11. Number of schools offering training in professions in professional direction “Construction”.

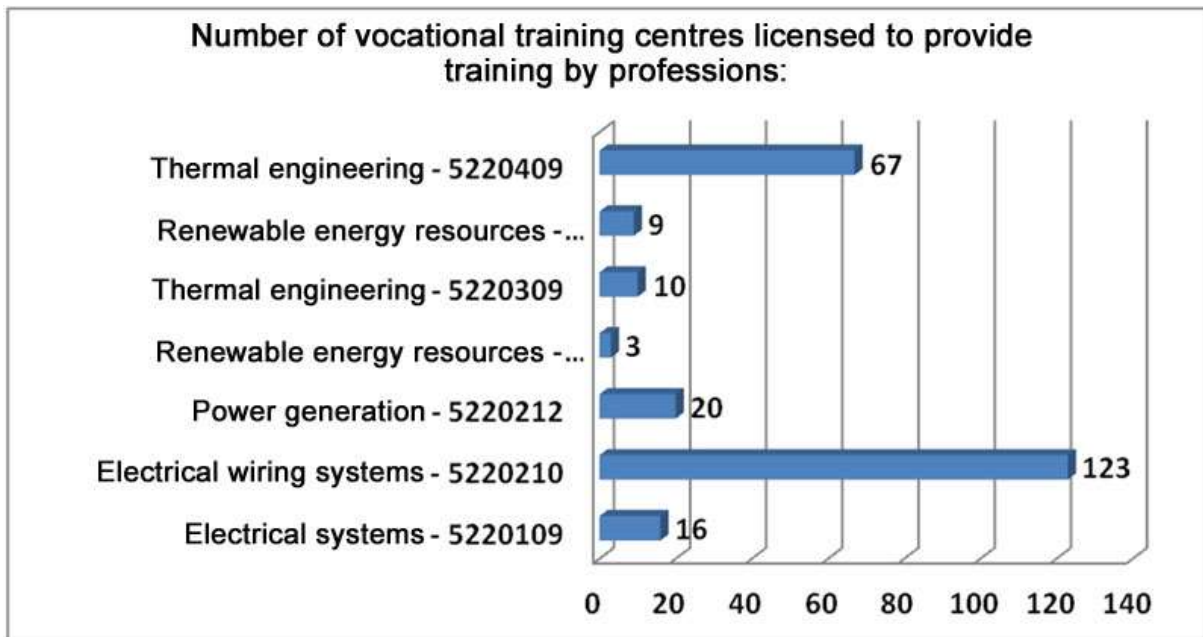


Fig. 12. Number of vocational training centres licensed to conduct training in professions in professional direction “Electrical engineering and energy sector”.

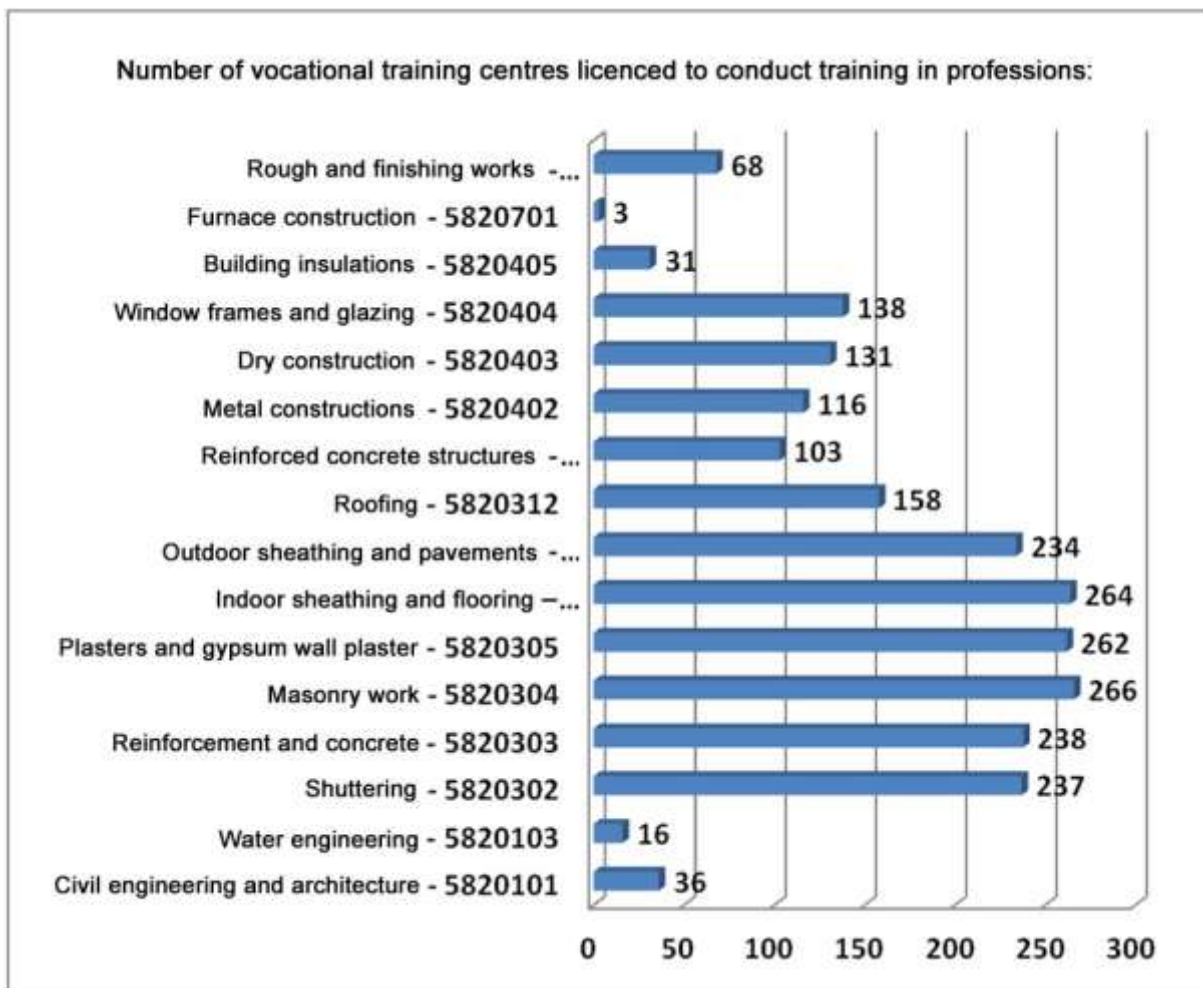


Fig. 13. Number of vocational training centres licenced to conduct training in professions in professional direction “Construction”.

6.1.4. Certification and accreditation framework

The certification of persons, who have successfully graduated their training in professions and crafts from the List of Professions for VET, is performed in compliance with the **Law on VET** (Articles 34-40).

For acquiring a Professional Qualification Certificate the successful graduates of training for acquiring a professional qualification degree (in a school or vocational training centre) should pass state exams in theory and practice in the given profession. The pupils should also pass with success the state maturity exams for graduation of their secondary education in accordance with the provisions of the Law on Level of Education, the general educational minimum and the curriculum.

The organization of the exams is performed in compliance with the **state educational requirement concerning the system of evaluation**.

As members of the commissions for conducting of the exams are included members of the training institutions, representatives of employers and representatives of the workers and staff with equal quotas.

There are certain requirements with respect to the representatives of the social partners, who sit as members of the commissions, namely that they should possess professional qualification in the respective professional field and have service record of not less than four years in the respective profession.

The practice and the interviews with headmasters of vocational high schools in the field of construction have revealed that the representatives of the Bulgarian Construction Chamber take an active part through their representatives in the commissions for conducting of the state exams.

The state exams in the theory and practice of the given profession are conducted following the national examination programmes, worked out in compliance with the state educational requirements for acquiring professional qualification. **The national examination programmes (NEP)** contain the evaluation criteria. With respect to the theoretic exam NEP contain also examination themes with plan-theses for the examination tickets, for the practice exam only evaluation criteria and a for preparation of practical assignments. NEP is endorsed by the Minister of Education, Youth and Science.

Graduated vocational education or vocational training is certified after successful passing of the state exams by virtue of **Professional Qualification Certificate**.

If practicing of the acquired profession requires a license, it is possible to obtain also a **License Certificate**, which is issued under the conditions of the respective ordinances.

Vocational training on part of a given profession is completed by taking exams in theory and practice, the organization and contents of which are determined by the training institution proper in compliance with the State Educational Requirements by professions.

For successful completion of vocational training for acquiring qualification on part of a given profession is issued a **Professional Training Certificate**.

The rights to issue documents for professional qualification have vocational high schools, vocational colleges and vocational training centres, which possess the respective license from NAVET.

The law gives the citizens the right to apply for receiving one of the two documents also in the event that they have not been trained under the VET system. The candidates to obtain a certificate should pass with success the exams in theory and practice of the given profession, having proven beforehand that they have not less than six months service in the profession, as well as the required educational level for the respective degree of professional qualification (secondary school for 3rd and 4th Level, graduated 10th grade for 2nd Level and graduated 6th grade or completed literacy programme under the 3H3 for 1st Level).

In the field of construction there are a great number of people, who learn the profession on-site and comply with the above mentioned conditions. There are no statistical data what portion of them has been certified.

Certification of individuals trained under the **Law on Trades** is done after successful passing of exams conducted in compliance with a regulation for conducting of journeyman exam and respectively a regulation for conducting of craftsman exam, conducted by the National Trade Chamber. The examination commissions are set up for a specific mandate and their membership is proposed by the regional trade chambers. The exam for journeyman is only one and comprises checking of knowledge and skills, and the exam for craftsman is conducted in three parts: practical, theoretical (comprising knowledge in the field of organization and management of the enterprise) and pedagogical.

The certificates issued after successful passing of the exams are Journeyman Certificate and respectively Craftsman Certificate.

Acquiring of License Certificate is required for practicing of regulated professions (for instance "Boiler operator"). The training, examination and certification should be performed under the conditions of **Ordinance No. 2** of 17 January 2001 concerning the conditions and procedures for acquiring a license and recognition of the right to practice the profession related to services of steam and water heating boilers.

"Accreditation" does not exist under the Bulgarian legislation. Permanent permit to perform vocational training is granted to vocational training centres through the licensing procedure with NAVET and to schools and colleges – through submission of application to the Ministry of Education, Youth and Science.

There are circumstances, under which the license of a vocational training centre may be withdrawn (spelled out in the Law on VET) and for the schools and colleges the Minister of Education may not permit realization of admission for certain professions.

The conditions for licensing of vocational training centres and for issue by the Minister of Education, Youth and Science of permission to schools and colleges are presented above.

Systems for evaluation of the quality exist In the vocational training of adults and in vocational education as well.

6.1.5. The extent to which the current system already addresses skills (competences) of VET graduates for implementation of energy efficiency and renewable energy measures in buildings

Learning of new skills, necessary for implementation of energy efficiency measures in construction and operation of buildings, is provided for at several levels:

- Existence in the List of professions for VET of specific professions related to implementation of energy efficiency and renewable energy measures in buildings, for instance special skills orientation “Renewable energy sources” in the professions “Installer” and respectively “Technician” of energy facilities and systems;
- Incorporation in the State Educational Requirements by professions of new knowledge, skills and competences related to energy efficiency measures in professions like electrician, electric installer, builder, builder-assembler etc.
- Changes in the training plans and programmes – for schools with permission by the Ministry of Education, Youth and Science and for the centres for vocational training – at the initiative of the centres proper.;
- Addition of new themes in the course of training (which are not clearly mentioned in the training programmes) during the process of planning of the training in the respective subject in the annual distribution of the classes or the respective course in the centre for vocational training.

To date no proposals have been submitted for changes in the State Educational Requirements or the training plans and programmes.

6.1.6. Existing instruments to monitor market developments in terms of technologies, skills requirements and training / sector skills councils

To date there are no observations, analyses and forecasts as regards the changing labour market demands for individuals with a specific qualification in connection with changes in the technologies, the structure of the economy or other factors (outside the framework of individual short-term projects).

Structures, which are entitled to propose changes in VET and which are the closest to the so-called “sector skills councils” are the **Expert Commissions on Professional Directions with NAVET** (for instance commissions on: architecture and construction; electrical engineering and energy sector; machine tools engineering, metal processing and metallurgy). These are 9-member commissions, which incorporate three representatives of the state, the branch employer organizations and trade unions. Their functions are as follows:

- They prepare reports to the President of NAVET with proposals for the issue, refusal to issue or withdrawal of licenses to vocational training centres in professions of the respective sector;
- They participate in the working out and updating of the State Educational Requirements for acquiring qualification in professions of the respective professional direction;
- They participate in the working out and updating of the List of professions for VET in the respective sector.

In the expert commission “Architecture and construction” sit representatives of the Ministry of Education, Youth and Science, the Ministry of Labour and Social Policy, the Ministry of Regional Development and Public Works, the Bulgarian Construction Chamber, the Association of Geodetic Companies, the Bulgarian Trade and Industry Chamber, the Confederation of Independent Syndicates in Bulgaria and the

“Construction, Industry and Water Supply” Federation with the “Podkrepa” Labour Confederation.

Sectoral commissions for evaluation of competences are set up in the framework of a project implemented by the Bulgarian Industrial Chamber and financed by the OP “Human Resources Development”. Their functions are expected to be expanded and to lead to assessment of the needs of training of individuals in specific qualification at sectoral and enterprise level. Unfortunately, construction is not one of the 20 sectors included in that project, for which such commissions will be structured and for which resources will be allocated to support their work.

Working out of a system (including instruments) for short-term and medium-term forecasting of the needs of qualified workforce at the level of standing-alone group from the НКПД (with ambitions to get to a forecast on the level “position”) is expected in the framework of projects of the Ministry of Labour and Social Policy, financed under the OP “Human Resources Development” and “Progress” Programme.

There exist an opportunity for enterprises, employers’ organizations etc. to propose new professions for training in the building sector – NAVET possesses an elaborated procedure for incorporation of new professions in the List of professions for VET. In it are detailed the rules for submission of such proposals, as well as the documents to be submitted in order to prove the need of training of individuals with such qualification.

There exist also possibilities for proposal of changes (additional) with respect to the currently offered training (in the State Educational Requirements by professions in the training plans and programmes of the vocational high schools and vocational schools). The proposals for changes may be addressed either to the Ministry of Education, Youth and Science or to NAVET, whereat according to its competence the respective institution will submit the proposal for review (NAVET submits the proposals to the expert commissions and the Ministry of Education, Youth and Science may refer them either to the experts from its Professional Qualification Department or to re-address them to NAVET).

The proposals for changes with respect to admission in vocational high schools and schools on the territory of a given district (for instance opening of classes for training from the List of Professions for VET, for which currently there is no such training in the region) should be addressed to the Regional Inspectorate on Education with the Ministry of Education, Youth and Science and to the Regional Development Commission with the District Governor – the Employment Commission.

The practice reveals that the engagement of partnerships with representatives of the training institutions, experts from the Ministry of Education, Youth and Science and NAVET in the preparation of such proposals accelerates the process of review of the proposals and prevents the drafting of proposals, which contradict the enforced regulatory framework (or the proposed changes have already been made)

One serious problem with respect to the introduction of training on themes related to new technologies, materials and systems appears to be the absence of possibilities and clear regulations concerning the upgrading and upkeeping of the qualification of teachers. There are no adequate forms of teacher training. The existing teacher training modalities are oriented towards theory and practice of tuition (teaching and evaluation methods, planning of the training process etc.), but not towards mastering

of knowledge and skills related to changes in the construction know-how, for instance.

6.2. Courses and training schemes on energy efficiency and renewable energies in buildings, which exist but are not (yet) part of the national continuing VET system

In order to prepare people for auditing, working out of plans and programmes for energy efficiency improvement and certification under Article 36 of the Energy Efficiency Act and in compliance with the requirements of Article 20 of Ordinance No. RD-348/02 April 2009 concerning the circumstances subject to entry in the registry of individuals performing certification of buildings and energy efficiency auditing, the procedure for obtaining information from the registry and the conditions and procedures for acquiring and recognition of rights, training sessions are organized (by the Energy Efficiency Agency, the Technical University of Sofia, the Technical University of Varna, the Technical University of Gabrovo and the Technical University of Plovdiv, consultancy companies, staff training under Article 36 Paragraph 2) in the subject of energy efficiency auditing and certification of buildings. The training sessions are oriented predominantly to engineers and architects, but persons with professional qualification in construction and graduated secondary education may also join them. The duration of the course is 90 hours, which comprises theoretical and practical sections. The contents of the course comprise the requirements of the specific regulatory framework, basic principles of energy exchange in industrial systems and sites, techniques of how to perform an energy efficiency audit in such systems, methods for identification and assessment of their energy performance, specific particularities of how to reduce energy consumption in the individual subsystems, the procedure and rules for establishment of a company standard for energy efficiency of industrial systems. Special attention is paid to the cost-efficiency evaluation of the decisions for reduction of energy consumption, as well as of the monitoring of the final result.

Training courses are organized also by companies, which are manufacturers of importers of equipment, materials and systems, whereat some of them, including some large construction companies, have obtained licenses for their own centres for vocational training (“Devnya Cement” plc, “Orgachim” plc, STS “Engineering”, “Enemona” plc, “Matev Story” SP Ltd., “Kurortno Stroitelstvo (Holiday Facilities Construction)” Ltd., “Glavbolgarstroy” plc, “Baumit-Bulgaria” SP Ltd. etc.). .

Profession, craft, code	Number of licensed centres for vocational training, offering training by professions in 2011	Number of persons trained in that profession in 2010	Method of funding of the courses
1. Electrician – Electrical wiring systems - 5220109	16	14	EU programmes, the Employment Agency, the trainees, the employer
2. Electricity installer - Electrical wiring systems - 5220210	123	1394	EU programmes, the Employment Agency, the trainees, the employer, other
3. Electricity installer – Power engineering - 5220212	20	-	-
4. Technician of energy equipment and systems –	3	-	-

Renewable energy sources - 5220308			
5. Technician of energy equipment and systems – Thermal engineering - 5220309	10	39	The Employment Agency, the trainees, the employer
6. Installer of energy equipment and systems - RES – 5220408	9	17	The employer
7. Installer of energy equipment and systems – Thermal engineering - 5220409	67	459	EU programmes, the trainees, the employer, other
8. Construction – Construction technician – Civil engineering and architecture - 5820101	36	395	EU programmes, the Employment Agency, the trainees, the employer
9. Construction – Construction technician – Water engineering - 5820103	16	39	EU programmes, the Employment Agency, the trainees, the employer
10. Construction – Builder – Shuttering - 5820302	237	549	EU programmes, the Employment Agency the trainees, the employer
11. Construction – Builder – Reinforcement and concrete - 5820303	238	634	EU programmes, the Employment Agency, the trainees, the employer
12. Construction – builder – Masonry - 5820304	266	251	EU programmes, the Employment Agency, the trainees, the employer
13. Construction – Builder – Plasters and gypsun wall plaster - 5820305	262	258	EU programmes, the Employment Agency, the trainees, the employer, other
14. Construction – Builder – Indoor sheathing and flooring – 5820306	264	395	EU programmes, the Employment Agency the trainees, the employer, national programmes
15. Construction – Builder – Outdoor sheathing and pavements - 5820307	234	399	EU programmes, the Employment Agency the trainees, the employer, other
16. Construction – Builder - Roofing - 5820312	158	139	EU programmes, the Employment Agency, the trainees, the employer
17. Construction – Builder-assembler – Reinforced concrete structures - 5820401	103	47	EU programmes, the Employment Agency, the trainees, the employer
18. Construction – Builder-assembler – Metal structures - 5820402	116	117	EU programmes, the Employment Agency, the trainees, the employer
19. Construction – Builder-assembler – Dry construction - 5820403	131	272	EU programmes, the Employment Agency, the trainees, the employer
20. Construction – Builder-assembler – Window frames and glazing - 5820404	138	135	EU programmes, the Employment Agency, the trainees, the employer
21. Construction – Builder-installer – Building insulations - 5820405	31	103	The employer
22. Строительство –	3	-	-

Пещостроител - Пещостроителство - 5820701			
23. Construction – Assistant in construction – Rough and finishing works - 5820801	68	1116	EU programmes, the Employment Agency, the trainees, the employer, other

Table 14. Courses and training schemes on energy efficiency and renewable energies in buildings.
Source: NAVET

6.3. Relevant initiatives at national/regional level supported by the EU

In the framework of what has been done for the purposes of this analysis we have identified projects, which are oriented towards training of professionals for energy efficient construction and maintenance of buildings. The projects have been implemented by state institutions, municipalities, private companies, employers' associations and training institutions under the programmes "Intelligent Energy Europe" and "Leonardo da Vinci".

Training in "European consultant on energy efficiency and building materials"

In the framework of the ECOESA Network (<http://ecoesa.divergenz.de/index/2000/>), funded by the "Leonardo da Vinci" Programme, modular training in "European consultant on energy efficiency and building materials" was launched.. It comprises the following themes:

"Analysis of the needs in Romania and Bulgaria";

"Regulatory framework related to construction in Germany, Austria, the Czech Republic, Finland, Hungary, Bulgaria and Italy";

"Training programme for modular training for qualification upgrading;

- Retrofitting of buildings and
- Funding models;

The network proper is open and new institutions may join it.

Training for installers of small-scale RES systems in buildings

Since May 2010 the "John Atanasov" VHSE (Vocational High School of Electronics) is partner of the European project "Training courses for installers of small-scale RES systems in buildings" (<http://www.resinstaller.eu>). The project with acronym "Install+RES", funded under the "Intelligent Energy Europe" Programme, is of 36 months duration. The main OBJECTIVES of the "Install+RES" Project are to set up training courses for trainers and for qualification of installers of RES systems like biomass, solar systems for DHW, photovoltaic and heat pump systems in European states like Bulgaria, Greece, Italy, Poland and Slovenia. This is implemented in compliance with the requirements of Directive 2009/28/EU. The expected result is qualification and certification of 48 installers of RES systems in each of the countries in the period 2011-2013 in three courses – one pilot course and two training courses.

Distance training for renovation of residential buildings

The “Energy Centre Sofia” Ltd. implements a project “Intelligent energy training for renovation of residential buildings”, funded under the “Intelligent Energy Europe” Programme.

The objective of the “IE-training” Project is to offer dwelling owners and housing associations a training programme to motivate them to implement energy renovation of their buildings. The “IE-training” programme is based on examples for best practices in Europe, which focus on practical solutions, such as how through refurbishment some 30% reduction of energy costs and improvement of the comfort in dwellings can be achieved.

An electronic platform <http://ei-education.aarch.dk>, has been developed as one of the major outputs of the programme. It contains a possibility for distance learning, reference to additional materials and a database about successful implementations under the sections “Technology and environment”, “Policy and strategy” and “Organization and funding”.

Training on implementation of RES solutions in energy renovated buildings

The Bulgarian Chamber of Trade and Industry in consortium with partners from six more countries is implementing the project “REE_TROFIT” – “Training in application of solutions with renewable energy in energy renovation of buildings” – financed under the “Intelligent Energy Europe” Programme. The duration of the project is 36 months (2010-2013).

The objective of the project is to promote introduction of institutionalized vocational training in the use of RES and energy renovation of buildings for the purposes of overcoming of the shortage of local qualified and certified building craftsmen and for introduction in practice the European Directive on energy efficiency in buildings.

“REE_TROFIT” will develop a model of European vocational training, comprising concrete platforms for the training material and handbooks on the training methods. Three training programmes will be worked out for the following trades: building technicians, technicians and installers of energy equipment and systems, i.e. craftsmen, who are involved in the processes of renovation of buildings. The programmes are developed in compliance with the labour market demand and the required skills, which these three groups of craftsmen should possess and develop. The courses will be conducted in three phases in the countries-partners under the project.

The module for electricians comprises subjects related to energy efficiency, photovoltaic generators (systems and dimensioning), co- and tri-generation, domestic wind turbines, energy saving lighting, in-house automation. The module for building technicians comprises the subjects building retrofit and energy saving, insulation of vertical and horizontal building components, window elements, integration of different construction systems and elements. The HVAC craftsmen module comprises the following subjects: analysis of energy consumption, district heating – preheating pumps and generator, solar heat systems, space heating with biomass, geothermal systems, energy saving and ventilation systems.

Training in the field of space heating equipment, gas supply, technical operation of wind farms, photovoltaic parks

Sliven Municipality, jointly with six more countries, is partner under the “SUNFLOWER” project, funded by the “Intelligent Energy Europe” Programme. The objective of the project is to promote, disseminate and popularize good practices of use of RES, which contribute to sustainable local development.

The training performed in the framework of the project is of 5-day duration and comprises the following themes:

- Modern trends in the development of energy efficiency in buildings. Energy performance of buildings – the experience of Bulgaria and good practices from Europe.
- How to create a company in Bulgaria: photovoltaic plants, small HPPs, wind farms.
- Decentralized cogeneration systems using biomass – application in industry. Examples from good practices with application of co-generation modules.
- Energy efficiency and the use of RES in the technological process of industrial systems. Energy transformation with low emissions of harmful gases.
- Zero GHG emissions from the residential buildings. Solar systems for DHW and their application in the space heating system of residential buildings.
- Examples of good practices with application of biomass;
- How to create a company in Bulgaria. Hybrid systems. Electrical engineering audit and designing of photovoltaic systems. Study for construction of wind farms. Assessment of the cost-effectiveness of projects for decentralized electricity generation. Procedures for performing energy auditing of buildings – selection of contractors.

The training comprises a theoretical part, meetings with representatives of companies, which have implemented successful projects, as well as site visits.

Training of specialists in renewable energy sources and technologies in the sanitary, space heating and air-conditioning systems

The National Installations’ Union, jointly with two more states, has implemented the project “SIRET” – “Specialists in renewable energy sources and technologies in sanitary, space heating and air-conditioning systems’, directed towards identification and popularization of good practices in the field of vocational training on RES. The project was funded by the “Leonardo da Vinci” Programme in the period 2008-2010. In the framework of the 3-day training under the project were incorporated the following themes: Solar technologies; Co-generation; Heat pumps; Biomass; Renewable energy; Solar heat energy; Photovoltaic systems.

Electronic educational platform for the young generations in the field of sustainable energy

The Energy Efficiency Agency has worked on the “Energy Path” project – “Electronic educational platform for the young generations in the field of sustainable energy”. It was funded under the “Intelligent Energy Europe” Programme. It was implemented in the period 2006-2008 jointly with representatives from 9 countries – Spain, Belgium, Greece, France, Italy, Great Britain, Norway and Slovenia. The “Energy Path” project is oriented towards pupils from the last three grades of secondary school education and through them towards a broader circle – parents, friends and relatives.

14 schools-partners from Sofia, Pernik, Pleven and Kazanlik also took part in project as project partners. .

In the framework of the project was created an electronic educational platform (<http://www.energy-path.eu/e-learning/>), in which can be found materials on the following subjects: “Energy”, “Renewable energy sources”, “Energy efficiency” and “Transport and mobility”. In the framework of the project have been conducted training courses for teachers, in order that they could use the platform in the course of teaching.

Development of a Guidebook for energy intelligent retrofitting of buildings

The Bulgarian Construction Chamber, jointly with partners from three more countries, is implementing the “Euro EnEff” project – “Development of a guidebook for energy intelligent retrofitting of buildings” (<http://www.euroeneff.eu/>), funded under the “Leonardo da Vinci” Programme during the period 2008-2010. In the framework of the project was developed and aprobated a guidebook for teachers and trainers, designated to prepare them to teach lessons on energy efficient rehabilitation of panel buildings.

7. Skills gaps between the current situation and the needs for 2020

7.1. Labour force evolution

As indicated above, according to NSI data the construction industry employs approximately 7% of the total number of employed persons in the country and in this way the building sector stands out as the biggest industrial employer.

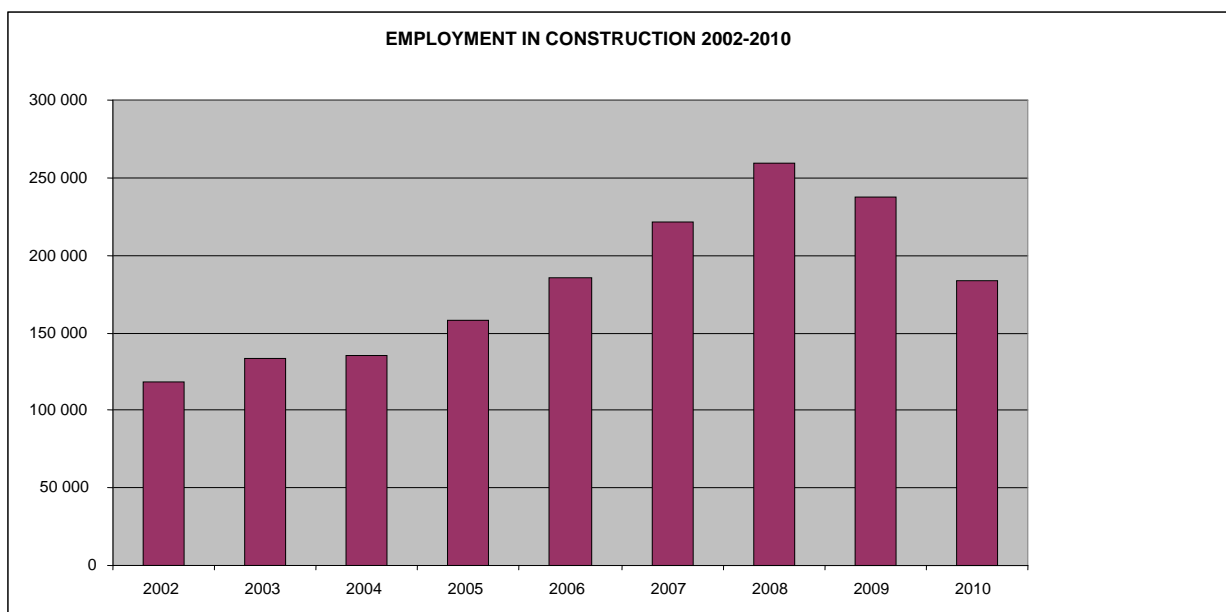


Fig. 14 (Fig. 3). *Employment in construction. Source: NSI*

These figures are somewhat different from the data of the Central Professional Registry of Builders with the Bulgarian Construction Chamber, according to which the registered companies cover about 92% of the volume of construction works and employ 85% of the total number of employees in the sector. The majority of the registered companies are small and medium-size companies.

The trend in the number of employees in the building sector both as an independent value and as compared to the total number of employed persons in the national economy during the period 2000-2010 is significantly declining. The migration of the Bulgarian population from villages to towns (caused by the economical growth until 2008), was the main reason for the rapid growth of multi-family houses, office and retail buildings. The flooded market nowadays will lead to reduction of build rates in these sectors. The growth of the construction sector in Bulgaria depends mostly on the economic situation in the EU. The expectations are for increased build rates of detached houses, semi-detached houses and luxury residential buildings, mainly built around the big Bulgarian cities. Construction of new retail buildings will either stay on the same level or will slightly grow.

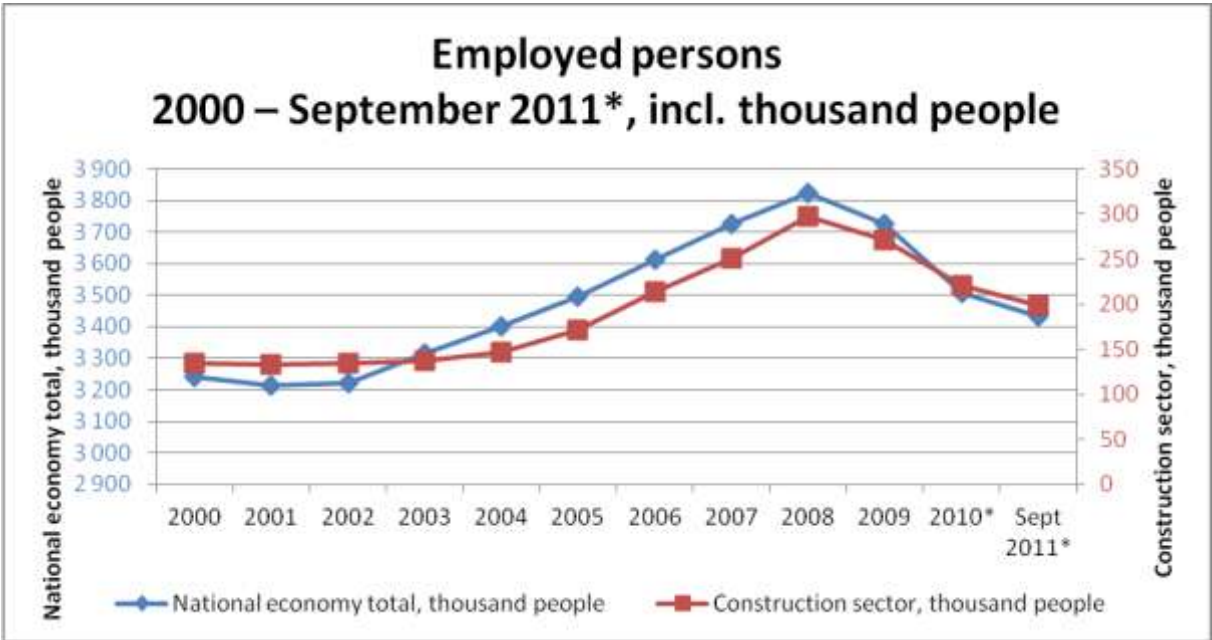
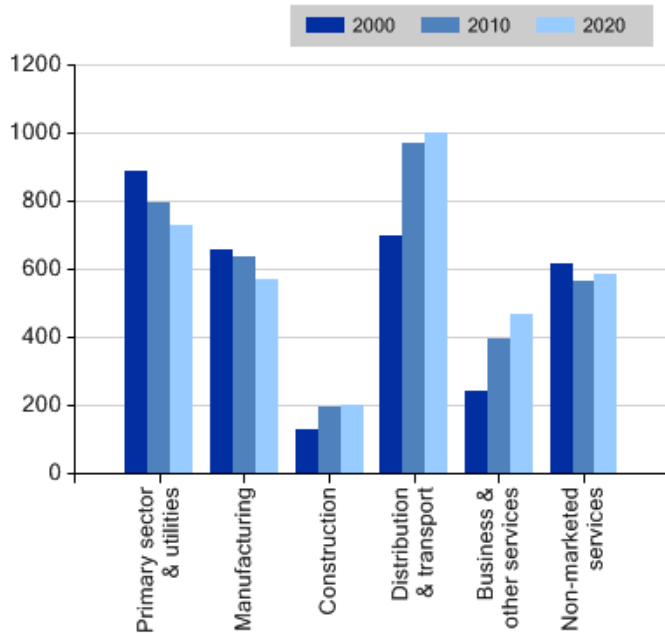


Fig.15. Employed persons – total for the national economy and in the building sector, 2000-2010, in thousand people (according to NSI data).

These expectations are confirmed by the latest prognoses by CEDEFOP, which show that no significant growth of employment is expected either for Bulgaria or for EU 27+ in general:

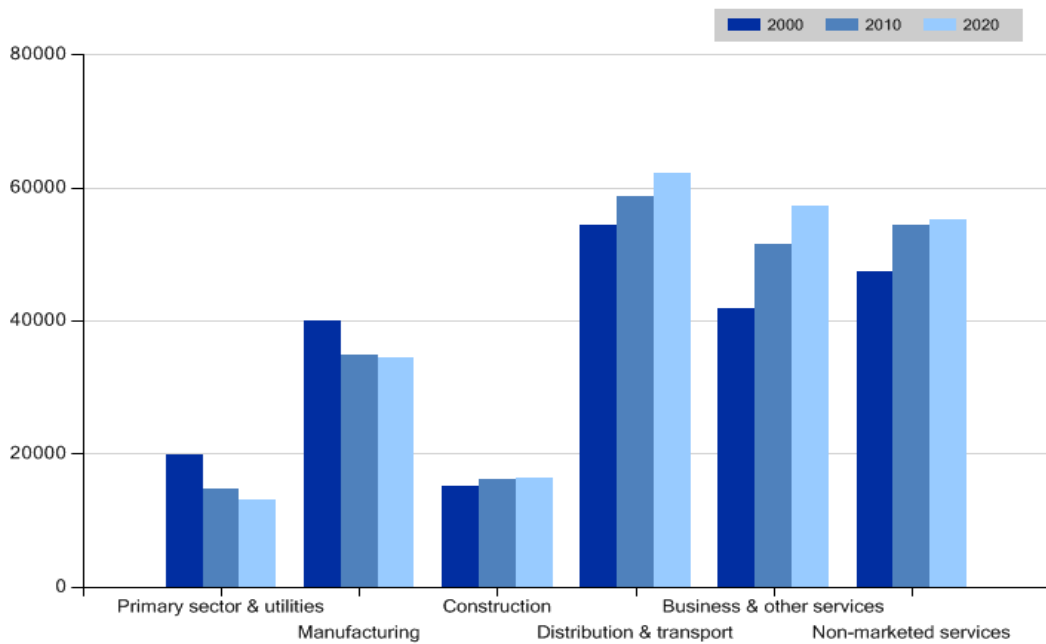
Skills forecast: Employment trends by sector (in 000s), Bulgaria



Source: Cedefop | Skills Forecasts | Data published in 2012

Fig. 16. Skills forecast, Bulgaria. Source: Cedefop

Skills forecast: Employment trends by sector (in 000s), EU27+



Source: Cedefop | Skills Forecasts | Data published in 2012

Fig. 17. Skills forecast, EU27+. Source: Cedefop

According to the Bulgarian Construction Chamber the relative share of construction companies operating in the non-formal economy has reached the level of 15-20% for a 10-year period.

For the first nine months of 2011 the average number of persons on payroll employed on the basis of labour contracts was 131 000 people, which represents a reduction by 11.5% as compared to the same period in 2010.

According to the Bulgarian Construction Chamber the number of the unemployed in the building sector is above 100 000 people. According to the NSI the number of the unemployed for the first half of the year is 59 thousand. Unemployment in the building sector bears the marks and seasonal nature typical for the sector. The economic crisis has to a certain extent screened the positive and negative characteristics of the sector.

The distribution of the employed persons by labour contract and position arrangements in the building sector as per the classes of occupied positions according to the National Classification of Professions and Positions and subsectors according to Classification of Economic Activities 2008 for 2010 is illustrated in the table below.

Distribution of the employed persons by labour contract and position arrangements in the building sector as per the classes of occupied positions according to the National Classification of Professions and Positions and subsectors according to Classification of Economic Activities 2008 for 2010

Legend: Qualification structure of persons employed under labour contract and position arrangement as per the classes of occupied positions:

- 1 – President, legislators, senior civil servants and managers
- 2 – Experts in analytical studies
- 3 – Technicians and experts in other applied sciences
- 4 – Administrative staff
- 5 – Personnel employed in provision of services to the population, trade and security
- 6 – Skilled workers in agriculture, forestry, fishery and hunting sectors
- 7 – Skilled industrial workers and craftsmen in similar trades
- 8 – Operators of machines and equipment and installers
- 9 – Professions not requiring specific qualification

Subsectors of CEA 2008 / National Classification of Professions and Positions classes	Number of employed persons by classes of the National Classification of Professions and Positions									
	1	2	3	4	5	6	7	8	9	TOTAL
2010 National total	122 393	305 600	238 227	216 970	380 014	15 625	240 444	297 968	299 031	2 116 272
F Construction	9 547	8 471	11 724	11 335	5 395	482	42 840	21 046	45 487	156 327
41. Construction of	3 948	3 543	5 000	5 161	2 668	207	20 432	5 672	23 349	69 980

Subsectors of CEA 2008 / National Classification of Professions and Positions classes	Number of employed persons by classes of the National Classification of Professions and Positions									
	1	2	3	4	5	6	7	8	9	TOTAL
buildings										
41.1 Activities for implementation of investment projects for buildings	161	143	135	167	166	5	128	51	203	1 159
41.2 Construction of residential and non-residential buildings	3 787	3 400	4 865	4 994	2 502	202	20 304	5 621	23 146	68 821
42. Construction of facilities	2 979	2 517	3 598	2 616	1 038	92	11 213	10 112	10 069	44 234
42.1 Construction of roads, incl. railroads	1 365	1 049	1 643	1 168	440	50	3 279	6 613	5 436	21 043
42.2 Construction of transmission and distribution lines and networks	768	689	866	718	267	19	3 380	1 681	2 442	10 830
42.9 Construction of other facilities	846	779	1 089	730	331	23	4 554	1 818	2 191	12 361
43. Specialized building activities	2 620	2 411	3 126	3 558	1 689	183	11 195	5 262	12 069	42 113
43.1 Clearing and preparation of construction site	213	205	192	268	136	15	367	1 161	560	3 117
43.2 Construction of installations	1 091	1 079	1 481	1 459	572	50	5 391	1 489	3 400	16 012
43.3 Finishing construction activities	574	392	708	951	634	49	2 458	817	4 882	11 465
43.9 Miscellaneous specialized construction activities	742	735	745	880	347	69	2 979	1 795	3 227	11 519

Table 15. Distribution of the employed persons by labour contract and position in the building sector by classes of the National Classification of Professions and Positions for 2010

The data about employment trends in the building sector is graphically presented in the following figure, including the information about the number of employed persons, the added value per worker and the the investments per employee :

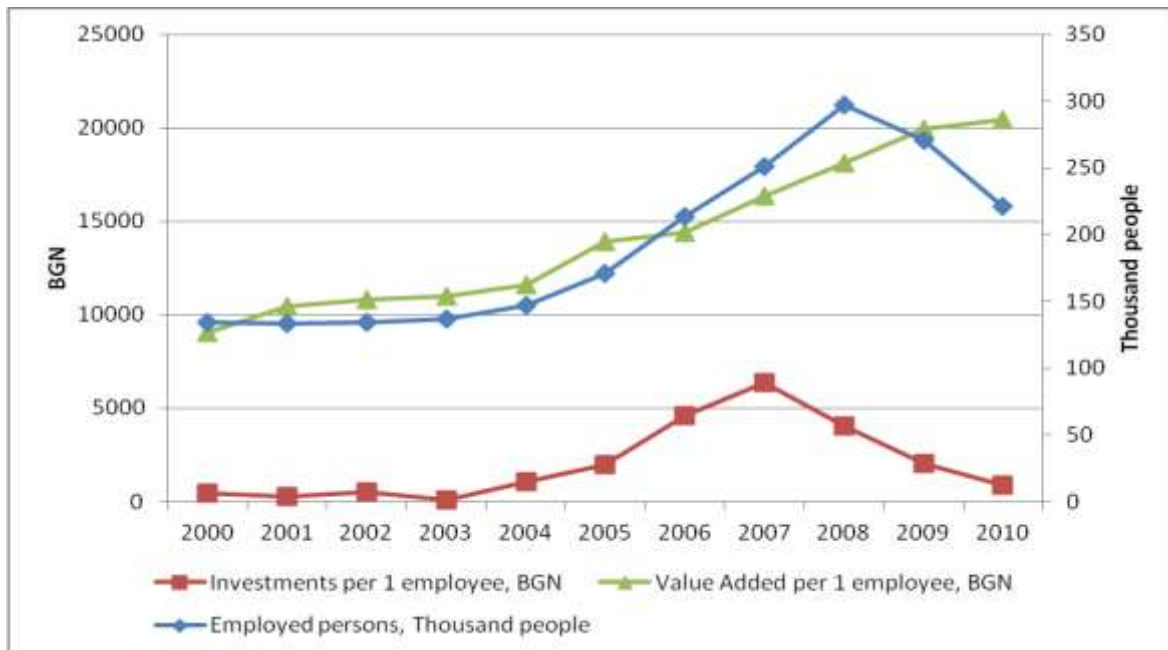


Fig. 18. Data about the employment in the building sector. Source: NSI and the Bulgarian National Bank

In connection with the total employment in the sector the table below presents the changes in employment by age groups in the building sector for the period 2008-2010.

	15-24 years of age	25-34 years of age	35-44 years of age	45-54 years of age	55-64 years of age	Above 65 years of age	Total
1. Major indicators							
Number of employed persons 2008 (thousand people)	32.1	80.3	95.7	86.1	46.1	340.3	32.1
% of the total number	12.2 %	10.9 %	9.9 %	9.7 %	9.1 %	10.1 %	12.2 %
Number of employed persons 2009 r. (thousand people)	29.0	78.1	93.3	79.3	42.7	322.5	29.0
% of the total number	12.1 %	11.3 %	9.7 %	9.3 %	8.5 %	9.9 %	12.1 %
Number of employed persons 2010 r. (thousand people)	20.9	64.6	80.0	67.3	35.7	268.5	20.9
% of the total number	10.1 %	10.4 %	8.5 %	8.2 %	7.7 %	8.8 %	10.1 %
2. Derivative indicators							
2.1. Change in the number of employed persons: 2009 as compared to 2008 (thousand people)	- 3.1	-2.2	-2.4	-6.8	-3.4	-17.8	- 3.1

Share of the total reduction, %	13.7 %	4.8 %	342.9 %	22.1 %	50.0 %	16.6 %	13.7 %
2.2. Change in the number of employed persons: 2010 as compared to 2009 . (thousand people)	-8.1	-13.5	-13.3	-12.0	-7.0	-54.0	-8.1
Share of the total reduction, %	24.8 %	19.1 %	46.7 %	37.9 %	18.8 %	26.9 %	24.8 %
2.3. Change in the number of employed persons: 2010 as compared to 2008 (thousand people)	-11.2	-15.7	-15.7	-18.8	-10.4	-71.8	-11.2
Share of the total reduction, %	20.3 %	13.4 %	53.8 %	30.1 %	23.6 %	23.3 %	20.3 %
2.4. Percentage reduction of the number of employed persons during 2010 as compared to 2008, %	-34.9 %	-19.6 %	-16.4 %	-21.8 %	-22.6 %	-21.1 %	-34.9 %

Table 16. Change in the employment by age groups in the building sector during the period 2008-2010

Bulgaria has the highest percentage of young people, who are simultaneously unemployed, have no education and do not get training for obtaining qualification. Bulgarians between 15 and 24 years of age corresponding to that profile account for 21.8% of the total.

Training in the framework of the system for people's education

The number of pupils, who have acquired professional qualification 2nd Level in professions from the construction sector in 2010 is 906 (total for all professions 14 834). As compared to 2000 a total of 1278 individuals have acquired Professional Qualification Certificate in professions 2nd Level in the field of construction (according to NSI data). The difference is due to a large extent to the changes in the educational requirements and in a medium-term horizon it is expected that the 2010 figures will be retained.

Narrow fields of education	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Secondary school graduates	18198	15595	4121	13355	13738	12826	10792	9841	7981	7677	7498
Persons, who have acquired professional qualification – total	18198	15595	4121	29781	23119	21639	20031	18819	15532	16816	14834
Architecture and civil engineering	1278	1079	431	1845	1247	1171	1011	944	815	1060	906

Table 17. Number of pupils acquired 2nd professional qualification level

The number of pupils, who have acquired professional qualification 3rd Level in professions from the construction sector in 2010 is 641 (total for all professions 9366), which is less than the number of graduates in the year 2000, when 1680 individuals had acquired Professional Qualification Certificate in professions 3rd Level in the field of construction (according to NSI data). The difference is again due to a large extent to the same reason and no significant change of the 2010 figures is expected by 2020.

(Number)

Narrow fields of education	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Secondary school graduates	28439	27871	29533	30956	28511	29793	29506	29659	25525	25772	23064
Persons, who have acquired professional qualification – total	28439	27871	29533	1637	11134	10628	10514	10409	8410	8332	9366
Architecture and civil engineering	1680	1227	1322	20	870	804	888	868	788	479	641

Table 18. Number of pupils acquired 3rd professional qualification level

A trend of diminishing of the number of persons taking training or graduating in professions from the building sector (especially professions of low-level professional qualification – 1st and 2nd) has been observed.

In 2010, the following numbers of workers have completed courses in the vocational training centers in the professions, which are the object of this analysis:

Number of trainees in the vocational training centres

Professional direction “Electrical engineering and energy sector”

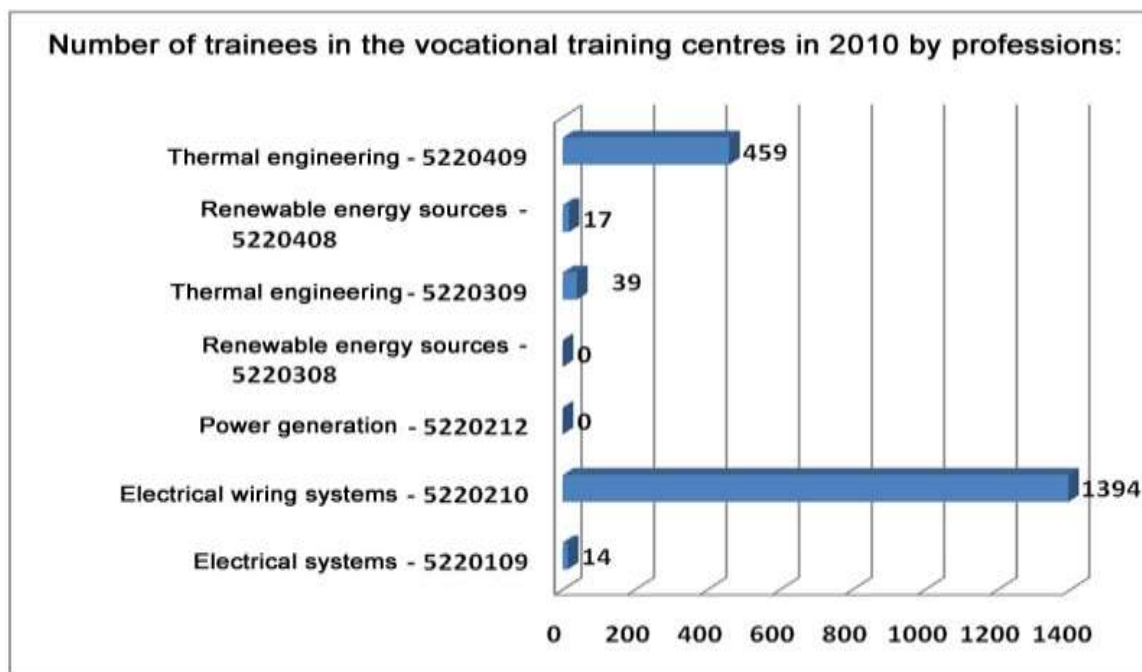


Fig. 19. Number of trainees in the vocational training centres in 2010, professional direction “Electrical engineering and energy sector”.

Professional direction “Construction”

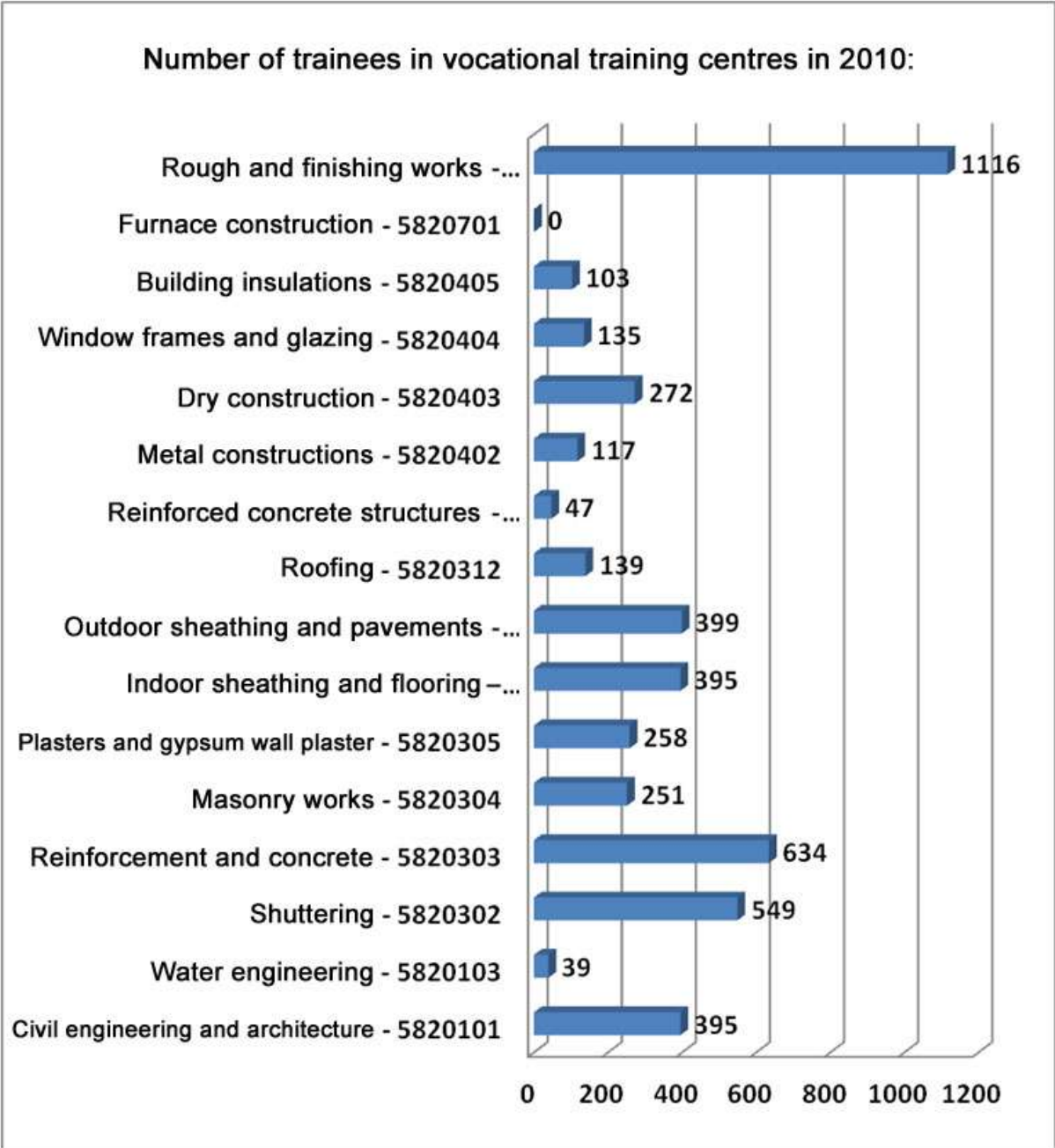


Fig. 20. Number of trainees in the vocational training centres in 2010, professional direction “Construction”.

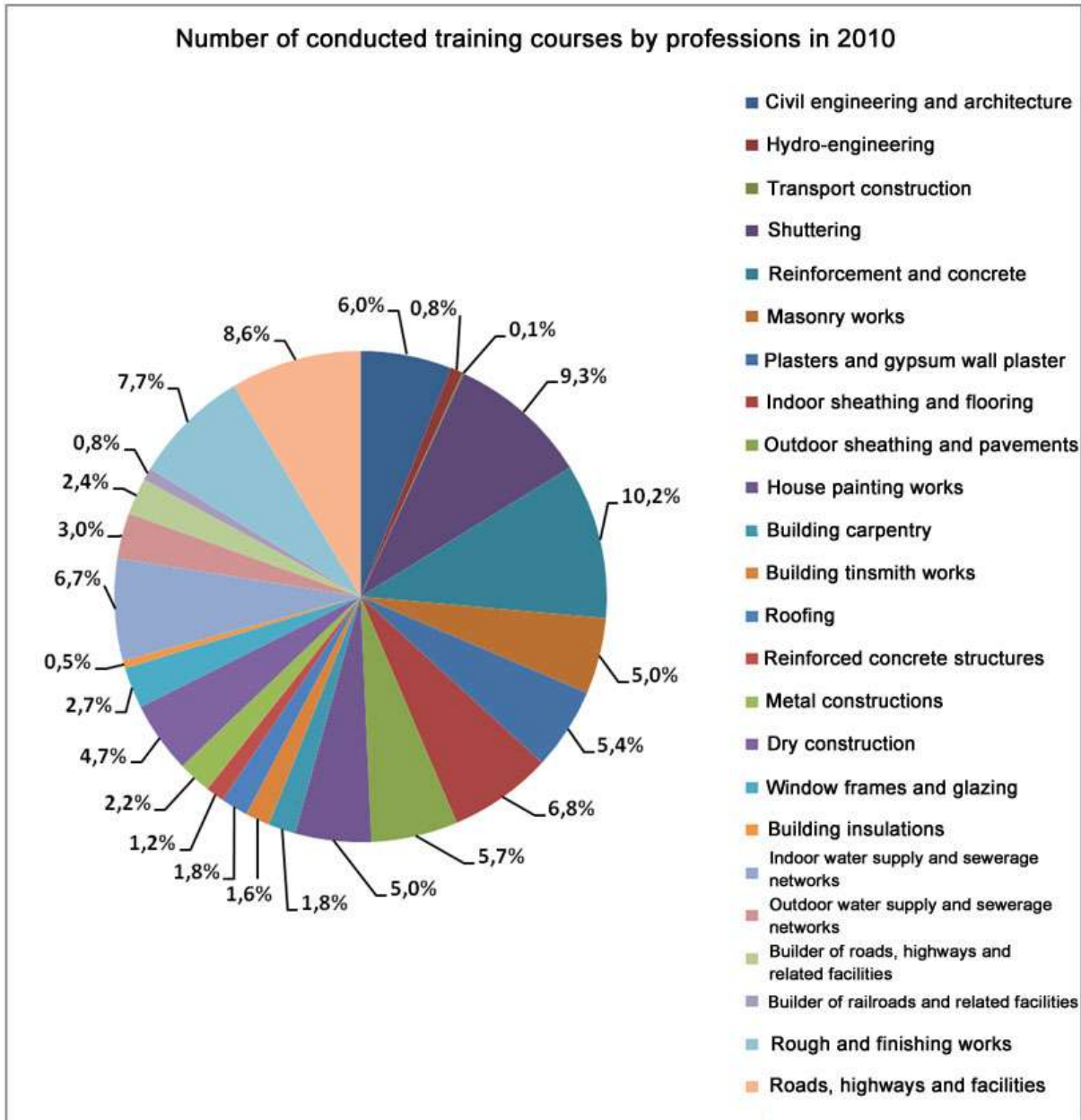


Fig. 21. Number of conducted training courses by crafts in 2010. Source: NAVET

From the information above it is evident that in 2010 in the training programmes were not included crafts related to servicing of energy efficiency and/or retrofitting

7.2. New emerging skills

The newly emerging skills, connected with the improvement and upgrading of the qualification of the building workforce, may hardly be forecast in a medium-term horizon, since they are directly dependent of the technology developments and market trends. It can be stated with a high degree of reliability, that the knowledge related to application of innovative energy efficient solutions, as well as the decisions related to integration of RES in buildings, are not adequately addressed in the national educational system. Nevertheless, the small number of exceptions, which are often the result of individual initiatives of certain institutions in the vocational training and education system, evidences through their success the existence of emerging and already assessed market demand.

On the basis of the performed analyses of existing studies and surveys the following newly emerging solutions, requiring additional qualification of craftsmen working in the different subject fields and/or upgrading of their skills have been identified:

- High insulation standard ($< 0,18 \text{ W/m}^2\text{K}$);
- Balanced ventilation with heat recovery ($>80 \%$);
- Triple glazing;
- **PV (rooftop and facade);**
- **Biomass CHP or trigeneration;**
- **Solar cooling systems;**
- **Water/water heat pumps (геотермални системи, термопомпи);**
- **Brine/water heat pumps (геотермални системи, термопомпи – друг вид);**
- Automatic lighting controls;
- Automatic controlled external shading.
- Work with inventory shuttering and built-in thermal insulations;
- Water-based floor heating;
- Methods of fastening of thermal insulation package and steam insulation;
- Installation of window frames: connection window-thermal insulation; fitting of indoor and outdoor window sills;

The expectations concerning the increase of the number of needed craftsmen are preconditioned by the level of penetration of the identified solutions in the building practice. The assessments are based on the existing statistical data and expert opinions and have been derived from a study of the Center for Energy Efficiency EnEffect, conducted at the order of BPIE for the purpose of formulation of the performance of buildings with near zero energy consumption in compliance with the requirements of the EU Directive on Energy Performance of Buildings. The forecast values are presented in the table below.

Renewable energy perspectives (estimation of market growth) in Bulgaria					
		Actual share of newbuild	2020	2030	Comment
Solar thermal for DHW	Most realistic case	about 5%	15%	40%	
	Best case	about 5%	40%	100%	If a proper law is passed
PV (rooftop and facade)	Most realistic case	about 0%	5-10%	20%	
	Best case	about 0%	40%	100%	If a proper law is passed
Solar cooling systems	Most realistic case	0%	2%	5%	
	Best case	0%	10%	20%	
Brine/water heat pumps	Most realistic case	less than 1%	2%	5%	
	Best case	less than 1%	8%	15%	
Water/water heat pumps	Most realistic case	less than 1%	2%	6%	
	Best case	less than 1%	10%	20%	
Air/water heat pumps	Most realistic case	3 - 4%	8%	15%	Mostly for cooling
	Best case	3 - 4%	15%	25%	Mostly for cooling
Pellet boiler	Most realistic case	5 - 6%	8%	12%	
	Best case	5 - 6%	20%	35%	
Other biomass boiler (please specify)	Most realistic case	30 - 40%	35%	35%	Mostly wood. Wood is expected to be replaced by pellets, wood chips and other more efficient types of heating system.
	Best case	30 - 40%	45%	55%	
Biomass CHP or trigeneration (please specify)	Most realistic case	0%	2%	5%	
	Best case	0%	5%	15%	

Energy efficiency measures perspectives (estimation of market growth) in Bulgaria					
		actual share of newbuild	2020	2030	Comment
Triple glazing	Most realistic case	less than 1%	15%	30%	
	Best case	less than 1%	100%	100%	If a proper law is issued
Balanced ventilation with heat recovery (>80 %)	Most realistic case	about 0%	5%	15%	
	Best case	about 0%	10%	40%	

High insulation standard (< 0,18 W/m ² K)	Most realistic case	less than 1%	20%	50%	
	Best case	less than 1%	40%	100%	If a proper law is issued
CHP / Trigeneration	Most realistic case	0%	5%	10%	
	Best case	0%	10%	20%	
LED Lighting	Most realistic case	2 - 4%	10%	50%	
	Best case	2 - 4%	25%	100%	If a proper law is issued
Automatic lighting controls	Most realistic case	less then 1%	10%	20%	
	Best case	less then 1%	20%	40%	
Automatic controlled external shading	Most realistic case	about 0%	5%	15%	
	Best case	about 0%	10%	30%	

Table 19. Renewable energy perspectives (estimation of market growth) in Bulgaria

In addition, the results from the performed empirical studies and survey indicate that to date there is demand for additional craftsmen for implementation of the following solutions, which cannot be assumed as newly emerging, but are of decisive significance for the application of measures in the field of energy efficiency and renewable energy sources:

- Air/water heat pumps
- Pellet boiler
- LED Lighting
- **Gas-fired boiler**
- **Naphtha-fired boiler**
- **Solid-fuel-fired furnace**

As regards the skills level, problems have been identified in the following fields and possible building solutions:

- **Gas-fired boiler**
- **Naphtha-fired boiler**
- **Solid-fuel-fired furnace**
- **Floor heating systems**
- **Cooling/Air-conditioning systems**

In compliance with the expectations concerning the dynamics of the workforce no clearly manifested shortage of craftsmen in the traditional professional activities has been noted (concrete-worker, reinforcement-worker, mason; carpenter, plumber, electrician, roofer, window frames installer, thermal insulation installer, water-proofing

installer, shuttering-worker). The distribution of responses with respect to the qualification of the existing workforce is even and does not presume conclusions about low quality of the performed building operations. These data are corroborated also by the respondents' evaluation of the quality of implementation of the main building components (foundations, walls, roof, windows, doors, chimneys, heating/cooling systems, ventilation, lighting, thermal insulations, water-proofing). What impresses in this control list is the low level of categorically unsatisfied with the work done customers, which is in the range between 0% and 21%.

The picture obtained from the study of the supply of craftsmen in the field of installation and maintenance of the major systems for renewable energy in buildings and the qualification level of the installers is quite different. As evident from the diagrams below, there is a clearly manifested shortage of installers for each of the investigated systems (small boilers, photovoltaic and solar heat systems, geothermal systems and heat pumps systems and heat pumps, mini wind turbines).

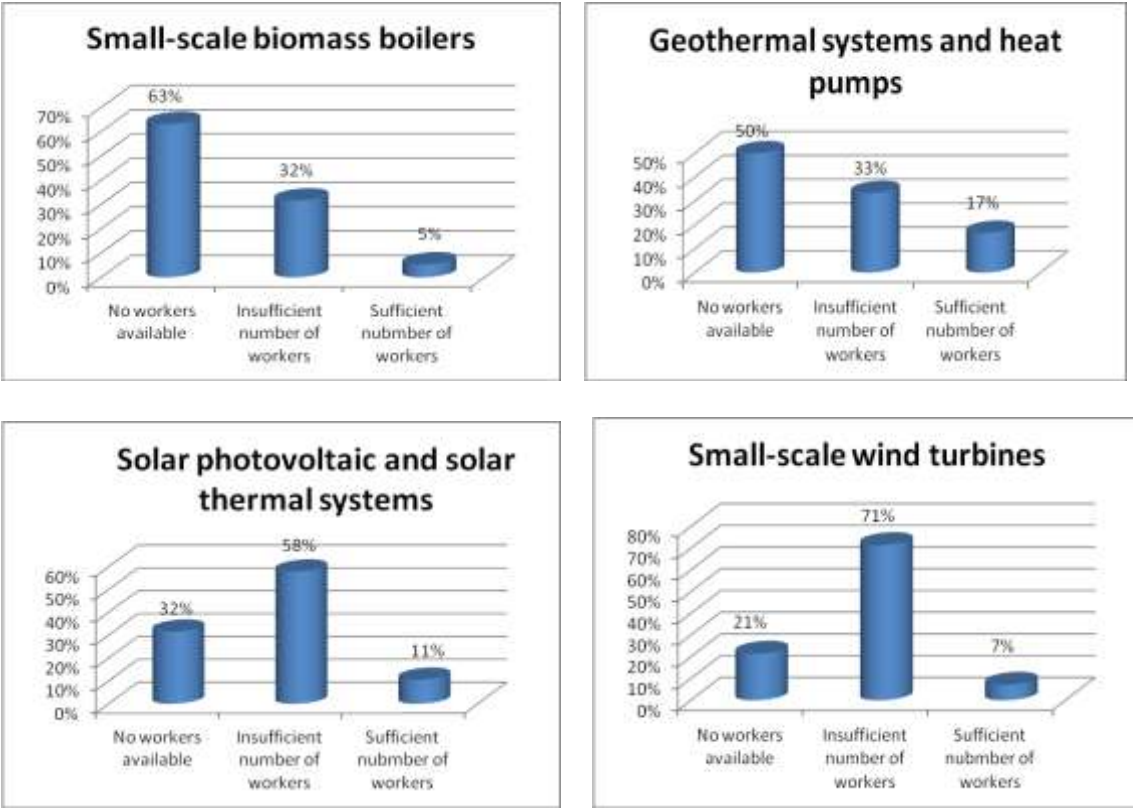


Fig. 22. Supply of craftsmen for installation and maintenance of systems for renewable energy in buildings.

The data about the qualification level of the existing workforce are similar, whereat in the predominant number of cases the respondents give unsatisfactory evaluation of the qualification and respectively the quality of the offered services.

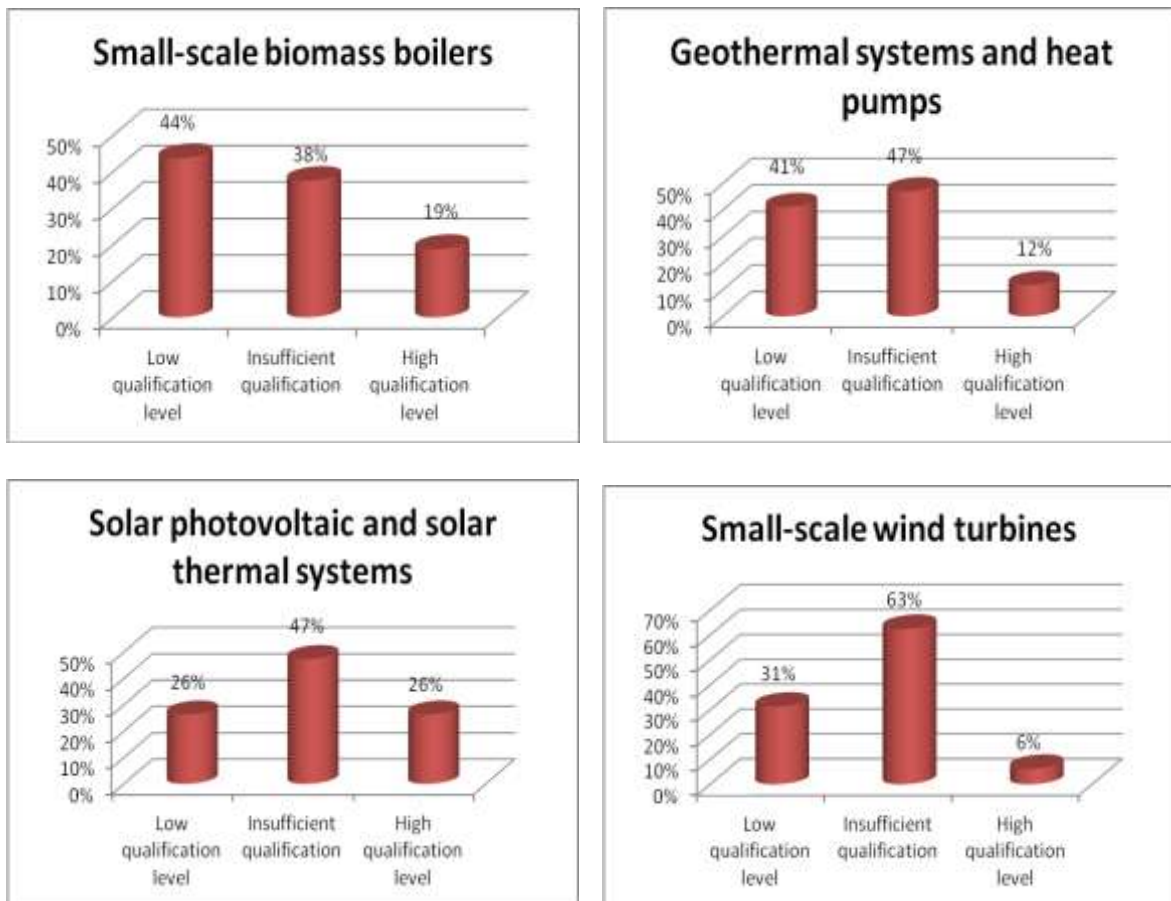


Fig. 23. Qualification level of the existing workforce for installation and maintenance of systems for renewable energy in buildings

Need of new/additional qualification

As already mentioned above, learning of new skills, necessary for implementation of energy efficiency measures in the construction and operation of buildings, is projected at several levels:

- Existence in the List of professions for VET of specific professions, related to the implementation of measures for energy efficiency improvement and the use of renewable energy in buildings;
- Incorporation in the State Educational Requirements by professions of new knowledge, skills and competences, related to the energy efficiency measures;
- Changes in the training plans and programmes – for schools with permit from the Ministry of Education, Youth and Science and for the vocational training centres at the initiative of the centres proper;
- Adding of new themes in the educational process, which are not clearly mentioned in the training programmes, in the framework of the process of planning of the training in the respective subject in the annual distribution of classes or the respective course in the vocational training centres.

To date no proposals for changes in the State Educational Requirements or the training plans and programmes have been submitted.

It is not reckoned necessary to introduce new specific professions related to implementation of measures for energy efficiency improvement and the use of renewable energy in buildings. On the other hand, it may be sustained with a high degree of confidence that changes are necessary in the other three levels – incorporation of new knowledge in the State Educational Requirements by professions, changes in the training plans and programmes and adding new themes in the educational process. There is a clearly manifested need of new craftsmen in the professions “Technician in energy equipment and systems – RES” (5220308 – 3rd Level of professional qualification) and “Installer of energy equipment and systems – RES” (5220408 - 2nd Level of professional qualification), but as early as here it should be noted that the high-quality implementation of renewable energy in buildings is the responsibility of specialists from other directions as well, who should also acquire elementary knowledge in that field. It can be assumed with a certain degree of conventionality, that the need of additional qualification in that field, forecast for the specialists from the two professions quoted above, is valid also for the other related professions (marked in the analysis below). Since increase of the number of craftsmen in neither of these professions has been reported, the emphasis is laid on the need of changes in the training plans and programmes and the addition of new themes in the process of education.

The identified needs of building new capacities or upgrading of the existing knowledge and skills are distributed according to the existing qualification framework as follows:

- 1. Electrician – Electrical wiring systems - 5220109 (3rd Level of professional qualification)**
- 2. Electrician-installer – Electrical wiring systems – 5220210 (2nd Level of professional qualification)**
- 3. Electrician-installer – Power engineering - 5220212 (2nd Level of professional qualification)**

Need of additional workforce has not been reported.

Need of additional qualification has been reported in the following directions:

PV (rooftop and facade); Solar cooling systems (~40% more qualified specialists);

Brine/water heat pumps; Water/water heat pumps; Air/water heat pumps (10-15%)

Pellet boiler (20%);

Biomass CHP or trigeneration (5%);

Balanced ventilation with heat recovery (>80 %) (15%);

LED Lighting; Automatic lighting controls (20-25%);

- 4. Technician in energy equipment and systems – RES - 5220308 (3rd Level of professional qualification)**
- 5. Installer of energy equipment and systems – RES - 5220408 (2nd Level of professional qualification)**

Need of additional workforce. With a view to the forecast norm for penetration of systems for integration of renewable energy in buildings in the optimistic scenario and the identified shortage of certified specialists, the need of increase of the number of workers is estimated as follows: ~40% in the direction photovoltaic and solar thermal systems; 10-15% in the direction geothermal systems and heat pumps; 15-20% in the direction small biomass-fired boilers. Despite the identified need of specialists for installation of mini wind turbines it is not possible to forecast the need of new workers, since the extent of penetration of that technology in the country is negligible and there are no reliable forecasts concerning the expected growth in the building practice.

Need of additional qualification and re-training has been reported in the following directions:

Solar thermal for DHW, PV (rooftop and facade), Solar cooling systems (~40% more qualified specialists);

Brine/water heat pumps, Water/water heat pumps, Air/water heat pumps (10-15%); Pellet boiler (20%);

Biomass CHP or trigeneration (5%);

Balanced ventilation with heat recovery (>80 %) (15%).

6. Technician in energy equipment and systems – Thermal engineering - 5220309 (3rd Level of professional qualification)

7. Installer of energy equipment and systems – Thermal engineering - 5220409 (2nd Level of professional qualification)

Need of additional specialists: not reported

Need of additional qualification has been reported in the following directions:

Solar thermal for DHW, Solar cooling systems (~40% more qualified specialists);

Brine/water heat pumps, Water/water heat pumps, Air/water heat pumps (10-15%);

Pellet boiler (20%);

Biomass CHP or trigeneration (5%);

Balanced ventilation with heat recovery (>80 %) (15%);

Gas boiler, oil boiler (identified need of up to 60% better qualified specialists)

Air handling units and filters (identified need of up to 47% better qualified specialists)

Cooling/air conditioning systems (identified need of up to 62% better qualified specialists)

Radiators (identified need of up to 30% better qualified specialists)

8. Construction – Civil engineering technician – Civil engineering and architecture - - 5820101 (III степен на професионална квалификация)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions:

*Solar thermal for DHW, Solar cooling systems (~40% more qualified specialists);
Brine/water heat pumps, Water/water heat pumps, Air/water heat pumps (10-15%);
Pellet boiler (20%);
Biomass CHP or trigeneration (5%);
Balanced ventilation with heat recovery (>80 %) (15%);
High insulation standard (< 0,18 W/m²K) (~40%);
Automatic controlled external shading (10%);
Gas boiler, oil boiler (identified need of up to 60% better qualified specialists)
Air handling units and filters (identified need of up to 47% better qualified specialists)
Cooling/air conditioning systems (identified need of up to 62% better qualified specialists)*

9. Construction – Civil engineering technician – Hydro-engineering - 5820103 (3rd Level of professional qualification)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions:

Water/water heat pumps; Brine/water heat pumps (10-15%).

10. Construction – Builder – Outdoor sheathings and pavements - 5820306 (2nd Level of professional qualification)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions:

Balanced ventilation with heat recovery (>80 %) (15%);

Underfloor heating system (identified need of up to 55% better qualified specialists)

Cooling /air conditioning systems (identified need of up to 62% better qualified specialists)

11. Construction – Builder – Outdoor sheathings and pavements - 5820307 (2nd Level of professional qualification)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions:

High insulation standard (< 0,18 W/m²K) (~40% more qualified specialists).

12. Construction – Builder – Roofing - 5820312 (2nd Level of professional qualification)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions:

Solar thermal for DHW; PV (rooftop and facade); Solar cooling systems (~40% more qualified specialists);

Air/water heat pumps (15%);

High insulation standard (< 0,18 W/m²K); high quality hydro insulation (~40% more qualified specialists).

13. Construction – Builder – Assembler-installer – Window frames and glazing - 5820404 (2nd Level of professional qualification)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions: :

Triple glazing (15% more qualified specialists (realistic case));

Automatic controlled external shading (10%);

Window installers (identified need of up to 69% better qualified specialists)

14. Construction – Builder - Assembler–installer – Building insulations - 5820405 (2nd Level of professional qualification)

Need of additional specialists: not reported.

Need of additional qualification reported in the following directions: :

High insulation standard (< 0,18 W/m²K); hydro insulation (~40% more qualified specialists).

7.3. Qualification needs

As already mentioned, it can be stated with a high degree of confidence, that the knowledge in implementation of innovative solutions for energy efficiency improvement and integration of renewable energy in buildings is not adequately covered in the vocational training and education system. One cannot fail to note the absence of proposals for changes in the State Educational Requirements or the training plans and programmes, especially in comparison with the identified need of additional qualification and re-training of the specialists, above all in the field of application of RES in buildings. From the conducted quality studies, based on semi-structured profound interviews, one gets clearly to the conclusion that making changes to the training plans and programmes and adding new themes in the practice is a “bottom-up” process, quite often the result of individual initiatives or specific projects, funded mainly through programmes of the European Commission.

In this sense, it is not by chance also that an opinion is gaining ground, namely that training plans and programmes are a conservative matter, since they are prepared according to a planning period of not less than 5 years and seldom meet the actual trends. The paths for updating of the teaching content are presumed to bound to the initiative of teachers/trainers, who are entitled to introduce new content in the framework of the programme (including in the course of classes for freely chosen study subjects), specialized seminars and workshops with the participation of external experts (companies and branch associations) and in project-based initiatives. These practices are assessed as being very successful taking due account

of the significant interest on the part of the pupils in the vocational high schools and the real improvement of the quality of education through practical classes. In this connection it is not a surprise that the support of the rule that the mandatory graduation exam in vocational high schools comprise also an exam in the selected subject field stood out clearly.

According to the conducted study introduction of new training programmes and/or upgrading of the currently used ones is necessary as a matter of priority in the following directions:

- *High insulation standard (< 0,18 W/m²K);*
- *Balanced ventilation with heat recovery (>80 %);*
- *Triple glazing;*
- *Biomass CHP or trigeneration;*
- *Automatic lighting controls;*
- *Automatic controlled external shading;*
- *Solar thermal for DHW, Solar cooling systems (~40% more qualified specialists);*
- *Brine/water heat pumps, Water/water heat pumps, Air/water heat pumps (10-15%);*
- *Pellet boiler;*
- *Balanced ventilation with heat recovery (>80 %);*
- *LED Lighting; Automatic lighting controls (20-25%);*
- *Gas boiler, oil boiler;*
- *Air handling units and filters;*
- *Cooling/air conditioning systems;*
- *Radiators;*
- *Air handling units and filters;*
- *Underfloor heating system;*
- *Window installers.*

At this point it should be noted that the need of permanent optimization of the training and educational programmes is valid for all the investigated professional groups. In this specific case the emphasis is laid on clearly manifested dependencies identified in the course of the analysis of the available documents, the results from the conducted survey and the high-quality research methods.

Despite the generally shared opinion that energy efficiency issues are not covered in the training practice and that there is no tradition in building workforce capacity building, one cannot fail to note the good example of the training courses for installers of small-capacity RES systems in buildings under the “Install+RES” project of the Sofia Vocational High School in Electronics “John Atanasov”. In the arrangements for training and education serious attention is paid to the national and common European norms for energy saving and energy efficiency measures, applicable at the national level with due respect of the declared priorities. The training course starts with a theme devoted to rational energy use (25 classes), review of the renewable energy sources used in all the sectors of the economy and simultaneously with that a summary review of the current strategic and legislative framework and the related by-laws. In co-operation with NGOs and the institutions of the executive authorities the most topical and reliable information is sought as much as possible.

The opinion that there are not a sufficient number of adequately qualified teachers/trainers is gaining ground. Emergence of practices of self-training, which do not comply with the requirements for didactics and methodology in the educational system, has been observed. There is some hope of being able to train trainers in the framework of projects and a shared opinion is also that this is the sole working approach. The post-graduate qualification in the higher educational institutions is defined as a suitable modality, but the observation is that such practices are not common. The existing practices of company-based training limit the qualification to a specific product or equipment, which is justified but not applicable to the training of trainers.

The identified shortage of teachers/trainers is viewed as a grave problem, especially with a view to the high age structure (above 55 years of age) for the majority of those currently employed. It is recognized that there are no mechanisms and reference points, which might help assess the quantitative needs of trainers. In the practice it is usually relied on the personal initiative and the opportunities for career development and adaptation of the capacities to the needs. Of course, the major problem related to staffing is also pointed out, namely the low remuneration level. The crisis in the building sector is, to a certain extent, regulating this gap and in the recent two years penetration of young teachers has been observed. They are estimated to be the bearers of innovations in the teaching content, but nevertheless the general trend remains negative.

In this connection it is worth noting also the fact that the further qualification of the trainers in professional capacity building is not well regulated and there is no institution responsible for it (as different from the system of general education) and therefore building of an additional institutional capacity is necessary. The manner, in which the institutions of the system of general education manage to handle the problem, is again through seminars and workshops sponsored by companies, which regard themselves as carriers of innovations, as well as through trainings under the PHARE Programme and other EU programs. No resources have been envisaged except for the funding provided from the delegated budgets. The interaction among the educational institutions and the enhanced possibilities for co-operation are also viewed as a major instrument for optimization of the training practices.

The need of implementing a national policy and providing institutional support, including by the centres for post-graduate training (above all in the higher educational institutions) is recognized. Proposals have emerged to incorporate opportunities for re-training of engineers under the OP "Human Resources Development". The estimate is that these are namely the people, who are able to introduce innovations and practical knowledge. It is relied upon penetration of leading technologies and the respective training practices with support from the EC programmes despite the existing barrier of inadequate material stock.

According to the conducted surveys the creation of a specialized structure, designated to assess the dynamics of demand in the building sector and guiding the adaptation of the educational and training institutions is regarded as an important step for maintaining the quality of professional qualification. It is hoped that the anticipated changes in the Law on People's Education and the Law on VET will ensure a basis for creation of such an institution¹, in which business and the branch

¹ *The need of quantitative analysis of the demand for teachers/trainers for the purposes of this study will be aligned to the methodology to be adopted at the national level.*

organizations will play a major role not only in the field of planning the number of craftsmen, but also in the working out of the training plans and programmes. The opportunities for co-financing and public-private partnerships are also discussed. A similar approach has already been used in the introduction of new subject fields, but that again was mainly at the initiative of the vocational high schools. Imposition of legislative requirements concerning certification of specialists is regarded as the basic manner in which improvement of the qualification of the employees in the sector can be achieved, whereat again there is a heavy emphasis on the responsibility of the companies and the control they should exercise on the quality of the additional qualification and the real application of the newly acquired knowledge in the practice.

In this connection, at the background of the identified need of an additional number of highly qualified specialists, a newly emerging and regulatory provided-for market niche takes shape, whereat according to the new legislation all the specialists, engaged in installation of RES systems, should be certified in compliance with the enforced registration regime with the State Agency for Metrological and Technical supervision of the companies active in installation, servicing and maintenance of RES systems. In this case again the control of employers is considered to be particularly important. This approach is optimistically regarded as the most suitable and the most beneficial *vis-à-vis* the existing possibilities.

In the educational practice the training programmes for special training are the product of individual initiative, quite often as a result of cooperation with EC programmes. This solution is, however, not sufficient to maintain a high level in a long-term aspect. Higher commitment on the part of the branch organizations and associations and of the representatives of business is needed, since they are those able to initiate change according to their requirements and needs. This approach of consultations and cooperation with the real sector has been used also in the development of the new training programmes during recent years, but the timeframe for the mandatory follow-up adaptation and optimization is estimated to be not more than two years. It is worth noting at this point that in all the work plans there emerges the issue of procurement of the minimum necessary equipment for the practical training sessions, which is assumed as being of key importance for the quality of the acquired qualification.

From the conducted studies it is not possible to identify is there any need of increasing the number of the educational structures. According to the views expressed by the respondents, the number of vocational high schools and vocational training centres is regulated naturally by the demand and the required subject fields in the system of people's education are estimated by the society. A possibility to seek partnerships between vocational high schools and vocational training centres in terms of personnel and material stock is recognized, moreover that there are good examples in that respect.

It has been recognized that at the current information level people are motivated and there is evident demand for training in the subject field "Renewable energy sources". A significant and leading interest has been identified for re-training of craftsmen, including building technicians, plumbers, specialists in automatics, electricians, roofers, with expressed wish to obtain professional certificates. Nevertheless, the leading motif is the individual initiative and not market demand. There exist also practices of co-operation with companies for training of trainers, which are estimated to have been useful and to mutual benefit.

7.4. Monitoring needs

The estimates about the needs of monitoring of the gaps and disparities between the demand of qualified workforce in the building sector and the supply by the national system for VET in this study are based on an analysis of the existing strategic documents and plans and the conducted sociological studies of the quality level. Although closely related to the subject concerning the need of improvement of the quality of vocational education and further qualification of the trainers, this problem is clearly recognized and real ideas and actions for its resolution emerge. At this stage, however, one may hardly say that there is a unified position and joint action front on the part of the stakeholder groups.

As already mentioned, the creation of a specialized structure aimed at assessing the dynamics of demand in the building sector and directing the efforts of the educational and training institutions in the necessary direction is regarded as an important step for maintaining the quality of professional qualification. The possible actions have been reviewed in two main directions, whereat the leadership in this field is associated on one hand with the branch organizations and associations and, on the other hand, with the bodies of the executive authorities. Although the opinions that it is namely business and its organizations that should bear the responsibility for ensuring feedback to the educational institutions, there has been not a single case, in which the possibility for creating a specialized structure in the framework of the Ministry of Education, Youth and Science of NAVET has been denounced. Some respondents even insist on actions of that type. Once again, successful practices of co-financing and public-private partnerships, which can support the efforts in this direction, come to the fore. A similar approach has already been made use of in the introduction of two new professional lines – “Real estate broker” and “Renewable energy sources”, whereat in the process of working out of the proposals for new training plans and programmes position papers were enclosed and interviews with the stakeholder groups and professional associations were conducted. Despite the positive evaluation of these initiatives this solution turned out to be insufficient for maintaining the training programmes at a high level in a long-term aspect and hence the opinion is that there is an evident necessity of systematization of the efforts.

It is presumed that the expected changes in the Law on People’s Education and the Law on VET will ensure a base for setting in place of such a structure, which would systematize and unite the efforts of the bodies of the executive authorities, the educational and training institutions and the branch organizations and representatives of business in the planning of the number of the necessary specialists, as well as in the elaboration, adaptation and optimization of the training plans and programmes. The timeframe indicated to date is not more than two years for updating of the teaching content, which, of course, is predetermined by the high pace of development of new technologies. In all the conducted interviews the major role of the EC programmes and of cooperation with leading European institutions for improvement of the quality of the training programmes for vocational training and their topicality has been emphasized many a time.

Unfortunately, to date there is no fundamental strategic document at the national level, committed specifically to the policies in the field of vocational education and further professional training (like the National strategy for further professional training for the period 2005-2010). The concrete activities, which are expected to be realized

in the system for VET, are laid down in the Objectives of the Administration of the Ministry of Education, Youth and Science for 2012 and the Action Plan for 2012-2013 in implementation of the National Strategy for Lifelong Education (2008-2013). A detailed review of the quoted documents will reveal that the first steps of monitoring of the inadequacy between the demand for qualified specialists and the supply in the national system have already been made (or are pending to be made in a short-term horizon).

According to the Action Plan for 2012-2013 and in implementation of the National Strategy for Lifelong Education (2008-2013) undertaking of the below listed measures in direct connection with the monitoring system is forthcoming:

- Preparation of proposals for changes in the regulatory framework aimed at improvement of the employers', employees' and state institutions' awareness; worked out policies for regulatory promotion of lifelong learning and career development as a major components of the so-called "flexible safety"; application and recognition of the results from the information system for evaluation of competences at the national level and creation of prerequisites for integration in the so-called "electronic government" and raising the awareness of employers, employees and state institutions;
- Preparation of basic analyses and studies related to the current state and trends on the labour market and the workforce; skills, qualification and competences of the employees and the workforce by branches and regions; evaluation of the competences of the workforce;
- Analyses of the activities of the licensed vocational training centres and licensed centres for information and professional orientation during 2011 and 2012;
- Analysis of the impact of the application of the system for career development of teachers;
- Statistical studies: professional training in the vocational training centres and the vocational high schools and colleges (of trainees aged 16 and above);
- Analysis of the results from the statistical study on the subject "Further professional training in enterprises";

And, subject to particular emphasis:

- Creation of a system for study and forecasting of the needs of workforce possessing specific skills;
- Introduction of a programme for training and qualification of specialists in the energy sector, new technologies and energy management.

More specifically, the envisaged measures in the field of vocational training in the context of lifelong education are as follows:

- Creation of prerequisites for introduction of European instruments and practices in the system for VET:
 - Working out methodology for upgrading, more accurate formulation and supplementing of the State Educational Requirements for acquiring qualification by professions as elaborated till now and drafting of new ones;
 - Number of framework programmes for VET;
 - Number of State Educational Requirements for acquiring qualification by professions;

- Transfer, popularization and implementation of innovations for ensuring the quality of vocational training and education;
- Expansion and establishment of modular intra-company education with a view to higher flexibility and adaptability of vocational training to the requirements of the labour market;
- Development and approbation of a mechanism for self-evaluation at the educational institution level for the purpose of ensuring good quality of VET;
- Updating of the Framework Agreement for cooperation in the field of VET between the Ministry of Education, Youth and Science, the Ministry of Labour and Social Affairs, NAVET and the nationally represented organizations of the social partners.

Laid down in the Objectives of the Administration of the Ministry of Education, Youth and Science for 2012 are the below listed measures, some of which are also related to the monitoring of the quality of the system for vocational education:

- Updating of the Law on VET with the major objective introduction of the new educational structure and European instruments in the field of VET;
- Introduction of European instruments in VET – starting of a project “Improvement of the quality and introduction of European instruments in the system of VET” under OP “Human Resources Development”;
- Development of a system for arrangement of student study practices in enterprises under OP “Human Resources Development” – “pupil and student study practices” Project;
- Modernization of the material stock in vocational schools;
- Working out and endorsement of training plans and programmes for new professions;
- Information and communication campaigns, oriented towards enhancement of the attractiveness of vocational education;
- Conducted final conference under the “Skills for Employment” Project, worked out and published guidebook on self-evaluation of vocational education;
- Implementation of a project on “Management of effective vocational education” under OP “Human Resources Development”.

In connection with the last tasks above it can be added that the currently enforced criteria for evaluation of the quality of vocational education unfortunately do not comprise updating of the training plans and programmes and involvement in activities for improvement of the qualification of teachers, but on the other hand it should be acknowledged that collaboration with the social partners and the branch organizations and the acquiring of practical experience on real work places is envisaged, which to a high extent has a positive influence on the process of synchronization of market demand and supply of qualified workforce.

8. Barriers

A significant numbers of barriers related to the qualification of the building workers which obstruct the expected development and may hinder the achievements of the 2020 targets in the building sector in Bulgaria have been identified. It is hardly possible to assign those barriers to a specific market or policy area and to propose a coherent framework; many of the issues are overlapping and concern – albeit to a different extent – construction companies and professionals, vocational education practitioners, producers and suppliers of building products and technologies, policy makers, etc... However, for the sake of better organization of the results of the analysis, a general distinction will be explored. The barriers are structured in four major categories:

- Barriers in the construction sector;
- Market barriers;
- Policy barriers;
- Barriers in the system of vocational education and training.

8.1. Barriers in the construction sector

Impact of the financial crisis

It is out of question that the abrupt end of the building boom in Bulgaria in 2009 lead to a significant change in the priorities of the construction companies, which had to cut most of their expenses, by all accounts starting with the investments in the professional development of their employees. This conclusion is valid for companies of all sizes, including bigger ones, but not surprisingly mostly affecting SME, which, in turn, represent the major part of the sector.

Lack of coherent HR policies

Closely related to the above-mentioned obstacle, corporate HR policies and activities suffered a major pullback, resulting not only to lack of access to vocational trainings but also to the stability of the jobs and prospects for career development of the skilled workers.

Lack of loyalty

Due to the smaller number of building projects, the main loyalty factor – the remuneration package – is not reaching the levels from previous years. As the working force is highly mobile and open to job opportunities at the EU open labour market, investments in continuing vocational trainings and qualification are perceived as highly risky by most of the employers.

Fragmentation of the labour market; regional discrepancies

Most building projects are concentrated in the largest Bulgarian cities and Black Sea coastline; seasonal workers are usually not interested in participating in trainings, even if on-site training approaches are undertaken.

Motivation of the workforce

The existing working force is generally not interested in participation in vocational training activities, which is evidenced by the appreciation of a number of initiatives of the Bulgarian Construction Chamber and its partnering vocational training centers. There are numerous reasons in the base of this observation, most of them related to insecurity of the jobs and project-by-project employment, but also to the low general education level of the workers.

Low educational level of the workforce; language and literacy barrier

A barrier identified during most of the conducted interviews and observation, the low education level of the workforce is a constant threat to both active participation in trainings and implementation of new building concepts, technologies and materials. A large part of the workers engaged in conventional building crafts, mostly representatives of other language speaking minorities, has problems with literacy in Bulgarian language. Trainings other than “learning-by-doing” are hardly possible.

The significant decrease of the general educational level in Bulgaria is also an obstacle, resulting in more efforts for mastering of high-end use of technologies and materials due to the larger gap between existing skills and required know-how. Additionally to improvement of the professional skills, an emphasis on key competences in the national vocational education system should also be put.

Low prestige of the profession

Not without relation to above-mentioned barriers, the unfavourable public perception of the builder’s profession is a major barrier to attracting young and ambitious people to the sector. The relatively high salaries during the construction boom overcame this barrier to some extent, but it still exists and is very formidable in the crisis period.

Age structure of the workforce

Another related problem with two-sided effect is the large numbers of construction workers in the later stages of their careers. Older workers usually do not manifest interest in continuing vocational training and new technologies; on the other side, (combined with the however existent low interest) the access to career development of young people is hindered.

Lack of experience

Construction of nearly-zero energy building is virtually “terra incognita” for most of the small and medium companies. Due to the lack of experience, the need for further training is not generally recognized.

Lack of practice for nearly-zero energy renovations

There is no regular practice of low/nearly zero energy building renovations. Especially in multifamily buildings, energy efficiency measures are implemented by each apartment owner with no relation to the whole building characteristics. The two most common measures – glazing and external insulation – are usually (especially for the insulation) applied by workers without any formal training in construction. No practice in step-by-step renovation is evidenced.

No access to new technologies, processes, know-how

Among other activities of the construction companies, the financial crisis has significantly reduced the introduction of new technologies, processes and know-how in the building practice, which hampers the opportunities for on-site training and skilling up of the construction workers.

Low level of penetration of RES technologies in buildings

Although no relevant statistical data is available, the integration of RES in buildings is estimated to be lower than 1% of the existing building stock and the new buildings, which virtually means no experience in installation, monitoring and maintenance of such technologies.

Grey economy

As discussed above, a significant part of the construction workers is involved in non-formal economical activities, meaning no access to formal trainings.

8.2. Market barriers

Lack of investment interest to NZEB

Due to a number of reasons (e.g. relatively low energy prices, inhabitants accustomed to low level of comfort in existing housing, higher construction costs, insufficient information and knowledge, lack of market incentives, etc.) there is virtually no interest in new NZEB, which in turn leads to low interest in specific training.

High cost of low-energy renovations

The same reasons apply to the renovations: both higher costs and low current levels of comfort contribute to unacceptable return rate of investment for low-energy building renovations. As already mentioned, step-by-step renovations are not recognized by the market, so no interest to such training is evidenced.

Lack of market for new technologies and products

Although most energy efficient solutions could be delivered, the small size of the market means higher costs and imbalanced positioning are common. For many of the materials and details, prices are higher than on European market. This is also recognized as an important barrier, especially to on-site and on-demand trainings.

8.3. Policy barriers

Unstable legislation base and institutional structure

Quite a few changes in the legislation base and the institutional structure have been evidenced in the past few years, and the process has not yet finished. Three important EU Directives related to the energy efficiency and integration of RES in building are yet to be fully integrated in the national legislation (Directive 2009/28/EC on the promotion of the use of energy from renewable sources, Directive 2010/31/EU of 19 May 2010 on the energy performance of buildings, the new Energy Efficiency Directive). The impact of the existing legislation cannot be evaluated due to its short terms of existence. No definition for NZEB has been accepted. After recent structural and management changes, the Agency for Sustainable Energy Development is assigned with new duties and responsibility and needs time for adaptation.

Lack of incentives for high-end low-energy new building and renovation projects

No national programmes for support of new NZEB exist. The current programs support (partial or total) renovations with no relation to the expected standards for NZEB.

Urban planning

In general, urban planning is not consistent with the requirements for NZEB. There is no coherent planning for optimized use of prospective solar gains, geothermal sources, etc.

Quality assurance and assessment

No monitoring or control on energy performance of new buildings and total renovations is provisioned in the existing legislation. There is no clear evidence if the declared energy efficiency characteristics on project level meet the actual energy performance of the buildings. Differences may well relate to low quality of execution of construction works and need for further trainings.

Lack of pilot and demonstration projects

No NZEB pilot and demonstration projects have been implemented on national or local level of governance. The current projects (mainly for renovations of multifamily buildings) are not based on high energy efficiency standards. This leads to obvious lack of understanding and appreciation of the current EU trends by both construction companies and the workforce.

Lack of coordination between crafts and professions

Better coordination between crafts and professions should be sought after, resulting in broader knowledge of related construction works and avoiding the problem of overspecialization. Moreover, additional controlling instruments are necessary to avoid execution of specialized construction activities by workers with no formal training, which is very common in the practice and especially in the non-formal economy.

8.4. Barriers in the system of vocational education and training

Insufficient facilities and equipment, lack of financing

Vocational trainings in the area of construction works and RES integration in buildings need extensive investments in technical equipment and training facilities, which usually cannot be provided by professional schools and vocational training centers by themselves. The recent developments are result of individual efforts, usually based on EU financing. Additional cooperation patterns – among training institutions and with different businesses – should be explored.

Low number and unfavourable age structure of qualified trainers

The ageing of trainers in professional schools is unfortunately a stable tendency and, by all evidence, no tangible measures are being taken. Moreover, the number of trainers in the years growth for the construction was clearly insufficient, although this process was to some extent regulated by the crisis, as due to the decreased workload in the real sector some of the trainers who had left the system returned to their previous occupation. However, immediate measures should be taken to fight the ageing trend, taking in account the fact that remuneration packages are not attractive in any way.

Access to training of trainers

There are no facilities or programmes for further qualification of teachers in professional disciplines in the national education system. Further solutions should also be found for qualification of construction specialist willing to enter the training system, probably with the participation of the higher educational establishments. Incentives for additional qualification of trainers are also missing.

Monitoring and anticipation of training needs

There is no institution for monitoring or accepted methodology for anticipation of training needs. Intensive cooperation between all interested stakeholders is crucial, including training and education establishments, professional chambers and associations, NGOs, and, most importantly, relevant representatives of the national government.

New training programmes

As the national system for vocational education is quite conservative and changes are implemented at a slower rate compared to the relevant technology developments, introduction of new elements in the education plans and the specific programmes is generally perceived as a major problem. Updates of the programmes should be easier and applied regularly, also in better coordination with the relevant stakeholders. New programmes reflecting emerging new skills should also be under constant consideration.

Cooperation with business actors

Although there are great examples of cooperation with representatives of the business community, they cannot be classified as common practice. Further efforts should be taken for intensive exchange of knowledge, coordination of interests and concrete partnership projects leading to better preparation of trainees for entering the labour market.

Lack of a national system for forecasting new skills

The national system for forecasting new skills (specific-sector skills, transversal skills, emerging professional skills) has not been established in the Bulgarian VET system yet. The cooperation between all stakeholders, the creation of appropriate organizational and financial conditions, the equal distribution of responsibilities, should be the cornerstone for successful establishment and further implementation of medium -term and long-term surveys in this particular area. Through such surveys the Bulgarian VET system will increase its attractiveness and strengthen the link between education and work.

Lack of financial and human resources for updating State Vocational Standards and their further development in terms of units of learning outcomes

State Vocational Standards defines the common and specific competences to professions that trainees should be able to demonstrate after the completion of a training course. The State Vocational Standards are the basis for the development of the training programmes. Keeping up to date the State Vocational Standards through their regular actualization according to the labour market needs is of crucial importance for increasing attractiveness and quality of VET.

Unattractiveness of the professions, lack of adequate professional orientation

Most students and adult trainees are attracted by different professions, predominantly in the areas of economics and computer science. Broad public communications campaigns and initiatives are necessary in order to market the opportunities created by the new developments of energy efficiency and RES.

Conclusions

Despite all challenges on the road ahead, it could be concluded that the building and vocational training and education sectors in Bulgaria are generally capable of delivering services which will enable the execution of the goals stated in the National energy strategy until 2020 and the EU 20-20-20 targets. That is, however, only in case certain measures are immediately undertaken to overcome the barriers defined and bridge the existing skill gaps. A rapid progress in transforming the building stock should be achieved, supported to a significant extent by tangible change of the current construction design and practices and upgrade of the available building skills towards quality implementation of low and nearly-zero energy buildings with integration of renewable energy sources.

Improvement of existing skills could be a major transformation factor when applied in real market conditions, as there are even proofs in support of the statement that such improvements could significantly contribute for decreasing the difference between the cost of new low-energy buildings and retrofits and the traditional construction practice. Skills development is also a main driver for introduction of new processes and technologies to emerging markets and could practically lead to actual integration of low-energy building standards to the mainstream building projects. However, these developments could only be expected if stable markets exist, and there are quite a few conditions for this to happen.

On the supply side, experience sharing and accumulation have proved to be the base for maturing of the low-energy construction value chain, which is a turning point for the successful marketing of energy efficient building services. Public policies play a major part in this process and a number of initiatives are expected, some of them focusing on the supply of workers with the skills required to deliver quality buildings - mainly in terms of their capabilities and broad interdisciplinary knowledge. The wealth of possibilities to introduce economic incentives at all levels of governance should be exploited, at the same time providing functional services for quality assurance and advice on sustainable low-energy building projects. Activities by professional associations and chambers, dedicated support groups and NGOs could also become a major contributor in this area.

A clear finding of the analysis is that continuing training efforts should be applied in virtually all areas in order to broaden the understanding of the workforce on the energy efficiency concepts and to build on the existing skills to provide quality implementation on the selected solutions. Without any doubt, an emphasis should be put on meeting the demand for specialists in RES integration in buildings, where the most significant gaps have been identified. These efforts should be spread in as many dimensions as possible – from skilling up unskilled workers, raising the qualification of semi-skilled and skilled workforce, and finally reaching building professionals, engineers and designers, and even managers of building businesses. In its first part, this task is lying on the shoulders of both the initial training and education and continuing vocational education and training systems. However, it is evident that it cannot be solved without provision of enough – in both numbers and quality – trainers and educators, and this is a barrier which needs attention and targeted cooperation efforts of all related stakeholders.

Obviously, it is necessary to update and raise the skills, knowledge and experience of trainers and educators already employed in the system of professional high schools and vocational training centers. A significant number of new (and young) trainers are

also needed, which brings in front the existing problems with their motivation to enter the educational system. On another issue, a wide new range of skills should be covered in training of trainers in order to meet the demand of the fast-growing emerging occupations. And while there are well established systems for formal education targeting the natural reproduction of the traditional occupations, the stable rise of the new technologies and practices provokes questions in terms of which occupations should be involved with specific energy efficiency and RES solutions, or how to combine interdisciplinary knowledge and skills in order to meet the new building requirements. New training and educational programs should be devised in most related areas, providing common comprehension of energy efficiency projects, eliminating over-specialization issues and, at the end, bringing multidisciplinary teams with better understanding of the problem on working sites. Most importantly, new capacities for better short- and mid-term skills needs monitoring and anticipation are needed, and they could also provide the necessary interface for cooperation among all relevant stakeholders.

Based on the research undertaken and the analysis of the results, it may be concluded that the raising of skills and qualification of the existing workforce in the construction sector is of strategic importance for the achievement of the national and European goals in the areas of energy efficiency, greenhouse gas emissions and RES. A strong ally in navigating national policies, the training component should be integrated in most pilot and demonstration projects in sustainable building, combined with introduction of respective legislative and market incentives for both end users and providers. Last but not least, all these efforts should be targeted at establishing of a self-sustaining low-energy building market, as virtually non-existent investor interest is still considered as the main stumbling block for sustainable energy development.

9. Authors/contributors

10. References

11. Glossary

BACK COVER

BUILD UP Skills

The EU Sustainable Building Workforce Initiative in the field of energy efficiency and renewable energy

BUILD UP Skills is a strategic initiative under the Intelligent Energy Europe (IEE) programme to boost continuing or further education and training of craftsmen and other on-site construction workers and systems installers in the building sector. The final aim is to increase the number of qualified workers across Europe to deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings. The initiative addresses skills in relation to energy efficiency and renewable energy in all types of buildings.

BUILD UP Skills has two phases:

- I. First, the objective is to set up national qualification platforms and roadmaps to successfully train the building workforce in order to meet the targets for 2020 and beyond.
- II. Based on these roadmaps, the second step is to facilitate the introduction of new and/or the upgrading of existing qualification and training schemes.

Throughout the whole duration of the initiative, regular exchange activities are organised at EU level to underline the European dimension of this important initiative and to foster the learning among countries.

The BUILD UP Skills Initiative contributes to the objectives of two flagship initiatives of the Commission's 'Europe 2020' strategy — 'Resource-efficient Europe' and 'An Agenda for new skills and jobs'. It is part of the Commission's Energy Efficiency Action Plan 2011. It will also enhance interactions with the existing structures and funding instruments like the European Social Fund (ESF) and the Lifelong Learning Programme and will be based on the European Qualification Framework (EQF) and its learning outcome approach.