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BUILD UP Skills – Latvija

Analysis of the national status quo

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Kurzeme planning region (KPR)
Latgale planning region (LPR)
Vidzeme planning region (VPR)
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Further information

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

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0. Executive summary

The project funded within the initiative *BUILD UP Skills* provides initial analysis of the knowledge and skills of the construction market employees as well as describes the situation in the construction sector of Latvia as a whole.

The aim of the analysis hereby was to determine the demand for employees in the construction sector and to forecast it for year 2020 in order to achieve the climate and energy targets the country has undertaken. The results of the analysis serve as a basis for discussion among all stakeholders involved in designing the action plan for developing the knowledge and qualifications of the construction sector employees.

In Latvia buildings possess a huge technically attainable and economically justified energy efficiency potential which currently is not used to the due extent. The renovation of buildings in Latvia is very slow. It is often that only a partly renovation of a building takes place and the average energy consumption reduction achieved in renovated building projects is low due to the poor quality of construction work. When implementing a complex building renovation in accordance with the minimal Latvian Building Standard LBN 002-01 requirements it is possible to achieve at least 50% and bigger energy consumption reduction along with the provision of high comfort and use of renewable energy resources.

EU directive 2010/31/EU on the energy efficiency of buildings has established that starting from 31 December, 2020 all newly constructed buildings should approach zero energy building standards or should achieve a very low energy building criteria and the energy must be produced from renewable energy resources. Starting from 31 December, 2018 when renting or purchasing a building all public institutions must choose this kind of buildings.

Similarly, Latvia has undertaken several international commitments by setting specific energy and climate targets:

- to increase energy efficiency by 20% until year 2020;
- to increase the proportion of renewable energy resources in the gross energy end consumption to 40% until year 2020;
- to increase energy efficiency on the final user side achieving 9% energy consumption reduction in the period from 2009 to 2016;
- to raise the level of employment.

High quality of construction work in renovation and construction is one of the most important factors to make the investments in raising energy efficiency and use of renewable energy resources economically justified. The achievement of the established targets is impossible without a sufficient number of highly qualified construction workers.

In 2011 17,940 jobs were occupied in building construction. To forecast the necessary number of employees until year 2020 three different scenarios were developed during the research:

1) Base scenario. The calculation is built on the GDP growth forecast of the Ministry of Economics of the Republic of Latvia predicting 2.9% growth in year 2012 and 4.6% growth in the period from 2013 to 2016. The GDP growth in the period from 2016 to 2020 is assumed as average 4%. According to the base scenario 19,949 employees are needed for the projects related to the provision of the energy efficiency of buildings and use of renewable energy resources.

2) Latvia 2020 scenario. For Latvia to achieve the climate and energy aims of 2020 to reduce the building energy consumption by 20% the investments of 1.5 to 1.8 mln LVL are needed. According to this scenario 38,056 employees are necessary.
3) Medium growth scenario. The scenario describes the situation where it is assumed that increasingly more buildings are renovated along with the development of new financial instruments which facilitate energy efficiency improvement and use of renewable energy resources, for example, ESCO (Energy Service Companies), rotation fund, tax reliefs, lower interest rates on loans, state guarantees etc. This scenario would require 29,003 employees in 2020.

As it is suggested by the analysis, vocational education institutions could prepare up to 5,166 new specialists by year 2020, which would provide for the additionally needed number of employees just for the base scenario. However, note should be taken of the forecasts on the decreasing of the number of the working-age population. Another problem topical in the construction sector today is the emigration of workforce to other countries in search for a better job. Moreover, construction sector employees suffer from chronic diseases which limit the possibility of employing the workers in many jobs, for example, for working in high elevation and other jobs which are essential in energy efficiency improvement work. At the age around 60 it is possible that 90% of employees will not be able to continue their work in the construction sector. As the performed analysis suggests, by 2020 it is necessary to increase the number of the graduates of vocational education institutions as well as to provide adults with an additional qualification.

In Latvia there is no distinct specialization in energy efficient construction and mostly the work in this area is performed by the same enterprises which work in general construction. Specializing of workers is not taking place at the moment. As it is suggested by the survey conducted for the report purposes, almost all respondents recognize the need for training workers and raising their qualifications. Similarly, the survey results suggest that the majority of workers have not acquired a corresponding education, but rather have picked up their skills on the building site and from the foremen in their enterprises. It is difficult for the small and medium enterprises to compete in the public procurement tenders and usually these enterprises participate in construction work as sub-contractors. The construction enterprise, if working just as a sub-contractor and not receiving contracts as the main contractor, cannot create and maintain a core team of qualified specialists – a new team is created for each particular site and no training of employees or development of their competences is catered for. The training of the existing staff is also hindered by imperfections in the public procurement legislation where the lowest price serves as the key criterion in tender result assessment. In the construction sector there is a very strong shadow economy factor which does not facilitate fair competition and development of workforce qualifications.

At the moment the prestige of construction workers is low and often it is difficult to assemble study groups in the vocational education institutions. As the most common reason for the additional training of workforce the survey participants have mentioned the lack of practical skills and inability to work independently. Besides, there is a lack of interest on the part of employers in the implementation of qualitative in-service practices for acquiring qualifications because no motivation system exists for encouraging enterprises to provide in-service practice positions. The existing workforce have narrow specialization and do not possess understanding about energy efficiency and latest RER technologies. Outside the formal vocational education system courses are organized by the manufacturers and distributors of construction materials; several courses and seminars have taken place within various projects. The organized courses have allowed for accumulating experience on the gaps in the current workforce qualifications and additionally needed knowledge, however, such courses are not organized regularly. Similarly, in Latvia there is no non-government organization (association) which would deal with the development of professional competences of the construction

sector employees. No instrument has been developed in Latvia for forecasting and monitoring development trends regarding new technologies, employee qualifications and training necessary in the construction sector which hinders developing long-term employee education plans.

The surveyed construction enterprises, however, admitted that the requalification of experienced workers is possible in a rather short period of time by organizing intensive training courses on the building site which could be implemented together with the vocational education institutions. According to the climate and energy targets undertaken by the state the increasing of both the number as well as knowledge and skills of the workforce would be necessary.

1. Introduction

The European Union (EU) member states have set climate and energy targets for the period until year 2020 stating that the use of renewable energy resources (RER) must be increased to provide for 40% of the total final energy consumption from RER in Latvia. Energy efficiency must be raised to reduce energy consumption by 20%. In Latvia, like in other EU member states, namely buildings are the biggest energy consumers. Buildings are material and energy-intensive engineering constructions and as such account for 40% of the total energy consumption and for 36% of the total CO_2 emissions in Europe. Currently the priority long-term goals both regarding new building construction as well as renovation of the existing buildings are as follows:

- to increase energy efficiency of buildings by approaching the indicators of a zero energy building;
- to increase the use of renewable energy resources for meeting energy consumption needs in buildings;
- to decrease CO_2 emissions.

Construction sector is one of the most significant branches of economy in Latvia both in terms of the turnover of funds as well as number of employees. The construction sector is dependent on the development of the national economy; it features a distinctly seasonal character in some of its jobs, high intensity of labour and energy as well as significant costs of fixed asset maintenance and acquisition.

Lately, the construction sector of Latvia has been undergoing considerable changes. Since 2002 the sector experienced a rise in its volumes which turned into a boom in the period between 2006 and 2007 as a result of a lasting, continuous growth of economy, population income and welfare as well as availability of cheap loans. The population willingness to improve their living standard and state investments in the construction sector lead to the rise in the construction product prices which was not economically justified. Year 2008 featured a steady growth of construction in the first half of the year and a rapid fall in the second one which continued until the third quarter of 2011 when the construction volumes finally started to grow.

In 2011 71 thousand people were employed in construction accounting for 7.3% of the total number of the employees in the country. Countrywise, the industry attracts about a half of all investments. On the whole, the construction sector characterizes the economic development and dynamics of any country. As a result of the economic crisis and along with a considerable fall in the construction volume the number of construction employees decreased. However, over the recent year construction volumes have been rising again, thus in 2011, compared to the previous year, construction volumes increased by 12.4% , which is connected with successful acquisition of the EU funds and low construction volume in 2010. The funding of the European funds for increasing the energy efficiency of buildings for the time being has been scheduled until 2013.

Currently the perception of the construction industry is changing and new requirements are set in relation to the environment protection, efficient use of energy resources, preservation of the national heritage and its adjustment to the needs of the modern society. The above-mentioned facts determine still bigger necessity for highly qualified and motivated employees that would enable achieving the climate and energy aims established for year 2020.

The objective of the analysis designed hereby is to identify the skills and knowledge gap among the construction employees and the related obstacles. Similarly, during the analysis the authors have tried to deal with the future demand for knowledge and skills.

The authors hope that the designed analysis of the current status quo will serve as a basis for further discussion on the present and future needs for the improvement of the employees' skills and knowledge.

2. Objectives and methods

The objective of the analysis is to establish the skills and knowledge gap among the construction employees and obstacles related to covering the gap. The analysis also deals with the issues associated with the achievement of the climate and energy targets established in the EU and Latvia for year 2020. The paper analyses three big blocks: energy sector, construction sector and education sector with the focus on the professional education. The analysis is made in the context with the national economic development as well as designed plans and strategies. The key research methods employed are as follows:

- Analysis of regulatory acts and policy planning documents;
- Analysis of the information and data available on the topic;
- Surveys of construction enterprises;
- Expert opinion;
- Statistical data processing methods (correlations, regression analysis etc.).

To provide for the validity of the employed data, the research is based on the data provided by the Central Statistical Bureau of Latvia (hereinafter CSB) as well as by the State Treasury, State Revenue Service, Financial and Capital Market Commission and the Bank of Latvia.

Besides in the research the authors have used the data and conclusions from other EU-funded studies and reports touching upon the spheres analysed within the research hereby as well as the annual reports, informative announcements, long and short-term strategies and plans designed by the competent ministries.

The data which are used when studying the macroeconomic situation in the country as well as the influence of the construction industry on the overall economy differ from the data which describe the area of interest for the authors – the raising of energy efficiency and use of renewable energy resources (RER) in the building construction sector. When studying the influence of the construction sector on GDP, the following aggregate data describe the construction sector: data on building construction and design, construction of engineering buildings and construction of buildings for special purposes. Building construction accounted for approximately a half of the overall volume in the growth years (2007) and accounts for approximately 1/3 now (2011), when the proportion of the engineering building construction in the aggregate volume has significantly increased.

In the forecast section, to establish the workforce needs in the future, the national climate and energy targets are analysed the achievement of which is planned through raising the energy efficiency and the use of renewable energy resources in buildings. The forecasts expressed by the Bank of Latvia, Ministry of Economics, Ministry of Finance, Ministry of Welfare and other state institutions are used. The official forecasts are compared with the independent experts' assessment.

Considering the current economic situation not just in Latvia, but also in Europe as a whole, it must be admitted that the construction workforce forecast expressed for the nearest 5-10 years is rather cautious and provides for three alternative scenarios: the workforce necessary for achieving the established targets, the forecasts created by the state as well as experts' forecasts. There are various factors that exercise essential long-term influence on the demand for workforce in the market, such as economic development, cash flow, housing policy, demographics, and employment problems in relation to the gradual aging of population, workforce emigration and immigration.

In preparing conclusions for further development of the action plan the guidelines set by the National Development Plan for years 2014-2020 (NDP) are built on. This will be the hierarchically highest mid-term development planning document in Latvia which will have to provide for the mid-term implementation of the long-term development strategies of Latvia until year 2030 (Latvia 2030).

3. Profile of the construction sector

The construction sector has experienced considerable changes lasting for several years; it represents a significant part of GDP and is an indicator of the overall development or stagnation stage of the economy. The construction sector is closely connected with the activities of other economic agents as when investments are made in other sectors they cannot develop without the participation of contractors, be it infrastructure development, construction of new manufacturing sites or construction of housing and non-residential buildings. The correlation of construction trends with the changes in GDP is shown in figure 3.1.[1]

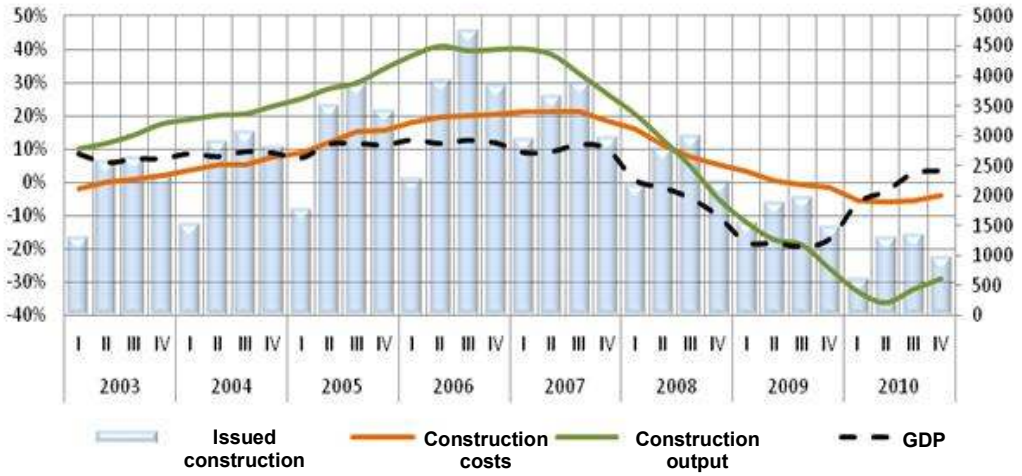

Fig. 3.1. Correlation of construction trends with the changes in GDP.

The seasonally averaged data of the Central Statistical Bureau of Latvia show that in 2011, compared to 2010, GDP has grown by 5.5%. In 2011 the construction volumes increased all together by 12.4%. In the fourth quarter of 2011, compared to the fourth quarter of 2010 – by

[1] www.em.gov.lv

25.9%, although the growth has been more ensured by raising funding for engineering constructions.

The changes in the construction volume across years compared to the base period are presented by construction output indices in table 3.1.

Table 3.1.

Construction output indices 2000-2011

Year	Total construction output	Buildings	Constructions	Total construction output	Buildings	Constructions
	Compared to the previous year, %			2005=100%		
2000	107.8	138.2	78.2	56.9	59.5	53.3
2001	105.8	103.4	109.4	60.4	61.3	58.8
2002	110.8	108.9	116.7	67.7	67.0	68.7
2003	113.5	117.3	107.4	76.6	78.4	74.0
2004	113.0	110.4	117.6	86.7	86.6	86.7
2005	115.3	115.4	115.3	100	100	100
2006	114.4	108.5	119.8	114.4	108.5	119.8
2007	113.0	123.6	101.3	113.0	123.6	101.3
2008	96.9	86.3	112.6	129.3	134.1	121.4
2009	65.1	50.5	82.2	124.9	116.5	136.7
2010	76.4	75.1	77.7	95.4	87.5	106.2
2011	112.3	114.7	110.6	107.1	100.4	124.7

The most rapid rise of construction indicators was seen in the period between 2005 and 2008, which was facilitated by the rapid economic development, growth of financial capital and the favourable loan policy of banks. The dynamics of the issued construction permits for the period suggests that the fastest growth of the permits was seen in the housing segment.

Such a trend had to be expected as in the Soviet time there was a severe lack of flats and residential space and the construction of housing met just the minimal needs. During this period many inhabitants from all over the Soviet Union came to Latvia. The high demand for flats affected the quality and energy efficiency of the buildings constructed at this time as energy resources were cheap. The second factor which facilitated the market demand for additional residential space was the large proportion of the space that was rented. According to the yearbook of flats and statistics[2], in 1996 in Latvia, 58.2% of population were renting their residential space, while in neighbouring countries the percentage accounted for just 19% in Estonia and 7.6% in Lithuania). The total residential space growth trend can be explained by the demand for more residential space per resident.

Disregarding the big housing construction volume, according to the data from the Central Statistical Bureau[3], in 2009 the total residential space accounted for 61.1 mln m^2 in Latvia, i.e., in average 27.2 m^2 per resident. Approximately 2/3 of the residential space were located in urban areas and respectively one third in rural areas. The average residential space per resident had increased by 8.2 m^2. It can be forecast that the residential space will continue to grow as compared to other European countries the average residential space per resident is among the smallest. In UK and Sweden the average residential space per resident is approximately 40

[2] Annual Builletin of HOUSING AND BULDING STATISTICS for Europe and North America, 1998, United Nations, New York and Geneva, 89p

[3] Central Statistical Bureau of the Republic of Latvia. Total residential space: http://data.csb.gov.lv/Dialog/Saveshow.asp

m^2. Figure 3.2 shows that since 1990 the total residential space has increased. The fastest growth took place in years 2005–2006. Since 2008 the growth rate has rapidly fallen which can be explained by the complicated economic situation in Latvia.

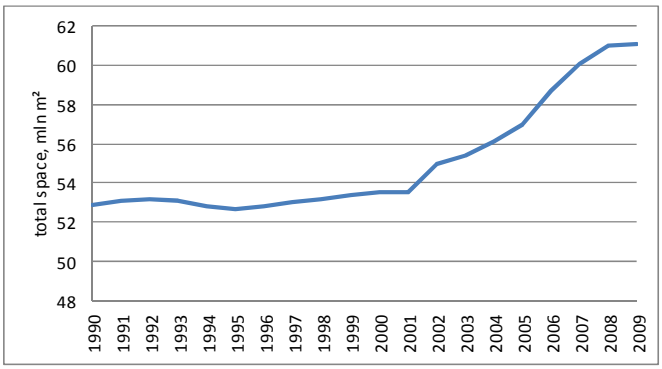

Fig. 3.2. Residential space across years (mln m² total area).

The big demand and development of the real estate market promoted the construction of housing. The growing volume of construction in this period did not facilitate the building of good quality housing and the provision of energy efficiency was not a priority. The extensive construction of buildings unjustifiably raised the prices of the construction output. However, the demand for workers had grown to the extent which left the worker's qualification without the due attention. In order to finish work within deadlines contractors had to pay inadequately high wage to the workers and unqualified persons from various industry backgrounds were attracted to work in construction. Wages in the construction were so high that employees from other sectors left for working in the construction sector which caused a rise in the total wage level in the economy. The high wages of the workforce and choosing of the cheapest building materials in order to slightly decrease the costs affected the quality of the buildings constructed in the period and to some extent destroyed the prestige of the persons working in construction.

Upon beginning of the economic recession the construction sector employees were among the ones most hit by unemployment. Despite the big volume of apartment buildings and private houses built in this period the problem with flats was not solved because the big demand had made the whole construction process very expensive – starting from the designers, material suppliers and up to the auxiliary workers. The demand for flats rapidly decreased and the value of real estate fell. The money invested in construction was frozen, did not return into the economy and made the crisis still deeper. Many construction enterprises went bankrupt. The volume of the residential space built across years is shown in table 3.2.[4]

Table 3.2.

Buildings constructed in regions

Regions	Total area, thousand m^2					One-flat buildings among them, thousand m^2				
Years	2000	2005	2009	2010	2011	2000	2005	2009	2010	2011
Total	191.1	552.2	672.0	384.7	380.9	181.0	324.7	427.0	323.8	240.9
Rīga, Rīga surroundings	118.0	438.0	504.2	282.9	306.3	108.6	235.1	278.1	225.3	166.5
Rest of Latvia	73.1	114.2	167.8	101.8	74.6	72.4	89.6	148.9	98.5	74.4

[4] Data from the Central Statistical Bureau of the Republic of Latvia

The Building Inspection annual report of 2007 among the most significant aspects in the year highlights the attraction of the European Union funds to infrastructure sites, renovation of multi-apartment buildings and raising of energy efficiency. In 2007 the total number of commissioned buildings had increased simultaneously with the increase in their volume. In 2007 the buildings were commissioned for the total amount of 1,707,497.8 thousand lats. The significant volume increase is connected with the rise in the prices of building materials, wages as well as energy resources etc. in the country. The total number of buildings, funded by the state and municipalities and commissioned account for approximately 20—22% of the total volume (in 2007 – 390,367.9 thousand lats, 22.9% of the total number of buildings commissioned; in 2006 – 255,880.7 thousand lats, 22.3%; in 2005 – 172,191 thousand lats, 21%). See appendix.

Taking into account the economic situation in the country, in 2008, compared to 2007, the construction volume decreased by 3.7% (new building volumes decreased by 1.6%, renovation and reconstruction volumes by 6.2%). During the economic recession of 2008—2010 the construction sector suffered much more than the economy as a whole. The shrinking of GDP in 2009 accounted for 14.4%, however, the construction sector index had decreased by 32.8%. The economic downturn brought the GDP indicators closer to those of 2005 and the construction sector indicators to the level of 2003.

In 2008 a significant fall in the construction volumes started, as a result the construction volume decreased by 35.5% in actual prices and until 2009 the reduction of construction volumes reached 71.5%. The fall in the housing construction decreased in 2010, accounting for 31%, in 2011 there was a rise in the construction of housing, which is proved by the total number of issued building permits for constructing new buildings, reconstruction and renovation as well as for the permits for new buildings alone. Similar falls and rises were characteristic to the sector of non-residential buildings. The number of building construction permits issued across years is shown in figure 3.3. [5]

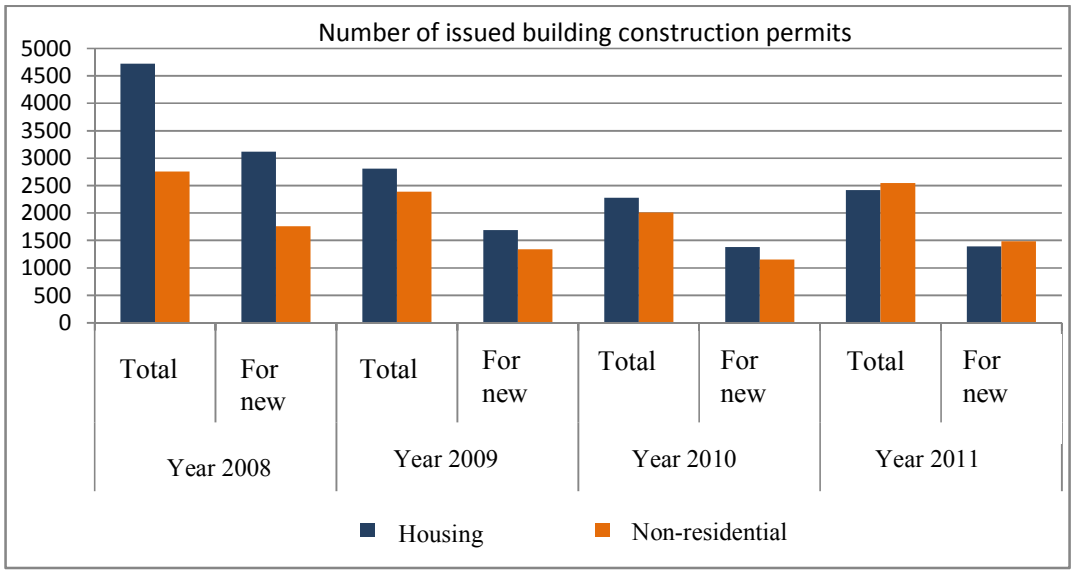

Fig. 3.3. Number of building construction permits across years

[5] Data by Central Statistical Bureau of the Republic of Latvia

Construction Market Participants

According to the Construction Law persons participating in construction are natural or legal persons who participate in the construction process with property, financial resources, work or services. The persons participating in construction are as follows: the builder, client, author of the building design, contractor, general manager. Currently banks are following a cautious loan policy that does not facilitate the raising of investments in construction; the biggest part of work is connected with the energy efficiency improvement and use of renewable energy resources in buildings and are mainly related to the implementation of the state support programmes. Along with the fall in the construction volumes, the number of the operating construction enterprises has decreased, similarly the entering of market by new enterprises has been made more complicated. However, the reduction of investments in construction has not been the only obstacle for new member involvement in the market. According to the report by SIA "Baltijas Konsultācijas" the key obstacles mentioned were:

- lack of specialists with an adequate qualification;
- work experience requirements set for the company;
- the big amount of contradictory and weak regulatory acts governing the construction sector;
- requirements for the company turnover.

Market Trends and Forecasts

Market trends depend on the development trends of each particular region, the financial potential of each municipality, investments, labour provision and most of all on the economic development of the country as a whole. The factor affecting the market is the attraction of funds to any sector. According to the report by the Ministry of Economics in 2012 the economic growth of Latvia will not exceed 3%, however the overall fluctuations of the added value in the construction sector might reach 7.7%. The construction output in relative prices might grow by 2—4 % annually until year 2020.

A study has been made of the market trends and forecasts by surveying construction sector enterprises. The data provided by SIA *Ernst&Young*[6] questionnaire suggest that the majority of the construction enterprises see a development potential in the local market and do not see much opportunity in the export markets, although a big part of business people do not expect essential changes in the local market.

The survey data on the forecasts made by enterprises regarding the enterprise development in the local and export markets in building construction in 2012 are shown in figures 3.4 and 3.5.

[6] The sub-activity project „Creation of the industry qualification system and development of the professional effectiveness and quality" within the European Social Fund programme „Human Resources and Employment" extension 1.2.1.1.1.

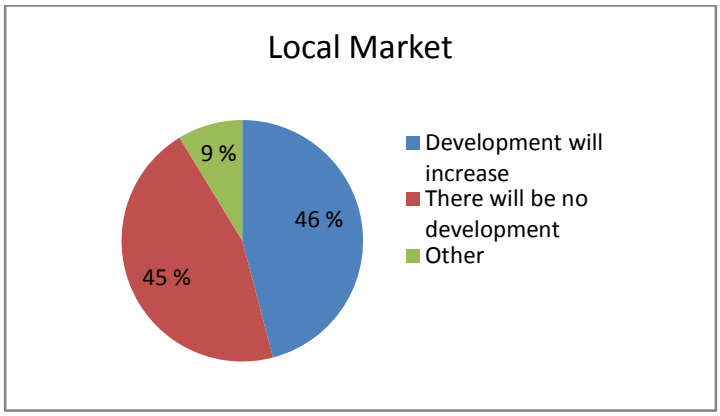

Fig. 3.4. Local market forecasts by construction enterprises.

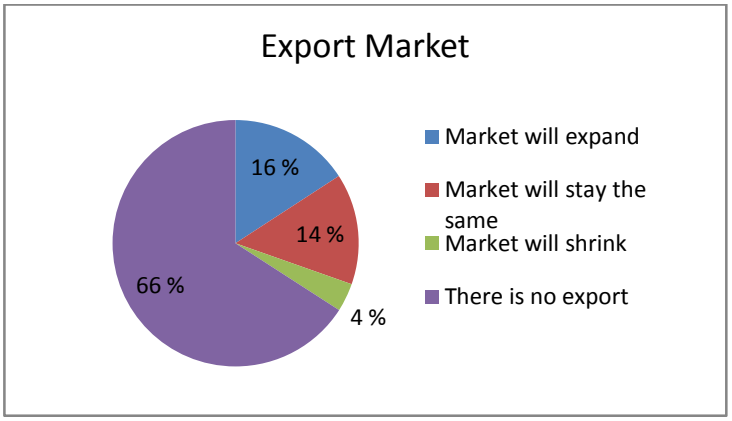

Fig. 3.5. Export market forecasts by construction enterprises.

Overall, according to the sector participants' evaluation the construction sector will continue its development, however, the development will more likely be moderate than fast. To improve the enterprise operation in the future and to raise their competitiveness it is crucially important to raise the competence of the workforce, which, as shown by SIA *Ernst&Young* study, has the biggest influence on the enterprise operation. Among the most important factors the business people mention the following:

1. level of workforce competence (77.4%);
2. changes in the taxation policy (65.7%);
3. purchasing power (56.4%);
4. availability of workforce in the labour market (56.2%);
5. changes in the business operation costs (45.5%).

Thus according to the survey the development of the workforce competence and availability of workforce in the labour market are mentioned as the most significant factors for the development of the business environment in the construction sector.

Illegal employment and shadow economy in the construction sector

In 2010 shadow economy accounted for 38.1% of GDP, which is 1.5 % more than in 2009, as it can be seen in the study of the European Council for Small Business and Entrepreneurship (ECSB) on the shadow economy in the Baltic States.

"The survey made by the scholars of the Baltic International Economic Policy Study Centre (BICEPS) Tālis Putniņš and Arnis Sauka revealed that the proportion of shadow economy was significantly bigger in Latvia than in Lithuania and Estonia in 2010."[7]. Most commonly shadow economy has the following forms: hiding of profits, partly hidden wages, illegal employment as well as bribing.

The scholars indicate that over the previous three years Latvia has had a favourable environment for shadow economy which has been facilitated by the unstable taxation system. In Latvia the construction sector is considered to be the sector where shadow economy is most common.

In the BICEPS study shadow economy accounts for 53%, figure 3.6. The scholars conclude that because of the growth of shadow economy the GDP fall can also be questioned in the construction sector.

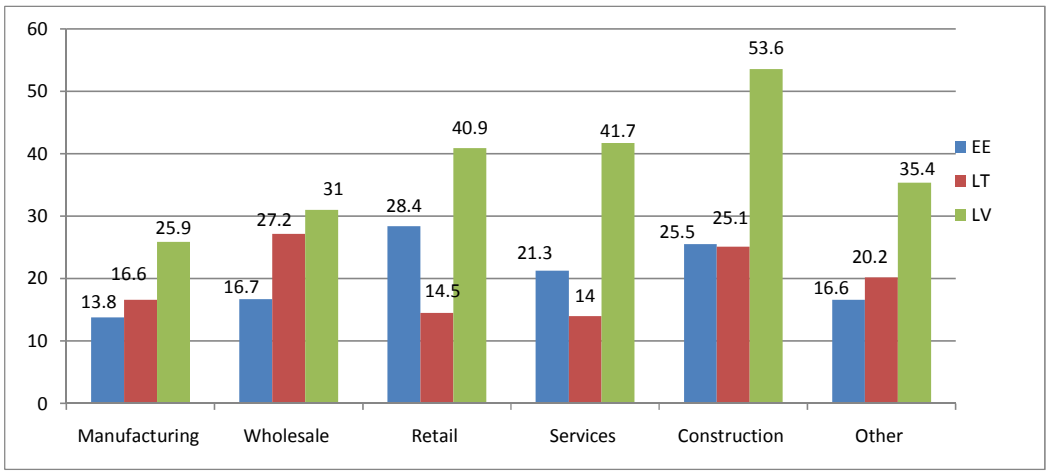

Fig. 3.6. Shadow economy by sector.

In 2011, compared to 2010, the number of the detected illegally employed persons increased more than twice. The State Labour Inspectorate made 3248 audits and 2958 employees employed without a written contract were detected in 885 enterprises. Most of the detected persons worked in the construction sector – 713 people (24.1%). The unregistered employment combatting experts of the State Labour Inspectorate explain this kind of data with the relatively limited number of vacancies as well as with the publicly widespread tolerance against unregistered employment.

[7] http://scenariji.lv/2011/09/enu-ekonomika-latvija-pern-pieaugusi/, 28 September, 2011.

The data from the State Labour Inspectorate on the audits regarding the number persons employed without registration in all Latvian enterprises together and particularly in the construction sector enterprises between 2007 and 2011 are presented in table 3.2.[8]

Table 3.2.

Unregistered employees (UE) in the construction sector

Year	Number of inspections (total)	Number of detected UE (total)	Number of detected UE in construction sector	Percentage against the total number, %
2007	3987	2846	1453	51.1
2008	4554	1623	695	42.8
2009	4996	1211	485	40
2010	3264	1823	716	39.3
2011	3248	2958	713	24.1

The statistics proves that construction enterprises are to be considered enterprises with a high risk of unregistered employment. The data from the study made by the research centre SKDS and ordered by the Free Trade Union Association of Latvia show that in the survey aimed at finding out inhabitants' attitude towards signing employment contracts, 37% of respondents had answered that they would agree to work in a paid job also without an employment contract, 26% of respondents, however, believed that an employment contract was a just a formality.

The information collected by the State Labour Inspectorate suggests that in Latvia there is a very high level of unregistered employment in enterprises – an evidence of unregistered employment has been found in one of three of inspected enterprises. The State Labour Inspectorate regularly provides information in its website on the enterprises where persons employed without registration have been found. The information is also used by public procurement institutions to acquire information on the enterprises which have applied for the participation in public procurement tenders. The latter more concerns the big enterprises which, according to research, are also involved in the creation of the shadow economy. Statistics suggests that the biggest proportion of illegal unemployment might be in the private sector, in the construction of one-apartment buildings.

[8] Data from the State Labour Inspectorate.

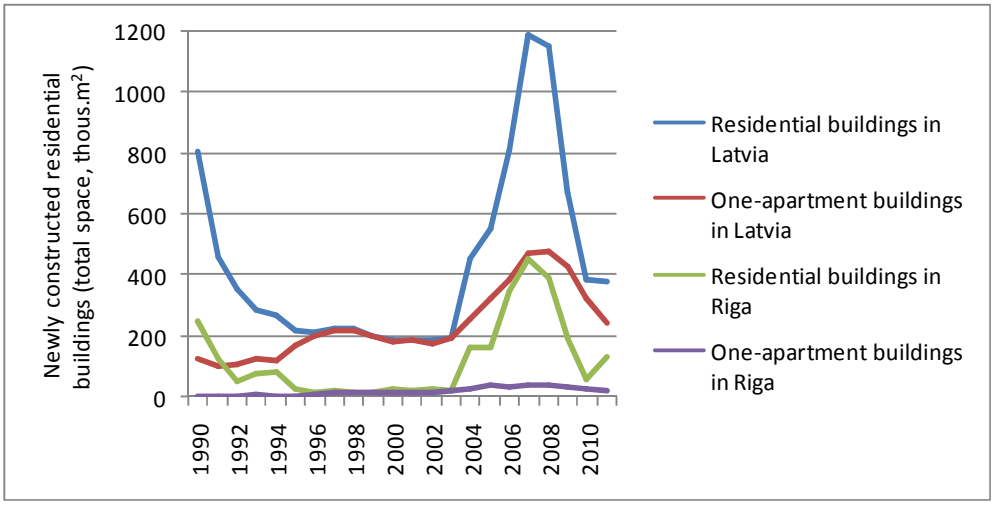

Fig. 3.7. Newly constructed residential buildings in Latvia and Riga region across years.

As it is shown in figure 3.7, a major part of the newly constructed residential space consists of private houses, most of which are located in Riga region. It is quite often that the private houses are built by owners themselves and illegal employment often dominates where private houses are being built. According to statistics and research, construction sector presents a high risk of illegal employment, which, in its turn, does not facilitate fair competition and development of employee qualification.

4. National Policy and Strategy to promote the achievement of the EU 2020 energy and climate targets in buildings

4.1 Energy efficiency requirements for buildings

Currently energy efficiency measures for buildings are implemented by two ministries – the Ministry of Environment Protection and Regional Development mainly deals with the projects regarding public premises, however the Ministry of Economics implements projects in apartment buildings. Regulatory acts envisage that the institution responsible for the energy efficiency policy is the Ministry of Economics (see Section 4 of the Law on Energy Efficiency[9] and Section 18 and 19 of Regulations on Energy Certification of Buildings).

Future energy efficiency requirements for buildings are outlined by EU Directive *2010/31/EU* on energy efficiency of buildings. The directive provides that each member state has to establish the minimum requirements regarding energy efficiency of buildings. In case of Latvia a reference is made to Latvian Construction Standard LBN 002-01 which governs the minimum requirements for the building envelopes and their density, although not providing for the energy consumption of a building as a whole. The energy sector strategy which is currently being developed establishes that in the long-term – until year 2030 – the building sector heat energy consumption shall be reduced to 100 kWh/m^2 per year, including the average consumption in new buildings of 50 kWh/m^2 per year.

[9] Law on the Energy Performance of Buildings ("LV", 51 (3835), 02.04.2008.; Ziņotājs, 9, 08.05.2008.) [came into force on 16.04.2008.] with amendments law of 3March,.2010 ("LV", 43 (4235), 17.03.2010.) [came into force on 18 March, 2010.] http://www.likumi.lv/doc.php?id=173237.

Directive 2010/31/EU[10] on energy performance of buildings establishes an important requirement – starting from 31 December, 2020 all new buildings should approach a zero energy building or low energy building indicators and energy must be produced by using renewable energy resources. Starting from 31 December, 2018 such buildings should be chosen by all public institutions when renting or purchasing a building. Unlike the first version, the revised directive concerns almost all buildings.
Article 2 of the new directive introduces the notion of a zero energy building. No specific quantitative (e.g., kWh/m^2 per year) indicators are provided in the directive which would allow for defining such a building, however there are qualitative indicators (e.g., heat losses reduced to the minimum) the building must comply with. Energy consumption must be very low and it must be provided for by renewable energy resources. The revised directive also features the notion of the "cost-optimal level" which will have to be applied in each renovation project.

For achieving the aims set by the directive the member states should:

- Establish quantitative and verifiable low energy building criteria;
- As a result of renovation achieve higher energy consumption reduction than it is currently;
- Design the methodology for establishing the cost-optimal level in case of a building renovation. The methodology must be designed with the condition that it takes into account not just private, but also public interests;
- In the EU level new energy efficiency funding methods and instruments must be found which would facilitate the renovation of the existing buildings.

As it can be forecast, in future buildings will have to meet increasingly stricter requirements regarding their energy efficiency. To be able to achieve the targets established by the directive and pass over to the construction and renovation of zero energy buildings (low energy consumption building using renewable energy resources) Latvia needs knowledgeable and highly qualified workers.

4.2. National climate and energy aims

Energy and climate targets of Latvia in the context of the EU 2020 strategy:

- To increase energy efficiency by 20% or acquire 0.668 Mtoe of saved energy in the consumption of the primary energy resources;
- To increase the proportion of renewable energy resources in the final gross energy consumption to 40%;
- To limit the total national GHG emissions to make them below 12.19 Mt CO_2 equivalent in 2020;
- Similarly, the international commitments of Latvia envisage the raising of energy efficiency on the final energy consumer side in the period between 2009 and 2016 to achieve a 9% energy reduction;
- Raising of employment.

Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services[11] also provides that until 2016 all member states must decrease final energy consumption by 9% compared to the year of reference. According

[10] Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)// Official Journal of the European Union. - 18.6.2010. – L 153/13.
[11] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services.

to these targets the first and second energy efficiency action plan was adopted. The biggest reduction of energy consumption is to be achieved through energy efficiency measures in the housing sector which will provide for 2701 GWh energy reduction.

In several studies the energy consumption in housing has been analysed and the influence various factors exercise on it. A. Kamenders, G. Žogla and A. Blumberga in the research "Energy Consumption of Soviet Type Buildings in Daugavpils"[12] analysed 35 apartment houses the averaged adjusted heat energy consumption of which under the standardized climate conditions for heating was 150 kWh/m^2 per year. The analysis of the data on the energy consumption of 94 apartment buildings in Salaspils[13] lead to the conclusion that the average adjusted heat energy consumption for heating and hot water is 212 kWh/m^2 per year, 56 kWh/m^2 per year of which accounts for the hot water consumption and 156 kWh/m^2 per year for heating. Although the buildings have been commissioned in different years their annual heating consumption does not depend on the year of the building construction and energy consumption may essentially vary among buildings.

According to the First Energy Efficiency Action Plan of the Republic of Latvia the average heat energy consumption in housing is from 220 to 250 kWh/m^2 per year[14].
In Latvia 77% of the energy consumed in households is used for general heating purposes and 8% – for heating water[15]. To pay for the consumed energy resources, households spend a big part of their budget. In 2009 expenses for groceries accounted for 26.7% of the total household spending and payment for energy and water came second accounting for 15.5% of the total household spending[16]. To compare, for example, in UK household spending on energy accounted for 2.9% in 2009[17].

Figure 4.1 shows the average heat energy consumption in kWh/m^2 per year for various buildings in Latvia. The average heat energy consumption in the residential buildings in Latvia accounts for 180 kWh/m^2 per year, however, upon meeting the minimal energy efficiency requirements of the Latvian Construction Standard LBN 002-01[18] it is possible to achieve the energy performance level which corresponds to the heat energy consumption of approximately 85 kWh/m^2 per year. According to the data of Riga Energy Agency the average heat energy consumption in various designs of apartment buildings exceeds 200 kWh/m^2 per year. To compare, the figure in the low energy building is four times smaller than the average actual consumption and, compared to the passive building, the average energy consumption is twelve times higher.

[12] Blumberga A., Kamenders A., Žogla G. Energy Consumption of Soviet Type Buildings in Daugavpils// RTU zinātniskie raksti. 13.sēr., Vides un klimata tehnoloģijas. – 2008. Sēj.1. – 134. –139. lpp
[13] Kamenders A. Ozoliņa L. Blumberga D. Tehniski ekonomiskais pamatojums centralizētās siltumapgādes sistēmas attīstībai Salaspils novadā// SIA „Ekodoma" darba atskaite, 2010.
[14] First National Energy Efficiency Action Plan (NEEAP), 2011: http://www.likumi.lv/doc.php?id=175690
[15] Central Statistical Bureau, 2011: http://data.csb.gov.lv/
[16] Central Statistical Bureau of the Republic of Latvia, 2011: http://www.csb.gov.lv/dati/statistikas-datubazes-28270.html-0
[17] Household energy efficiency, 2005: http://www.csb.gov.lv/dati/statistikas-datubazes-28270.html-0
[18] Latvian Construction Standard LBN 002-01 "Thermotechnics of Building Envelopes"

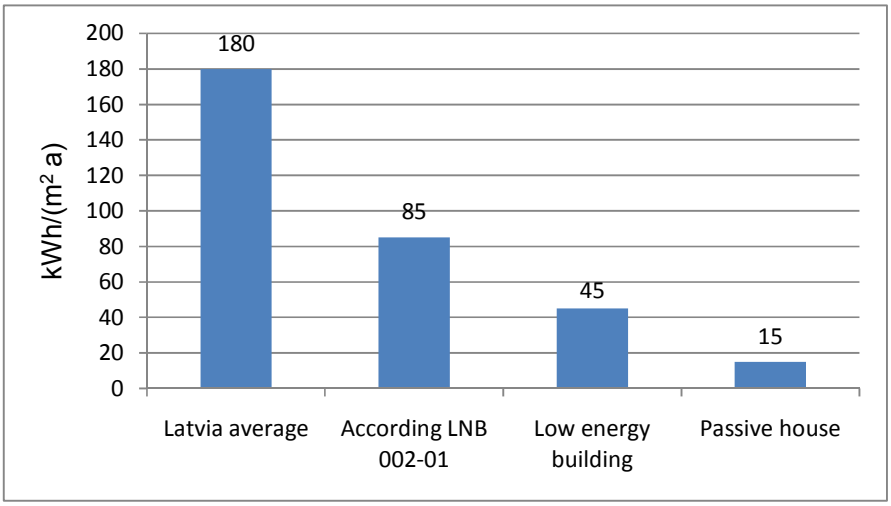

Fig. 4.1. Comparison of heat energy consumption

Most of residential buildings in Latvia (68%) were built in the period between 1958 and 1992. 22% of buildings were built until 1940, 9% in the period between 1940 and 1957, however, since 1993 only about 1% of buildings have been constructed (see figure 4.2.)[19].

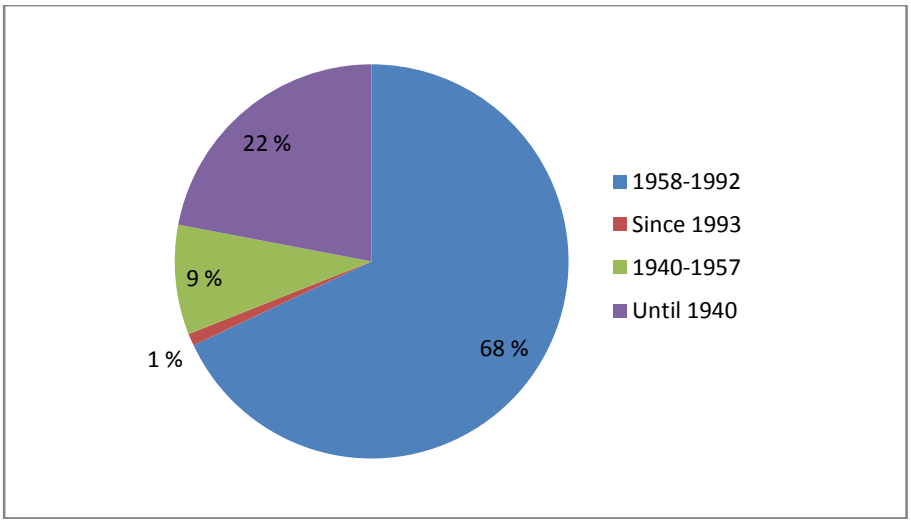

Fig. 4.2. Structure of housing in Latvia by the year of construction

In 1947 precast reinforced concrete structures were introduced in Latvia. This is connected with Latvia being a part of the Soviet Union where typification of residential buildings and designs took place and mass introduction of the precast reinforced concrete products and structures was started. In 1960 according to serial designs 88% of all the housing were built, however, in 1981 – 96%. In 1959 slab structures were introduced in Latvia and in 1985 more than 60% of housing was built in them[20].

In 1957 the construction of apartment buildings was expanded in Latvia and a turn took place from constructing individual buildings to constructing big housing estates. Initially they were built from bricks, however later the physical infrastructure – the precast reinforced concrete

[19] Central Statistical Bureau of the Republic of Latvia
[20] Rubīns J. Rīgas dzīvojamais fonds 20. gadsimtā. – Rīga: Jumava, 2004

and other industrially produced large-size elements allowed for increasing construction productivity.

Year 1959 is considered the beginning of slab housing construction in Latvia. In this period mostly the five-storey buildings of serial designs were built; starting from 1980 – mainly the nine-story buildings of serial design 119. In these buildings there were the so-called "small-size apartments", i.e., the dimensions of the premises had been reduced up to the minimum extreme, especially those of auxiliary premises.

Starting from 1960 the construction of housing was modernized and the introduction of buildings of serial designs 467A and 464 modernized by Latvian architects started. The brick building of serial design 318 presented a new apartment quality and it could be used both in 2 and 3-story as well as 5 and 9-story versions.

As figure 1.14 shows, the majority of the current housing was built namely in this period. Now these massively constructed buildings have served their time and are energy-inefficient. When the building designs were created the key attention was paid to fast construction and functionality as well as provision of a big number of apartments, however, no attention was paid to the consumption of energy resources and energy efficiency of the building. Energy consumption in a typical apartment building in Latvia is from 149 to 270 kWh/m^2 per year[21].

The data above suggest that the change of housing in Latvia is slow; consequently, the energy consumption of the newly constructed buildings will be important in a long term. Good quality of building renovation can be ensured by well-trained workforce and is an important factor for reducing the energy consumption of buildings and their environmental impact.

4.3 Energy efficiency targets

Buildings in Latvia, similar to Europe, represent one of the biggest energy consumers. Households spend 37% of the final energy consumption in Latvia. Approximately 85% or 51.65 PJ of the energy spent at homes is used for heating and preparation of hot water. A big part of the final energy consumption in households is wood – 49.6%, electricity – 12%, natural gas – 7.7%, oil products – 2.3%, coal – 1.3% as well as centralized heating – 27%[22].

Figure 4.3 below shows the energy consumption by final consumers distributed by year and used for calculating the planned economy of the final energy consumption.

[21] Borodiņecs A. Dzīvojamo ēku energoefektivitātes novērtēšana/ Promocijas darbs, Rīga, RTU izdevniecība, 2007
[22] Latvijas enerģētika skaitļos: Gala enerģijas patēriņš mājsaimniecībās. Latvijas Republikas Ekonomikas ministrija. – Rīga, 2009.

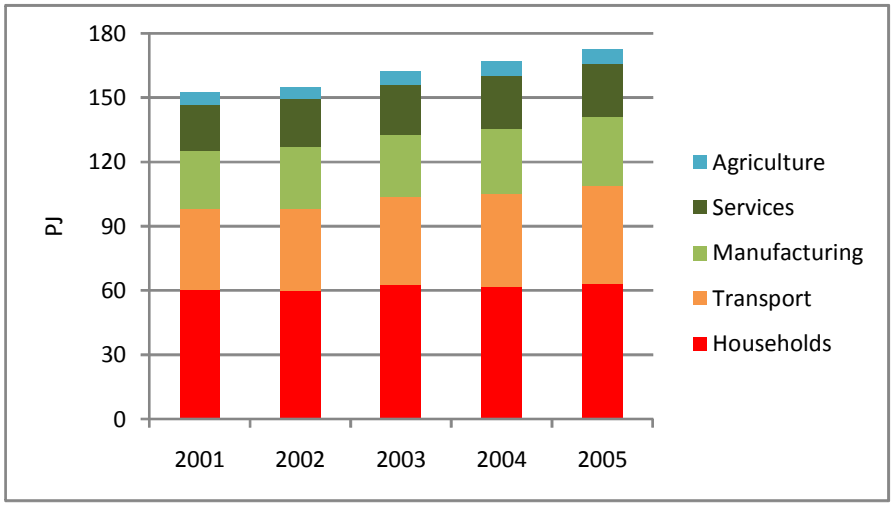

Fig.4.3. Energy consumption of the final energy consumer[23]

The planned reduction of the final energy consumption in Latvia is described in figure 4.4.

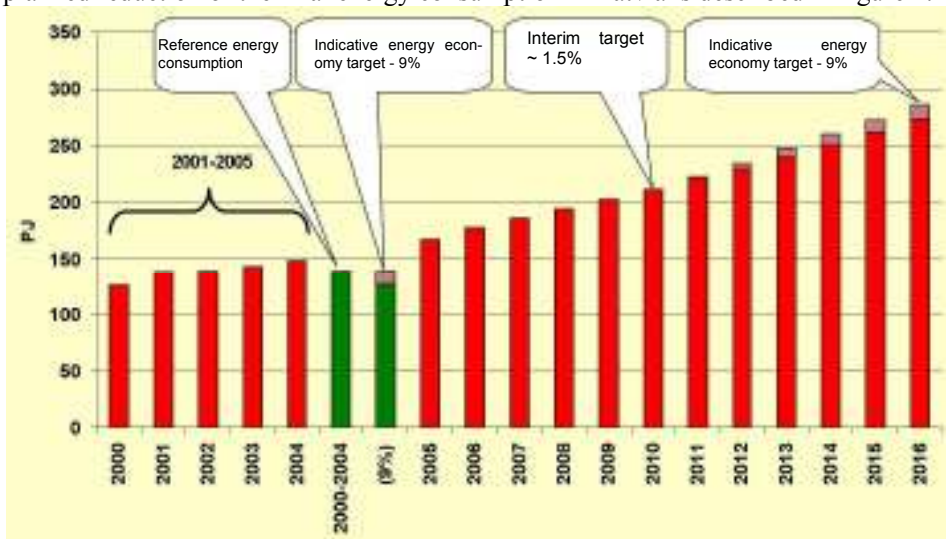

Fig. 4.4. National final energy consumption and calculated economy of accumulated energy (reference to the action plan).

To achieve the planned energy consumption reduction the First Energy Efficiency Action Plan for Years 2008–2010[24] was designed with the target to reduce energy consumption by 3483 GWh until year 2016 disregarding the climate corrections. The biggest energy economy – 77% or 2701 GWh – was planned in the housing sector. It was based on the fact that in Latvia the household sector represents the biggest final energy consumer – approximately 37% of the total final energy consumption in the country.

[23] www.em.gov.lv
[24] First Energy Efficiency Action Plan for Years 2008–2010.

Disregarding the huge potential for the heat insulation of buildings, the current policy has not significantly facilitated its use. Although in 2009 the funding of 44 mln LVL was allocated from the European Regional Development Fund and state budget for the implementation of the energy efficiency measures in apartment buildings and the owners of the housing benefit from the insulation, the growth in the amount of the insulated buildings has been trivial since the beginning of the energy efficiency policy introduction – from more than 30,000 apartment buildings just about 600 buildings have been fully insulated.

To establish the volume of the potential renovations for the improvement of energy efficiency and use of renewable energy resources in buildings, all targets set by the state must be examined in detail. As it was said before, the biggest energy consumption reduction is planned in the housing sector with the help of energy efficiency measures which would allow for 2701 GWh energy economy. Further analysis explores how many buildings and what energy consumption reduction should be achieved to provide for the planned economy in the housing sector. According to the data of the Central Statistical Bureau[25], the total residential space in Latvia was 61.1 mln square metres at the end of 2009 and the average energy consumption for heating was 180 kWh/m^2 per year. With the help of building renovation it is possible to achieve various energy consumption reductions depending on the implemented renovation measures and construction work quality. The potential economy from building renovation is shown in figure 4.5.[26]

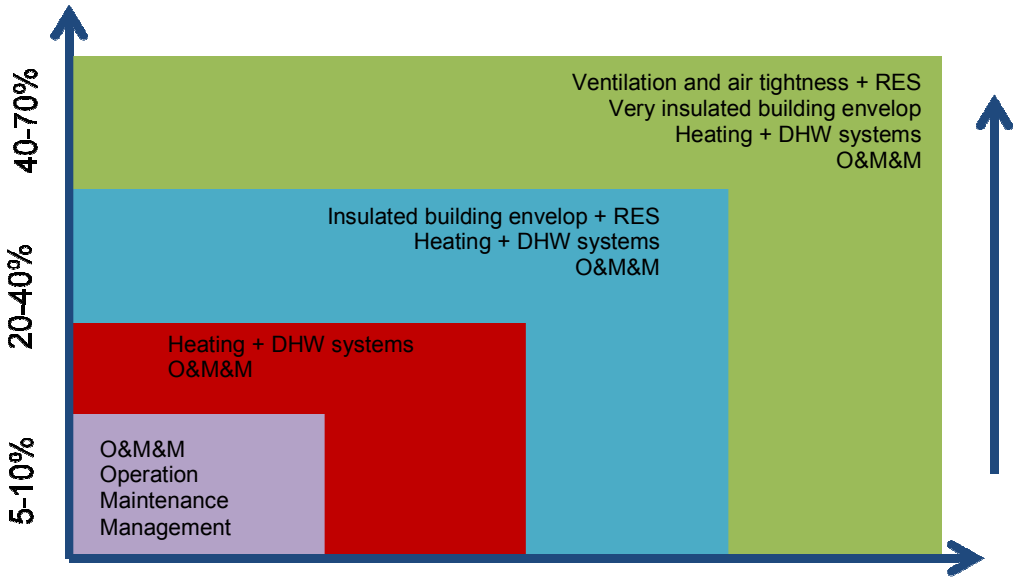

Fig. 4.5. Energy consumption reduction potential in residential buildings.

As it can be seen, residential buildings have a high energy efficiency potential – up to 70%, which can be achieved by implementing a complex, good quality building renovation. The average energy consumption reduction after the building renovation is from 30% to 50%. Thus, taking into account that the average building energy consumption is 180 kWh/m^2 per year and the average residential space is 61.1 mln square metres, to achieve 2701 GWh economy by year 2016 the energy consumption must be reduced to 135 kWh/m^2 per year in all buildings or partly renovation must be made in all buildings by achieving a 25% energy consumption reduction. If a complex building renovation is made, construction work is done at a

[25] Central Statistical Bureau. Area of residential space. http://data.csb.gov.lv/Dialog/Saveshow.asp
[26] Presentation by C.Rocha.

high quality and a 50% energy consumption reduction is achieved, approximately a half of the residential space would have to be renovated according to this pattern. Figure 4.6 depicts both alternatives and the necessary renovation volumes for the country to achieve the targets it has established.[27]

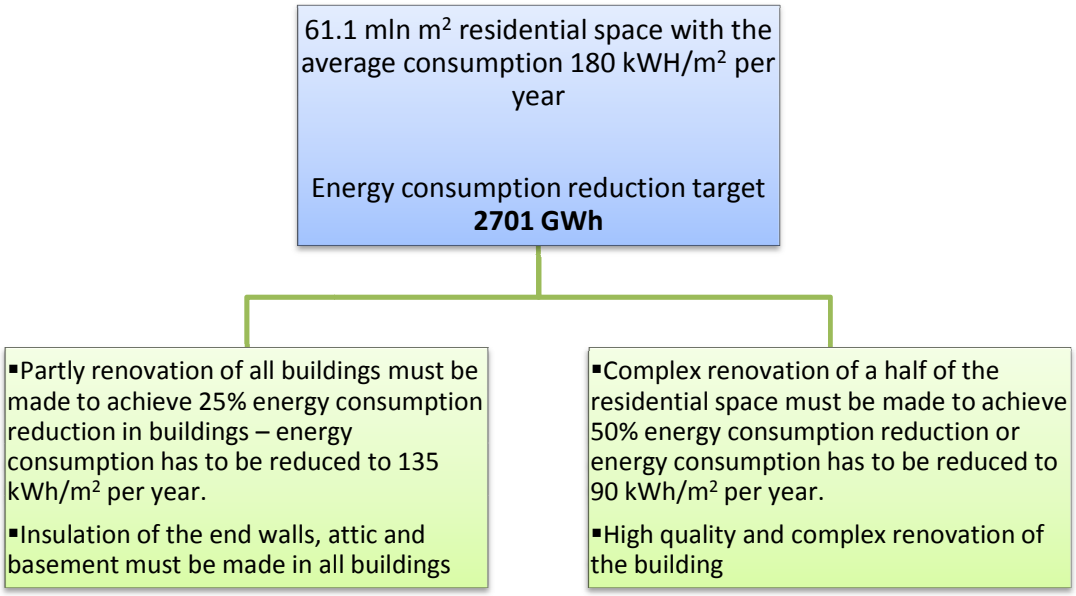

Fig. 4.6. Renovation volumes needed for meeting energy efficiency targets.

The necessary workforce provision for the renovations to be made is analysed in chapter 7. When forecasting the number of the necessary workforce several options were created and the results acquired above were used in developing the option which is based on meeting the aims of the energy efficiency action plan – it can be considered an optimistic alternative because the study of the Environment Protection and Heating Systems Institute of Riga Technical University underlines that the established target cannot be reached by using the existing policy instruments. The system dynamics model for raising the energy efficiency of buildings leads to the conclusion that by using the existing policy instruments the established target of 2701 GWh reduction could not be met even until year 2080. However, by supplementing the energy efficiency policy with such policy instruments as one-stop agency, CO_2 tax, raising of the minimal energy efficiency measures, supporting science and research, designing of standard procurement documentation and contracts, targeted information campaign, the aspired consumption reduction could be achieved around 2019.[28] Considering the average renovation costs, which are around 50 LVL/m^2 for the heated area, 1.5 bln LVL would be necessary for achieving the target. According to other experts, the investments needed for renovation in the nearest years to achieve the target of 20% reduction in building energy consumption until 2020, 1.5 – 1.8 bln LVL would be necessary (of which 0.6 bln in Riga).[29] As a result of the existing support programme implementation just 4% of the residential space of Latvia has been renovated.

[27] Blumberga A., Blumberga D., Bažbauers G. u.c. Sistēmdinamika vides inženierzinātņu studentiem. – Madona: Madonas Poligrāfists, 2010, 318 lpp.

[28] Blumberga A., Blumberga D., Bažbauers G. u.c. Sistēmiskas domāšanas integrēšana vides politikā. – Madona: Madonas Poligrāfists, 2010, 225 lpp.

[29] A. Salmiņš. Pašvaldību loma un iespējas atbalstīt kvalitatīvu mājokļu renovāciju.

National and regional policy and strategy in the area of energy efficiency is largely characterized by the opportunity to implement measures for raising energy efficiency or the availability of funds for this purpose. Up to now almost all measures for raising energy efficiency of buildings have taken place with the help of loans from banks, investment funds or various support programmes, including the ones from the state, municipalities and the European Union.

A review of individual investments related to raising energy efficiency or use of renewable energy resources is presented in table 4.1.

Table 4.1.

Review of investments over the recent years

Year	Funder (Support provider)	Total funding and number of renovated buildings	Description
Until 2013	European funds ERAF	61,348,397 LVL (ERAF support 28,027,066 LVL). 474 projects for the total amount of 61,348,397 LVL (ERAF support 28,027,066 LVL).	Measures for improving heat retention capacity in apartment buildings
Until 2013	Heat retention capacity measures in social housing	4.85 mln LVL 43 projects	
2007-2010	State support programme	6.5 mln LVL	
2004-2005	German Federal Foundation for the Environment	2004 – 5 buildings 2005 – 2 buildings	Modernization of residential buildings for saving energy within the project of Kreditanstalt für Wiederaufbau (KfW), Ministry of Environment Protection of the Republic of Latvia, Environment Investment Fund and Hipotēku bank
Since 2001	Hipotēku banka[30]	Since 2001 when Hipotēku banka started issuing loans for apartment building renovation, all together 465 such loans have been issued accounting together for 9.5 mln LVL.	
Since 2007	AS SEB banka		
2010-2013	KPFI	Raising energy efficiency of the higher education institution buildings 6,027,000 LVL – 28 buildings Complex solutions for reducing the greenhouse gas emission in the vocational education institution buildings 14,419,000 LVL – 48 buildings Complex solutions for reducing the greenhouse gas emission in the manufacturing institution buildings 16,932,000 LVL – 68 buildings Complex solutions for reducing the greenhouse gas emission in the municipal institution buildings 22,654,000 LVL – 133 buildings Low energy buildings 9,514,000 LVL – 28 buildings	/+
Since 2009	Third party funding (ESCO)	2 projects 10 projects	
2008-2010	Liepāja[31]	Year 2008 – 24 energy audits for the total amount of 4236 LVL and 13 renovation projects for 54,367 LVL; Year 2009 – 70 energy audits for the total amount of	Awarding of Liepaja city municipality co-funding for implementation of energy efficiency measures in apart-

30 http://www.hipo.lv/lv/par_banku/jaunumi/20090120_pern_ar_hipoteku_bankas_finansejumu_renoveti_100_nami

31 Liepāja City Council information

		13,277 LVL and 47 renovation projects for 186,914 LVL; Year 2010 – 17 energy audits for the total amount of 3400 LVL and 3 renovation projects for 7774 LVL	ment buildings
	Jelgava[32]	Renovation of 2 buildings, total funding of approximately 455,392 LVL (Co-funding from German partners – 154,370 LVL)	Modernization of Jelgava City heating supply system
Year 2010	Daugavpils[33]	In 2011 the amount of co-funding accounted for 50,000 LVL. In 2012 the amount envisaged for co-funding represents 38,000,000 LVL.	Programme for awarding co-funding for energy efficiency measures

The municipalities which have supported energy efficiency projects over the recent three years are shown in the appendix. The appendix shows that the majority of municipal support has not been awarded for complex renovation, but rather for individual renovation stages. The average support amount suggests that some municipalities have chosen to promote possibly many renovation projects with a small support, however, others, for example, Rīga, Kandava, Skrunda and Viļaka fund the renovation of individual buildings.

As the Ministry of Economics, which is the state institution responsible for energy efficiency measures in Latvia, has informed that the provision of support will not continue with the current intensity – by providing donations at the scale of 50—60% of the total costs, it is necessary to look for other sources and mechanisms of funding.
Theoretically there is an option to fund the measures for improving the energy efficiency of buildings from the savings of the apartment owners, earmarked payments or profits, however it does not work in practice in Latvia because:

- Savings, if any, are insufficient;
- Inhabitants do not have extra funds or their accumulation is rather complicated;
- Public utility businesses often work with losses rather than profit.

The ESCO model, common otherwhere in Europe, envisages that profit-earning energy service companies which benefit from raising energy efficiency of buildings are involved in funding building renovation. Larger involvement of ESCO companies in the Latvian market would facilitate the renovation of the existing housing and reduction of energy consumption.
One of the most significant factors for the successful operation of ESCO companies in Latvia is the ability to achieve a high quality of construction work. Consequently, in order to make the development of new models for funding building renovation possible it is important to raise the knowledge and skills of the workforce.
Moreover, municipalities have a significant role in dealing with the energy efficiency issues. The regional policy in the area of energy efficiency is to a large extent represented by municipal support programmes and mechanisms for raising energy efficiency.
The forms of municipal involvement or support:

- Municipal action plans and support programmes;
- Co-funding in building renovation measures;
- Accumulation of best practices and informing/motivating of population;
- Real estate tax reliefs.

4.4 National policy and strategy to achieve the desired result in the construction of renewable energy buildings until 2020

[32] Jelgava City Council information
[33] Daugavpils City Council information

The general target of Latvia for the proportion of the energy produced from renewable energy resources in the final energy consumption in 2020 is determined to be 40% (in 2009 it was 34.3% and in 2010 – 32.5%). As it was mentioned before, namely buildings is one of the major energy consumers in the country and buildings possess big potential for reducing building energy consumption and successful application of renewable energy resources for supplying the necessary amount of energy. The directive on energy efficiency of buildings provides that starting from 2020 the demanded energy consumption in buildings must be produced from renewable energy resources.
According to the data from the Central Statistical Bureau, the consumption of energy resources in households in 2010 is shown in figure 4.7.

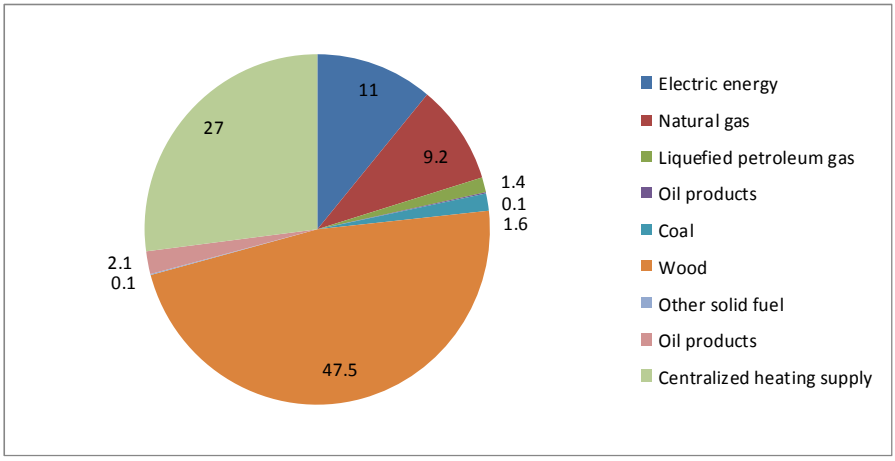

Fig. 4.7. Proportion of the kinds of energy resources in the total consumption

Although figure 4.7 indicates that the still most popular renewable energy resource in Latvia is wood, the CCFI approved project results indicate a new trend. Within the Climate Change Financial Instrument programme "Use of renewable energy resources in the household sector, 1st round" 1147 contracts were signed with various households all over Latvia in 2011.

All together 1284 kinds of renewable resource equipment were chosen which means that in 137 households complex solutions were chosen, most popular being the biomass granule boiler with sun collector support for water heating. The most favoured equipment kinds within the programme are heat pumps (including air/water, air/air, liquid/water, liquid/air heat pumps), which were chosen by 476 households and sun collectors installed by 442 households.

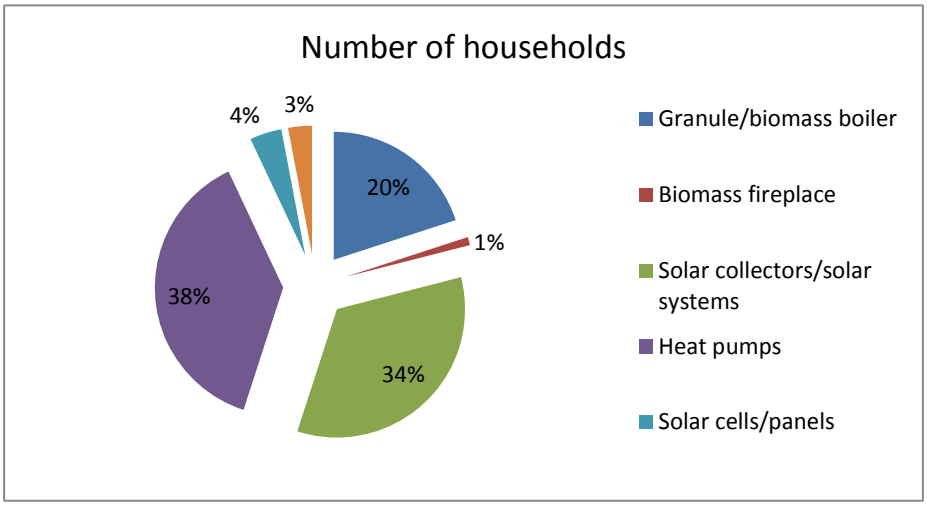

Fig. 4.8. Distribution of the equipment kinds chosen by households within CCFI programme.

Along with the availability of funding for using RER, the use of the new renewable energy resource technologies in buildings has increased as well, which in its turn creates the demand for qualified workforce.

According to the CCFI funded project implementation statistics it can be concluded that in Latvia there businesses which have started specializing in the area of renewable energy resources or have developed the trade of renewable energy resource technologies and have set it as a separate business direction for themselves. Many of the enterprises operate in several RER technology areas. Most of them provide both the delivery and installation of the equipment:

- 72 enterprises deal with biomass (woodchip, straw, granule, wood) boiler installation;
- 70 enterprises which deal with biomass (woodchip, straw, granule, wood) fireplace installation;
- 50 enterpises which deal with the installation of solar collector systems;
- 22 enterprises, which deal with the installation of geothermal heat pumps;
- 3 enterprises, which deal with the making geothermal drills;
- 6 enterprises, which deal with the installation of wind generators;
- 15 enterprises, which deal with the installation of solar cells;
- 84 enterprises which deal with the delivery of biomass (woodchip, straw, granule, wood) boilers;
- 14 enterprises which deal with the delivery of biomass (woodchip, straw, granule, wood) fireplaces;
- 48 enterprises which deal with the delivery of solar collector systems;
- 30 enterprises which deal with the delivery of geothermal heat pumps;
- 13 enterprises which deal with the delivery of wind generators;
- 81 enterprises which deal with the delivery of solar cells.

As it can be seen, a range of businesses have started specializing in the use of RER, although the survey of the construction firms involved in the energy-efficient construction which was made for this report suggests that the work is done by the same enterprises which work in general construction. The business people also admit that the biggest difficulties lie in attracting engineering staff. Along with the entry of new technologies in the market (granule boilers, solar collectors, heat pumps, various combined systems etc.) there is a rise in the significance

of the issue of the workforce with the required knowledge and skills for installing the technologies and servicing them.

5. Statistics in construction and energy sector

There are multiform buildings in Latvia – not only residential and non-residential buildings which have been built over the last century, but also a big number of historic masonry and wooden buildings, which require energy efficiency improvement measures. Overall, in Latvia there is no statistics on the kinds of the existing buildings and their need for energy efficiency measures. Information is available about the number and kinds of buildings constructed over recent years. The information on the kinds of buildings constructed between 2003 and 2011 is presented in Appendix 10.1.

In Latvia the measures for improving the energy efficiency of buidings and construction of low energy houses is at its very beginning. The information on the buildings constructed in period 2004 – 2011 is provided in Appendix 10.2.

5.1 Renovation volumes

The overall distribution of buildings by building types is provided in Appendix 10.1. The biggest number of renovations aimed at reducing energy consumption or using RER is taking place in the residential and public building sector.

As only individual construction boards of Latvia collect information on the implemented renovation projects, the collection of statistics on the renovated projects is rather complicated. In the paper the authors have used unpublished CSB data which provide a partly insight into the statistics on the renovated buildings.

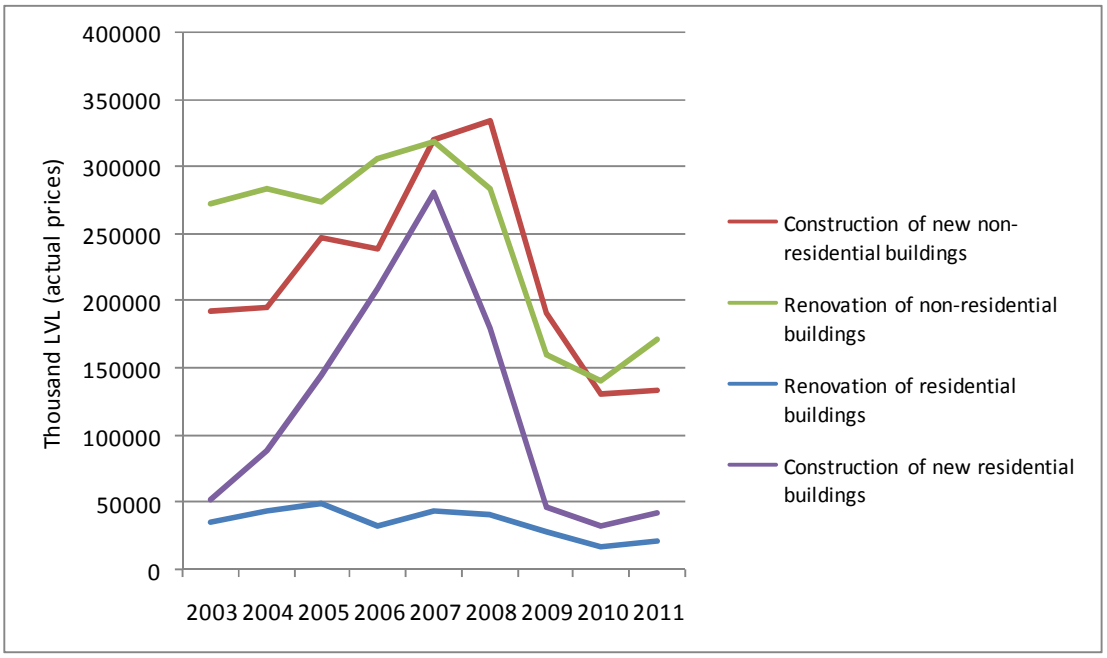

Fig. 5.1. Construction and renovation of new buildings

As most of renovation projects have been implemented within various European Union, state or municipal support programmes, the number of the supported projects to a large extent depicts the overall renovation statistics in Latvia. The data, however, are not complete as there are also bank loans which have provided for many renovation projects over recent years. Support programmes are also implemented by municipalities within the buildings in their ownership. As the municipal funding is small for the projects already funded by ERDF, CCFI or bank loans, the summarizing table includes only the projects where the municipality has funded a significant proportion of renovation works. (See Appendix 10.2.)

The data on the implemented building renovations can also be acquired by summarizing the information on the issued construction permits. In Latvia the construction permits issued for renovation are not singled out. There are data available only about the total number of the issued construction permits and the number of construction permits issued for constructing new buildings. Assuming that the rest of permits are mostly for overhaul and reconstruction, which include renovation, the acquired difference shows the number of construction permits issued for renovations.

It should be considered that not all construction work has been completed, consequently, the number of issued construction permits does not reflect the number of renovated buildings, but rather the trend as well as initiative to carry out renovation.
The volume of the overhaul and reconstruction work in LVL is presented in table 5.1.[34]

Table 5.1.

Volume of Overhaul and Reconstruction work, LVL

	2008	**2009**
Total	550,690,900	243,066,700
Public sector	19,125,000	14,364,700
State property	19,049,200	11,869,600
Municipal property	75,800	2,495,000
Private sector	531,565,900	228,702,100
Private property	398,913,300	165,060,900
Property of foreign legal or natural entities	31,413,500	9,286,400
Mixed ownership property without involvement of foreign capital	84,029,400	50,781,900

No information has been summarized on the completeness of the renovation of existing buildings or namely what jobs have been done. However, mostly for the building energy efficiency improvement a complex renovation is chosen which includes facade insulation, roof renovation/insulation and heating system renovation. Less commonly the measures involve changing windows, changing doors, improvement of the cooling system and insulation of the basement or attic.

Many project results, however, prove the significance of a complex approach. If just insulation is made and windows changed without simultaneous creation of a corresponding cooling system, the renovated buildings start experiencing condensate accumulation, development of mildew and poor interior climate.

[34] http://data.csb.gov.lv/DATABASE/rupnbuvn/Īstermiņa%20statistikas%20dati/Būvniecība/Būvniecība.asp [26.04.2012]

The regional energy efficiency policy is characterized by the number of buildings renovated or being renovated within the ERDF programme.

5.2 Enterprises in the construction sector

According to the information provided by the Ministry of Economics, 4385 enterprises were registered in the Construction Merchant Register as active companies in 2011. Changes in the number of economically active construction merchants across years have been presented in figure 5.2.

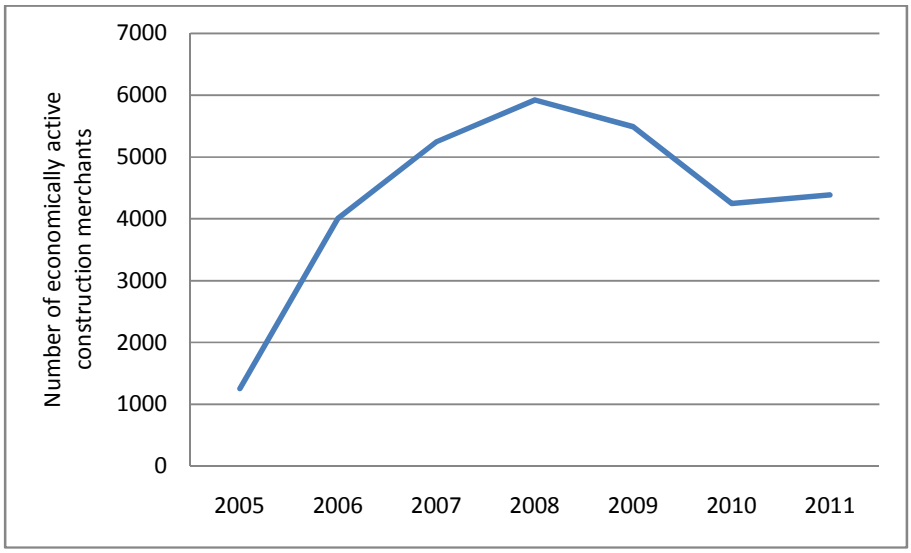

Fig. 5.2. Number of economically active construction merchants.

At the beginning of 2012 there were 4385 companies registered in the Construction Merchant Register which had indicated construction as their core business, however this figure does not provide an accurate picture about the market participants as according to the Enterprise Register and CSB data, construction as a way of earning profit has been indicated by many more companies and individual merchants. (See table 5.1.)

Table 5.1.

Economically active market participants in the construction sector

	2010				
	Construction				
	Self-employed persons	Companies	Individual merchants	Agricultural farms and fishermen's households	Total
Latvia					
Micro	892	4507	270	25	5694
Small	-	1081	2	-	1083
Medium	-	218	-	-	218
Large	-	20	-	-	20
TOTAL	892	5826	272	25	7015

The difference can be explained by the fact that only the enterprises which employ a certified construction engineer or architect with a higher education are registered in the Construction

Merchant Register. Only such enterprises may participate in the public procurement tenders in the internal market. A part of the unregistered companies work in foreign markets and participate in the projects funded by foreigners in Latvia where certification is not required. The volume of work in actual prices done by Latvian construction merchants abroad rapidly rises year by year. In 2008 it was 14.15 mln LVL, however in 2011 it accounted for 75.13 mln LVL. Many, especially small businesses and self-employed persons gain income mainly in the private sector by constructing individual buildings or repairing apartments.

The construction market is rather fragmented both from the regional point of view as well as each particular enterprise's share of the market. As it can be seen from figure 5.3, in Latvia small enterprises with small turnover prevail. On the one hand, they would not be able to attract a highly qualified workforce, however, on the other hand, these enterprises might have a narrow specialization with a high quality. There are such enterprises which work with biological materials and they might represent craftsmen with unique skills.

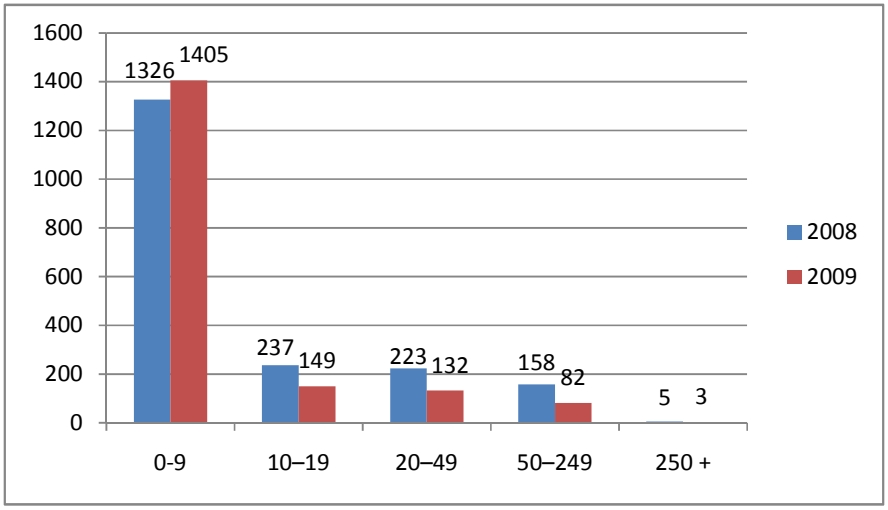

Fig. 5.3. Number of enterprises and employees.

The Competition Council considers that the enterprises should provide various mutually connected services which would promote their competitiveness.

Figure 5.4 shows the distribution of enterprises across years. During the economic crisis the number of companies has decreased, however there has been a rise in the number of self-employed persons, which suggests that a part of the enterprises have not stood the competition, have gone bankrupt or merged and the number of free workforce has increased.

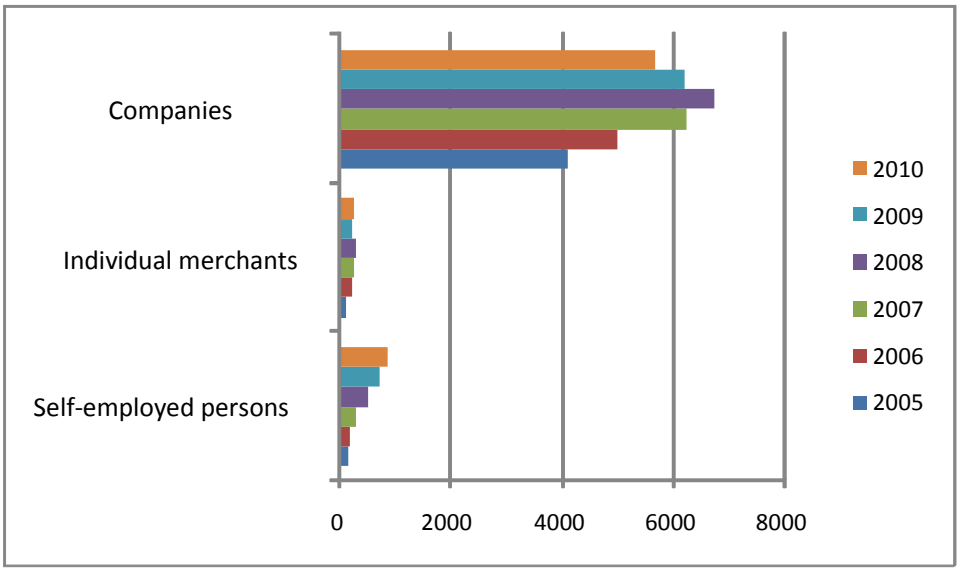

Fig. 5.4. Economically active enterprises in the construction sector.

However, as it is suggested by figure 5.5, the total number of employees in the branch has sharply fallen.

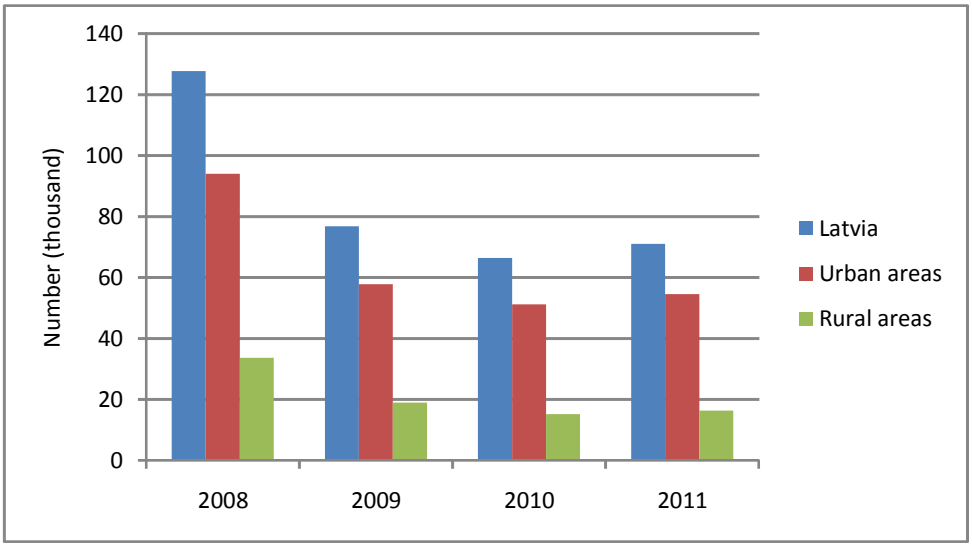

Fig. 5.5. Total number of employees in the sector.

In the Report on the Economic Development of Latvia (December, 2011) the Ministry of Economics forecasts that along with the improvement of the general economic situation in the country there has also been an improvement in the labour market, however its recovery will be moderate. Until 2016 the number of the employed persons is expected to grow in average just by 1.6% per year because the growth will be more based on the increase of the output.

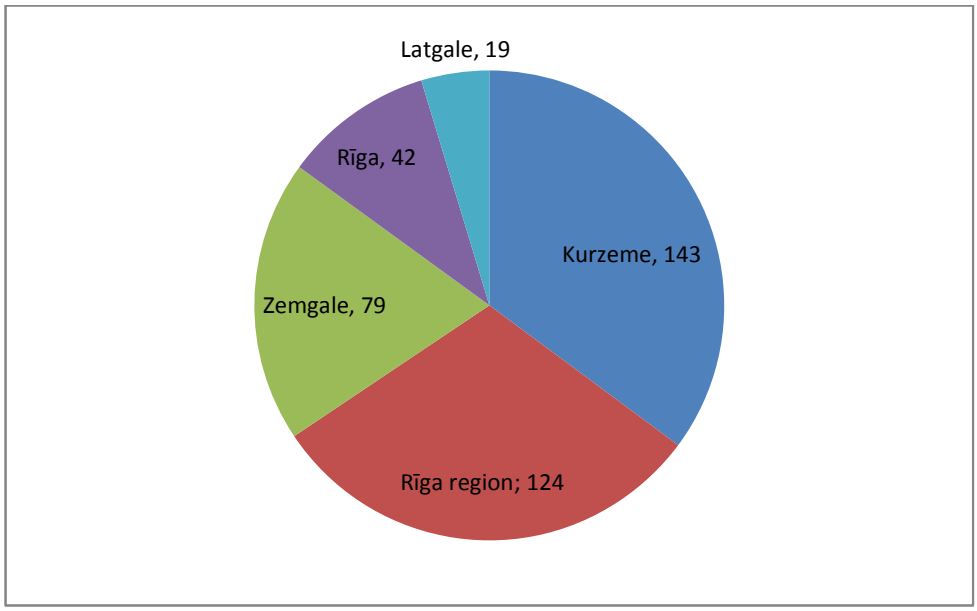

Fig. 5.6. Number of buildings renovated or being renovated within the ERDF activity[35].

Workforce employed in the construction sector

No data are available on the qualification of the persons employed in construction and their distribution across specializations. Such data are not available as no certification of the persons working in construction takes place in Latvia and there is no information regarding employee skills and qualification. When applying for a job the applicant informs the employer about everything he has ever done on a building site and many skills are acquired namely there. Only the graduates of vocational schools are registered by the speciality they have acquired (not by their skills) as well as the persons who have finished various further education courses and the unemployed persons registered at the State Employment Agency. These data do not provide the picture about the actual number of qualified specialists working in the construction sector in Latvia.

To assess the current level of the workforce skills and specialization in the area of energy efficient construction as well as the wishes and needs regarding the employee qualification, a survey of the construction enterprises working in the area of energy efficient construction was made.

When composing the respondent sample it was concluded that in Latvia there is no distinct specialization in the energy efficient construction and mostly the work is done by the same enterprises which work in construction generally. Consequently, the enterprises were selected for the survey which had made energy efficiency improvements within the projects funded by the Climate Change Financial Instrument programme.

All together the respondents include 16 enterprises of various sizes and experience, of which:
4 were founded between 1991and 1999;
7 were founded between 2000 and 2005;
5 were founded between 2006 and 2010.

13 enterprises had mentioned building construction as their core business;
9 enterprises had mentioned construction engineering as their core business;
2 enterprises had mentioned specialized construction as their core business.

[35] Information by the Ministry of Economics

Several enterprises had more than one key area of business.

The owners of almost all enterprises are the citizens or enterprises of the Republic of Latvia with just one exception where there is also foreign equity capital. Three of the enterprises are subsidiaries.

What concerns the number of employees, only in two enterprises there has been no change. The number of employees has decreased in 7 enterprises and in 7 other enterprises it has increased. The same concerns the people working on construction sites. The number of people working in administration remained unchanged when the total number of employees changed. Only in 7 enterprises the number of employees in the administration had changed along with the changes in the total number of employees. This leads to the conclusion that the changes in the labour dynamics have mainly taken place on the account of the persons employed on construction sites.

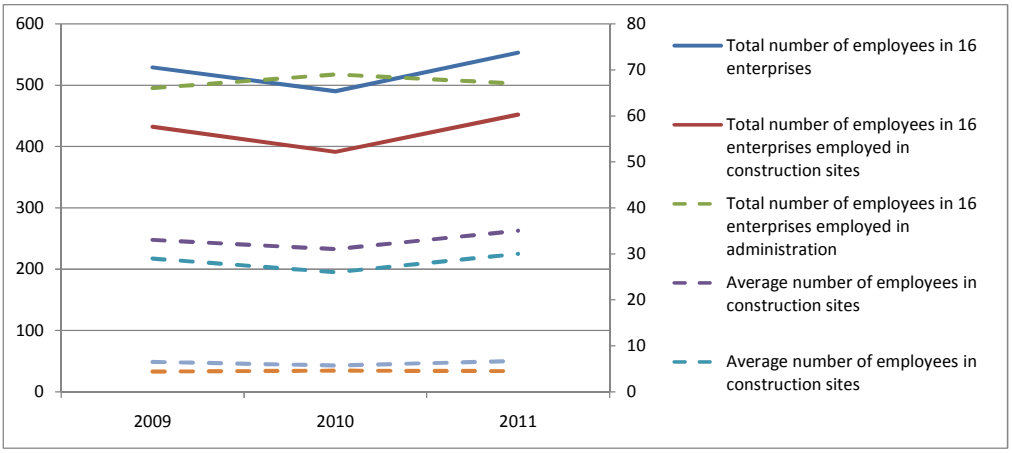

Fig. 5.7. Changes in the number of employees between 2009 and 2011.

As we can see in figure 5.7 the total number of employees and the total number of employees employed on building sites decreased in 2010 and increased in 2011 exceeding the initial level of 2009.

14 of the surveyed construction companies admitted that during recent 5 years they have been engaged in work related to the improvement of energy efficiency all together implementing energy efficiency improvement measures in 80 construction sites, in average 5.3 sites per respondent. The existing level of the workforce qualification is mainly appreciated – considered to be average or high. The enterprises have commented on that saying that they have invested huge efforts in finding, motivating and training their employees, however the overall market situation is not so favourable.

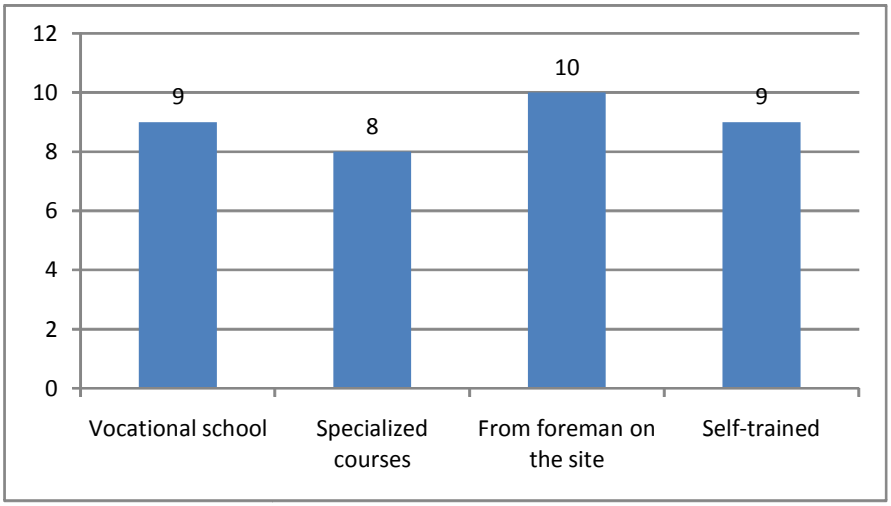

Fig. 5.8. Worker's site of skill acquisition, number of enterprises.

As it can be seen from figure 5.8, a similar number of employees are trained in vocational schools, specialized courses (in Latvia and abroad) as well as learn themselves or with a foreman on the construction site. Mostly the employees have acquired their skills in more than one way. The figure shows that majority of workforce have not been trained in vocational schools and have acquired their skills from a foreman on the site or by themselves. Similarly, it can be forecast that a big part of the employees do not have the diploma certifying the necessary education.

When assessing the level of professional qualification of the employees with vocational education background, no enterprise has assessed it as low or very high (this assessment has been awarded just by enterprises the employees of which have acquired their skills in specialized courses.

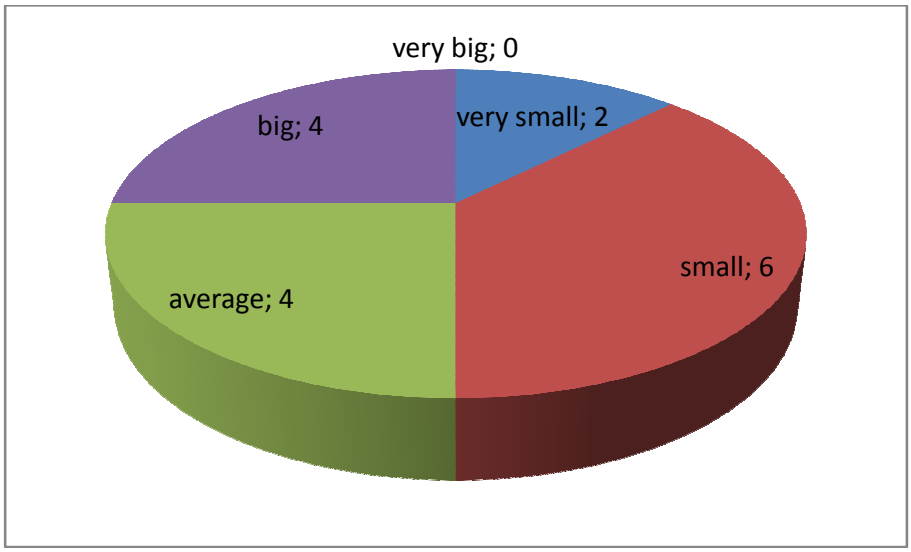

Fig. 5.9. Possibility to recruit workforce qualified in energy efficiency from Latvia.

As it can be seen in figure 5.9, the possibilities to recruit workforce qualified in the area of energy efficiency from Latvia are mostly considered small, average or very small. Only 25% of the surveyed enterprises consider them big.

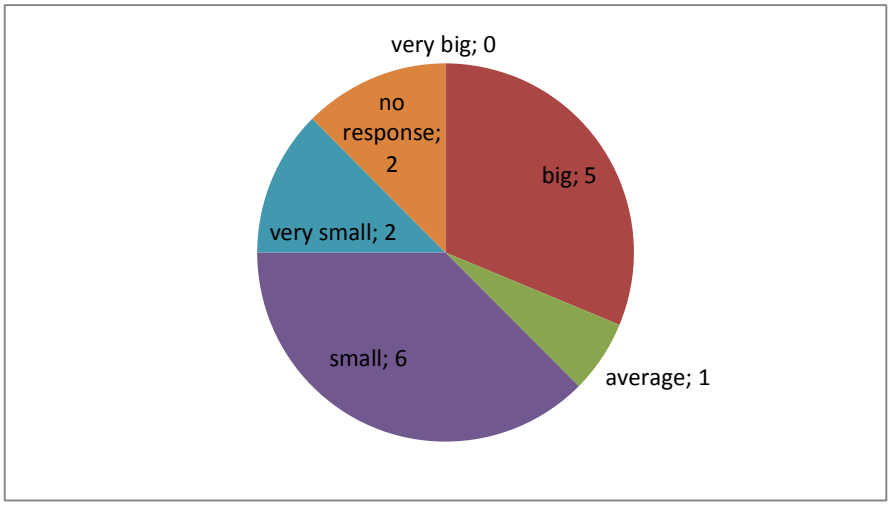

Fig. 5.9a. Possibility to recruit workforce qualified in energy efficiency from abroad.

Figure 5.9a shows that also the possibilities to recruit workforce qualified in the area of energy efficiency from abroad are mostly assessed negatively. It can mostly be explained by insufficient funding or difficulties in accessing the workforce rather than by the level of skills.

Almost all surveyed enterprises admit that there are problems in finding workers in all or some specific professions, for example, layers of all kinds of engineering communications, engineering technologists, plumbers are difficult to find for the salary offered. There is also a lack of insulation specialists. Most of the surveyed enterprises have admitted that it is not difficult to find workers, however, there are more problems with highly qualified specialists – foremen and construction managers. Some respondents admit workers are available, however it is difficult to find the ones who will guarantee good quality.

In the survey there also was a question on the average worker wages depending on the profession, but, as the enterprises were extremely hesitant to share their financial situation, this question is not analysed here.

The possibilities to involve subcontractors are assessed more positively than the workforce. Only 2 of the respondents admitted that it is difficult to involve subcontractors in all of the areas. 7 respondents admitted that they do not face problems in any area.

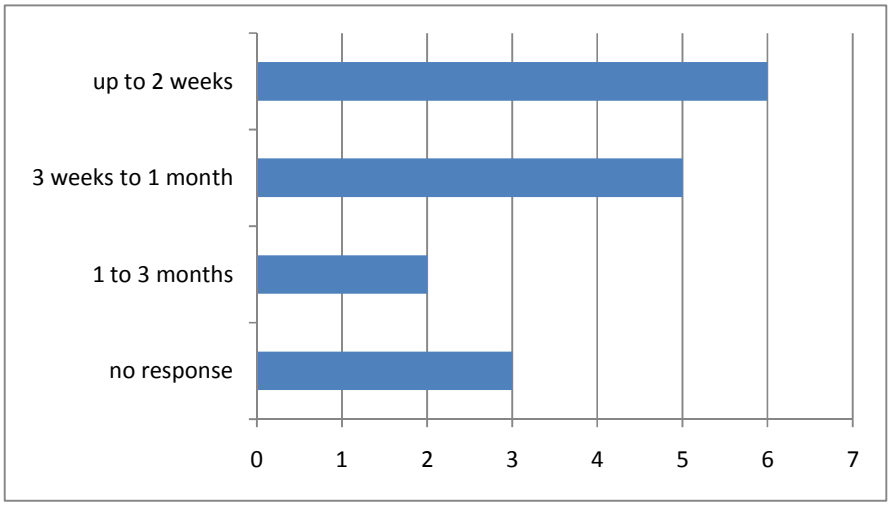

Fig. 5.10. Estimation of the time necessary for training workers on-site.

Within the survey respondents were asked the question about the time necessary for the on-site training of workers by profession. However, as the enterprises mostly did not differentiate the time by professions, the summary presents the overall result. As it can be seen, in figure 6, it is enough with two weeks or even a few days to train workers for working on the site. This is mainly true about experienced workers. Many respondents admitted that they recruited only experienced workers as they did not have sufficient resources for investing in their training or development.

Table 5.1.

Assessment of the reasons for worker turnover

no turnover	3
wage	3
other	4
unserious attitude to work	1
ambition	1
personal	1
miscellaneous	1

Only 3 of the respondents admitted that they did not encounter worker turnover. Wage was mentioned as the key reason for worker change and many respondents admitted that it was difficult to recruit workers for the official pay which was lower than without paying taxes.

Basically the surveyed business people are satisfied with the vocational training of workers. When asked what specialities prospective workers should be taught in the vocational training institutions, majority of respondents (8) admitted that all should be taught – any or all of the current. The professions pointed out particularly were as follows: carpernters, plumbers, engineering technologists and fundamentals of energy-efficient construction work. It was stressed that the knowledge would have to be strengthened in practice.

Almost all respondents admitted that their workers' should receive training to improve their qualifications. This means that the improvement of qualifications with the help of training methods is appreciated. Only one respondent admitted that it is not necessary because all skills can be acquired in practice.

When answering the question about what instruction methods would have to be used with in-service workers, almost all respondents stressed that teaching should take place through prac-

tice and experience exchange and familiarization with the latest solutions. Some of the respondents also pointed out the need for better theoretical instruction and more emphasis on teaching responsibility and thinking rather than cramming of methods by heart.

The majority of respondents admitted that worker qualification requirements had to be established and several of the respondents practiced that in their own enterprises. Respondents also stressed the need to differentiate worker wages in the enterprise depending on their qualification.

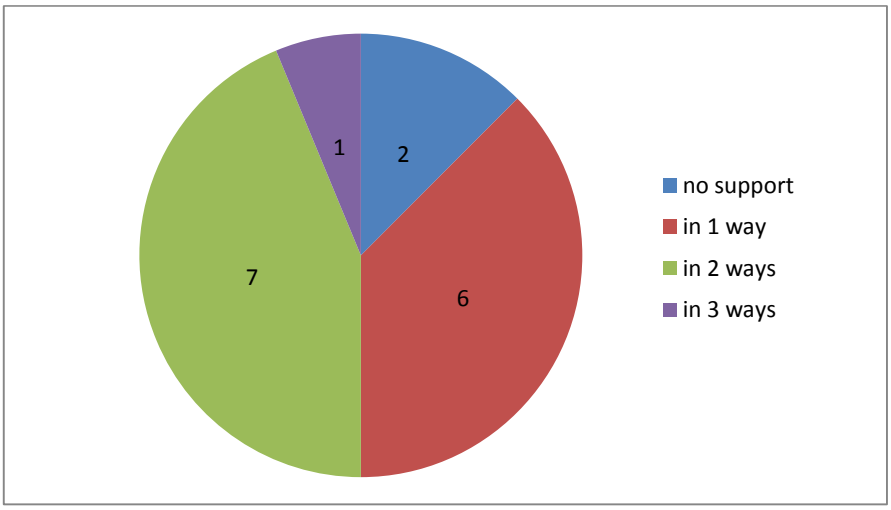

Fig. 5.11. Enterprise willingness to support professional growth of workers.

Figure 5.11 shows that almost all enterprises are ready to support professional growth of their employees.

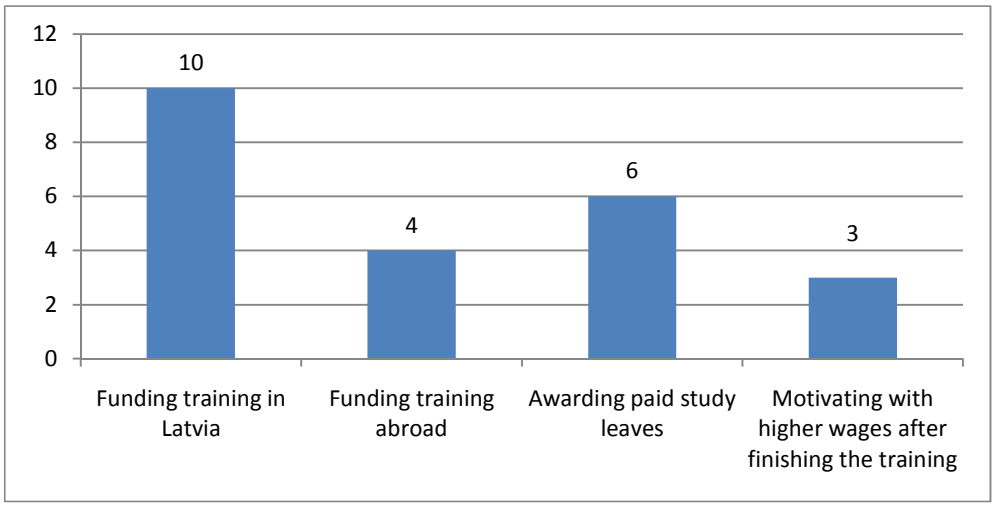

Fig. 5.12. Methods employers are ready to use to support workers' professional growth.

Most often the enterprises are ready to support their workers' professional growth by funding their training in Latvia (mostly in courses) or awarding paid study leaves. Many of the enterprises practiced it already, as they stated.

Workers' education programmes according to their qualification level must include the following:

- Information on the building energy consumption; concepts of primary and final energy;
- Methods of energy efficiency control and accounting of consumption;
- The concepts of the long-term and sustainable construction, energy efficiency, insulation, renewable resources etc.;
- Information on energy audit;
- Overheating of buildings in summer;
- It is necessary to provide for qualitative in-service practices so that the student would spend 2/3 of the training time on the construction site by working 50% of the training time namely in the enterprise. It would be necessary to subsidize contractors which take apprentices and students for in-service practices. The supervision of the in-service practices on the construction site must be compensated – schools should delegate the supervision of the technological practice to the employer;
- Students must be trained to operate the relevant modern equipment.
- More attention should be devoted to the issues of fire safety, acoustics and application of heat insulation;
- Employees should be familiar with the Construction Quotation Catalogue for the worker to understand the notion of work productivity;
- In the energy efficiency context the contents of the studies should be supplemented with the ETAG assembly manual.
- Workers should know construction climatology, fundamentals of heat losses, humidity and heat retention capacity. Workers should understand the construction object as a united system.

6. Analysis of vocational education

The achievement of the climate and energy targets of 2020 is impossible without highly qualified workforce. This chapter summarizes the information about the existing situation and development trends in all forms of vocational education established by the Law on Vocational Education[36] and Education Law[37]. Basic vocational education, initial vocational education and vocational secondary education are provided by the state vocational education institutions and colleges as well as in the form of the instruction of the unemployed for the funds allocated for the training of the unemployed by the State Employment Agency (SEA). Vocational further education and professional development programmes are implemented by state institutions of vocational education, private limited companies (SIA) and privately owned study centres[38]. Informal education courses are organized by the manufacturers and distributors of construction materials, individual seminars take place within the European projects related to energy efficiency.

Organization of vocational education in Latvia

The Cabinet of Ministers establishes the procedure for designing the profession standards**,** the organisational procedures for in-service training, the form of the state-recognised vocational qualification documents and the issuance procedures thereof, establishes the order of funding etc.

The Ministry of Education and Science (MES) designs recommendations for funding allocation and distribution to the vocational education institutions in its subordination, designs

[36] 10.06.1999. Vocational Education Law ("LV", 213/215 (1673/1675), 30.06.1999.; Ziņotājs, 14, 22.07.1999.) with amendments.

[37] 29.10.1998. Education Law ("LV", 343/344 (1404/1405), 17.11.1998.; Ziņotājs, 24, 24.12.1998.) [came in force on 01.06.1999.] with amendments.

[38] www.niid.lv

draft regulatory acts regarding vocational education, approves the statutes of the state vocational education institutions in the subordination of the ministry.

Other ministries cooperate with MES in the development and updating of profession standards, assessment of the vocational education quality, vocational further education as well as in the requalification and training of the unemployed.

Municipalities participate in the implementation of the vocational education, they facilitate development of business in their territory as well as cooperate with the employer organizations and participate in dealing with their issues relating to the provision of in-service sites for the students in the territory of the respective municipality.

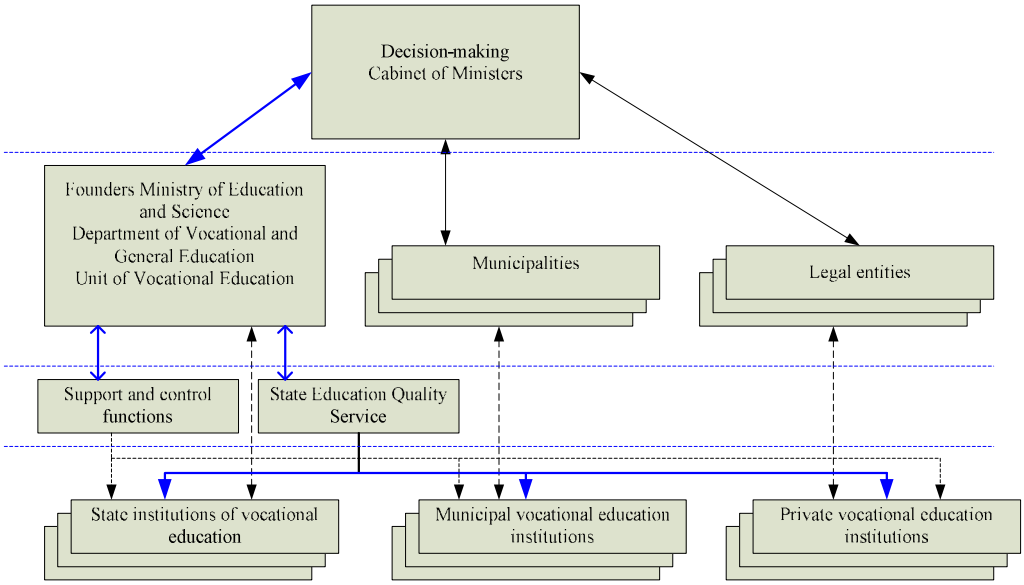

Fig. 6.1. Organogram of Institutions involved in vocational education.

The initial vocational education cash flow is shown in figure 6.2.

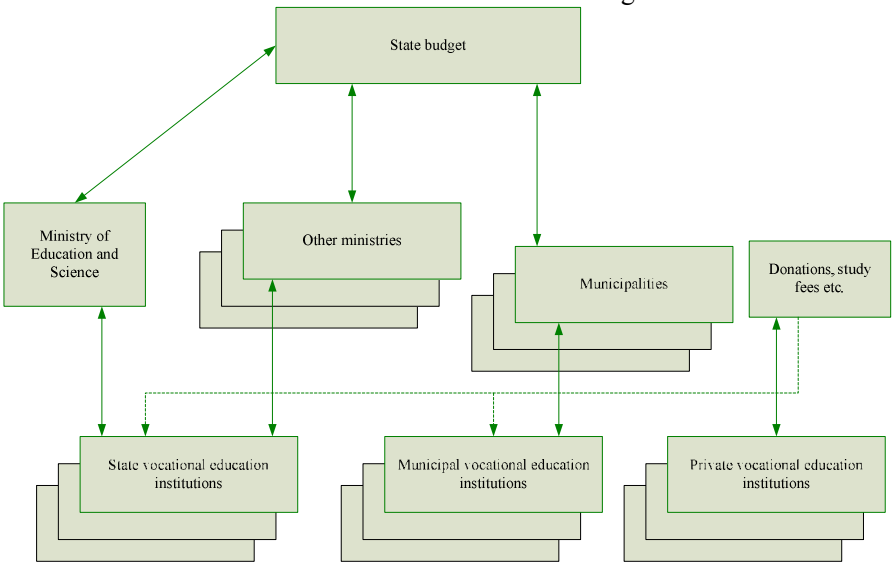

Fig.6.2. Cash flow in the initial vocational education.

Currently vocational education is provided by 57 institutions – basic vocational schools, vocational secondary schools, professional secondary schools, technical colleges and 9 colleges. Education programmes in construction-related professions are implemented by 21 educational institutions in the country which provide for 13 basic construction professions at the 2nd and 3rd qualification level. The length of studies as well as the number of students in each speciality in the educational institutions providing education for construction specialists is presented in Appendix 1. Although the programmes have been licenced and accredited there still are institutions which have no students – the study group has not been assembled. In Appendix 1 these groups have been marked with *.

Following the government resolution "On the guidelines for the optimization of vocational education institution network for years 2010 – 2015"[39], the structural reform of vocational education was started which involves optimization of the number of vocational education institutions and their distribution in regions and creation of the physical infrastructure compliant with the modern requirements. As a result of the optimization, the creation of 13 vocational education competence centres is planned as well as 14 vocational education institutions with a specialization and 2 vocational education institutions for the acquisition of the fundamental skills (from 56 institutions in 2010 to 29 institutions in 2015). To provide specialists for the national economy it is envisaged by 2015 to increase the proportion of the general education school pupils and vocational school students to reach 50/50.

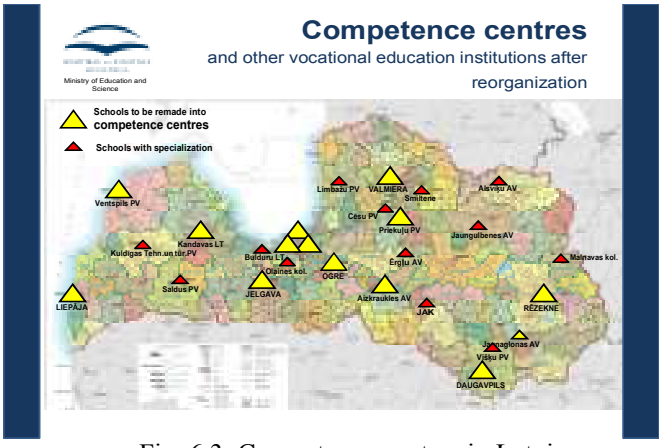

Fig. 6.3. Competence centres in Latvia.

The contents of the vocational education programme are established by the state standards of vocational education and the corresponding profession standard. After the graduation from vocational education programmes the vocational qualification of a certain level is awarded. Vocational education institutions educate the workers with the 2nd and 3rd qualification level. The qualification level indicates the theoretical and practical competences which provide for dealing with the corresponding work duties in terms of complicacy and responsibility. In accordance with the Vocational Education Law (1999) there are five vocational qualification levels presented in figure 6.4. The vocational qualification levels concern only vocational education and could not be automatically referred to EQF levels (see Appendix 10.4).

[39] Order no. 5 of the Cabinet of Ministers "On the guidelines for the optimization of vocational education institution network for years 2010—2015" of January 6,.2010.

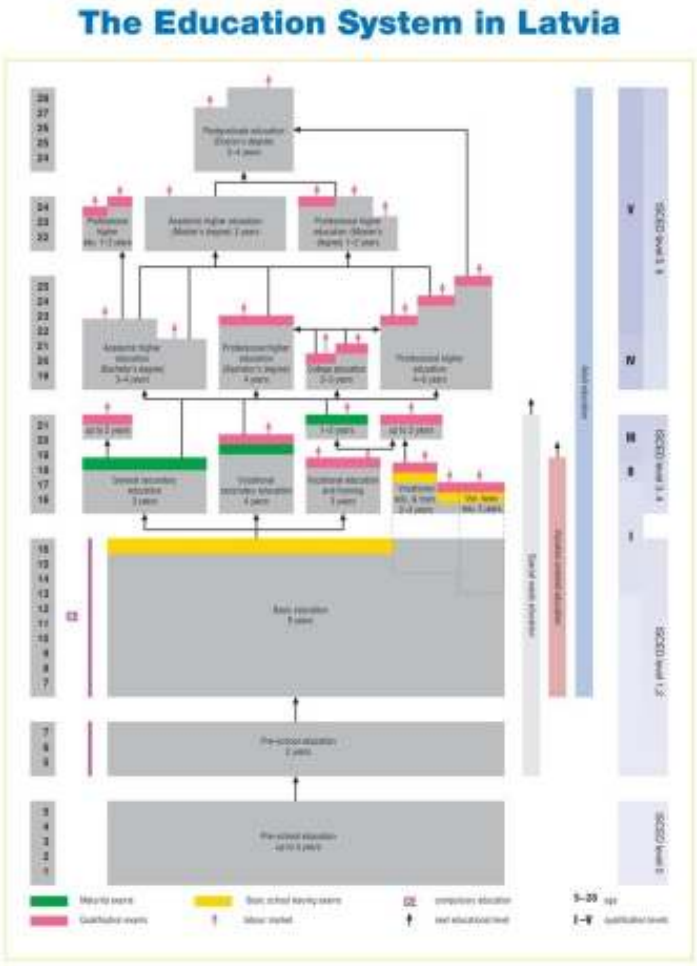

Fig. 6.4. Education system of the Republic of Latvia.

6.1 Documents certifying vocational education

Vocational education institutions are licensed/accredited according to the procedure established by the Education Law and implemented according to the profession standard. Vocational further education and development programmes are accredited by the Ministry of Education and Science, also in the cases when the instruction is provided by private study centres. The acquisition of a profession is certified by the documents determined and recognized by the state which confirm completing a certain vocational education and receiving vocational qualification. A state-recognized vocational education document is issued to the student who has acquired an accredited vocational education programme and passed the vocational qualification and other examinations envisaged in the state vocational education standard. There are the following documents certifying vocational education:

1. Certificate on initial vocational education;
2. Certificate of basic vocational education;
3. Diploma on the vocational secondary education.

6.1.1.1 Vocational education level descriptions for equalling to EQF

When designing EQF level descriptions the vocational education standards were taken into account as vocational education institutions are guided by them when developing the education pro-

grammes they provide. The specific aims and tasks of vocational secondary education and basic vocational education are determined by each individual education programme according to the awarded vocational qualification.

Vocational education in its basic and secondary degree complies with the EQF levels 3-4. As it was mentioned before, EQF level 3 corresponds to the basic vocational education programmes. EQF level 4 contains basic vocational education programmes the graduates of which are not entitled to continue their studies in the higher education programmes and vocational secondary education programmes which allow for continuing studies in the higher education programmes.

6.2 Pegging of the education system of Latvia to the European Qualifications Framework

To implement restructuring of the education contents in accordance with the European Qualifications Framework and integrate it into the lifelong learning context as well as to promote employment by flexible availability of education, in study year 2010/2011 amendments were made in the regulations of the Cabinet of Ministers of Latvia[40]. The regulations envisage continuing the development of new profession standards and new vocational education programmes and updating the existing education programmes in accordance with the changes in profession standards.

Following the conception "Raising of the appeal of vocational education and involvement of social partners in the provision of vocational education quality" (2009), the dialogue is developed between the government and social partners before drafting a new vocational education law. Two main problem areas have been identified: prestige of vocational education and its compliance with the market needs.

Within the optimization of the vocational education institution network municipalities are offered to take over the institutions with a small number of students in order to create integrated education institutions where various general and vocational education programmes are implemented as well as adult and further education. Thus the municipality has the opportunity to make economic use of their financial resources. The creation of such educational institutions is provided for within the activity "Support to the optimization of the general education institution network" funded by the European Regional Development Fund.

To ensure the **compliance of the vocational education and training with the market needs** the vocational education process is designed in ever closer cooperation with social partners, Employers' Confederation of Latvia and sectoral associations, Free Trade Union Confederation of Latvia and sectoral trade unions, professional organizations and employers who participate in designing and assessing of the vocational education contents by accrediting vocational education institutions and vocational education programmes, awarding vocational qualifications and providing students with in-service practice sites as well as by contributing to the development of the professional mastery of teachers and students. A decisive factor for prospects in the labour market is the employer demand and cooperation.

The funding of the European Social Fund and European Regional Development Fund allows for the modernization of education programmes by introducing the module system, improving the study course contents, formulating study results as well as making investments for the improvement of physical infrastructure:

- sub-activity "Support to the improvement of quality and implementation of initial vocational education programmes" within which support is to be provided for the improvement of the teaching methods and intellectual resources as well as organization and procedure of studies thus facili-

[40] Amendments in Regulations no.211 of the Cabinet of Ministers "Regulations on the state vocational secondary education standard and state basic vocational education standard" (Regulations no.826 of 07.09.2010) and Regulations no.149 of the Cabinet of Ministers Order for designing profession standards" of 27.02.2007

tating students' faster integration in the labour market and providing for balanced acquisition of competences and skills for professional work and continuation of education;
- sub-activity "Modernization of study equipment and infrastructure for the implementation of vocational education programmes", which will provide support to the improvement of the vocational education institution buildings, including students hostels, and infrastructure, modernization of study equipment, machinery and technologies as well as modernization of the library and at least two science classrooms;
- sub-activity "Creation of the sectorial qualification system and restructuring of vocational education";
- sub-activity "Development of vocational education teachers' competence";
- with the involvement of the Climate Change Financial Instrument – project "Complex solutions for the reduction of the greenhouse effect gas emission in the buildings of state and municipal vocational education institutions".

State Education Development Agency in cooperation with the National Centre for Education, State Education Quality Service, Employers' Confederation of Latvia and Free Trade Union Confederation of Latvia uses the project funding of the sub-activity "Development of a sectoral qualifications system and improvement of the efficiency and quality of vocational education and training" for exploring various industries. Within the project it is planned to study 12 sectors and according to the study results to design 80 professional standards and create 55 vocational education programmes by using the module approach as well as create 12 sectoral expert councils and approbate the introduction of **ECVET** (European Credit system for Vocational Education and Training) and **EQAVET** (European Quality Assurance in Vocational Education and Training) in vocational education. The Ministry of Education and Science coordinates the credit point creation mechanism based on the information acquired in the EC ECVET working groups.

On 18 June, 2009 the European Commission and European Council designed recommendations for the introduction of ECVET 2009/C 155/02, envisaging that the transfer of credit points is referred to all levels of the European Qualifications Framework to facilitate the transnational mobility, recognize the results of vocational education studies (vocational qualification) and facilitate lifelong learning. In each member state the respective regulatory acts are adopted and the expression of the study results in credit points has been started in practice. The credit points are started to be recognized in the member states in order to enable the comparison of the study results among the European countries[41].

6.3 Certification of construction specialists

Certification of the construction worker professions is not practiced. In Latvia only builder's and architect's practices are certified. According to the regulations of the Cabinet of Ministers, the certificate can be claimed only if the person has acquired both levels of higher education in architecture or in the respective engineering speciality and the requirements of the regulations have been met.
The competent institutions for assessing the professional compliance of builders in the regulated areas are as follows:

- Latvian Building Engineers Union;
- Latvian Association of Architects;
- Heat, Gas and Water Technology Engineer Association of Latvia;
- Latvian Association of Geotechnicians;
- Independent Certification Centre

[41] Informative report on raising education efficiency and quality in general, vocational and higher education, on the provision of the application of students' theoretical knowledge and on the European Union funding in education. Ministry of Education and Science, 2011.

Low-skill worker professions are not certified in the construction sector and there are no qualification levels, consequently workers are not motivated to grow professionally. Worker qualification is certified by the state-established documents of education and certificates on the completion of a narrow specialization courses.

6.4 Dynamics of construction sector labour market

After the rapid fall of wages in 2009 and 2010 in 2011the situation stabilized and this year has seen a rise which is explained by the lack of specialists.

It can be forecast that in future for the employers in the construction sector it will be most difficult to find the lowest and middle level employees and employees doing specialized construction work as namely these groups have emigrated most. Among the most popular job search destinations there are UK, Germany and Sweden. However, it must be pointed out that the forecast leaving of workforce for Germany has not come true. It might be due to the language knowledge or the fact that when applying for a low-qualified job in Germany the applicant is required to present education documents certifying the applicant's skills. In Latvia the qualification document is not compulsory for the lowest and middle level employees, which explains the rotation of workers from one profession to another depending on the work and pay. It is impossible to establish the employee's qualification and as a result the quality of the performed construction work suffers. Even if Latvia succeeded in solving its labour problems now, the demographic data indicate that in the future they will intensify anew anyway. The forecast in figure 6.5 shows the working-age population in Latvia.

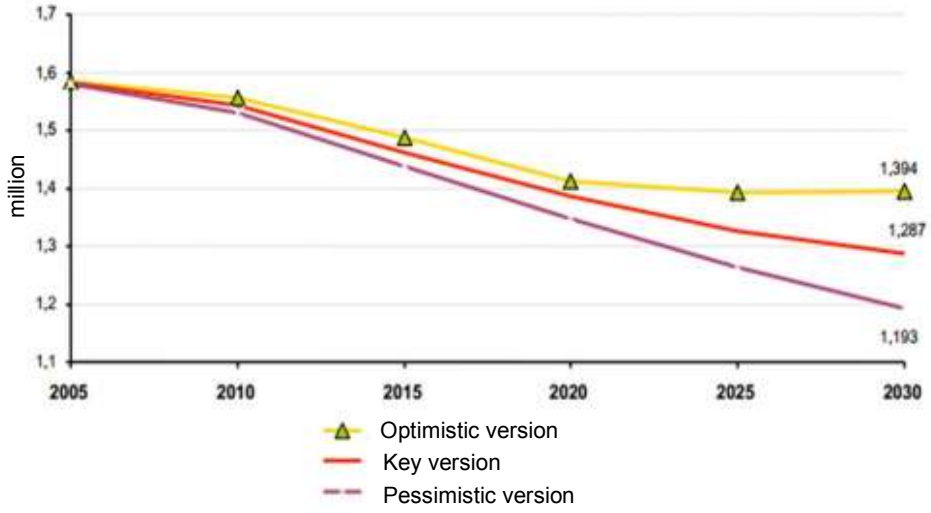

Fig. 6.5. Forecasts of the working-age population in Latvia

This means that in the next 8 years the number of vocational education institution graduates will keep decreasing. This trend is confirmed by the current data on the number of students in the vocational education institutions. The data about the number of students currently taught in construction specialities in vocational education institutions are presented in table 6.1.

Table 6.1.

Graduate numbers forecast based on the number of students enrolled in construction specialities[42].

Years	2012	2013	2014	2015	Total
Potential graduates	812	612	639	507	2583

The inability to assemble groups for vocational education institutions means the reduction in budget funding; this leads to decreased teachers' salaries which will later affect the quality of teaching. The key problems in vocational education institutions are connected with the course contents, number of students, lack of teachers and funding. If the number of potential graduates remains unchanged then until 2020 5166 young specialists will be prepared.

6.5 Other existing courses and training programmes on the energy efficiency of buildings and the use of renewable energy in buildings

There are comparatively few opportunities to improve qualification or receive training in the area of the energy-efficient construction of buildings outside the formal education, with the exception of individual courses or training programmes which have been developed or implemented within individual projects. A big part of the designed education programmes are not implemented in practice or just some courses have taken place about energy efficiency measures, energy audit, designing of passive houses, installation of boilers, construction of low energy buildings and others. During the research several training courses were analysed (see Appendix 10.5). There are courses which comprise a training programme for the professional development of workers, however none of them is aimed at developing energy-efficient construction skills, but rather focuses on general construction.

6.6 Conclusions and recommendations

The implemented vocational education system analysis leads to the conclusion that in the construction area the vocational education system of Latvia has to be supplemented in levels 1 to 3 with the elements and programmes of energy efficiency. The analysis shows that in the area of construction in the vocational education system of Latvia there is no certification (categories) of worker professions which would allow differentiating workers according to their qualification. The survey of contractors proves that mostly workers do not even have the necessary education and many acquire the profession from the foreman on the building site. In construction area of the vocational education system of Latvia formal in-service practices is a norm; there is no incentive system for in-service practice supervisors and mentors to take students for in-service practice and pass their knowledge over to the students of vocational education institutions. The training of the students on the construction site is associated with big investments (specialist remuneration, work security measures, insurance). Thus, for example, the programmes of construction technologists and technologists of engineering communications are implemented disregarding the profession regulation.

The surveyed contractors emphasize that much time should be devoted to training workers and preparing them for independent work. On the construction site employers expect the knowledge and implementation of certain operations from the worker/specialist, however schools lack the necessary equipment for hands-on training and the employers themselves do not provide for qualitative technological in-service practice (envisaged for 900 hours (half a year) for the students of the 3rd level qualification) because no funds are allocated for remunerating the practice supervisor for training in-service students on the site. Moreover, the installation of such equipment as heat pumps or sun collectors is also possible just theoretically

[42] www.izm.gov.lv/registriunstatistika...

and students learn the practical part of it on the in-service site which does not correspond to the employers' interests.

In Latvia there is no instrument developed for forecasting development trends and monitoring of new technologies, employee qualification and the training necessary in the construction sector which interferes with designing long-term plans, involvement of qualified teaching staff and developing physical infrastructure for training. In Latvia there is no incentive system for construction sector employers to take students for in-service practice and for practice supervisors and mentors to pass their knowledge to the students of vocational education institutions. As it was mentioned before, many enterprises are small or medium and it is difficult for them to recruit qualified workforce; similarly, it is difficult to encourage employee training as there is frequent employee turnover, the enterprises cannot provide for stable income and shadow economy is common in the construction sector.
Currently it would be important to revise the construction profession standards in the context of the targets of 2020 disregarding the fact that there is no non-government organization in Latvia which would deal with the improvement of professional competences of workers employed in construction. According to the future forecasts and targets of 2020, a rapid increase in the lack of construction specialists will be seen. The key weaknesses of the workers currently employed in the construction sector:

- No understanding about the energy efficiency solutions;
- Lack of knowledge and skills;
- Lack of self-dependence.

The qualified worker education programmes (3rd qualification-level programmes, 4-year programmes) provide for very fragmented and narrowly specialized professions like masons, painters, plasterers etc., however the programmes do not emphasize the energy efficiency issues.

The newly created competence centres lack physical infrastructure for hands-on training which is extremely material-intensive, requires large premises, stands and study polygons without which the provision of qualitative training is impossible. There are various study centres which organize and provide courses, however employers are not always satisfied with the quality of training there. As vocational education institutions have both the teachers and study basis, it would be necessary to organize the training of the unemployed, professional development training and further education in these institutions. The State Employment Agency, however, orders the training of the unemployed through the Public Procurement Service by announcing tenders which often have the lowest price as the main criterion.

The training of adults for additional qualifications in the vocational education institutions should be made more significant. As the number of students in vocational education institutions is decreasing, this would provide for the training of qualified employees as well as exploitation of the education institutions.

7. Weaknesses and obstacles in achieving the aims of 2020

7.1 Forecast of investment opportunities in the projects connected with raising energy efficiency of buildings from 2012 to 2020 and potential sources of investments

The raising of energy efficiency of buildings will be directly related to the investments contributed to achieving the specific aim. At the moment there is no specific information about the future investments, however, it can be forecast that all investments will be divided in two groups:

1. The key source of investments will be the European funds which, according to the existing information, can be divided by ministries as follows:

- Insulation of apartment buildings – Ministry of Economics,
- Insulation and renovation of administrative and public buildings – Ministry of Environment Protection and Regional development,
- Insulation and renovation of educational premises – Ministry of Education and Science;

2. The second source – other investors:

- Municipalities, in the buildings in their ownership;
- Private investments – to provide for increasing the energy efficiency of apartment buildings, the investments aimed at diminishing the high costs for heating the buildings.
  Thus, the future demand for the qualified workforce will also depend on the amount of investments for improving the energy efficiency of buildings.

7.2 Selection of methodology for calculating labour resources

For the time being there is no one generally approved methodology for calculating labour resource methodology. In order to attract the necessary amount of workforce the term of labour intensity should be defined under predictable investments forecast for the energy efficiency improvement projects in buildings.

The regulations of the Cabinet of Ministers[43] define "labour intensity in construction" as the time necessary for completing a specific unit of construction work expressed in person-hours.

Labour intensity constitutes a part of any construction work estimate. It is calculated in person-hours and indicates how much labour resources are necessary to do the work envisaged in the estimates.
Assuming that one working day consists of 8 hours and there are 21 or 22 working days or 168—176 working hours per month, the number of people can be calculated to do the work envisaged in the project if the construction time is known.
It must be taken into account that the insulation work can be done only during suitable or good weather conditions and this kind of work is distinctly seasonal. Thus in Latvia insulation can be started not earlier than on April 1 and implemented until October 1 the latest – all together for 7 months a year. In this period there are 126 working days or 1,004 working hours.
There certainly are projects where it is possible to work for the whole year, for example, the projects which are connected with plumbing or electric installation, however, all together it can be assumed that the proportion of such work is very small. Considering also the costs of such work they will not be analysed further in this report.
When knowing the total project costs and its labour intensity it is possible to calculate the costs of one person-hour or person-day if the construction deadline is known; consequently, it is also possible to calculate the number of people necessary for doing the work envisaged in the project.

Key calculation formulae:

$$\frac{\text{Total project costs (LVL)}}{\text{Labour intensity (in person-hours)}} = \text{costs of 1 person-hour x 8 hours} = \text{1 person-day /costs}$$

$$\frac{\text{Labour intensity (in person-days)}}{\text{Construction time (in person-days)}} = \text{Necessary number of people}$$

[43] Regulations of the Cabinet of Ministers of the Republic of Latvia no.1014 of December 19, 2006 "Regulations on the Latvian building standard LBN 501-06 "Order for establishing construction costs" ".

The application of this calculation model and knowing of the planned amount of investments per year allows calculating how many people will be occupied in construction.
The data on project costs can be received either from the institution which claims funding, for example, there are project control estimates available in municipalities, or by using the construction costs of a real project which have been calculated by a contractor, or during the project public procurement procedure if a project has not yet been implemented, or by using the estimates of an already implemented project. Taking into account that the project application and approval time is rather long and costs of construction work may fluctuate and grow, there is a reason to believe that the actual situation in the market can be established by using pre-established project costs of existing projects.

Considering the specific character of the projects under examination – the energy efficiency improvement in buildings, it is possible to determine the main kinds of construction work necessary for the implementation of the established target:

- roof construction,
- window replacement,
- insulation of facade and basement ceiling,
- electric installation,
- plumbing.

It can be concluded that according to the Profession Classifier the following professions will be necessary to implement these projects: roofers, plasterers, window fitters, electricians, plumbers-fitters.

7.2.1 Systemization of projects, key groups

Each construction project is different therefore it is difficult to establish the optimal or average sample of project systematization. Disregarding the difficulty all projects can still be divided into three bigger fundamental groups based on similar costs, degree of difficulty and technical solutions:

- "Classic" renovation. It comprises the thermal insulation of the outer basement walls and ceiling, reconstruction of the edge, thermal insulation and plastering of outer walls, window replacement, roof insulation and creation of a new damp-proof course.
- "Upgraded" renovation. It comprises all work included in the first option. In addition, this group comprises the reconstruction of the heating system, change of the heating distribution unit, new insulation of pipes, restoration of water pipes and sewerage.
- "Deep" renovation. This group involves the work mentioned in both of the previous groups, in addition to which there is also the fitting or reconstruction of the cooling system, mounting of sun collectors for hot water preparation, installation of heat pumps for heating, heat withdrawal equipment for the fecal sewerage system. There could be other exotic and expensive solutions.

The analysis of various renovation project estimates and the specific character of building insulation projects makes the authors forecast the likely division of worker professions according to the Profession Classifier of the Republic of Latvia:

1. Roof insulation with stone wool or other thermal insulation materials as well as the construction of the damp-proof roof cover by a roofer. The average working day of a roofer costs 130 LVL;
2. Insulation, plastering and final decoration/painting or finishing is done by a plasterer, The average working day of a plasterer costs 100 LVL;
3. Mounting of plastic windows is not mentioned in the Profession Classifier, this work may be referred to the one pertaining to a carpenter. The same concerns the mounting of plas-

tic/aluminium windows. The average working day of a carpenter/window fitter costs up to 235 LVL;

4. Miscellaneous kinds of work connected with the replacement or additions to the water-supply, sewerage, heating and cooling systems. The average working day of a tinker/cooling systems fitter costs between 380 and 405 LVL. The average working day of a plumber/locksmith costs between 100 and 125 LVL.

The comparison of the proportion of each group in a project shows that the first three groups are the main ones and may account for up to 90% of total amount of work in a project. The calculations of the workforce necessary until year 2020 will be based on these data.

7.2.2 Forecast of workforce needed for energy efficiency improvement work in construction sector

The GDP forecast of the Bank of Latvia[44] for the nearest years is 1.3% (see fig.7.1), however, the economic indicators of the first months of 2012 may require the revision of the forecast. Figure 7.1 shows changes in GDP (compared to the respective period in the previous year – Bank of Latvia forecast*).

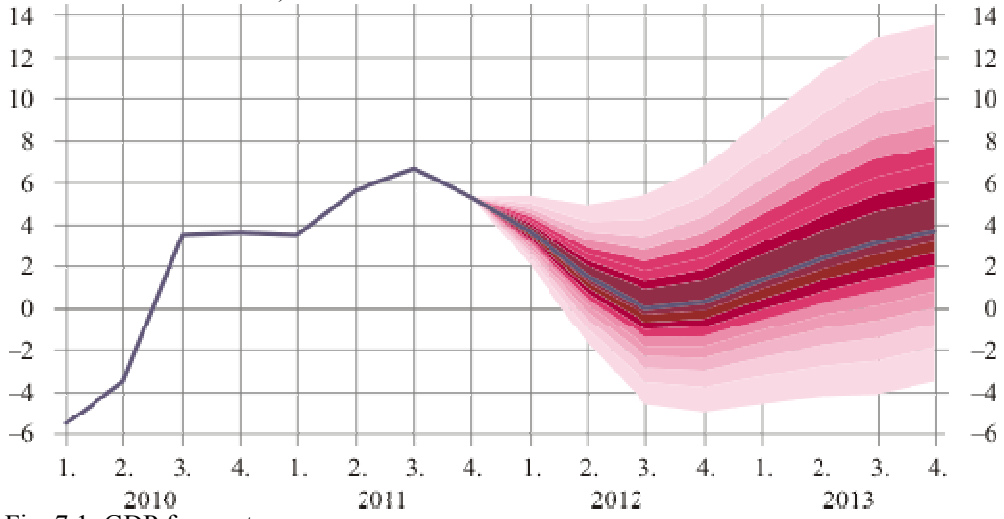

Fig. 7.1. GDP forecasts

*The coloured area covers 90% of all possible scenarios (the lighter the colour, the less likely is that the scenario will come true).

One of the factors which can significantly influence the GDP growth is the fall in the number of population in the future. As it is suggested by the GDP growth forecast created by the Ministry of Economics[45] the number of the population of Latvia will continue to decrease. In 2016 the total number of inhabitants will have decreased. Along with the renewal of the economic growth both under the faster and slower growth scenarios a gradual increase of population involvement is expected. According to the demographic forecasts the number of working-age population in Latvia will decrease faster than the total number of population which is mainly explained by the aging of population, lasting low birth-rate and emigration of population.

In its forecast the Ministry of Economics considers such important factors as the aging of workforce in some profession groups and within certain thematic education groups and levels as well as the professional mobility of workforce. The model of forecasting medium-term developments in the labour market consists of three basic sections: labour market demand sec-

[44] Review of Macroeconomic Processes of April, 2012. http://www.makroekonomika.lv/node/4629
Bank of Latvia forecasts, April 2, 2012, http://www.makroekonomika.lv/latvijas-bankas-prognozes

[45] "Informative report on the forecasts of compliance between labour supply and demand in medium term" by the Ministry of Economics (2011), http://www.lm.gov.lv/upload/darba_tirgus/darba_tirgus/emzino_130611.pdf

tion, education section and labour market supply section. The logic behind the model operation is based on the demand and supply aspiration to the equilibrium in the medium term, which is mainly determined by the gradual adaptation of the supply side to the labour market demand. The GDP forecast of Latvia in the industry cross-section (actual growth percentage compared to the previous year) is presented in table 7.1 and shifts in labour demand within sectors are shown in table 7.2.

Table 7.1.

GDP forecast for Latvia in industry cross-section

	2011	**2012***	**2013—2016*** (average per year)
GDP	**3.5**	**4.0 / 2.5**	**4.9 / 2.9**
Construction	4.3	5.2 / 2.9	8.2 / 4.6

* in the numerator – in case of faster growth scenario, denominator – slower growth scenario

Table 7.2.

Shifts in labour demand within sectors, %

	Faster growth scenario		**Slower growth scenario**	
	2016 to 2008	2016 to 2010	2016 to 2008	2016 to 2010
Construction	-23.4	46.3	-33.6	26.8

The shifts in the number of economically active population are closely related to the forecast trends in population numbers across age groups. The distribution of labour supply by age group is provided in table 7.3.

Table 7.3.

Distribution of labour supply by age group

	2010		2016
		Faster growth scenario	Slower growth scenario
Total	1157.1	1123.4	1094.9
15—24	131.9	-41.9	-44.2
25—34	289.4	27.6	19.5
35—44	279.6	3.6	-3.6
45—54	287.0	-14.2	-21.2
55—64	146.2	5.3	1.4
65—74	23.1	-13.9	-14.1

The Ministry of Economics considers that the labour supply and demand will reach equilibrium on the level of vocational secondary education. Bigger problems in the construction sector, however, might arise in the engineer, architecture and city planning group.

Workforce calculation

Two scenarios have been created to calculate the workforce:

1. Base scenario
2. Latvia 2020 scenario
3. Average growth scenario

Base scenario

Guided by the GDP growth forecasts by the Bank of Latvia and Ministry of Economics which have been partly calculated until year 2016 and statistics for the previous period, a forecast is created considering the fact that the construction volume forecast by the Ministry of Economics comprises not only building construction and renovation, but also other construction work such as road construction, construction of engineering communications and others. It is assumed that the proportion of energy efficiency improvement projects will not exceed 20% of

the whole construction volume. Currently the co-funding of the European funds is available in Latvia, however the funding will discontinue already in the next year. Private investments will also be minimal as a big proportion of the country population have suffered from the availability of cheap loans and will be cautious about taking new ones; consequently, in the current economic situation it is difficult to forecast the volume of work and respectively also the growth of workforce.

In order to create an approximate forecast of the number of workforce for this volume of work the authors assume that the number of workforce will grow in proportion to the volume of work. Thus it is possible to calculate the possible number of workers based on the calculations above – 81 workers per 1 million inhabitants.

Table 7.4.

Forecast of the number of workers needed until year 2020

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Construction volume	893,853	919,774	962,084	1,006,340	1,052,631	1,094,736	1,138,525	1,184,066	1,231,429
Volumes of energy efficiency improvement projects in buildings	178,770	185,216	192,416	201,268	210,526	218,947	227,705	236,813	246,286
Number of necessary workers	14,418	15,002	15,585	16,302	17,052	17,734	18,441	19,182	19,949

* The calculation is based on the GDP growth forecast for year 2012 – 2.9% and 4.6% in the period from 2013 to 2016. The GDP growth could decrease in period from 2016 to 2020 and account for average 4% per year.

Latvia 2020 Scenario

Following the energy efficiency target of decreasing the energy consumption of buildings by 20 % until 2020 renovations are necessary for a half of the housing, which might cost 1.5 to 1.8 million LVL. This means additional 15,000 to 18,000 employees per year just for the renovation measures to achieve the established energy and climate targets until 2020. Both development scenarios are provided in figure 7.2.

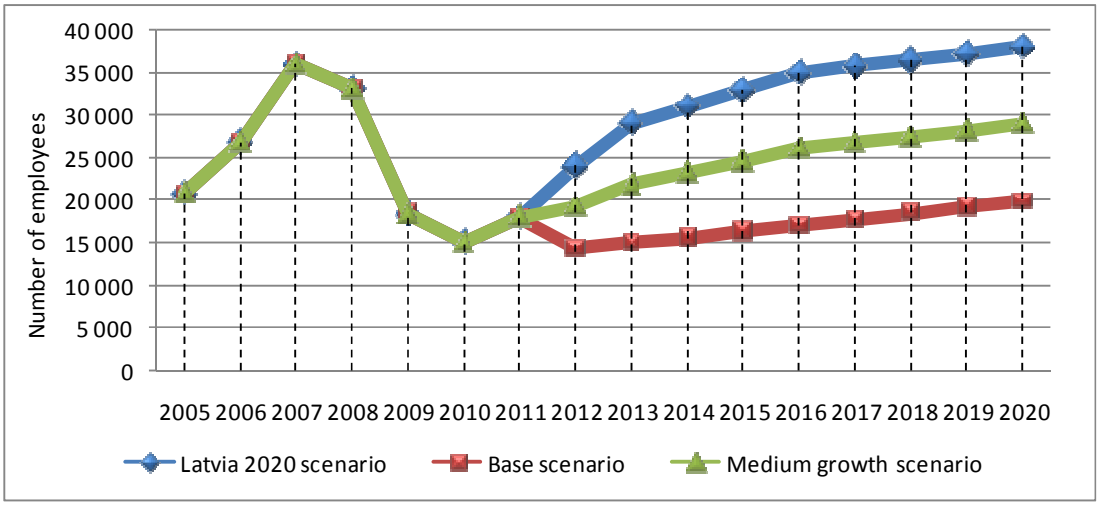

Fig. 7.2. Forecast of workforce needed until year 2020.

As it was concluded before, all workers involved in energy efficiency improvement projects in Latvia can be divided in 4 big groups: roofers, plasterers/finishing work specialists, window and door fitters – carpenters; fitters of internal engineering networks – water supply and sewerage, heating and cooling system reconstruction specialists as well as electricians performing the related electric installation work.

The division of the total amount of the necessary workforce into the four groups is relative. It is assumed that the biggest proportion of work is the thermal insulation of the facade performed by workers doing the finishing which may constitute about 55% of the total volume of work, roofers' job may account for 14%, window and door fitter volume could be 20% and the rest of work – 11% might account for the fitting of the internal engineering networks.

Following the proportions it can be concluded that the division by profession groups for the base scenario and Latvia 2020 scenario could be the following:

Table 7.5.

Distribution of necessary workforce by profession across years

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Base scenario									
Plasterers – finishing work specialists	7,930	8,251	8,571	8,966	9,379	9,754	10,143	10,550	10,792
Roofers	2,018	2,100	2,182	2,282	2,387	2,483	2,582	2,685	2,789
Window/door fitters	2,884	3,000	3,117	3,260	3,410	3,547	3,688	3,836	3,990
Fitters of internal networks	1,586	1,651	1,715	1,794	1,876	1,950	2,028	2,111	2,378
Latvia 2020 scenario									
Plasterers – finishing work specialists	13,200	15,950	17,050	18,150	19,279	19,654	20,043	20,450	20,931
Roofers	3,360	4,060	4,340	4,620	4,907	5,003	5,102	5,205	5,328
Window/door fitters	4,800	5,800	6,200	6,600	7,010	7,147	7,288	7,436	7,611
Fitters of internal networks	2,640	3,190	3,410	3,630	3,856	3,931	4,009	4,090	4,186

Following the forecast demographic situation it can be concluded that in the nearest the future construction sector may face labour deficit as there will be a small inflow of young people.
The second little discussed problem in Latvia is the health issues of workforce. According to legislation, builders' health has to be examined by doctors' commission once in two years. For experienced workers with the length of service of 15—20 years already at the age of 45 difficulties arise in passing the doctors' commission as most of the workers already have some chronic disease which limit employing them in many jobs, for example, working on a high elevation and other important kinds of work involved in energy efficiency improvement. At the age of 60 90% of workers most likely will be unable to continue their work in the construction sector.
These problems cannot be solved in the forthcoming years.

Two possible scenarios can be forecast as follows:

The first scenario assumes that sufficient funding is ensured for energy efficiency improvement projects. Labour costs will automatically increase due to the labour deficit – as a result, the construction sector wage will become more competitive and additional workforce will flow in from other branches of the national economy. The return of workers from abroad may also be forecast. Thus the domestic labour reserves of the country will be exploited.

The second – workforce will be brought in from abroad.
In both cases the rise in the worker price is expected and it will impossible to decrease the labour deficit neither under the first, nor the second scenario.

8. Obstacles and recommendations for the implementation of 2020 objectives

During the analysis performed within the report by organizing expert meetings, surveying the contractors involved in energy efficient construction and studying the available literature several obstacles were detected in relation to vocational education, construction and implementation of the climate and energy targets established for 2020. Similarly, the first steps were outlined which would allow achieving the aims and raise the employee competences.

8.1 Vocational education

- The number of students decreases year by year, it is difficult to assemble study groups which results in low-paid teachers and practical training supervisors. In the construction sector area of the vocational education system of Latvia in-service practices are a formality; there is no incentive system for in-service practice supervisors and mentors.
- Lack of qualified workforce in all builder professions. Besides, the physical infrastructure in vocational education institutions is outdated; teacher and practical training supervisor salaries have been decreased to the minimum salary level which is combined with increased requirements and workload. The pedagogical staff are aging and lagging behind the new technologies.
- Low vocational education prestige. Young people do not choose the most prospective/necessary professions (possibly there is a lack of publicly available and understandable information).
- There is no certification (categories) of construction sector worker professions in the vocational education system of Latvia.
- No instrument has been designed in Latvia for forecasting and monitoring development trends in new technologies, worker qualification and training necessary in the construction sector.
- It is very complicated for the small and medium enterprises of the construction sector to facilitate the training of their workforce. Besides, the large proportion of shadow economy in the construction sector does not facilitate fair competition and employee training.
- In Latvia there is no non-government institution which would deal with developing professional competences of the workers employed in the construction sector.
- Bigger significance should be awarded to retraining of adults for additional qualifications in the vocational education institutions. As the number of students in these institutions is decreasing, this would provide both for training of qualified staff as well as due exploitation of the educational institution.

8.2 Construction sector as a whole

- Bureaucratic and administrative obstacles. (In accordance with the World Bank study "Doing Business", Latvia ranked 79th in terms of the construction approval procedures in 2011. The official construction approval procedures take 186 days and require 24 different procedures).
- Corruption.
- Unequal competition which is based on the fragmentation of the construction sector and merging of the big contractors with the aim to win public procurement contracts.
- Legislation imperfections and drawbacks.

- Big volume of legislation which governs the construction sector regarding the contracts funded by the EU funds.
- Low level of workforce competence.
- Lack of transparency in public procurement procedures.
- Legal proceedings are inadequately long.

8.3 Achievement of climate and energy aims

- To reach the maximum of the directive targets with the existing funding it is necessary to promote the raising of private investments by creating and facilitating new funding mechanisms, including:
  - EU funding as an indirect support;
  - Implementation of ESCO and PICO (Public Internal Performance Commitments) principles in dealing with housing renovation and energy efficiency projects based on business principles;
  - Subsidized loan interest rates;
  - State guarantees for loans;
  - Partial extinguishing of a loan if certain criteria are met;
  - Indirect support mechanisms, including tax reliefs or higher taxes to the buildings that do not comply with energy efficiency requirements.

- To achieve the established aims the involvement and interest of the owners is necessary. It could be attained with the help of informative measures and integrating the requirements in legislation which will impose making renovation thus decreasing the currently established heat consumption threshold.
- Energy efficiency measures are not facilitated in the current legislation, but rather hindered.
  - Decreased VAT rate (12%) is currently applied to heating and gas supply, however the rate applied for the energy efficiency measures is the regular one – 22%, similar to the alternative kinds of fuel – wood and wood granules. Thus energy consumption rather than investments in energy efficiency or use of renewable energy resources is indirectly supported.
  - The value of buildings increases as a result of their renovation; consequently, there is an increase in the real estate tax to be paid. An additional real estate tax rate is not applied in the cases when energy efficiency requirements are not met.
- There is a lack of motivation to apply energy efficient construction principles in all levels of the construction process, including building design, enterprise management, construction work management and construction work performance.

9. Conclusions

There are no national long-term and medium-term development plans for the construction sector and housing. Latvia has undertaken several international commitments and implementation of EU directives, however, currently there are no sectoral development plans and forecasts which would allow for pursuing the established targets.

Buildings in Latvia have a very high energy efficiency potential which is not sufficiently used. Latvia has undertaken several international obligations by establishing specific energy and climate goals:

- To increase energy efficiency by 20% until 2020;
- To increase the proportion of the renewable energy resources in the gross energy end consumption to 40% until year 2020;

- Increase in the end energy user side by achieving 9% energy consumption reduction in the period from 2009 to 2016;
- To raise employment level.

The achievement of these aims is impossible without highly qualified and knowledgeable workers. High quality of construction work in renovation and construction is one of the most important factors in making the investments in raising energy efficiency and using renewable energy resource economically justifiable.

There are no examples in the public space which would demonstrate the relations between the energy efficiency of buildings and achievement of the energy and climate targets of 2020.

Energy efficiency measures are very often implemented to raise EU funds for mitigating the effect of the recession in the construction sector rather than to achieve the reduction in energy consumption.

Buildings in Latvia have low energy efficiency indicators which suggest high potential for raising energy efficiency and achievement of the targets.

Market division and existing legislation do not facilitate the development of small and medium enterprises and consequently their wish to take care of educating their employees.

The workers' own wish for higher qualification is not stimulated by the low and average wages in the construction sector and the absence of the qualification assessment system among workers.

In the country there is no specific vocational education policy and young people are not stimulated to acquire crafts and profession, not only in the construction sector.

The schools which are engaged in training construction sector employees lack physical infrastructure and qualified teachers (low salary, unwillingness to acquire new knowledge etc.). Vocational school students have minimal opportunities to acquire the profession on the building site. The enterprises in the country have no motivation systems in use.

There is a lack of educating information about energy efficiency improvement measures.

There is a lack of funding and motivation for improving energy efficiency and implementation of the respective measures. Moreover, the state support is insufficient for stimulating achievement of the energy targets by the building owners, banks, enterprises as well as workforce.

In 2011 17,490 jobs were occupied in building construction and until 2020 vocational education institutions will be able to prepare 5,166 young specialists. Within the report research phase the construction enterprises which have participated in the Climate Change Financial Instrument grant programme were surveyed, literature analysis made and specialists interviewed with the aim to forecast the number of workers necessary until year 2020. There were three different development scenarios designed within the report. Depending on the scenario in 2020 the following numbers of employees will be necessary:

- Base scenario – 19,949 employees;
- Latvia 2020 scenario – 38,056 employees;
- Average growth scenario – 29,003 employees.

Taking into account the decreasing number of population in Latvia and emigration of working age population the existing vocational education institutions and study centres will be able to provide for the necessary number of employees only under the base scenario. Accordingly, it means that it is impossible to achieve the established climate and energy targets of 2020 because of the lack of workers.

10. Authors/contributors

Agris Kamenders, Riga Planning Region
Sanita Jankovska, Riga Planning Region
Katrīna Vastlāve, Latvia Environmental Investment Fund
Inese Rostoka, The Latvian Builders Association
Helēna Endriksone, Latvia Association of Civil Engineers
Ludmila Okoloviča, Latvia Association of Civil Engineers
Anda Kraukle, Latvia Association of Civil Engineers
Anna Ramata, Association of Heat, Gas and Water Technology Engineers of Latvia
Dzintars Vjakse, Latvia Environmental Investment Fund
Normunds Grīnbergs, The Latvian Builders Association
Igors Tarkovs, The Latvian Builders Association

11. Appendices

11.1 Appendix – Buildings by their type

	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
One-apartment buildings, summer cottages, garden houses	1057	1425	1667	2075	1914	1502	1035	815	883	**84,099**
Two or more apartment buildings	135	128	141	96	74	88	67	75	128	**5343**
Co-residential buildings of various social groups	15	18	20	16	17	17	16	11	0	**290**
Hotels and similar purpose buildings	75	80	99	70	52	39	30	33	46	**2555**
Office buildings	291	304	260	251	175	143	91	70	80	**4415**
Wholesale and retail buildings	540	389	370	249	190	136	96	92	92	**6742**
Transport and communications buildings	41	30	47	40	21	15	9	14	16	**1323**
Industrial manufacturing buildings and warehouses	214	181	213	178	176	111	95	116	177	**6856**
Mass entertainment, educational or health care institution buildings	299	250	272	209	222	172	269	268	267	**5837**
Other non-residential buildings	544	347	388	503	473	384	462	264	385	**30,756**
Sports and recreation buildings	11	8	13	16	10	17	19			**721**
Total	**3222**	**3160**	**3490**	**3703**	**3324**	**2624**	**2189**	**1758**	**2074**	**149,541**

11.2 Appendix – Municipal investments

Municipality	2009		2010		2011		Total		Average costs per building, LVL
	Number of residential buildings	Amount, (LVL)	Number of residential buildings	Amount, (LVL)	Number of residential buildings	Amount, (LVL)	Number of residential buildings	Amount, (LVL)	
Rīga City Council	0	0	1	133,751.25	2	300,436	3	434,187.25	144,729
Mārupes novads	0	0	0	0	2	5680	2	5680.00	2840
Salaspils novads	0	0	0	0	4	5811	4	5811.00	1453
Mālpils novads	0	0	0	0	1	13,500	1	13,500.00	13,500
Tukuma novads	16	31,308	15	35,245	14	25,000	45	91,553.00	2035
Ogres novads	7	22,455	4	26,165	5	10,128	16	58,748.00	3672
Sējas novads	0	0	0	0	2	142,325	2	142,325.00	71,163
Kandavas novads	0	0	0	0	3	343,647	3	343,647.00	114,549
Skrundas novads	0	0	1	161,646	0	0	1	161,646.00	161,646
Liepājas City Council	47	186,914	4	8015	0	0	51	194,929.00	3822
Ventspils City Council	92	26,218	16	9930	25	8470	133	44,618.00	335
Saldus novads	0	0	0	0	5	10,000	5	10,000.00	2000
Alojas novads	0	0	1	no info	0	0	1		no info
Burtnieku novads	0	0	0	0	7	14,000	7	14000.00	2000
Iecavas novads	0	0	0	0	1	622	1	622.00	622
Neretas novads	2	578	6	3483	7	4031	15	8092.00	539
Aizkraukles novads	1	15,320	0	0	0	0	1	15,320.00	15,320
Rugāju novads	0	0	1	111,390	0	0	1	111,390.00	111,390
Līvānu novads	0	0	0	0	1	4903	1	4903.00	4903
Preiļu novads	0	0	0	0	5	3000	5	3000.00	600
Viļakas novads	0	0	1	130,000	3	440,000	4	570,000.00	142,500
Daugavpils City Council	93	33,922	7	2558	10	39,467	110	75,947.00	690
MUNICIPALITIES TOTAL:	**165**	**282,793**	**50**	**619,625**	**87**	**1,331,553**	**302**	**2,309,918**	**7649**

11.3 Appendix – Building space by building type

	2003	2004	2005	2006	2007	2008	2009	2010	2011	Kopā
One-apartment buildings, summer cottages, garden houses, m^2	187,780	238,716	276,981	332,077	317,758	258,125	167,092	153,970	188,859	2,121,358
Two or more apartment buildings, m^2	210,568	244,332	187,863	150,632	126,055	93,622	64,896	60,671	160,413	1,299,052
Co-residential buildings of various social groups, m^2	11,293	11,377	18,791	10,505	33,327	6193	16,223	6393	23,862	137,964
Hotels and similar purpose buildings, m^2	79,446	97,210	133,977	97,027	47,283	35,836	15,595	26,155	60,753	593,282
Office buildings, m^2	160,119	176,997	155,751	308,447	160,299	314,725	55,995	46,721	51,459	1,430,513
Wholesale and retail buildings, m^2	164,251	201,240	265,730	129,906	129,375	114,014	49,523	54,924	42,180	1151,143
Transport and communications buildings, m^2	20,452	21,097	37,610	13,505	18,277	4795	4606	4413	15,092	139,847
Industrial manufacturing buildings and warehouses, m^2	253,684	228,527	263,685	571,433	376,652	158,163	185,871	204,046	297,748	2,539,809
Mass entertainment, educational or health care institution buildings, m^2	0	163,234	266,800	183,610	301,539	263,895	319,125	508,415	424,022	2,430,640
Other non-residential buildings, m^2	0	80,123	109,291	194,747	147,774	118,838	96,302	88,963	311,214	1,147,252
Sports and recreation buildings, m^2	1,325,716	1,462,853	1,716,479	1,991,889	1,658,339	1,368,206	975,228	1,154,671	1,575,602	13,228,983

11.4 Appendix – Initial vocational education, EQF levels

In the initial vocational education programmes a person is enrolled without previous education limitations and starting from the calendar year when the person becomes 15 years old. Initial vocational education programmes last for 1—2 years. The certificate on the initial vocational education states that the student has acquired initial vocational education (theoretical and practical training which allows performing simple tasks in the specific area of operation, for example, a cook's or carpenter's assistant). The persons who have not acquired full primary education until the age of 15 can also finish their general primary education along with acquiring a vocational qualification.

Basic vocational education (EQF, level 4)

The National Standard of vocational secondary education and basic vocational education establishes that basic vocational programmes last for 3 years for the persons who have finished the primary school. The finishing of the basic vocational education programme is confirmed by the certificate on basic vocational education which proves that the awarded qualification corresponds to the second vocational qualification level (theoretical and practical competences which allow independent and qualified performance of assigned work, for example, carpenter, hairdresser, cook, tailor, dressmaker, welder). General education courses have been integrated in the contents of the basic vocational education, however this type of education does not allow for studying at a higher education institution. The students who wish to continue their education are offered a one year general secondary education equalization course or they have to study additionally in a night school.

Basic vocational education comprises the following:

- Theory and practice in proportion 35:65;
- General education and vocational subjects in proportion 60:40.

Listed below are the general education courses included in the basic vocational education programme:

- Language and communication knowledge 45%;
- Mathematics, nature sciences, technical sciences 33%;
- Social sciences and culture theory 22%.

The basic vocational education programmes are aimed at the acquisition of the necessary knowledge and skills for qualified performance of operational duties of a worker, requiring responsibility for the work which is done according to the previously established guidelines as well as at developing team work skills.

Vocational secondary education (EQF level 4)

In the vocational secondary education programmes students are enrolled who have acquired general or basic vocational education. Such programmes last for 4 years after the primary education, 1 to 2 years after the acquisition of basic vocational education or up to 2 years after the acquisition of general secondary education. Upon the completion of the course the diploma on the vocational secondary education is awarded as well as the 3rd level vocational qualification of Latvia (increased theoretical competence and professional mastery which allows for performing certain operational duties including the planning and organizing of work, for example, various technicians, car mechanics, fashion designers, hotel service specialists). The diploma allows continuing education in a higher education institution.

The contents of the education programme are determined by the National Standard of vocational secondary and basic vocational education as well as the corresponding profession standard. The vocational secondary education programme comprises the following:

- Theory and practice in proportion 50:50;
- General education and vocational subjects in proportion 60:40.

The general education courses are divided as follows:

- Languages and communication 45%;
- Mathematics, sciences and technologies 33%;
- Social sciences and culture 22%.

Vocational secondary education programmes are oriented at the qualification level which envisages the competence allowing performance of operational worker's duties including the planning and organizing of work. After acquiring the respective work experience the student will be able to assume responsibility for resource allocation and other assigned work. General education subjects have been integrated in the contents of the vocational secondary education programme at the extent which allows for studying in higher education programmes. Similarly to general secondary education programmes, the students pass centralized examinations at the end of studying four general education subjects.

11.5 Appendix – Education possibilities in the area of energy efficient construction outside the formal education in Latvia

Possibilities to develop qualifications or receive training in the area of energy efficient construction outside the formal education system in Latvia

- Handbook (training programme) for professionals: Holistic energy efficient planning and construction – in English (Baltic Environmental Forum (BEF)).
- Handbook (training programme) for professionals: Ecology of construction materials (on ecological construction materials and solutions) – in English (BEF).
  The manual was designed within the project "Using ecological construction materials in new, energy efficient buildings in the Baltic States" (BEF, 2009—2011) (funded by the *Deutsche Bundesstiftung Umwelt* (German Federal Foundation for the Environment)).
- Training programme for implementation of reasonable energy saving measures in municipal buildings (BEF) – specialized instruction for municipal specialists, architects, builders, craftsmen and energy auditors.
- Project "Energy-efficient and ecological housing" (EcoHousing) (BEF, 2011—2013). The project is funded by the programme "Central Baltic INTERREG IV A Programme 2007—2013". A study material has been designed and practice seminars organized for the installers of boilers to achieve more efficient and nature friendly operation of bio-boilers.
- Courses for certified passive house designers (CEPH) – in English;
  Organized by the Window and Door Manufacturer Association of Latvia and NGO *Passive House Latvija*
- 3-day practical training course "Low energy building construction" – *Passive House Latvija*
- 3-day practical training course "Passive house and green construction" – *Passive House Latvija*
- Programme of the Ministry of Economics "Have a warmer life!" which comprised regional and international seminars, including the ones for professionals.
- 24 seminar cycle "Energy-efficient and environment-friendly construction – from planning to implementation" in all regions of Latvia. Organized by SIA "LBS Konsultants".
- Courses offered by manufacturers and distributors of construction materials – individual manufacturers or distributors of construction materials and equipment offer courses and training or educating seminars to builders within their marketing campaigns which often provide training for high quality construction work performance.

There are some non-formal education programmes which are implemented on regular basis:

- Recertification courses for building engineers organized by SIA "LBS Konsultants".
- Vocational further education and professional development education programmes within the project funded by the European Social Fund "Training of the unemployed and job seekers in Latvia" coordinated by the State Employment Agency.
- ERDF support to the training of the unemployed for the promotion of the general competitiveness of business people (administered by the Investment and Development Agency of Latvia)
- Support from the EU programmes through the vocational and adult lifelong learning programmes *Leonardo da Vinci* and *Grundtvig*.

Project „Efficient Energy Building Roadmap for Latvia" Lead Partner:

Contact details:

Project Manager: Agris Kamenders
e-mail: agris.kamenders@rtu.lv
http://www.rpr.gov.lv/bus/

Partners:

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.