



Roadmap

Raising of Construction Sector Employee Qualifications and Skills for Achieving Energy and Climate Targets of 2020

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Further information

More information on project „BUILD UP Skills – Latvia” can be found in website www.rpr.gov.lv/bus
More information on BUILD UP Skills initiative in other countries can be found in www.buildupskills.eu
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0. Preface

Energy, construction and education experts were invited to participate in project “Build Up Skills – Latvia” for designing joint recommendations that would allow raising the qualification and knowledge of the persons employed in construction:

- To ensure that the result of the construction provides for low energy consumption in the building and the performed work would correspond to high quality standards;
- To ensure that the renewable energy sources (RER) are used efficiently;
- To ensure that the new buildings are constructed in compliance with zero energy consumption criteria.

„Build Up Skills – Latvia” project partners are Riga Planning Region, Latgale Planning Region, Kurzeme Planning Region, Vidzeme Planning Region and Zemgale Planning Region, Heat, Gas and Water Technology Engineer Association of Latvia (LSGUTIS), Latvian Environmental Investment Fund (LEIF), Latvian Builders Association (LBA), Latvian Building Engineers Union (LBEU).

The Roadmap has been designed based on the analysis of the current situation¹ describing the knowledge and skills of the persons working in the construction market as well as the current situation in the construction industry as a whole. The aim of the analysis of the current situation was to identify the demand for construction employees and forecast the future (until year 2020) demand to meet the energy and climate objectives of Latvia.

The characterization of the current situation as well as the designed forecast served as a basis for further discussions among all interested parties for designing the Roadmap.

Goals of the Roadmap

To raise the knowledge and skills of the persons working in construction to provide for achieving the climate and energy targets of 2020.

Training programmes which provide knowledge and skills about the construction of LEB buildings, efficient use of RES and renovation of existing buildings

Need for highly qualified construction workers is generally admitted and employment of such workers is facilitated or made compulsory

¹ <http://www.rpr.gov.lv/bus/index.php?id=181>

1. Summary

When thinking about the dependence on imported energy sources and the need for the renovation of housing and public buildings and transition to the production of higher added value goods and services we inevitably face the qualification issue of construction sector employees. Only the workers who are duly qualified will be able to provide that investments in raising energy efficiency and using renewable sources are economically justified and sustainable. Otherwise, the funding may be spent without achieving the so much needed results – reduced energy consumption, renovated and optimized buildings, transition from fossil fuel to the local and renewable energy resource, reduced exploitation costs and increased comfort.

The survey of constructors who have implemented projects aimed at reducing energy consumption and using RES shows that majority of workers lack the necessary knowledge and skills. Predominantly, they try to acquire the necessary skills from the foreman on the building site. However, the employer expects that the worker/specialist already knows and is able to implement certain operations when arriving on the building site. The surveyed constructors admit that much time is needed for training workers and preparing them for independent work. The workers do not understand how the quality of the particular job will influence the overall result. Consequently, a particularly big challenge is changing the employees' attitude towards their work and development of bigger independence and self-control.

The conducted survey suggests that in order to achieve the set energy and climate targets until year 2020, it is necessary both to increase the number of the vocational school leavers as well as retrain adults. The supply of qualified labour will be considerably smaller than the demand for them.

The analysis of the existing situation suggests that the demand for labour will have increased in the construction sector in 2020 and meeting the demand will be very difficult. If there are sufficient investments in the renovation and energy efficiency improvement projects, the labour deficit will increase which, in its turn, will facilitate the inflow of workforce from other sectors. If no requirements are set regarding the employee qualification and no retraining opportunities are provided for employees the situation experienced during the construction boom is about to repeat when majority of jobs requiring specialized knowledge were done by low qualified workforce.

The conclusions derived from the analysis of the current situation have been discussed and possible solutions examined in several seminars in Latvia and abroad. Panel discussions with the participation of experts and representatives of the competent ministries have taken place in search for joint solutions on topical issues.

The Roadmap that has been designed may seem a big enough challenge for both the education and construction sector, however the tasks of the Plan are intended to facilitate achieving the “20-20-20” climate and energy targets. The Roadmap envisages that short training courses on the construction of zero energy buildings which provide for very low energy consumption in buildings would be necessary for the majority of employees working in the construction sector. The improvement of experienced workers' qualifications can be made over a rather short period of time, for example, by organizing intensive training courses on the building site which can be implemented together with vocational education institutions, study centres, suppliers of building materials and technologies. Likewise, it is necessary to prepare instructors (teachers) for the course.

2. Introduction

Construction industry is one of the most significant branches of the economy of Latvia both in terms of financial turnover as well as the number of employees. Currently, for Europe as a whole sustainability is set as one of the key objectives comprising the construction of nearly zero energy or very low energy consumption (LEB) buildings starting from year 2020, renovation of the existing buildings to ensure a very low energy consumption and efficient use of renewable energy sources (RES).

High qualification of the persons employed in renovation and construction projects has been one of the most significant factors to provide that the investments in raising energy efficiency and use of renewable energy sources were economically justified and reduction of energy consumption, sources and costs was achieved.

In order to raise the knowledge and qualifications of employees it is necessary to create both: the demand for qualified workers as well as the environment which would allow for raising the qualifications (knowledge and skills needed).

The raising of the qualifications of the persons employed in the construction industry for achieving the climate and energy targets of 2020 concerns various areas: education, construction, environment and energy industry. For the development of the Roadmap measures the persons and institutions representing these areas were assembled and met both individually as well as during several conferences and seminars, see fig.2.1.

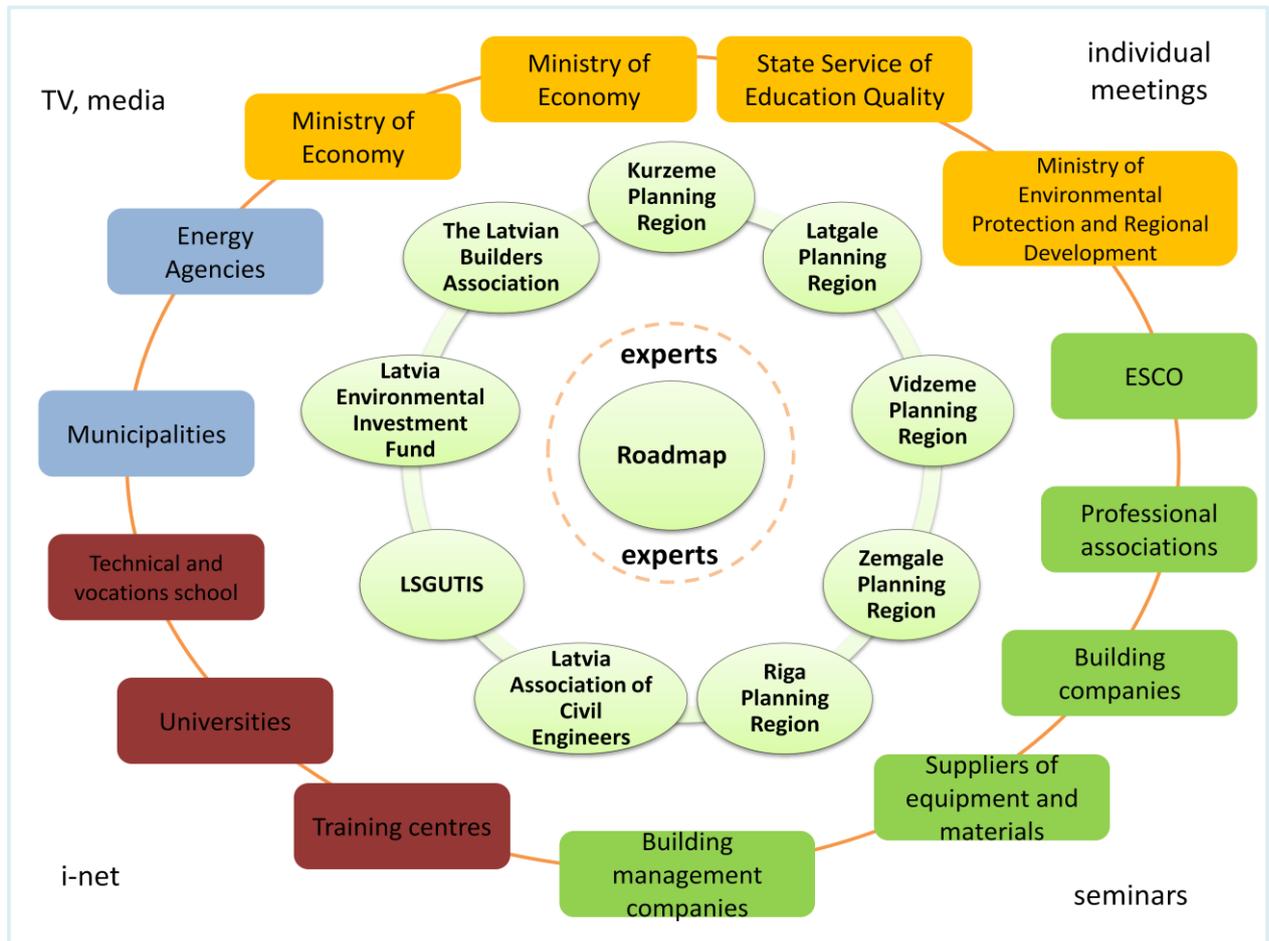


Fig.2.1. – Designing of the Roadmap measures

3. Objectives of 2020 and Construction Industry

Latvia has assumed several international obligations regarding specific energy and climate objectives.



20% increase in energy efficiency by 2020



By 2020 to achieve 40% proportion of renewable energy sources in the gross final energy consumption



In the period from 2009 to 2016 to raise energy efficiency on the final consumer's side to achieve 9 % reduction in energy consumption



To raise the employment rate



Starting from 2020 to build near to zero energy buildings and use renewable energy resources

Along with the energy efficiency of buildings and use of renewable sources the qualification of workers has a significant role in both the National Development Plan as well as several European directives:

- Directive 2010/31/EU on Energy Efficiency in Buildings;
- Energy Efficiency Directive 2012/27/EU;
- Directive 2009/28/EU on the promotion of the use of energy from renewable sources.

Directive 2010/31/EU on Energy Efficiency of Buildings² sets forth the target – from 31 December, 2020 all newly constructed buildings must approach zero-energy building criteria or meet a very low energy building criteria and the energy must be produced from the renewable energy resources. Starting from 31 December, 2018 all public institutions when renting or purchasing a building must choose buildings which meet the above-mentioned criteria. Building renovation must lead to a cost-efficient level of energy efficiency. For Latvia, not only the construction of the near to zero energy buildings, but also the renovation of the existing buildings and housing fund pose a big challenge.

Disregarding various efforts that have been taking place over recent years, the housing fund is rapidly becoming out of date and its technical condition is deteriorating. According to the data of the Central Statistical Bureau the majority of the buildings of the housing fund of Latvia (68%) were built between 1958 and 1992. To solve the housing issues the renovation of the existing housing fund should become a national priority. For the majority of buildings the renovation investments compose one tenth of the investments that would be necessary for constructing a new building.

² 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* L 153, 18.6.2010, p.13.

Although in Latvia there is no precise statistics on the number of renovated buildings the analysis of the up-to-date support programmes suggests that not more than 3 % of the housing fund of Latvia have been renovated. The major part of the housing fund will be irreversibly outdated in the nearest 10 to 20 years unless the current renovation speed of buildings is increased and the quality of renovation is improved. For the majority of buildings in Latvia renovation is economically justified.

In Latvia there is a huge technically achievable and economically substantiated energy efficiency potential which has to be used. The average thermal energy consumption in buildings in Latvia is between 150 and 200 kWh/m² per year, however, if the minimum energy efficiency requirements set in Latvian Building Standard 002-01 are met, it is possible to achieve the energy efficiency level that can decrease the energy consumption of buildings at least by a half. Compared to the passive building the average energy consumption in buildings is almost ten times bigger.

The savings which can be acquired as a result of building renovation exceed the total costs of renovation and energy efficiency measures. Broader assessment of investments in energy efficiency measures may also include the examination of other benefits that can comprise social, environmental, health and energy supply benefits. It is necessary raise the current renovation rates as well as its quality in order to implement projects with large energy savings, simultaneously achieving higher level of comfort for the building residents as well as owners. At the moment several projects have been implemented where the achieved reduction of energy consumption and use of RER have allowed to repay the investments in renovation. A successful use of RER in Latvia has been demonstrated in several projects³.

4. Knowledge and Skills Necessary in the Construction Sector in Future

4.1. Necessary skills and knowledge

The persons working in the construction sector are facing new requirements to provide for achieving very low energy consumption in a building and successfully using RES. In Latvia there are no precise data available on the qualification of the persons employed in the construction sector and their distribution by speciality. No records of this kind are made because certification of persons employed in construction is not made and, consequently, the information on employee skills and qualification is not collected. When applying for a job the candidate states everything he has ever done on a building site and a significant part of all skills are acquired while working on building sites. Records are made only on the vocational school leavers by their acquired speciality (not by skills) as well as on the persons who have finished various further education courses and the unemployed registered at the State Employment Agency. These data do not provide a sufficient picture about the actual amount of qualified specialists working in the construction sector of Latvia.

In order to determine the existing qualification level and the knowledge and skills necessary for the employees in the future a survey was made among enterprises which had implemented work on raising energy efficiency in the projects funded by Climate Change Financial Instrument (CCFI) (its results are summarized in the Analysis of Current Situation)

³ Aivars Žandeckis, Lelde Timma, Dagnija Blumberga, Claudio Rochas, Marika Rošā "Solar and pellet combisystem for apartment buildings: Heat losses and efficiency improvements of the pellet boiler", Applied Energy, Volume 101, January 2013, Pages 244–252

According to the survey as well as analysis of statistics data the majority of workers are employed in the small and medium enterprises. However, for the small and medium enterprises it is difficult to compete in public tenders and these enterprises are usually involved in construction work as subcontractors. It is very often that the building contractor working solely as a subcontractor cannot form and maintain qualified permanent staff. The team is created for each particular site and the training of the employees or raising of their competences is usually not present. Moreover, in the construction sector there usually is a very high "shadow economy" factor which does not facilitate fair competition among the workers. For the time being, the training of employees mainly takes place in informal education courses organized by the manufacturers of building materials and distributors of technologies.

In Latvia the lowest and middle level employees are not required a document certifying their qualification, consequently the employees can rotate from one construction sector speciality to another disregarding their skills and knowledge. However, the employer cannot establish the worker's qualification.

The understanding of energy efficiency currently essentially differs from the one defined several years ago. When renovating a building it is possible to achieve a different reduction of energy consumption depending on the implemented renovation measures and quality of the construction work.

Currently it is clear that low energy consumption and successful use of RER can only be achieved by using a complex approach involving simultaneous solution of various issues.

At the moment the adjustment of the design practice, employed engineers, construction supervisors and construction work managers to the new requirements is still taking place. It is common that even after having acquired the necessary knowledge for constructing and renovating LEB buildings and using RES the youth find the practice in the building sites quite different from what they had learnt. Consequently, it is necessary to facilitate a still closer mutual co-operation between vocational education institutions and construction companies.

Currently construction sector experiences a lack of qualified workers and craftsmen. Many of them work irregularly and are forced to change their specialization according to the offers they receive; consequently, the situation creates the workers who can do everything – to concrete, screw plywood, assemble airing systems etc. The higher qualified workers usually are more daring and leave for abroad in search for a better pay. It is very often that older and more experienced workers do not want to learn because they consider that they are demanded as they are and have already acquired everything over their working lives and are not going to learn anything new. The young specialists, however, do not have sufficient experience.

From the conducted analysis of the vocational education system it can be concluded that the education programmes of the first to third levels of the vocational education system of Latvia must be supplemented with energy efficiency and RES use training elements and programmes. As it can be concluded, in the construction branch of the vocational education system of Latvia there is no worker vocational certification (categories) which would allow dividing the workers by their qualification. The constructor survey shows that workers mostly do not have even the necessary education and many professions are acquired from the foreman on the building site. In the construction branch of the vocational education system of Latvia the students' internship has a formal nature and there is no motivation system that would encourage mentors in the employer organizations as well as trainers at vocational schools to offer internship to students and pass their knowledge to them. The training of students on a building site is associated with big investments – pay to the specialist, labour safety measures, insurance etc. For example, the vocational education programmes of

construction technician and engineer network technician are implemented disregarding the regulation of the profession.

The surveyed builders admit that training of workers and their preparation for independent work takes much time. On a building site the employer expects the worker/specialist to know and be able to carry out certain operations; vocational schools, however, lack the machinery for the training and employers do not provide for a qualitative technological internship (which for the students of the 3rd qualification level is envisaged to consist of 300 hours) because no funding has been allocated for compensation to the internship supervisor for training internees on the building site. For example, the installation of equipment like heat pumps or solar collectors can be acquired just theoretically. When starting the internship, the internees learn the practical skills only on the building site which contradicts employers' interests.

In Latvia no tools or methods have been designed for forecasting future trends and monitoring regarding new technologies, worker qualification and required training in the construction sector. This, in its turn, interferes with the creation of long-term development plans and attracting qualified workforce as well as developing the study infrastructure. Employers are not motivated to take students on internships and mentors and industrial training instructors have no motivation to pass their knowledge to students. As it was mentioned before, a major part of all enterprises are the small or medium enterprises for which it is difficult to attract qualitative workforce as well as encourage employee training due to the high turnover of employees, inability to provide for stable income and shadow economy in construction.

According to the future forecasts and goals of 2020 there will be a marked lack of construction specialists which is increasingly evident already. The key drawbacks of the persons currently involved in construction are as follows:

- Lack of understanding about energy efficiency solutions;
- Lack of knowledge and skills for work with new technologies (thermal bridges, recovery equipment, individual heating substation management systems, building management systems, heating and hot water supply systems etc.) and RES (solar collectors, heat pumps, wood pellet boilers etc.)
- Lack of knowledge and skills about nearly zero energy buildings;
- Lack of independence and quality control.

The vocational education programmes of qualified worker professions (3rd qualification level, four-year programmes) offer very fragmented and narrowly specialized professions: bricklayers, painters, plasterers etc.; the programmes, however, do not stress energy efficiency issues.

The newly created competence centres lack the infrastructure for practical training which is very material-intensive, require large premises, stands and study sites which are indispensable for qualitative training. There are various study centres which organize and run courses. However, employers are not always satisfied with the quality of the training provided there. As the vocational education institutions have both the teaching staff as well as study infrastructure, it would be necessary to organize the training of the unemployed as well as professional development and further organization in these institutions. However, the State Employment Agency orders the service through a public procurement procedure organized by the Procurement Monitoring Bureau where the most significant criterion often is the price.

When carrying out an analysis of various renovation project estimates and taking into account the specific character of building renovation projects, we can design the feasible distribution of worker professions according the four key groups envisaged in the Profession Classifier:

1. **Roofers** – insulation of roofs with insulation materials as well as construction of waterproof roof coverage;
2. **Plasterers, finishing work specialist** – facade insulation, plastering and final finish as well as painting and lying of texture. Builders, dry construction builders, log building specialists, bricklayers – the building, assembling and insulation of bearing constructions. Specialization of builders is associated with the arrangement of gypsum plates of various configurations and levels and various constructions. Correct arrangement of insulation, steam and water proofing from the point of view of energy efficiency.
3. **Carpenters** – in connection with building wooden construction, insulation, steam and wind proofing installation jobs, windows mounting, construction of frame houses etc. The mounting of windows is not mentioned in the Profession Classifier, these jobs can be equalled to those of a carpenter;
4. **Installers** - fitters of internal networks, RES (small boilers, solar collectors, PV ect.), HVAC, electrical and low-voltage network fitters.

The comparison of the proportion of each of the worker groups in a project leads to the conclusion that these groups are the main ones and in case of renovations might be responsible for up to 90 % of all the envisaged amount of work. In all these professions, regarding energy-efficient construction, workers must be educated about building airtightness and construction leakage prevention as well as correct technology for applying various materials.

The analysis of the current situation⁴ shows that according to the education level several themes should be included in the worker education programmes which would allow for increasing the competences and skills of the employed workers. Depending on the education programme and study level their training should include the themes that would provide the basic knowledge on:

- Recording of the energy consumption in a building and building management systems;
- Energy balance and losses of heat in a building;
- Operation principles of the heating and hot water systems in a building, mounting of the thermostatic valves and balancing valves. Construction of floor heating;
- Knowledge about comfort requirements, air quality, building airtightness and mechanical ventilation system;
- Energy efficiency measures in public event buildings. Knowledge on the most commonly used materials and technologies;
- Use and assembling of various types of heat pumps;
- Assembling of solar collectors for heat solar photo-elements for electricity;
- Installation of recovery systems and mounting of energy-efficient cooling systems;
- Installation of biomass boilers (pellets, woodchips, wood) and accumulation tanks;
- Installation of heating substations, connection, installation and insulation of control blocks;
- Knowledge about the energy audit procedure and information it includes;
- Overheating risks and shading of buildings;
- Practical skills elaborated during qualitative internship;
- Fire safety and acoustics issues when using heat insulation;
- Workers must know the Construction Price Catalogue to ensure that they understand the notion of labour productivity;
- Understanding about the available manuals and information on energy efficiency solutions, e.g., ETAG Assembly Manual.
- Influence of humidity on constructions and their protection against humidity;

⁴ <http://www.rpr.gov.lv/bus/index.php?id=181>

- Requirements set by Latvian Building Code (LBN 002-01) regarding energy efficiency.

4.2. Forecast Labour Needs

Due to the current economic situation not only in Latvia, but also in Europe as whole, the labour forecast expressed for the nearest 5 to 10 years in construction is very cautious and provides for three alternative scenarios. The long-term demand for labour is significantly influenced by many factors, such as economic development, investments in building renovation, housing policy, demographics, employment, labour emigration, immigration etc., Within the analysis of the current situation three different scenarios were designed which characterize the demand for labour until year 2014, see fig. 4.1.

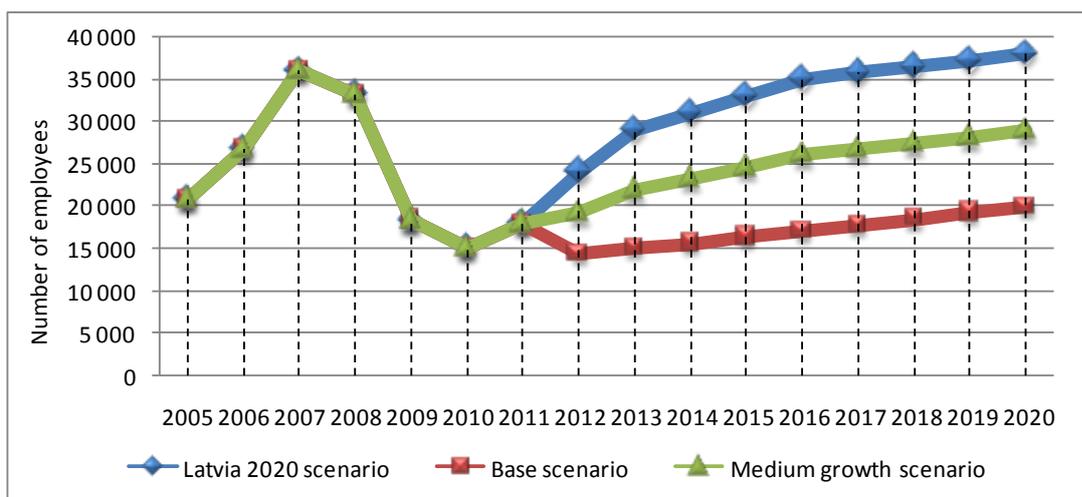


Fig.4.1. Forecast labour needs until year 2020.

1. **Base scenario:** the calculation is based on the GDP growth forecast designed by the Ministry of Economics. According to the scenario around 20,000 employees are needed for the projects in relation to energy efficiency of buildings and use of RES.
2. **Latvia 2020 scenario:** to achieve the climate and energy objective set for 2020, i.e., decrease the energy consumption of buildings by 20 %, from 1,5 to 2 bln LVL investments are needed. According to this scenario, the forecast labour needs account for 38,000 employees. As it can be seen, in terms of the number of employed persons the construction sector would have to achieve the levels of years 2006 to 2008.
3. **Medium growth scenario:** the scenario is based on the assumption that increasingly more buildings will be renovated along with the development of ever new funding instruments for promoting higher energy efficiency of buildings and use of RES, e.g., ESCO, rotation fund, tax discounts, reduced interest rates on loans, state guarantees etc. Under this scenario 29,000 employees will be needed.

According to the conducted analysis, until 2020 vocational education institutions could prepare 5200 new construction sector specialists which would provide for the additionally needed number of employees just in the case of the basic scenario – i.e., in the case if the renovation of the housing fund is not made. At the moment the prestige of construction workers is low and vocational education institutions often find completing study groups difficult. In the case of bigger volumes of construction, such as scenarios two and three in the construction sector it will be necessary to attract employees from other sectors. However, the forecasts on the working age population suggest a

decreasing trend in the working age population. Moreover, currently a topical problem is the emigration of construction sector employees in search for a better job. Besides, construction sector workers suffer from chronic diseases which limit using them for diverse jobs, e.g., for working in high altitudes as well as other jobs which are essential in raising energy efficiency. At the age of around 60 90 % of the workers most likely will not be able to work in the construction sector. Taking into account the forecast demographic situation it can be concluded that in the nearest time the construction sector may face labour deficit because the inflow of young people will be small.

The conducted analysis suggests that for the achievement of the energy and climate targets set for year 2020 both the number of vocational school leavers has to be raised and retraining of adults should be implemented

The supply of qualified workers will be significantly lower than the demand for them

The distribution of the total necessary labour force in 4 key groups is rather conditional assuming that the major amount of work can be connected with the renovation and insulation of the building envelopes which is done by finishing work specialists and may account for about 55% of the total amount of work. The volume of work to be done by roofers may account for 14% of the total, the amount to be done by window and door assemblers might be 20%, leaving the remaining 11 % for the assembly of internal engineering networks.

The aforementioned figures lead to the conclusion that the distribution by the profession groups for the basic scenario and Latvia 2020 scenario could be equal to the one presented in table 4.1.

Table 4.1.

Labour Distribution in Construction Sector by profession and year

Years	2012	2013	2014	2015	2016	2017	2018	2019	2020
Basic scenario									
Plasterers – finishers	7930	8251	8571	8966	9379	9754	10 143	10 550	10 792
Roofers	2018	2100	2182	2282	2387	2483	2582	2685	2789
Carpenters	2884	3000	3117	3260	3410	3547	3688	3836	3990
Installers, Internal network assemblers (RER assemblers, HVAC etc.)	1586	1651	1715	1794	1876	1950	2028	2111	2378
Medium growth scenario									
Plasterers – finishers	10565	12101	12811	13558	14329	14704	15093	15500	15951
Roofers	2689	3080	3261	3451	3647	3743	3842	3945	4060
Carpenters	3842	4400	4659	4930	5210	5347	5488	5636	5801
Installers, internal network assemblers (RER assemblers, HVAC etc.)	2113	2420	2562	2712	2866	2941	3019	3100	3190
Latvia 2020 scenario									
Plasterers – finishers	13 200	15 950	17 050	18 150	19 279	19 654	20 043	20 450	20 931
Roofers	3360	4060	4340	4620	4907	5003	5102	5205	5328
Carpenters	4800	5800	6200	6600	7010	7147	7288	7436	7611

Installers, internal network assemblers (RER assemblers, HVAC etc.)	2640	3190	3410	3630	3856	3931	4009	4090	4186
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Another problem Latvia faces is health issues of construction sector employees. According to legislation, builders once in two years have to pass through medical examination at doctors' commission. The workers with 15 and more years of experience at the age of 45 and more encounter huge difficulties in passing the examination as the majority of them, according to the commission, suffer from chronic diseases which limit using them for diverse jobs, e.g., for working in high altitudes as well as other jobs which are essential in raising energy efficiency. At the age of around 60 around 90 % of the workers most likely will not be able to work in the construction sector.

According to the informative announcement of Ministry of Economics of the Republic of Latvia on the medium and long-term labour market forecasts⁵, the demand for labour in the construction sector in 2020 will exceed the figure of 2011 by 12.9%. Compared to the labour demand forecast made during the "Build Up Skills – Latvija" analysis this indicator corresponds to the basic scenario where the increase by year 2020 is forecast to be 11.2% to year 2011. This means that in the case of the basic scenario in year 2020 around 2000 additional workers will be needed which in this case could be trained by vocational education institutions. However, the age structure of the population leads the authors to the prediction that the supply of qualified labour will be significantly lower than the demand for it. We must take into account that the demand will also exceed supply in other sectors, such as agriculture, forestry and fishery.

If Latvia assumed rapid renovation of existing buildings in order to achieve the energy efficiency goals (Latvia 2020 scenario) the demand for labour in the construction sector in 2020 would exceed that of 2011 by 112% and would require around 20,000 workers equalling to the level of years 2007 and 2008. In the situation of average growth the increase of 2020 to 2011 would be around 62% and would require around 11,000 employees, see table 4.2.

Table 4.2.

Forecast of Labour changes as to year 2020.

	Employment growth % (Year 2020 compared to year 2011)	Number of employed persons (construction of buildings)			Number of employed persons Difference (2020 – 2011)
		2007	2011	2020	
Latvia 2020 scenario	112.13 %	36,033	17,940	38,056	20,116
Average growth scenario	61.66 %	36,033	17,940	29,003	11,063
Basic scenario	11.2 %	36,033	17,940	19,949	2,009
EM labour forecast	12.9 %	-	-	-	-

Based on the analysis of the current situation it can be forecast that the demand for construction sector employees will increase and will be difficult to meet. If there are sufficient investments in the renovation projects and projects for raising energy efficiency the labour deficit will increase labour costs. The wages of the persons employed in construction will

⁵ LR Ekonomikas ministrija www.em.gov.lv

increase which will lead to the inflow of labour from other sectors of economy. Similarly, a part of workers might return from abroad. If no requirements are set for the employee qualification and no opportunities are provided for their fast retraining, there is a threat of repeating the situation experienced during the construction boom when a major part of jobs which require specialized knowledge were done by workers with low qualification.

The forecasts have been made by analysing the necessary labour which could be employed in energy efficiency construction and use of RER. Vocational education institutions lack qualified workforce because the teachers need both technical and pedagogical education. To train the existing workers and prepare the new specialists for work a corresponding number of professional teachers are needed which has not been analysed in more detail during the Roadmap design, however, has been included in the tasks of the Roadmap.

4.3. Existing Certification Systems

Construction sector professions are not certified. In Latvia certificates are issued only to builder's and architect's practices. According to the regulations of the Cabinet of Ministers the certificate can be claimed only after the acquisition of both levels of higher education in architecture or respective engineering speciality and after meeting the requirements which have been envisaged in the regulations.

The following institutions have been empowered to assess the professional compliance of construction sector specialists in the areas of their competence:

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

Construction worker professions are not certified and there are no qualification levels which would stimulate workers to improve their qualifications. The qualification of workers is attested by the education documents set by the state as well as certificates about completing a narrowly specialized training.

There rather limited opportunities to improve qualifications or receive training in the area of energy-efficient construction outside the formal education system in Latvia; the only exception are some individual courses or training programmes which have been developed or conducted within concrete projects. Besides, there are courses offered by the manufacturers and distributors of building materials and technologies which are available on regular basis. However, a huge part of the training programmes designed within certain projects are not continued after the end of the concrete project and funding. Up to now, several training seminars have been organized for architects and engineers, for example, on the energy efficiency measures, conducting of energy audit, designing of passive buildings, installation of boilers, building of low energy consumption buildings. Several training programmes have been rather successful for the level of engineers and architects due to the motivation of the specialists to improve their qualifications as well as increased requirements towards the energy efficiency. At the moment workers have no motivation system which would encourage them to improve their qualifications.

Several courses contain a training programme for improving builder qualifications, however, none of the programmes is aimed at developing energy efficient construction skills, but rather at the general construction.

4.4. Future changes in the certification system

Article 14 of the adopted Directive 2009/28/EC (23 April, 2009) on the promotion of the

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use of energy from renewable sources envisaged that the state shall provide information on the use of RES and shall ensure the creation of a certification system or a similar qualification scheme by December 31, 2012. Certification would be necessary for the installers of low capacity biomass boilers and heaters, solar photo elements, solar collector systems and heat pumps.

5. Barriers for the achievement of the targets of 2020.

When designing the current situation report for the purposes of „Build Up Skills – Latvia” (BUS – Latvia) and discussing the qualification improvement issues of the persons employed in the construction sector in several national and regional level seminars several barriers were identified which currently interfere with the achievement of the targets of 2020. Together with experts and representatives of the competent ministries panel discussions were organized to deal with the topical issues. Several obstacles have been identified in relation to the vocational education, construction and achieving of the established 2020 targets.

5.1. Construction Market

- In the construction sector there is no certification (categories or levels) of worker professions which would promote the mutual competition of workers. It is difficult to set certain qualification requirements to the potential employees. The unstable situation in the construction market interferes with forecasting and planning the necessary amount of workers and long-term need for them.
- In Latvia the small and medium enterprises which employ the majority of workers have very limited possibilities to promote the training of their workers and invest in the company development. However, the big building companies mostly do not work on creating a team of their workers.
- In Latvia there is no non-government organization which would deal with the professional competence improvement issues of the people employed in the construction sector.
- In Latvia no instrument has been developed for forecasting development trends for establishing the amount of workers needed in specific profession groups and in the construction sector as a whole.
- Latvia has committed itself to meeting several international obligations and EU directives, however, at the moment there is no clear development plans for the construction sector nor there forecasts which would allow tracking the achievement of the set targets.
- No monitoring of the current workers and their knowledge takes place.

5.2. Vocational education

- Lack of qualified teachers. Teachers and trainers have to improve their knowledge on the construction/renovation of low energy consumption buildings and use of RES.
- Low level of compensations to teachers and trainers. The remuneration to teachers and trainers has been decreased to the minimum salary in combination with increased requirements and work load.
- In the construction sector of the vocational education system of Latvia the internship of students is often formal, mentor from the employer side as well as trainers at schools are not motivated to spend time for training the students.
- Vocational education institutions have an outdated training infrastructure. It is often that the operation of certain systems can be acquired only theoretically, for example, in the case of heat pumps or solar collectors – there are no possibilities to undergo the training by assembling and operating the equipment.

- The prestige of vocational education is low. The young people are not willing to acquire the most perspective/necessary professions. The number of students decreases year by year and for schools it is hard to assemble the study groups.
- The funding of the general education secondary schools depends on the number of students. Consequently, disregarding the young people's abilities and interests secondary schools tend to retain all the students who have finished their primary education. This impedes the achievement of the set target – the 50:50 proportion between the number of students in the general and vocational education schools.
- Big number of vocational education institutions per one inhabitant in combination with a low budget and shrinking number of students. The involvement of the vocational schools in the training of adults and the unemployed is often insufficient. Each of the institutions manages a small part of resources.

5.3. Construction and legislation

- Bureaucratic and administrative obstacles. According to the assessment included in the World Bank research "Doing Business" Latvia ranked 79th in terms of the construction approval procedures in 2011. The official construction approval procedures require 186 days and consist of 24 different procedures.
- Corruptibility, unfair competition and non-transparent public procurement procedures. The huge proportion of shadow economy in the construction sector does not facilitate fair competition and training of employees.
- Disproportionately long court procedures.
- The current tax policy does not facilitate energy efficiency measures in buildings, but rather slows them down. At the moment the decreased VAT rate is applied to heating and gas supply, however energy efficiency measures and RER – wood and wood pellets still have 21% VAT. Thus there is an indirect support to energy consumption rather than investments in energy efficiency or use of renewable energy resources;
- As a result of renovations the value of buildings increases, which leads to the rise in the real estate tax (RET). No additional RET rate is applied for failure to meet energy efficiency requirements, but rather the real estate tax increases along with the improvements in a building.
- Legislation does not define the criteria for a low energy consumption building nor have the minimum energy efficiency requirements been expressed in kWh/m² per year or W/m², which has to be achieved after renovation or constructing a new building.

6. Overall strategy

As it was found when designing the forecast, the labour needs in the future might differ depending on the amount of investments and development of economy, however it can be definitely forecast that the requirements to construct/renovate buildings by achieving increasingly lower energy consumption and using renewable energy sources will not change. Moreover, as modern technologies develop very fast, the strategy has to be periodically revised which would provide for meeting new challenges if there are any.

In designing the overall strategy the authors were searching for the answer to two key questions:

1. What will create the demand for qualified employees?
2. What is necessary to make training possible if such a demand arises?

Table 6.1.

What will create the demand for qualified employees?	What is necessary to make training possible??
<ul style="list-style-type: none"> •The need to achieve the Climate and Energy targets of 2020 •Support to energy efficiency and RER projects •Investments in education and human capital •Requirements for the training of employees in grant projects •Support from ESCO and PPP funding mechanisms and their popularization •Educated customer, investor. Development of LEB construction • Worker categories by their qualification •Qualification requirements for working in construction •Application of the principles of the building life cycle costs •Support to small and medium enterprises •Raising of the prestige of construction employees 	<ul style="list-style-type: none"> •Training programmes which provide for qualitative internship and study infrastructure •Study materials, engineering solutions manuals (renovation, construction of new buildings, use of RER) •Professional teachers, trainers •Motivation and potential of construction companies to invest in the employee education •Retraining of adults, improving of qualifications and lifelong learning •Development of science and pilot projects •Competence centres have equally good technological provision for all acquirable professions •Employee motivation: higher qualification => higher pay, stability and employment opportunities

As it can be seen, the demand for qualified labour and possibilities to train them are determined by various factors. They can be divided in several groups, see fig.6.1.



Fig.6.1. Grouping of factors which determine the demand for additional training

Targets set in the Roadmap:

- To raise the knowledge and skills of the persons employed in the construction sector for achieving the “20-20-20” climate and energy targets;
- To ensure that there training programmes which provide knowledge and skills on the construction of nearly zero energy buildings, efficient use of RES and renovation of the existing buildings;
- To achieve that the need for highly qualified workers is generally recognized and their employment is promoted and made compulsory

To achieve the established aims several subordinated tasks were established and divided in several groups by identifying the likely competent institutions, possible supporters, sources of funding and time schedule. Various institutions and groups are responsible for a certain specific area and can influence either one or another of the tasks. The given below are the identified groups and their responsibilities in the Roadmap.

6.1. Overall strategy

Study centres and vocational education institutions	Construction enterprises	NGO	Associations	State and state institutions	Planning regions and municipalities	State Employment Agency	Universities	Manufacturers and suppliers of building materials and technologies	Immediate measures		Medium-term measures			Long-term measures		
									2013	2014	2015	2016	2017	2018	2019	2020
		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		Legislation requirements							
<input checked="" type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>			<input type="radio"/>	<input type="radio"/>	Study courses and materials							
<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>		<input checked="" type="radio"/>	<input type="radio"/>	Science and pilot projects							
				<input checked="" type="radio"/>	<input checked="" type="radio"/>				Support to EE and RER projects, renovation and construction of LEB buildings							
		<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>	Awareness-raising of market participants. Long-term development.							
<input checked="" type="radio"/>	<input type="radio"/>		<input checked="" type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>			Employee training					
<input type="radio"/>		<input checked="" type="radio"/>	<input checked="" type="radio"/>				<input type="radio"/>		Long-term development lobby							
<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>			Training of adults, improvement of qualifications, professional					

6.2. Tasks of Roadmap

LEGAL REQUIREMENTS

	Tasks	Necessary sources and responsible institutions	Result and monitoring	Deadline
Climate and energy targets of 2020 must be achieved	1.1. To design the construction sector development plan for the achievement of the targets of 2020. Latvia has committed itself to several international obligations and implementation of EU directives, however, there are no development plans for the construction sector development which would determine how the sector can achieve these targets.	Competence of the Ministry of Economics	Result: Designed construction sector development plan	2013

<p>Employee categories</p>	<p>1.2. Profession standards have to be designed as well as additions to the Profession Classifier with the formulated skills according to the qualification levels of the persons employed in construction (qualification levels II and III according to CEDEFOP /European Centre for the Development of Vocational Training/ or levels III and IV according to the European Qualifications Framework) and for the respective education (vocational education, vocational secondary education or qualification awarded by the Chamber of Crafts).</p> <p>As it is suggested by the conducted survey, about 2/3 of the persons employed in construction do not have any professional education. Only a few of them develop and improve their knowledge at their jobs thanks to the training available there as well as offered experience.</p>	<p>Competence of the Ministry of Education and Science, Ministry of Welfare</p> <p>(State Education Development Agency SEDA together with the National Council of Experts is implementing the European Social Fund project "Development of a sectoral qualifications system and increasing the efficiency and quality of vocational education". The total project funding accounts for 2 550 000 lats.)</p>	<p>Result:</p> <ul style="list-style-type: none"> - reviewed contents of construction sector education and amended according to the results of the construction sector study and the sector needs; -structure of professional qualifications in the construction sector made; -revised profession standards and updated key requirements for each specialization; - recommendations designed for the restructuring of vocational education. - amendments and additions to the Profession Classifier prepared; -recommendations designed for the assessment of employee qualification (category) and recording it in the education document and consideration for the employee remuneration. 	<p>2013 - 2015</p>
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<p>Recognition of informal education</p>	<p>1.3. Opportunities to improve qualifications or receive training in the area of energy efficient construction outside the formal education system. To ensure that the construction sector employees could compete in the labour market, improve their skills and prove their qualifications, it would be necessary to provide the construction sector employees not having professional education and willing to improve their qualifications (by receiving a certificate) with the opportunity to have training in study centres as well as on-job training and receive a document with the awarded qualification category.</p>	<p>Competence of the Ministry of Education and Science; State Employment Agency</p>	<p>The system designed for recognizing the skills acquired outside the formal education system. In year 2010 the law “Amendments in the Law on Vocational Education” was adopted which governs the evaluation of the professional competence acquired outside the formal education system. On 22 February, 2011 Regulations of the Cabinet of Ministers no. 146 were adopted on the “Order for evaluating professional competences acquired outside the formal education system”, which correspond to the professional competence of the professional qualification of the first, second or third level. Currently, the evaluations of the knowledge and skills acquired outside the formal education system is implemented in 26 institutions of vocational education.</p>	<p>2013 – already in operation</p>
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Energy efficiency requirements for buildings	1.4. To establish the criteria of a zero energy consumption building	Competence of the Ministry of Economics	Clearly defined quantitative and qualitative zero energy consumption criteria.	2013
Changes in tax policy	1.5. Decreased VAT rate (12 %) is currently applied to heating and gas supply, however, energy efficiency measures as well as alternative fuel – wood, wooden pellets are still imposed the regular 21% rate. Thus there is an indirect support to energy consumption rather than investments in energy efficiency and use of renewable energy resources	Competence of the Ministry of Finance and Ministry of Economics	Decreased VAT rate on energy efficiency measures	2014
	1.6. As a result of building renovation their value rises, along with the value there is a higher real estate tax (RET) to be paid. No higher RET rate is applied for incompliance with the energy efficiency requirements	Competence of Ministry of Finance and Ministry of Economics	After renovation no higher RET rate is applied	2014
Designing of the system for certifying the installers of RER	1.7. To design the certification system for the installers of RER in compliance with the renewable sources directive	Competence of the Ministry of Economics	Certification system has been designed	2013
Minimum energy efficiency measures	1.8. Definite requirements for the minimum energy efficiency. In order to achieve climate and energy targets of 2020 the activity and interest of house owners is needed. It can be achieved both with the help of informative measures as well as by integrating the obligation to renovate buildings and decrease the current heat consumption threshold.	Competence of the Ministry of Economics	Several classes of buildings have been established. Minimum energy efficiency requirements have been elaborated for heat and hot water consumption in housing in terms of Wh/m ² per year.	2013

	<p>1.9. To make amendments in Regulations of the Cabinet of Ministers No. 299 “Regulations on Commissioning of buildings” to include the following: a) an object of construction must not be commissioned without an energy audit; b) information on the official and actual energy efficiency indicators must be included in the act on commissioning a building; c) energy efficiency certificate is to be submitted to the officials commissioning the building.</p>	<p>Competence of the Ministry of Economics</p>	<p>Amendments have been made</p>	<p>2013</p>
<p>Instrumental measurements (quality control) upon commissioning a building</p>	<p>1.10. According to the Latvian Building Code LBN 002-01 the construction envelope must correspond to certain air permeability and heat permeability values, however, it is not assessed when commissioning a building. The air permeability can be tested with a help of instrumental measurements which usually means making just one measurement.</p>	<p>Competence of the Ministry of Economics</p>	<p>Amendments made in Latvian Building Code LBN 002-01</p>	<p>2014</p>

STUDY COURSES AND MATERIALS

	Tasks	Necessary sources and competent institutions	Result and monitoring	Deadline
Designing of study materials and technical literature	2.1. Exhibition of the catalogues of engineering solutions	Universities and research institutes (Riga Technical University, Latvian University of Agriculture)	Engineering solutions have been developed for the renovation of typical housing models and construction of LEB buildings.	Until 2015
	2.2. Designing of e-study materials.	Ministry of Education and Science	Study materials have been designed on constructing LEB buildings and use of RER.	Until 2015
Improvement of vocational education teachers and mentors' competences	2.3. To provide for a paid internship of teachers in construction companies and design offices of insulation material manufacturers, which are engaged in designing and construction of LEB buildings and integration of RER in buildings. Study excursions and experience exchange trips. Organization of professional seminars for training the teachers and mentors (modern building technologies and materials, new machinery and new installation methods, using of energy efficient materials in construction, energy efficient construction, foreign experience etc.).	Possible funding: ESF	Provision of qualitative training process and professional internship for the students and teachers of vocational education institutions	Until 2015
Study internships	2.4. For implementing a technological internship the issue about the mentor working on a building site must be solved – the experienced builders should be motivated to supervise the internship. Employers should be motivated through the internship contracts. The pay for internship supervision should be divided by two (internship	Ministry of Education and Science	Provision of internship sites in accordance with trilaterally signed contracts (CM regulations no.785, 20 Nov.2012.).	Until 2014

	<p>supervision is envisaged to be paid by hours) – ½ to the mentor from the school and ½ to the mentor on a building site. However, as the jobs related to energy efficiency will represent just a part of the basic profession skills (carpenter, finisher, engineer network installer etc.). At the conclusion of the internship the mentors should indicate what specializations have been acquired during the practice – incl. the ones related to energy efficiency. The order for organizing the internships of vocational school students (internees) in an institution, a business entity or society (internship site) is established by Regulations of the Cabinet of Ministers no.785 of 20 November, 2012 “Order for organization of internship and order for insuring students” that came into effect on 1 January 2013.</p> <p>The internee may sign a bilateral contract with the internship site on the order of mutual settlements (CM Regulations No.785, 20 Nov., 2012).</p>		<p>Systematic control and analysis of results.</p>	
<p>Training of current employees and the unemployed.</p>	<p>2.5. The retraining of adults can be organized in vocational education institutions. As the number of students in vocational education institutions is decreasing, both the issues of training qualified labour as well as exploitation of the education institution can be solved this way. According to section 2.5 of the Regulations of the Cabinet of Ministers No.148 (22.Feb.,2011) on the “Order for awarding and annulling the vocational education competence centre status”, “... it is possible to train the students of other vocational education institutions for working with the latest technologies as well as improve the qualifications of other persons employed in the sector and implement training, retraining and qualification improvement programmes for the unemployed and job seekers”.</p>	<p>Vocational education institutions, ministry of Education and Science, state Employment Agency</p>	<p>Competitiveness in the labour market.</p>	<p>2013</p>

<p>Design of study courses in vocational education institutions</p>	<p>2.6. Necessary for separate energy efficiency courses in the education programmes of various construction-related and engineering communications professions (builder, finisher, carpenter, building technician, finisher-technician etc.). The acquisition of the theoretical and practical course on energy efficiency must be affirmed with a certificate. The examination must be designed as a qualifications examination with the participation of professionals. The study course theories must be designed as well as the internship programme, contents of the qualification examination and a certificate. The course must align with the amount of hours of the existing programmes as the education programmes have been designed based on the Education standard (the amount of the proportion of the theory and practice as well as proportion of general and professional education courses established in the regulations of the Cabinet of Ministers) and Profession Standard. The qualification improvement programmes and professional development programmes are guided by the description of the profession in the Profession Classifier which will have to be updated.</p>	<p>Ministry of Education and Science Working group established for the SEDA project and the Branch Expert Group for designing of Profession Standards</p>	<p>Amendments have been made in Profession Standards and Profession Classifier. Theoretical and practical study courses have been designed Study course syllabi must be designed</p>	<p>Until 2015</p>
<p>Study infrastructure</p>	<p>2.7. Competence centres must have correspondingly equipped study workshops. Competence centres or other study centres must be provided with the opportunities to acquire the latest technologies in the construction sector. Regulations of the Cabinet of Ministers no. 148 (22 Feb., 2011) „Order for awarding and annulling the vocational</p>	<p>Ministry of Education and Science</p>		<p>Until 2015</p>

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	education competence centre status”, p.2.5.			
Training of current employees	2.8.To create the list (of the Ministry of education and Science, private institutions as well as those of State Employment Agency) of the current construction sector professions and offered education programmes which should contain an energy efficiency course and internship by the kind of implementation: education, improvement of qualifications, professional development.	Ministry of Education and Science Working group established for the SEDA project and the Branch Expert Group which has designed the map of construction sector professions		2013
	2.9.Vocational education programmes in the construction sector must be synchronized with the higher education programmes in the sector	Ministry of Education and Science	Integrated in the Laws on Higher and Professional Education	2014

SCIENCE AND PILOT PROJECTS

	Tasks	Necessary sources and competent institutions	Result and monitoring	Deadline
Scientific research support	3.1. Support from the scientific research on energy efficiency and using RER in buildings	Ministry of Education and Science, Riga Technical University, Latvian University of Agriculture, Ministry of Environment Protection and Regional Development, Ministry of Economics	Scientific publications in internationally cited publications Quarterly information bulletin on achievements for inhabitants	2014 – 2020
Pilot projects	3.2. Pilot projects which will comprise joint work of the students of engineering, university teaching staff, students, teachers and trainers from vocational schools for acquiring theoretical and practical experience in designing and constructing LEB and passive buildings.	Identified resources: CCFI instrument, State Financial Reference funding to science, ERDF resources.	Scientific publications in internationally cited publications and designed engineering solutions.	2014 – 2020
	3.3. Pilot projects which achieve very low energy consumption by using innovative and environmentally friendly engineering solutions (solar collectors, pellet boilers, heat pumps etc.)	Implementers of pilot projects, seminars	Popularization of the achieved results, new technologies and experience Construction of a sample zero energy consumption building	From 2013 to 2017
Designing of standard renovation solutions and technical documentation	3.4. Designing of standard renovation solutions and technical documentation	Ministry of Economics, Institutions of Higher Education	Standard solutions designed for the renovation of typical block houses	Until 2015

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SUPPORT TO EE AND RER PROJECTS

	Tasks	Necessary sources and competent institutions	Result and monitoring	Deadline
Support from ESCO and PPP	<p>4.1. To raise private capital for the energy efficiency projects of buildings by providing methodical support for services of energy service companies.</p> <p>Support from innovative funding mechanisms, such as ESCO and PPP.</p> <ul style="list-style-type: none"> ▪ In order to achieve the maximum of the directive targets with the existing funding, the raising of private investments should be promoted by creating and facilitating new funding mechanisms including: <ul style="list-style-type: none"> ○ EU funding as an indirect support; ○ Provision for using ESCO (Energy service companies) and PECO (a company owned by municipality which operates according to the ESCO principles) principles in solving energy efficiency projects based on business principles; ○ Subsidized interest rates on loans; ○ State guarantees for loans; ○ Partial repayment of loans if certain criteria are met; ○ Indirect support mechanisms, including tax discounts or additional taxes on the buildings which do not correspond to the energy efficiency measures. 	Ministry of Economics	Documentation sample (contract) designed for the co-operation between an energy service provider and the receiver of its services The sample contracts is published in the website of the Ministry of Economics.	2013
Result-based support	<p>4.2. To provide that the funding corresponds to the achieved result. The commissioning of buildings and acceptance of work should be organized only after the instrumental quality control measurements. Quality control</p>	Ministry of Economics, Ministry of Environment Protection and Regional Development, Ministry of Economics, Ministry of Education and Science,	Amendments in the regulatory acts governing construction (see section 12.)	2014

	measurements comprise the measurements of the building density control, thermography, airing, testing of heating and hot water systems. The buildings which have received support must provide for the monitoring of energy consumption. Result-based investments would promote hiring of qualified workers for the jobs.	Building authorities		
	4.3. To provide employee training for the projects co-funded by the European Union, state or municipality and projects aimed at reducing energy consumption or use of RER.	Ministry of Economics, Environmental Investment Fund – funding must be envisaged or the requirement recorded in the procurement	Employee training requirements has been recorded in the procurement contracts between the customer and procurement winner – general contractor of the project.	From 2014
Public procurement	4.4. To supplement the construction-related requirements set forward to applicants in public procurements with a requirement on a definite category of the employee qualification who will work on the building site in order to provide for the heat retention capacity in a building and achieve the planned energy efficiency etc. This would motivate contractors to provide the employees with the opportunities, facilitate and support them to learn in order to achieve a certain category. The employees would be motivated to improve their professional qualifications.	Ministry of Economics, Ministry of Education and Science, Council of Branch Experts	<p>Sample documentation has been designed and regulation regarding the categories and their acquisition</p> <p>Sample documentation has been designed for stating the qualification required from a public procurement applicant.</p> <p>The requirements of article 51, point 6 of the Public Procurement Law (06.04.2006.) have been implemented regarding the applicant's ability to operate professionally</p>	2014

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			as well as the information to be submitted for the evaluation of the applicant in accordance with the above mentioned requirements.	
4.5.	Public sector zero energy building and RES technology. Application of life cycle cost principles.	State institutions and municipalities		From 2014

EDUCATING OF MARKET PARTICIPANTS

	Tasks	Necessary sources and competent institutions	Result and monitoring	Deadline
Information campaigns	5.1. Targeted information campaign for the population	NGOs, Municipalities, planning regions, energy agencies	Awareness of builders and public about the necessary energy efficiency measures and energy certification of buildings has been achieved	2014 to 2020
Construction enterprise motivation	5.2. Construction worker compensation and demand for the employee in accordance with the specialization and education level and in accordance with the qualification category.	Latvian Builders Association, Builders' trade union	Improvement of the quality of construction work Competitiveness in the labour market. Quality of construction work.	Starting from 2013
Employee motivation	5.3. Employee motivation	Latvian Builders Association, Energy agencies	Qualification and Education in compliance with the qualification and education	2015 to 2020
Employee prestige	5.4. Issue of prestige	Ministry of Education and Science, NGOs, LBA, Rise in energy efficient construction volumes	New jobs with adequate remuneration	2014 to 2020
Law on Public Procurement	5.5. Still dominating is the lowest price principle when prices are artificially decreased by reducing the quality of construction work. All market participants involved in the construction process must be educated.	Ministry of Economics, Environmental Investments Fund, funding has been increased in accordance with the raising of energy efficiency measures	Energy-efficient construction is connected with big investments both in designing and construction of the building as well as making its engineering systems. The site	Starting from 2013

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			cannot be commissioned if the planned indicators are not achieved. The low price principle is not admissible and not applicable in the construction of LEB buildings.	
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EMPLOYEE TRAINING

	Tasks	Necessary sources and competent institutions	Result and monitoring	Deadline
Training of existing employees	To provide the existing employees having construction sector specialities with the programmes for qualification improvement and professional development.	State Employment Agency, Ministry of Education and Science, vocational schools and private study centres. Informing of employers. No need for too big number of hours. The study practice in workshops under the guidance of the industrial training instructor could be for 100 hours including the test for receiving the certificate – it is about 2.5 weeks. Manuals designed by building material producers with a detailed list of operations to be carried out. Supported by Riga Technical university,	Sufficient amount of employees with adequate qualifications. Designing of typical course contents.	2013

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		Latvian University of Agriculture, producers		
Training of new specialists	The new specialists in the construction sector must prepossess substantial knowledge about energy efficiency - this regards all specializations from a worker to the engineer	Ministry of Education and Science, updated Profession Standards, Profession Classifier, fast licensing and accreditation of programmes	New construction sector specialists meet the labour market requirements	2014
Retraining and lifelong learning	General introduction of Regulations of the Cabinet of Ministers no.146 of 22 Feb., 2011 the „Order for awarding and annulling the vocational education competence centre status”	State Employment Agency, Ministry of Education and Science, vocational schools and private study centres. Informing of employers.	There is a wide range of programmes in all regions, incl. the programme “Building insulation specialist” Every year at least 10 % of the sector employees	From 2013
Forecasts and monitoring	In Latvia no instrument has been designed for forecasting development trends to establish the necessary number of workers in specific professional groups and in association with the appearance of new technologies in the construction sector (e.g., heat pumps, solar colLEBtors etc.)	Ministry of Education and Science, EM	The method for the monitoring has been designed (regular surveys)	From 2014

Necessary resources

Knowledge and skills of workers:

- The new specialists
- Knowledge and skills of existing workers

The new specialists

To ensure that young professionals acquire the knowledge in addition to the nearly zero energy buildings and renewable energy use, it is necessary to prepare additional subjects and integrate them into existing courses (see task "Courses and Materials"). Similarly, the estimated costs associated with participating in vocational education teachers and mentors raising competence and training necessary material and technical development and production of training materials. The training and professional development program is guided by the characteristics of the profession Classification of Occupations, which is currently being updated. Course location during training should precede technological practice - a trainee on an object to go with a certificate of energy efficiency course of theoretical and practical learning. Corrections and additions to the curriculum aligned with the Ministry of Education, as it will affect the program licensing and accreditation. However, additional resources should be provided for the purchase of materials for practical training and training the teachers.

Knowledge and skills of existing workers

Knowledge and skills about nearly zero energy buildings and renewable energy in buildings also required for existing workers. Knowledge among workers is very different from the very bad to very good. Training of existing workers to provide additional time for the knowledge of the nearly zero energy buildings and renewable energy use in buildings, emphasizing the need for profession collaboration, integration and team work methods, self-control and control of the operation. It is necessary to provide new and innovative methods of teaching – on-site learning, distance learning opportunities, e-course development and others. Currently difficult to determine training costs, because it depends on the number of workers trained. The estimated costs associated with:

- Instruction of teachers/trainers for conducting the courses
- Programme design
- Maintenance and acquisition of study equipment and stands
- Certification / Accreditation
- Expert and teacher costs
- Programme marketing
- Study materials
- Registration system (data base, platform)
- Co-ordination (administration) of studies
- Organization of examinations
- Maintenance costs (rent of premises etc.)
- Time spent (in studies rather than at work)
- Examination of the trainee applications/ management (assessments, interviews etc.)

It is envisaged that the basic training of the nearly zero energy buildings and renewable energy sources in buildings would require a complete all construction workers - depending on the scenario for the year 2020 it would be needed to train from 19,949 to 38,056 workers. The Roadmap foreseen that workers training begins year 2015, with an average of 3300 to 7200 workers per year up to 2020 including. Depending on the scenario or the number of trained workers would be needed from 23 to 51 experts. Training courses designed to

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provide in existing training centers (competence centers). Investment needs in the organization of such training could range from 30 millions up to 40 millions Ls.

7. Conclusions

Buildings in Latvia possess a very big energy efficiency potential which is not sufficiently used. Latvia has committed itself to several international obligations by establishing specific energy and climate targets:

- By 2020 to increase energy efficiency by 20 %,
- By 2020 to increase the proportion of renewable sources in the final gross energy consumption by 40 %,
- during the period from year 2009 to 2016 to raise energy efficiency at the side of the energy end user by achieving a 9 % reduction in energy consumption,
- to raise the level of employment.

Implementation of these targets is impossible without highly qualified and knowledgeable employees. In renovation and construction high quality of work is one of the most important factors providing justification for the investments in raising energy efficiency and use of renewable resources.

As Latvia experiences the reduction of its population and emigration of its workforce, the existing vocational education institutions and study centres will be able to provide the necessary number of workers only under the basic scenario. This means that it is not possible to achieve the climate and energy targets of 2020 due to the lack of workforce.

The Roadmap offers the way and identifies the tasks to be implemented for raising the employee qualification.

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BACK COVER

BUILD UP Skills

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

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

BUILD UP Skills has two phases:

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

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

The BUILD UP Skills Initiative contributes to the objectives of two flagship initiatives of the Commission's 'Europe 2020' strategy — 'Resource-efficient Europe' and 'An Agenda for new skills and jobs'. It is part of the Commission's Energy Efficiency Roadmap 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.