BUILD UP SKILLS

ENERGY TRAINING FOR BUILDERS

Status Quo Report

Energy Efficiency and Use of Renewable Energies
in Buildings:
Opportunities and Needs in the Hungarian Education System

BUILD UP SKILLS HUNGARY

(BUSH Project)

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Energy Efficiency and Use of Renewable Energies in Buildings: Opportunities and Needs in the Hungarian Education System

Prepared as part of

BUILD UP SKILLS HUNGARY (BUSH Project)

In association with

Budapest Chamber of Commerce and Industry

Hungarian Association for the Building Materials Industry

Hungarian Association for Building Engineering Contractors

National Labour Office

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Further information

More details on BUILD UP Skills can be found at www.buildupskills.eu
More details on the IEE programme can be found at http://ec.europa.eu/intelligentenergy

About the Project

Build Up Skills Hungary (BUSH) is one of the Build Up Skills projects currently running in 29 EU Member States and is funded under the Intelligent Energy Europe (IEE) programme.
A strategic initiative, Build Up Skills seeks to boost the education and training of qualified workers in the construction sector to deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings as per the 2020 EU objectives. 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 objectives are to have the subjects of energy efficiency and renewable energy included in the continuing education system of the qualified building workforce, to set up national qualification platforms and roadmaps in order to meet the targets for 2020 and beyond, and to support the step-by-step development of training/certification systems in connection with energy efficiency and the use of renewable energies.

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.

For the implementation of the goals set forth in the project, a consortium has been set up, coordinated by ÉMI Non-profit Lld. for Quality Control and Innovation in Building. Members of the consortium are the National Labour Office, the Hungarian Building Material Association, the Budapest Chamber of Commerce and Industry, and the Hungarian Association for Plumbers and Technical Contractors.

For information on project-related events and achievements, visit www.bush.hu.

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EXECUTIVE SUMMARY

This Study seeks to assess the potential and needs of the Hungarian education system in relation to energy efficiency in buildings and the use of renewable energies. Our goal is to provide an analysis of the status quo based on an objective approach, also including well-founded conclusions and possible recommendations. To that end, research for this Study began in two parallel efforts: while chapters on the building economy and vocational and adult education represent snapshots of the current situation in Hungary, results of the questionnaire survey presented in the last third of the paper demonstrate the potential and needs of education in relation to energy efficiency in buildings and the use of renewable energies.

In the year preceding the global financial crisis (2008), Hungary's total energy use was measured at 1,121 PJ, of which 425 PJ was attributable to heating and cooling in buildings, meanwhile energy use for household heating and cooling stood at 192 PJ. The first section of the Study focuses on the role of the construction industry in the national economy, as well as on key tendencies in the building economy and employment. This is followed by a presentation of major strategies, plans and regulatory tools in energy policy that are relevant to this area. Among others, the New Széchenyi Plan, the National Energy Strategy and the Széll Kálmán Plan 2.0 which functions as Hungary's framework programme for the EU 2020 Strategy, will all be put under review. The latter document summarises Hungary's most important commitments, according to which use of renewable energy carriers will have to increase by almost 15 percent while achieving overall savings in energy of 10 percent (with 2005 representing benchmark levels).

The Study also introduces the Hungarian housing sector and its status quo in terms of energy use. Typical characteristics and energy performance of the building stock will be presented based on statistics and available literature. In light of these information, it becomes clear that family houses located in rural and suburban settings and built in the 70s and 80s constitute the bulk of Hungary's housing stock, approximately 80 percent of which is in need of renovation or should be demolished and replaced with newly built properties. About two million people call prefab concrete tower blocks their home; however, even these outperform single-family homes by more than 50 percent in terms of specific heating energy demand. Another typical feature of the country's housing stock is its considerable dependency on energy: at 75 percent of dwellings natural gas is considered the primary energy carrier.

We can see that a commitment to lifelong learning allows for a quick and effective adaptation to the demands of the labour market and the economy, thereby promoting economic growth and equal opportunity across our society. For the development of our adaptability, in a market economy it is essential that education and training do not end whenever a qualification or degree is obtained. Given the unrelenting advancements in technology, education systems able to stay abreast of the latest technologies must be developed, opportunities for further and continuous education must be established and mechanisms should be set up that facilitate rapid switches between vocations at a high level of quality and in a cost-effective manner.

The Study provides a summary of the status quo in adult education and training, while also pointing out some of the key characteristics of adult education. It also provides information on adult

education within and adult training outside the school system, about the structure of institutions engaging in adult education as well as on legal documents relating to vocational education such as the National Register of Vocational Qualifications (OKJ), the vocational and examination requirements and the modular system of qualifications.

Moreover, we will be looking at how investments can be made in the financing of adult vocational education and training, also assessing the differences between state-recognised qualifications offered under the OKJ and those offered by accredited market participants, according to the scope, size, duration and the type of financing of the courses at hand.

One can notice that, as for the courses run under the OKJ, only a fragment of these are related to energy efficiency and renewable energy. Consequently, state-run training programmes are unable to keep up with – or even lag behind – the demands of technology and the market (in qualifications offered under the OKJ, for instance, tasks related to contractor work only make up 10 percent of the total course time), and the number of students signing up for examination both in vocational and adult education is declining. Meanwhile, advanced-level vocational programmes in energy efficiency and renewable energy are gaining popularity. As the ratio between secondary and advanced vocational education shifts to the detriment of the former, it imposes a significant barrier to immediate entry to the job market.

This Study also aims to unveil the differences that designate, based upon factual data and assessed needs, a trajectory towards the establishment of adult education programmes in energy efficient and renewable-focussed construction, the introduction of which can take into account the EU 2020 targets for zero-energy buildings relating to qualified construction professionals.

Conducted as part of the BUSH Project, our survey's main goal was to examine the competence of construction professionals as well as the related expectations and demands of construction companies, while also evaluating the current and planned offer of relevant training institutions and assessing whether these are suitable to fulfil the demands set by the construction industry.

Furthermore, we have also investigated the qualifications where demand exceeds supply and where the competence of professionals ought to be improved. The range of vocations taught at educational and training institutions matches that of professionals employed by construction-industry respondents in the highest numbers. Institutions currently offer several programmes that, based on the expectations of construction-industry respondents, can be considered shortage skills. It is very likely that professionals graduating in these programmes will not enter the labour market but migrate to other vocations – or perhaps even immigrate. There are, however, qualifications that are high in demand, yet the number of training institutions suited to meet such demand is low, which in part results from the vocational structure. In summary, one can conclude that the current and planned course offers at educational institutions are suited relatively well to today's and future demand for qualified professionals at construction companies.

However, for certain vocations, our gap analysis indicated considerable deficiencies in terms of competence. Use of this analysis allows determining the competence of professionals in relation to the significance of vocations at building energy retrofit projects. In order to reach a point where advanced

technologies are being utilised as appropriate, our analysis shows that the teaching of most building engineering vocations ought to be improved.

During the questionnaire survey, we began a mapping of the obstacles designated by our respondents. Their answers given to open questions shed light to a wide spectrum of problems that were categorised for more detailed analysis. For educational institutions and stakeholders of the building economy, we distinguished between financial, economic, structural and systemic obstacles. Once identified, these obstacles were subjected to a closer inquiry in the course of our talks with members of the platform and by way of the analysis performed together with the project consortium. It was then that the need for a detailed negotiation with stakeholders became evident, in order to accurately define both the challenges that lie ahead and their possible solutions as well.

1. INTRODUCTION

Hungary's efforts to emerge from the economic crisis are greatly hindered by a poor energy efficiency, which could be improved at the lowest cost and at the highest benefit both to society and in terms of climate protection by a sustainable energy retrofit programme of its buildings and by the construction of new, energy-saving dwellings. At least 70 percent of Hungary's building stock of 4.2 million units is in need of renovation, with approximately 10 percent being so obsolete that these ought to be demolished and replaced with new buildings. Today, **40 percent of all energy usage in Hungary takes place indoors**, nearly two-thirds of which is attributable to heating and cooling. **Our buildings are by far the greatest sources of CO_2 emissions**, well ahead of industry, transport and land use. Energy bills constitute an ever larger share of budgets for families and public institutions alike. On a national economic scale, **demand for natural gas for heating purposes represents the core reason behind our energy import dependency**, which is the highest in Europe (66 percent of Hungary's energy demand is met by imports).

As part of the **EU 2020 Strategy**, Hungary committed itself to raising the share of renewable energy sources to 14.6 percent of primary energy use, achieving total energy savings of 10 percent and limiting the increase of greenhouse gas emissions at 10 percent relative to the 2005 level. The implementation of these targets not only contributes to improving employment figures, it also allows innovation-based investments, and therefore the country's knowledge base, to gain more ground. As a prerequisite, the current adult education system must be expanded.

The Program of National Cooperation (the Government Programme) stipulates that a nationwide energy efficiency programme must allow for the realisation of a "European energy efficient buildings initiative" in the construction industry, while also promoting the proliferation of green technologies, facilitating the implementation of our commitments as regards climate change, and encouraging job creation and entrepreneurial growth. The **National Energy Strategy** determines that retrofitting the existing building stock – with special regard to public buildings – is a high-priority task. The aim is to decrease the heating energy demand of buildings by 30% by 2030. **The National Action Plan for Renewable Energy Carriers** sets out a 18.9 percent target for the share of renewables in the heating and cooling of buildings by 2020, half of which ought to be achieved by 2015.

Of the seven core programmes that constitute the **New Széchenyi Plan**, actual tasks are contained under "Renewal of Hungary – development of green economy" and "Home projects – residential property policy". **The Széll Kálmán Plan 2.0** earmarks a total of HUF 163 billon (or approximately 0.6 percent of Hungary's GDP) to be reallocated between Operative Programmes for building energy purposes. These funds will allow for projects aimed at reducing the use of conventional energy carriers at buildings of public institutions and SMEs (building insulation, fenestration replacement, lighting overhaul etc.), which, in addition to boosting the economy, also contributes to relevant targets of the Europe 2020 Strategy.

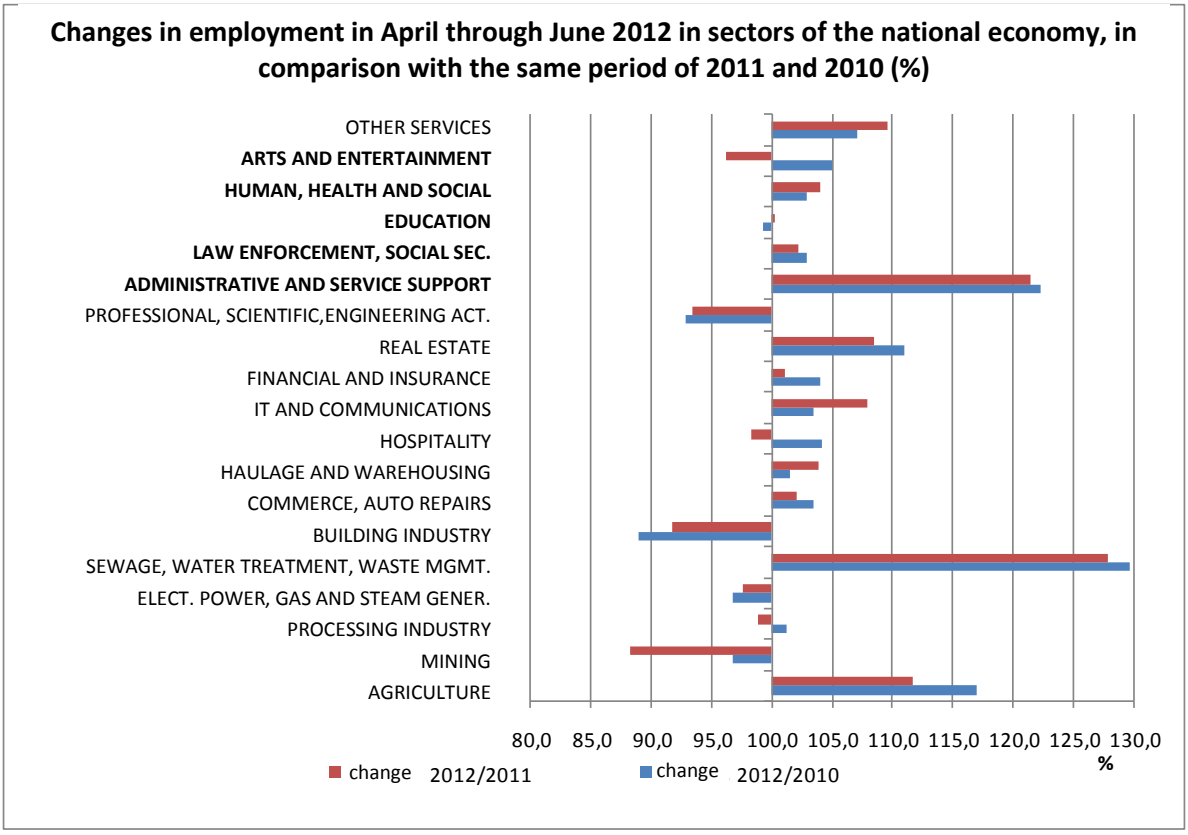
Measures enacted in energy efficiency play a central role in ensuring that climate and energy policy targets can be implemented **at the possible lowest cost – for that, improving the energy efficiency of buildings offers the best alternative**. The greatest savings potential lies in residential buildings, households, municipal and public buildings. Developments in building energy efficiency also bear relevance to the **Government Programme's aspirations in job creation**, as the energy retrofit projects and new constructions would require a significant amount of qualified (but not university graduate) workforce. These activities could also give companies engaging in green industries a boost (e.g. through the use and proliferation of high-performance construction products and technologies), thus contributing to the Government Programme's targets in innovation and R&D. In turn, the demand created by developments improves the competitiveness of Hungarian SMEs involved in the construction industry, also helping the planning, production, contracting, commercial etc. capacities of the building economy to get back on track. Having various initiatives and tenders in building energy organised in a bidder-friendly manner cuts back on red tape while also helps to mitigate the debt chain and replace substandard products – mostly originating from imports – that are flooding the building market with quality goods and services by Hungarian companies.

Despite the above facts and a clear commitment in Hungary's energy and climate policy, the opportunities that lie in a deep building retrofit programme have yet to be exploited. Experts say that this is mostly due to a general lack of funding, since traditional financing schemes are unable to

provide a dependable background for the establishment and operation of building energy projects. **Given the country's distressed budget, non-refundable grants disbursed from the state budget are hard to come by and will only cover a fraction of needs that arise. Commercial bank loans cannot be considered viable alternatives for making up whatever funds are lacking because neither the Hungarian population, nor the municipal governments or the country's SMEs possess enough own funds to pass creditworthiness and provide collateral. Moreover, because of negative experiences regarding foreign currency lending and due to a lack of state guarantee, both investors and financiers are now in a passive state.** Further aggravating the above situation is that, because of the lack of an institutionalised building energy programme, the investment environment is not stable enough for commercial banks to provide financing.

As mentioned above, "energy retrofit projects and new constructions would require a significant amount of qualified (but not university graduate) workforce". This demand for labour could be met by way of providing further training to those working in and/or leaving the construction industry. Based on the following table, we can see that it is the construction industry that experiences the highest rate of contraction in workforce, with the number of workers falling at an annual rate of 8.3 percent.

Figure 1



Source: Central Statistical Office, Labour Force Survey

A harmonious cooperation and coordinated development of education, vocational and adult education is of absolute necessity. While the school system is an important basis to ensure the availability of qualified personnel over the long term, adult education caters to more quickly changing needs. Continuing education, with adult education included, is one of the most effective tools in bringing expected demands for labour and current layoffs into balance. The term 'adult education' refers to educational programmes provided to non-school aged students outside the school system. **The objective is, therefore, to have vocational training course(s) launched that can meet the expectations of supply and demand on the labour market in accordance with prevailing needs,**

while also establishing the culture of contracting in energy efficiency and renewable energies. It must be kept in mind that adult education can be divided into two types: programmes provided within and outside the school system. These two have different basic functions: while adult education within the school system is aimed at obtaining higher levels of general education, programmes outside the school system are primarily geared towards obtaining a specific qualification and further enhancing the competencies acquired earlier. Nonetheless important is that "vocational training outside the school system can be better suited to the tasks, financial means and schedules of adults than those offered within the school system, which further increases their role[1]. "

1 László Zachár: A felnőttképzés rendszere és főbb mutatói [The adult education system and its key indicators] http://www.oki.hu/oldal.php?tipus=cikk&kod=felnottkepzes-zachar-felnottkepzes

2. GOALS AND METHODS

2.1 Objectives of the study

The **overall objective** of this study focuses on three elements:

a) First, to analyse and assess the broader environment in which the retrofitting of buildings for energy efficiency is implemented;
b) Second, to formulate conclusions, proposals and recommendations based on the deficiencies and problems revealed;
c) Third, to build partnerships, i.e. to discuss the findings and the deficiencies detected with the widest possible circle of professionals concerned.

The **specific objectives** of the study are as follows:

- Present the status, condition and main characteristics of the Hungarian building stock including available statistics on the housing sector and the energy efficiency of buildings;
- Give an overview of the labour market, employment and vocational education in the building industry;
- Introduce the relevant policies and strategic and legal regime, in particular the Hungarian and EU policy documents currently being drafted;
- Present the policies and the strategic and legal regime that regulate vocational and adult education.

The main methods of preparing this study involved an analysis of the relevant literature and a questionnaire survey.

2.2 Methodology of the desktop study

A literature review served as the basic method for developing the desktop study using the following information:

- professional and scientific publications in periodicals and monographs available in domestic and international literature;
- studies and strategic documents produced by independent professional organisations, civil organisations, associations, academic workshops and public bodies;
- official data releases (KSH – Central Statistical Office, energy statistics);
- government-commissioned background studies and analyses;
- strategies, concepts, plans, legislation and their corresponding background material;

Information derived from both the questionnaire and the interviews was used in the desktop study also to support the analysis and assessment of the building industry and of vocational and adult education; such information will be indicated specifically.

2.3 Questionnaire survey methodology

To collect primary data a questionnaire survey was used. Our respondents included training institutions and undertakings engaged in design and implementation in the construction industry.

Main goals of the questionnaire survey:

- Obtain information about the competence of professionals in the building industry;
- Obtain information about construction companies' demand for professionals;

- Become acquainted with the current and planned course offerings of training institutions;
- Compare the offers by training institutions with the needs of construction companies;
- In both target groups, identify those obstacles that prevent the training offer from meeting expectations.

2.3.1 Sampling[2]

For our survey two samples were taken according to the two groups below:

1) respondents representing construction companies,

2) respondents representing training institutions.

The questionnaires were sent to all *building contractors* who were included on the mailing lists of BKIK (Budapest Chamber of Commerce and Industry), MÉASZ (Hungarian Building Material Association), ÉMI (Non-profit Limited Liability Company for Quality Control and Innovation in Building) and MÉGSZ (Hungarian Association for Plumbers and Technical Contractors). MÉGSZ liaises with building engineering companies many of which, apart from implementation, pursue design and trade activities as well, the latter two often being registered as their core activity. However, as the major part of construction activities reviewed in this project that promote a more efficient energy use and the utilisation of renewable energy qualifies as building engineering, the project partners decided that for building engineers they would consider not only contractors' views, but also those of designers and companies engaged in trade activities.

Building industry respondents returned 280 questionnaires. After data cleansing and the deletion of incomplete forms, a total of 218 questionnaires remained, representing the sample examined.

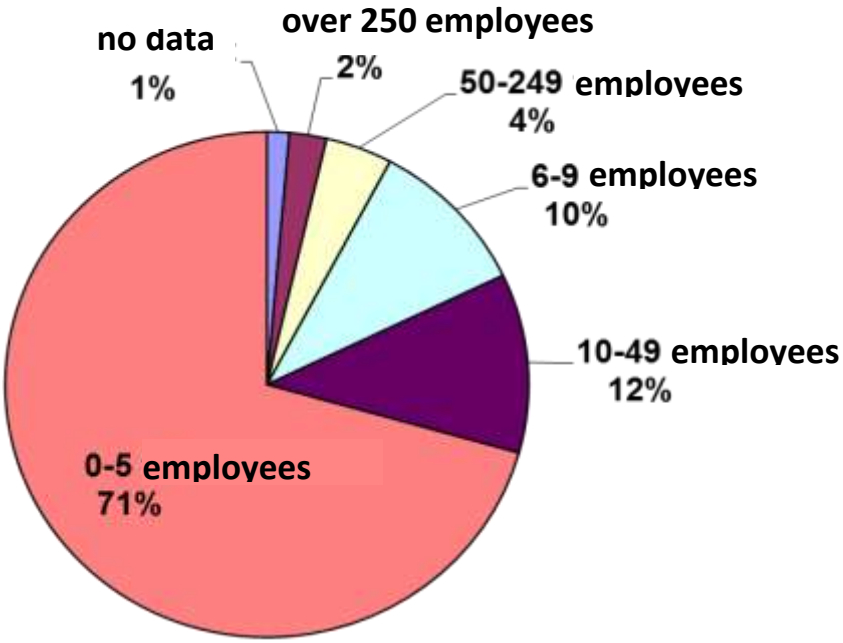
The sample is not representative of construction companies. One reason is that we did not wish to reduce the sample size in which companies with a core activity in building engineering were overrepresented: 86 per cent of the respondents were building engineers. Their ratio within the sample size could not be reduced also because statistics on construction companies are rather limited for the purposes of our survey as the proportion of building engineering companies within the total number of companies pursuing construction activities cannot be established.

In terms of their size, the sample is not representative of the companies interviewed. The vast majority of interviewees were micro, small and medium enterprises. According to KSH statistics for 2011, 89 per cent of construction undertakings had less than five employees – the ratio of such companies in the sample was 72 per cent. Based on statistics concerning the entire construction sector, medium enterprises with 5 to 49 employees made up 11 per cent in 2011 – in our sample this ratio was 21 per cent, meaning that medium enterprises were overrepresented. The share of companies with over 50 employees in our survey was above their real ratio too: large enterprises reached 6 per cent in our sample whereas only 0.3 per cent of construction companies can officially be classified into this category. Based on the above, compared with the status quo in the building industry, the opinion of small enterprises was underrepresented and that of large enterprises was overrepresented in the sample. This is partly due to the fact that our respondents included large enterprises offering both building design and implementation services whose main activities (e.g. commerce) did not qualify them to be recorded in construction industry statistics, yet their experience was important for our survey. Therefore, and in order to avoid any loss of data, we figured it would be inappropriate to lessen the sample size.

The figures below show the composition of the sample of construction companies according to various criteria.

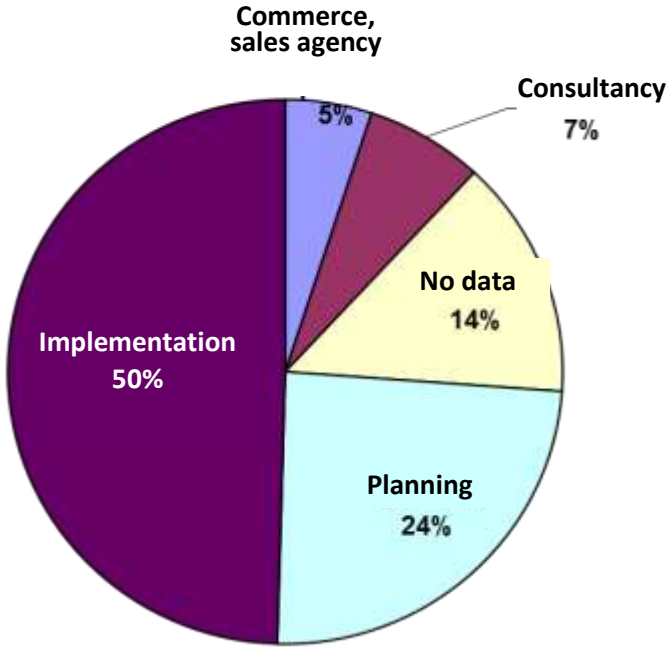
2 Source of KSH data cited in this Chapter: KSH 2012, Jelentés az építőipar 2011. évi teljesítményéről (Report on the performance of the building industry in 2012).

Figure 1: Composition of the BUSH survey sample of construction companies according to company size (number of employees)



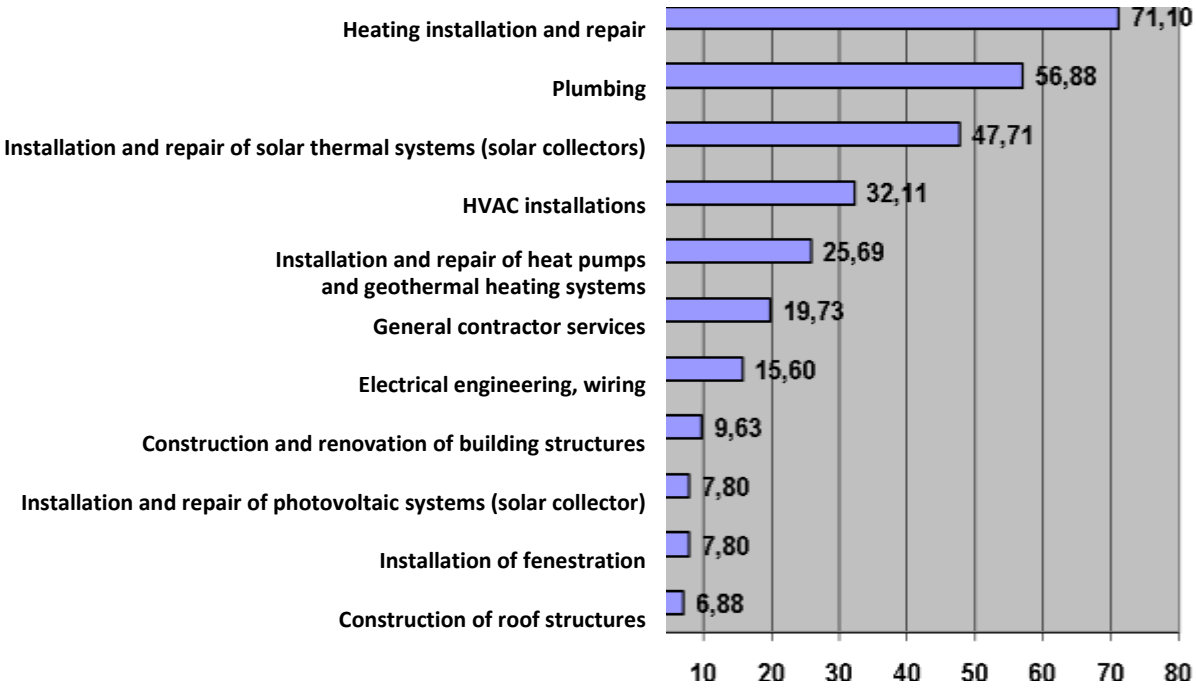
Source: BUSH project survey

Figure 2: Composition of the BUSH survey sample of construction companies according to company activity/company profile (all respondents; %)



Source: BUSH project survey

Figure 3: Activities most commonly pursued by the companies interviewed (frequency of mention in relation to all respondents; %)



Source: BUSH project survey

As the above diagrams show, the ratio of firms pursuing building engineering activities is extremely high, resulting in the overrepresentation of building engineers' views. However, it must be pointed out that building engineers were ready to answer the questions in such large numbers exactly because it is typically these companies that are involved in the retrofit of buildings for energy efficiency. The sample size was not reduced to reflect the correct proportion of construction subsectors, since respondent building engineering companies can formulate concrete needs that are based on experience. The needs and expectations identified in our survey thus do not exemplify the whole construction sector, but are typically based on the opinion of building engineering companies which implement energy retrofitting projects.

For **training institutions** neither the randomness of sampling nor the representativeness of training places were of particular significance. It was much more important to get to know the opinion of as many institutions engaged in educational activities related to the project as possible. Therefore, project partners who maintain contacts with institutions providing training for construction professionals compiled a national mailing list from their own mailing lists. E-mails containing a link to the online questionnaire were sent to the heads of such institutions who in many cases forwarded these to instructors whose opinion they thought would be relevant to the topic at hand. Ultimately, 29 questionnaires were returned, constituting the sample for our analysis. It is important to note that this sample does not necessarily reflect the opinion of 29 training institutions, but fewer than that – due to their anonymity it was not possible to detect which questionnaires were returned by instructors of the same institution. However, our primary goal was not to seek out the opinion of institutions and their management, but to get to know the entire training side which for the most part is influenced by the views of instructors. They are the ones who are in regular contact with trainees and the companies that later will employ them, i.e. with the respondents who constitute the other sample.

2.3.2 Measurement tools

For the collection of data an online questionnaire was used. The two target groups interviewed (training institutions and construction companies) received different questionnaires with certain questions included in both, and the way the questions were formulated allowed for the same topic to be examined from the points of view of either respondent groups. (E.g. Construction companies were asked what kind of professionals they hired, and training institutions were asked what kind of professionals they trained.) The online questionnaire was accompanied by an email cover letter. For both target groups completion was anonymous and voluntary.

2.3.3 Incorporating survey findings into the situation analysis

Gaining an insight into what kind of professionals undertakings engaged in building energy retrofit projects employ and what other trades' representatives they would need is the most important result of the questionnaire survey. It became apparent how much they thought the competence of different professionals was adequate to retrofit buildings for energy efficiency and the development of what vocations they found important. On the other hand, we could also see what kind of training options the training institutions offered and what obstacles the training and especially a suitable training supply faced.

3. TYPICAL FEATURES OF THE HUNGARIAN BUILDING SECTOR

3.1 The building economy and the construction industry: status and significance in the national economy

The building economy is a comprehensive function giving rise to the built environment in our constantly regenerating socio-economic and cultural existence. While the construction industry is indeed an organic part, it goes deeper and wider than that. It represents a shared set with a number of fields in environmental management, resource management, urban planning and education (training). (For a SWOT-analysis of the Hungarian building economy, refer to Appendix 1.)

> *"The economic crisis is not the only reason to blame for the setback in the performance of Hungary's building economy, as the industry is being plagued also from within. Oversized capacities, an inadequate regulatory environment, the absence of competencies, the extent of internal division, the lack of a definition for the building economy, the inflexibility of entrepreneurs etc. can all be held liable for the situation that has ensued. ... We must also understand that state-run programmes themselves are not sufficient in generating sustainable growth by which to lead us through the crisis. In order for a quality vocation to work for a quality market, stakeholders in the value chain must formulate a joint vision and strategy that could form the basis of development, sustainable in economic, social and environmental terms alike. What are the challenges for the Hungarian trade in the early 21st century and can these be met?"*[3]

3.1.1 The construction industry's role in the national economy

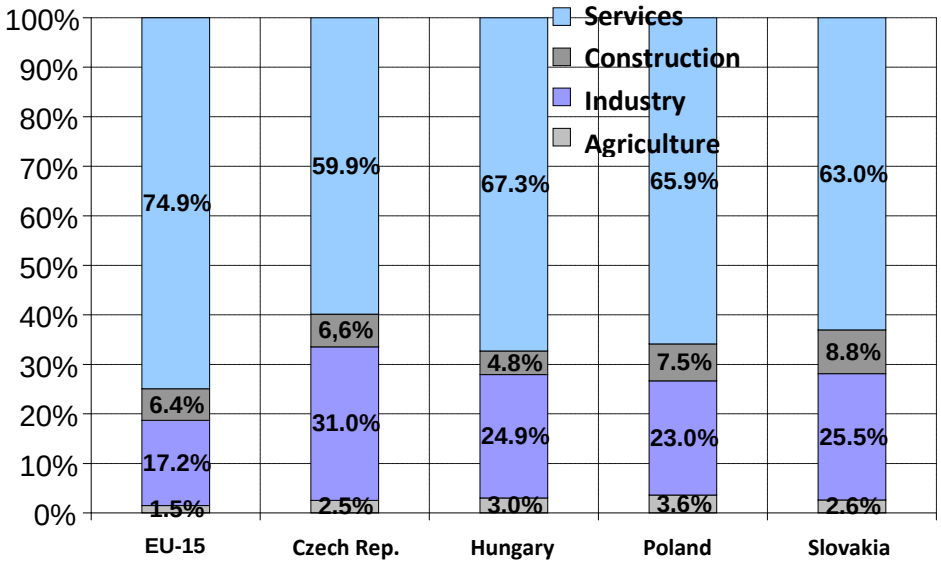
According to a background analysis by the government (Ministry for National Development and Economy, 2010)[4] , growth in the construction industry throughout the 2000s (that is, in the period between 2001 and 2009) was the least dynamic from among the four key areas (agriculture, industry, as well as construction and service industries) of the national economy. (All data and information specified in Section 3.1.1 originate from the aforementioned background study.) Over the 9-year period under review, the average growth rate of the construction industry's added value remained below 1 percent on an annual level, in contrast with the 2.2 percent growth rate of the national economy as a whole. While in the first half of the decade, the various schemes in state subsidised housing loans (interest subsidy on mortgage loans and supplementary interest subsidies) and then the pronounced upswing in infrastructural development around mid-decade ensured that the construction industry's added value expand at a rate more or less equal to that of the national economy, by the second half this momentum had tapered off and fell back considerably. Particularly distressing is that, as a result of a multi-year recession in construction, **the industry's overall value added in 2009 – after adjustments in price – fell to an eight-year low and was around the 2001 level**.

Taking into account the indicators of growth, it is hardly a surprise that the **significance of the construction industry in the national economy** has been markedly reduced lately. In 2009, the construction industry's gross value added accounted for a mere 4.8 percent of the national economy's net GDP, as opposed to its share in excess of five percent that had been typical during the early 2000s.

3György Széman Speech held at the 6th annual Hungarian Building Economy Forum (Construma, April 2011)

4NFGM, 2010. Elemzés az építőipar és az építőanyag-ipar nemzetgazdasági szerepének, teljesítményének, valamint belső szerkezetének elmúlt évekbeli alakulásáról [Analysing recent trends in the output and internal structure of the construction industry and the construction materials industry, also taking into account their roles in the national economy (Prepared by: Csaba Lay), Ministry for National Development and Economy, April 2010

Figure 4: Weight of the construction industry in the national economy according to gross value added, 2009



*Note: 2008 data

Source: Ministry for National Development and Economy, 2010

On an international comparison, these figures are considered very low: while in the EU-15 countries the construction industry boasts a share of 6.4 percent, in the case of the Visegrád Countries[5] this is even higher. Given the construction industry's restrained dynamism and its less significant weight in the national economy, its contribution to overall growth has also been negligible (with 2002 being the last year when the GDP growth rate had been given a considerable boost by the construction industry, adding as much as 0.6 percent to an overall GDP growth of 4.4 percent).

According to 2009 data, from the various fields constituting about three-quarters of the construction industry, **specialised construction – the bulk of which is represented by installation works on buildings, as well as special trade construction (e.g. building engineering, wiring, plastering, cladding, painting and roofing) – accounted for nearly one third of the construction industry's total output**. The building of complete constructions or parts thereof – which includes civil engineering projects such as roads and cables – was responsible for 22.9 percent of the total output; whereas the construction of buildings – which only involves the organisation of building construction projects and the structural completion of buildings – provided another 20.7 percent.

Output Structure

The share of civil engineering also confirms a significant drop in building construction over recent years. Building construction between 2007 and 2009 fell back by an average rate of 10 percent each year. Although the construction of other structures in infrastructural development only gained some momentum in the past two years, the weight of civil engineering within the construction industry as a whole had practically been balanced out by 2009.

As regards construction groups, it can be established that, in the period between 2001 and 2008, non-residential construction projects (particularly industrial buildings and warehouses) accounted for more than 40 percent of all construction activity, by far the largest segment. In 2009, the impacts of the economic crisis were most severe in manufacturing, with processing industry falling back more than 15 percent and commerce registering a near-20 percent plunge (although construction projects were only down approx. 5 percent), the weight of non-residential buildings remained around 40

5 representing the Czech Republic, Poland, Hungary and Slovakia

percent. **However, the weight of residential buildings within construction activity was relatively low, registered at 11.3 percent in 2008**.

In addition to non-residential buildings, the transport infrastructure constitutes the second largest element within the construction industry (20.5 percent in 2008), naturally mostly in the form of road construction (11.5 percent), even though the construction of related bridges, overpasses, elevated highways, tunnels and subways (4.5 percent) and railways (3.6 percent) should not be overlooked. Besides the transport infrastructure, also notable among other projects is the construction of pipelines, telecommunication and electric networks and their structures, which together accounted for 12.2 percent of all construction activity in 2008.

A distribution of output of construction enterprises according to **staff headcount** indicated that the performance of companies employing a maximum of four people is of key importance for the industry. It was this category that was responsible for over 30 percent of all construction activity in 2008. With companies operating with a headcount of 5 to 9 people contributed a further 9.1 percent, micro-enterprises accounted for approximately 40 percent of all production volume. **Large corporations represented a rather puny 11.8 percent of the industry's total output.**

The Construction Job Market

During the second half of the 2000s (in the 2005-2009 period), the number of construction employees clocking a minimum of 60 work hours per month decreased at an annual average rate of 2.6 percent, meanwhile this latter figure for the national economy as a whole was around 1 percent. The last three of the five years under review brought about particularly severe layoffs (with annual rates nearing the 7 percent mark), thus the number of construction employees had by 2009 shrunk to below 118 thousand, or 4.4 percent of the national economy workforce. Nearly three-quarters of all people working in construction is engaged in physical labour; layoffs in their category during 2009 were approaching double-digit rates. In other building materials industries, the year 2009 saw the number of employees with a minimum of 60 hours worked per month decrease by approximately 12 percent, resulting in an overall headcount of less than 13 thousand. According to our estimates, the period between 2005 and 2009 under review caused the total number of people working in other building materials industries to decline by about 3.2 percent. Other building materials industries tend to employ physical labour at a rate higher than any other area in construction: in 2009 it stood at 77 percent of the overall headcount.

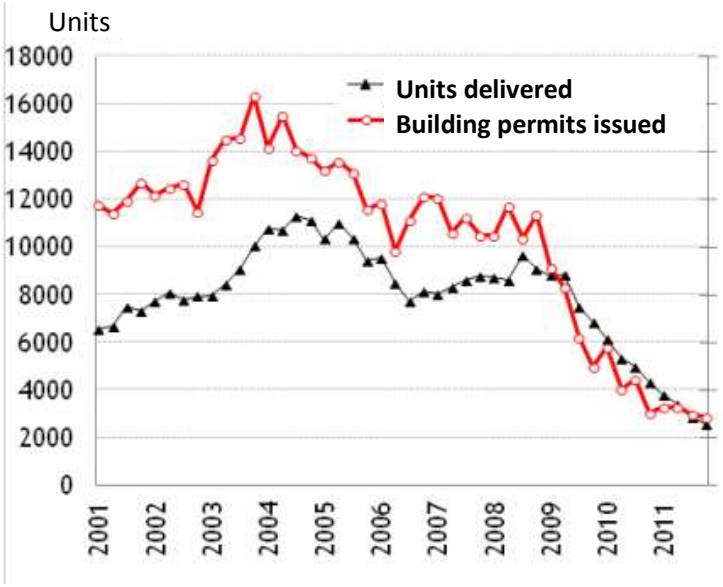
Housing Construction: a building economy indicator for the national economy as a whole

The following section has been prepared on the basis of an assessment by the Hungarian Association for the Building Materials Industry (MÉASZ, 2012)[6] .

According to data by the Central Statistical Office (KSH), the decline of the construction industry – at least in the housing sector – began as early as in 2003-2004. **A key element of the national economy, the construction industry is performing at ever decreasing rates year after year, and is in a deepening crisis**. Starting with 2009, state investments were put on hold, sources of home-building allowances began to dry up, and the country is now experiencing the backlash of the lending frenzy that took place in previous years. At this moment, the number of new buildings unsold is in the tens of thousands. As a result of tighter lending policies and uncertain growth prospects, investments are being curtailed. The population's declining income status projects that consumption is set to decrease. To top it all, besides an absence of funding, the industry is also characterised by a lack of information: however dwindled, the market ought to be informed about the benefits of attaining ever higher levels of quality and energy efficiency.

6 MÉASZ, 2012. Background material presented at a press breakfast hosted by the Hungarian Association for the Building Materials Industry and ÉMI Non-Profit Ltd. for Quality Control and Innovation in Building, at the 31st CONSTRUMA International Building Trade Exhibition

Figure 5: Newly built dwelling units delivered and building permits issued on a quarterly basis



Source: KSH (Hungarian Central Statistical Office)

According to forecasts by independent research and finance institutions, the construction industry is expected to stagnate during 2012, and even under optimal circumstances, positive changes are not likely to take place before 2013-2014. That, however, would require the government to get more deeply involved (in terms of housing allowances, interest subsidies, social housing programmes etc.). The housing and renovation sector should be allocated more funding from additional sources (EU funds, revenue collected from CO_2 quota sales) and at higher rates.

Proposal no. 1	We recommend that government bodies in charge of the building economy and construction prepare, on an **annual** basis and in a level of detail identical to that of the 2010 paper, **evaluation reports** on the status of the construction industry, **for submission to the Government**.

3.1.2 Hungary's construction industry: current situation, trends and vision

The following section seeks to summarise the economic, social and political factors that, while emerging on both sides of supply and demand, define the status of and trends in the industry (Wéber, 2011)[7] (All data and information featured in Section 3.1.2 originate from the above referenced background study.)

1. Supply side: general industry characteristics and tendencies:

- growing dominance of conditions of market-based operation, increasing competition,
- growing significance of business and financial processes,
- concentration of capital and the consolidation of capacities (also on account of company acquisitions carried out during the crisis) are set to be the main characteristics of the period ahead,
- the rather significant (and overrated) circle of sole proprietors and micro-enterprises is set to decrease, firstly due to the aging of a high number of "false self-employed" and the (expected) regulation of private businesses,

7 László Wéber, 2011. Support material to the Appendix of the National Building Economy Strategy . Building Economy Workgroup, Ministry for National Economy, Budapest, 2011

- increasing use of a client-oriented approach,
- requirements of environmental protection, climate protection and health gaining ground in contracting,
- significant innovation processes in the manufacture of building materials, in equipment used for building engineering and electrical purposes and in the mechanisation of construction – use of new materials, structures and equipment,
- building engineering, electrical and building automation systems that are related to energy efficiency gaining momentum at an increasing rate,
- emergence of new technologies (also) as a result of the above, combined with a more effective implementation stage, in which various solutions of information technology (IT) also become common,
- higher demand for advanced competencies and managerial skills,
- competition between technical solutions set to become more pronounced in contracting, which means that clients will often specify basic requirements, and there can be competition even in the way these requirements are fulfilled,
- international aspects growing stronger, amalgamation of domestic and foreign actors becoming more widespread throughout the industry (the competitive environment for general contractors in the Hungarian construction industry basically represents European companies, with specialist contractors mostly engaging on a Central-European regional basis).

2. Demand side: the trends and impacts of client demand:

- end-users growing more discerning, which means that demand for high-quality buildings and structures, as well as complex construction/contractor services will rise, with environmental awareness, energy savings and energy efficiency becoming the key trends among clients,
- share of project implementation (construction and renovation) based on a life cycle analysis (LCA) set to grow at a rapid pace,
- "green procurement" by public clients gaining ground and becoming more common,
- increasing competition for orders, large-scale and sometimes even cross-border (infrastructural) projects, growing competition on an international scale, wider range of opportunities for small and medium enterprises, subordinate tasks gaining more significance, general contractor roles reconsidered, project management by (private) clients gaining momentum,
- in the areas of housing development and housing policy, the construction of social housing becoming more dominant than before, with the share of energy efficiency retrofits also set to increase,
- the rate of construction and renovation of homes while relying solely on household resources, a common feature of previous periods, will decrease– due in part to the appearance of building materials and technologies requiring specialised skills – , only to be replaced by specialist contractor work, typically ordered by private individuals.

3. Expected changes in and the impacts of production factors and characteristics

- growing need for improving work ethics and improve qualification rates,
- in connection with the needs of more discerning clients, the diligence and dependability of skilled labour are to play a more important role in complex technical tasks, with the construction industry becoming less of a safe haven for unskilled labour,
- in connection with the above, employee wages increase, thereby stripping the contractor segment off its current competitive edge,
- at the same time, the contracting business will remain a labour-intensive sector, given its characteristics of production,
- managerial skills, economic and financial competencies and the use of computerised processes and organisation methods are to become common requirements in company operations, at large, medium or small enterprises alike,

- parallel to the quality improvements of buildings and structures, the technical, technological and organisational skills of middle management (primarily onsite supervisors) become more of a decisive factor,
- as for the factors of production, the role of the financial capacity and reliability of construction companies will definitely increase,
- as building and installation technologies evolve and new building materials and equipment are put to market, new expertise and more advanced equipment and tools will be required, leading to the further segmentation of specialist contractors.

4. Changes in the role of related and support sectors – subcontractors, suppliers and other parties

- in complex, high-volume projects, the horizontal contact network (consortiums, ad-hoc associations etc.) of contractor enterprises will grow more relevant – primarily for purposes of risk sharing arrangements,
- the role of vertically integrated companies – that is, specialist contractors – will increase particularly when it comes to more complex and high-profile projects, further pointing out the importance of more advanced organisation and coordination,
- on a mutual benefit basis, various forms of more distinct cooperation (cash pool, factoring etc.) can emerge between financial institutions and (typically cash-strapped) companies engaging in the building economy,
- a much more effective cooperation between designers and contractors will be an essential client requirement as far as liability regarding the completed facility is concerned,
- more active engagement by affected professional organisations in order to allow realisation of the above.

Table 1: List of "systemic" problems encountered by the construction industry

1.	struggle for state (EU) development funds – the highly centralised redistribution scheme lives on
2.	the widespread sub-sectoral structure of the construction industry acts as an obstacle to the creation of integrated markets and renders flexible adjustment to needs and complex solutions impossible
3.	project-centered view instead of an integrated approach
4.	building economy exists in a dual framework: not only is there a wide gap between the few large corporations and the tens of thousands of small enterprises, their relationships are also weak
5.	scarcity of funds, restricted internal market (limited purchasing power and creditworthiness)
6.	marked presence of foreign stakeholders, yet entrance to external markets is difficult
7.	deficiencies in employment and vocational education
8.	low rate of renovations and poor efficiency in energy use.

Proposal no. 2	We recommend the creation of a Building Economy Strategy, on the basis of which action plan(s) facilitating the rise of the construction industry can be prepared.

3.2 Status of the construction job market, employment and vocational training

The construction industry is one of the most significant sectors of our national economy both in terms of output and its role in employment. As an integrating sector, it incorporates and utilises the products of various other industries. Approximately 70 percent of the value created in building and installation activities comes with the installation of products originating from other industries, thereby

having a ripple effect in the areas of production and innovation alike. The construction industry sparks development in various industries, which also contributes to the creation of jobs.

Hungary's transition to a market economy came at the price of massive layoffs in industry, agriculture and construction alike. As part of the necessary transformation process, it was in 1997 that the rate of decline in the newly restructured sector came to a halt for the first time, with 1998 bringing further improvements in employment. Before the economic crisis, in 2006, the number of people employed in construction was close to 141,000. By 2011, however, this figure had dropped to 115,000[8].

The fact that the 'expected salary increase' imposed on employers in 2012 resulted, on average, an additional gross pay hike of 4 percent on a year-on-year comparison, sparked further layoffs in construction. However, with the retention of the wage bill, building enterprises are being forced to cut their workforce. At companies expecting to retain their existing staff, pay hikes can only be implemented to the detriment of profitability, which averages at 2 percent – a very low rate in comparison with other sectors of the national economy.[9]

The job structure necessitated by construction differs significantly from those pertaining to the processing or service industries. Given the higher percentage of unskilled labour employed in constructions, it is here that a significant part of the workforce that cannot be employed elsewhere is absorbed. And continuously improving employment figures can also yield improvements in economic policy for the country as a whole. That, however, cannot be possible without the construction industry.

Under the Renewables Directive of the EU, all public institutions will need to have introduced low energy consumption schemes by 2018. From 2020 onwards, all newly constructed buildings will have to be operated at near zero-energy levels. To that end, EU calculations show that each EUR 1 billion spent on energy retrofit programmes could create an additional 7,000 new jobs in construction. If each year we could have 10 percent of Hungary's 2.8 million family houses renovated, that alone could provide employment to 80-100 thousand people in construction.[10]

The explicit demand for energy efficiency and sustainability in buildings – first by politicians and now by a growing number of developers and property managers – requires that novel building concepts be developed on a comprehensive scale, necessitating the use of intelligent technologies, new building methods and an environmentally sound usage of energy. With climate change and the increasing price of fossil fuels in mind, architects, designers and developers are all being required to adhere to an ever stricter set of requirements, whether it comes to construction or renovation. **While most technologies and products are available today that are necessary for such new concepts to be realised, the availability of an adequate group of professionals mastering experience in sustainable building can often present a hindrance. Therefore, the demand in these areas for high-level qualifications in renewable energy and meeting all relevant technical requirements is significant[11].**

However, the vocational education and training system has yet to gear up to keep pace with the latest trends. Vocational education in the field of construction is provided mostly by state-financed schools, as the high costs of training make this area difficult for private schools to finance. State-run education, however, is always more sluggish and takes longer to respond to changing needs, not to mention that it does not always conform to demands by the EU and the market. This can be traced back to several reasons. More developed Member States not only allocate significant funds and support to education, they also provide special subsidies for those using the latest innovative technologies. By contrast, Hungary is faced with a shortage of highly qualified trainers – in addition to the lack of funding referred to above – who could transfer state-of-the-art technological skills and competencies to vocational students. Besides the absence of proper qualifications, the foreign language skills most professionals in Hungary possess are insufficient even

8 www.evosz.hu

9 www.index.hu

10 www.mti.hu

11 Further aggravating the difficult situation of VET and continuing education is that, starting with the beginning of this year, companies are no longer able to have their vocational training contributions reduced through development aid contracts or by having their employees' training costs deduced as business expense. Therefore, 58 percent of companies have decided to curtail the funds allocated to employee training.

for reading foreign literature or checking online sources, let alone participating in foreign studies or workshops. While information technology does make life for those working in construction a lot easier, the selection and use of the appropriate software can become problematic in many cases.

Companies planning for the long term typically all try to collaborate with select educational institutions in one way or another, a process in which various public bodies can provide assistance. Such public body is the Budapest Chamber of Commerce and Industry, which helps students of vocational schools receive a practice-focussed education by way of individual student contracts and providing career paths to applicants. Companies also seek to mitigate the professional shortage by holding in-house training courses, thereby paving the way towards Europe's labour market. Some of the professionals working at such companies may have obtained their skills and expertise abroad and are now trying to pass it on to future generations. However, difficulties are presented by the fact that, under the recently amended legislation, companies are unable to have most of their training expenses posted as company expense or subtracted from their vocational contribution payments. From January 2013, the adult education act will change all that.

Another aspect of the European labour market, in addition to Hungary's import of know-how, is the migration of professionals. Construction companies are particularly affected by the issue; that much we know from the accounts of various companies, all based on own experience. While each Member State has its own employment policy, the free flow of labour is one of the four fundamental freedoms of the EU, which means that no accurate information is available on the extent of migration. Therefore, no sender country has information as to how many professionals are seeking employment abroad and for what purpose. Published by the National Labour Office, the Europass Certificate Supplements can provide information to the employer or training institution about changes taking place in the Hungarian VET system or their impacts on relevant competencies, while also serving as proof of the qualifications obtained by Hungarian employees prior to leaving their homeland. It is important to note that these documents can also help getting qualifications obtained in Hungary recognised abroad. The following table summarises the number of professionals having applied for certificate supplements in each of the vocations that together represent the target group for the BUSH Project.

Table 2: Number of professionals holding Europass Certificate Supplements legally employed abroad

	2008	2009	2010	2011	2012	Total
Bricklayer	28	23	8	30	35	124
Central heating system mechanic	1	15	10	8	11	60
Cooling system and air conditioner mechanic	31	17	19	24	51	142
Gas equipment mechanic and gas pipe fitter	9	22	2	25	13	71
Plumber and water appliance installer	3	31	12	14	11	71
Building engineer technician	15	31	17	5	6	74
Tiler	29	24	17	26	12	108
Drywall Builder	1	4	12	15	6	38
Carpenter and scaffolder		17	18	8	21	64
Renewable energy technician			4	1	7	12
Roofer	1	1	1	3		5

Source: National Labour Office

Given that illegal employment is associated with the construction industry both in Hungary and abroad, we are unable to draw solid conclusions from the above data regarding the extent of migration affecting the above qualifications. What we can establish, however, is that – aside from a few occupations – working abroad is permanently seen as an attractive alternative. By assuming a logical relationship between one's applying for a certificate supplement and working abroad, we can see that professions are becoming more and more affected by migration. From the industry's point of view, the possibility of a knowledge transfer later on in the future as mentioned above – allowing for the adoption of foreign technologies and work processes – can represent the positive aspect of this phenomenon.

3.2.1 Conclusion

By having 10 percent of Hungary's stock of family houses renovated each year as part of an energy efficient, renewables-based retrofit scheme, the ongoing decline in the construction labour market could be somewhat alleviated, as this could represent the creation of 70 to 80 thousand new jobs. Vocational training is currently unable to keep up with the pace of technological advancement; therefore, further training programmes in energy efficiency and renewable energies are highly recommended for professionals working in contracting and facilities maintenance.

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4. NATIONAL POLICY AND REGULATORY BACKGROUND

4.1 The current regulatory and strategic background of energy policy

4.1.1 The New Széchenyi Plan

The New Széchenyi Plan creates a vision for the country and marks out the paths of potential development for the economy. The Plan defines building energy enhancements as among the main sources of energy efficiency and energy saving. **From the aspect of buildings' energy efficiency, the most important element** is that the ***Green Economy Development Programme***, which incorporates green energy, energy efficiency, green education, employment and a shift in approach, as well as green R&D&I, is among the seven core projects of the Széchenyi Plan. Also worth noting is the fact that the Plan considers the increased use of energy from renewable sources principally not an obligation (in connection with climate change, dependence on energy import and the safety of energy supply), but as a take-off point for economic competitiveness.

The Green Economy Development Programme states that **the development of Hungary depends to a large extent on how it will manage to shift from an economic model relying on traditional (fossil) energy carriers to one that is essentially built on the use of green or clean technologies and energy resources, and to operate such an alternative model in a sustainable fashion.** In an economic model which lays the foundation for a sustainable future, energy saving, energy efficiency, the increased use of renewables and prioritising own resources have great significance. The Plan defines the following as the tools for the Green Economy Development Programme:

energy efficiency – energy saving – rationalisation of energy use

green energy – renewable energy sources

agricultural energy production – bioenergy from agriculture

The Green Economy Development Programme pays marked attention to job creation. **Job creation** and retention will primarily have an impact in agriculture and disadvantaged regions. Biomass collection and energy farming may generate employment for a considerable number of unskilled workers. Depending on its form and intended use, there are several possibilities for biomass use (heating technology, biogas and biofuels) where special attention should be paid to those resulting in greater benefits for the national economy and society as a whole. The use of biomass for energy production purposes also allows for implementation to take place in an integrated system, by joining several project elements. A significant skilled labour force could be created by way of enhancing Hungarian production capacities and – through the creation of domestic added value – developing proprietary technologies.

Table 2: Priorities and sub-programmes under the Green Economy Development Programme

1. Green energy

- Green transport
- Modernisation of lighting
- Promoting the decentralised production of renewable and alternative energy
- Agricultural energy production
- Environmental industry, waste industry
- Green model projects

2. Energy efficiency

- New sub-programme for green home building

- Renovation sub-programme for the creation of liveable prefab buildings
- Central heating efficiency sub-programme
- Our Home renovation sub-programme
- Renewed public institutions sub-programme
- Green SMEs sub-programme

3. Green education, employment and shift in approach

- Green employment
- Development of a green VET system
- Support for activities promoting green awareness

4. Green R&D&I

4.1.2 The National Energy Strategy

The framework of the Hungarian energy policy[12] is set by the National Energy Strategy, **which aims to reconcile national energy and climate policy**, align economic progress with environmental concerns and provide a **vision** that energy market stakeholders can all approve. The Energy Strategy serves as guidance in ensuring the long-term supply of energy for the country and in fulfilling its climate protection commitments. The Energy Strategy formulates detailed proposals up to 2030 and outlines a roadmap until 2050, putting the measures proposed for up until 2030 into a global, longer term perspective.

> *"The first proposition of Hungary's energy strategy 2030 is energy efficiency, where energy efficiency projects in the building sector are a key component. This is followed by the second proposition, increasing the use of renewable energy and energy with low carbon dioxide emissions."*
>
> (Citation from the National Energy Strategy)

The objective of the National Energy Strategy 2030 is to reconcile energy and climate policy while keeping economic development and environmental sustainability in mind, to determine an acceptable level of energy demand and the future directions of energy improvements, and to frame a vision of the future for Hungarian energy policy. Taking specific geopolitical features into account, the Energy Strategy contains detailed proposals for the stakeholders of the Hungarian energy sector and the decision-makers, and includes a roadmap until 2050.

The primary goal of the strategy is to effect a change in the energy structure by achieving rationalised energy demand and sustainable, safe and independent (less import-centred) supply. To that end, the major tasks ahead are as follows:

- energy efficiency measures spanning the entire supply and consumption chain;
- increasing the share of low CO_2-intensive electricity generation based primarily on renewable sources of energy;
- promoting renewable and alternative methods of heat generation;
- increasing the share of low CO_2-emission modes of transport.

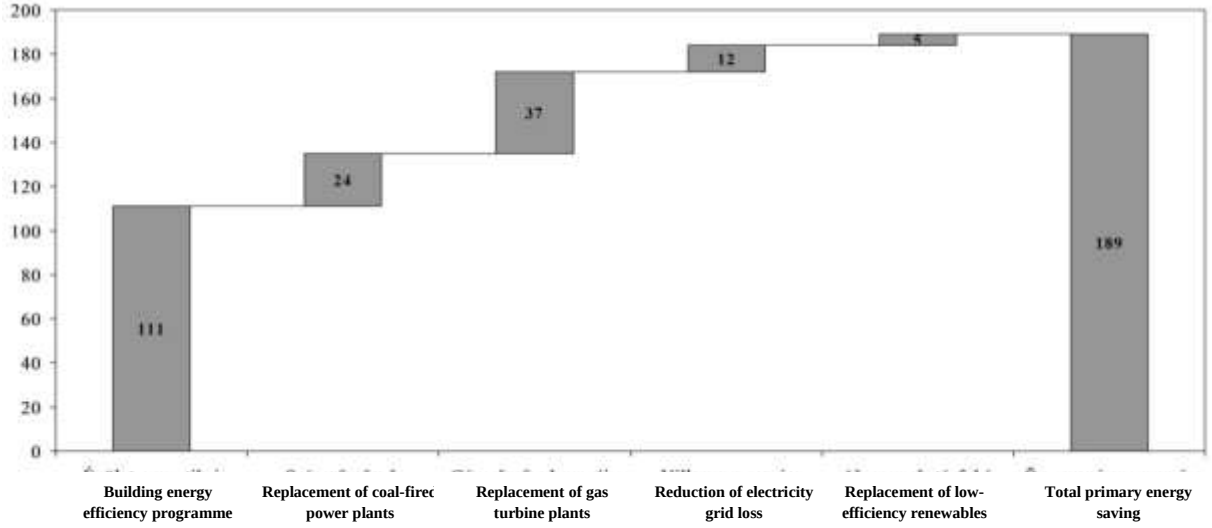
The most crucial measure is increasing energy efficiency, within which building energy (see Figure 6) is a key component followed by the enhanced role of renewable energy sources.

1277/2011. Parliament Resolution 77/2011 (X. 14.) on the National Energy Strategy

To quantify Hungary's main energy efficiency goal for 2030, the 2010 level of primary energy use of 1085 PJ should be decreased and in no case should it exceed 1150 PJ, a level typical of the years preceding the economic crisis .

Within the area of energy efficiency, the retrofit of the existing building stock, and in particular that of public buildings, is a priority. It is the purpose of the Energy Strategy to reduce by 2030 the heating energy requirements of buildings by 30 per cent through energy efficiency programmes in the building sector that are in line with European Union targets. This represents a 10 per cent cut in the overall primary energy demand in Hungary.

Figure 6: Energy saving options up to 2030 (Primary energy consumption, PJ)



Source: National Energy Strategy 2030

In order to meet building energy efficiency objectives, the strategy encourages renovation projects for both residential and public buildings and cites the importance of complying with Directive 2010/31/EU. It assigns a central role to complex, so-called deep retrofits which result in energy savings of more than 50 per cent and, contrary to suboptimal renovation, allow for cost-effective CO_2 savings also in the long run while also having a greater potential as far as job creation is concerned.

As regards energy supply, **one key objective of the strategy is increasing the share of renewable energy** in primary energy consumption from the current 7 per cent to the neighbourhood of 20 per cent by 2030. The envisaged growth up to 2020 (with a targeted share of 14.65) is described in detail in the National Renewable Energy Action Plan. Among renewable energy sources priority is accorded to co-generating biogas and biomass power plants and the various forms of geothermal energy use which primarily, but not exclusively, serve heat generation. In addition, the volumes of solar-based heat and electricity and wind-generated electricity should increase, although for solar energy this is envisaged for after 2020.

4.1.3 National Energy Efficiency Action Plan

Directive 2006/32/EC of the European Parliament and of the Council (ESD) requires Member States to prepare a National Energy Efficiency Action Plan for a period of nine years between 2008 and 2016 (second NEEAP) in accordance with the content-related and formal requirements specified by the European Commission. During this period Member States should endeavour to achieve

altogether 9 per cent savings in energy end-use. Accordingly, Hungary's second NEEAP[13] outlines on-going and planned energy efficiency measures which will make it possible to **reduce** Hungary's energy use in the sectors set out in the ESD **by an average annual rate of 1 per cent, in the 9 years between 2008 and 2016.** Under Hungary's second NEEAP, in the coming period

- a National Building Energy Strategy must be drawn up,
- a database for building energy statistics should be set up,
- based on representative sampling, a database on the energy consumption of public buildings should be created.

The document first and foremost expects the retrofit of traditional residential, prefab concrete and public buildings to produce the required savings.

The second NEEAP **estimates that a total of HUF 1,395.8 billion in investments is required in order to safely achieve the savings target of 57.4 PJ per year**, of which funding from the European Union and through allowance trading and auctions add up to HUF 617.4 billion. (The remaining sum is covered by own resources allocated for investments.) Investments implemented under the second NEEAP will contribute to the competitiveness of Hungary. This could spark considerable demand for labour, which would rise at a growing rate and hence by 2020 as many as 80,000 new jobs could be created. According to the second NEEAP job creation and the demand increasing effect of investments have clearly positive implications for the economy.

4.1.4 National Renewable Energy Utilisation Action Plan

According to *Hungary's Renewable Energy Utilisation Action Plan* (NREAP)[14] adopted in 2010 the key areas of Hungarian renewable energy policy are as follows:

- Security of supply. Through the use of renewable energy sources, the dependency on imports can be reduced, as the use of renewable energy is planned to be realised from domestic sources.
- Environmental sustainability and climate protection. The use of renewable energy sources contributes to the reduction of CO_2 emissions. When selecting specific applications, aspects of environmental and nature conservation have special priority.
- Agriculture and rural development. The use of biomass, based on the favourable agro-ecological conditions of the country, can contribute to both the retention and creation of agricultural jobs, thereby increasing the competitiveness of the sector and significantly reducing the need of communities for fossil energy sources.
- Development of a green economy. A rational use of renewable energy sources, in close coordination with energy conservation and energy efficiency programmes, could constitute the basis of the creation of a new (green) sector of the economy.
- Contribution to community goals. Hungary is committed to fulfilling the objectives set out in the RED (Renewable Energy Directive).

Under the Action Plan, it is extremely important to ensure that professionals engaged in the installation and implementation of energy-efficient and renewables-based systems possess certified sub-sectoral competencies and skills, whose continuing training must therefore be a mandatory requirement and that institutions offering continuing training are centrally supervised.15 To that end, the involvement of appropriate experts and continuous consultation with professional organisations are both necessary.

As for feasibility, training programmes should be implemented at regional level in the future in which educational organisations, representatives of the R&D sector and industrial players in the green economy will also participate. Accordingly, a standard curriculum and its quality control can be

13 Government Resolution 1374/2011 (XI.8.) Korm. on the Second National Energy Efficiency Action Plan of Hungary until 2016 with an outlook to 2020.

14 1002/2011. Government Resolution 1002/2011 (I.14.) Korm. on certain duties related to Hungary's Renewable Energy Utilisation Action Plan.

15 Hungary's Renewable Energy Utilisation Action Plan 2010–2020, p. 88 (Downloaded on 16 July 2012).

realised in the most efficient manner[16]. On the one hand, the rationale behind the Action Plan is that green economy managers will receive education at training institutions that already have similar specialisations and their training will be based on a standard curriculum placing emphasis on operations and practice, where the training programme must be competitive; on the other hand, it seeks their inclusion in training courses that will be delivered through the regional network of national adult education. To promote the quick launch of courses, the training of staff of authorities and auditors will be based on standard curricula and they will continuously be provided with the latest and most up-to-date information on solutions and renewable energy sources.[17]

Directive 2009/28/EC of the European Parliament and of the Council specified a legally binding obligation for Hungary to ensure a 13 per cent minimum share of renewable energy in its gross final energy consumption by 2020. **Taking into account the importance of green economy development to the national economy, its effects on employment (the creation of at least 150–200 thousand jobs, including 70 thousand in the renewable energy sector),** Hungary's Renewable Energy Utilisation Action Plan **sets out the achievement of a target of 14.65 per cent by 2020, exceeding the obligatory minimum target.** This means that gross consumption in renewable energy will rise at least to 120.56 PJ. According to the Action Plan, the government's intention with this target is to emphasise that it considers the production and utilisation of renewable energy sources as one of the hidden potentials for economic development. If we look at the scheduled agenda in Table 3, we see that **the current share of renewable energy in the heating (and, to a somewhat lesser degree, cooling) of buildings is envisaged to rise from 8.6% to 18.9%.** This ambitious goal requires massive resources.

Table 3: The national target for energy produced from renewable sources and the scheduled agenda for heating and cooling, electricity and transport

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Renewable energy – heating and cooling (%)	5.4%	9.0%	8.8%	8.6%	8.5%	9.1%	9.8%	11.8%	13.7%	15.7%	17.4%	18.9%
Renewable energy – electricity (%)	4.3%	6.7%	6.5%	6.9%	7.5%	8.6%	8.1%	7.1%	8.6%	10.2%	10.7%	10.9%
Renewable energy – transport (%)	0.22%	3.7%	4.6%	5.0%	5.0%	5.2%	5.4%	5.8%	6.4%	7.3%	8.0%	10.0%
Overall share of renewable energy (%)	4.2%	7.4%	7.3%	7.4%	7.5%	8.0%	8.3%	9.3%	10.7%	12.3%	13.4%	14.65%
Of which from the cooperation mechanism (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Surplus from cooperation mechanism (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

As per Part B of Annex I to the Directive		**2011-2012**	**2013-2014**	**2015-2016**	**2017-2018**		**2020**
		S2005 * 20 per cent (S_{2020}-S_{2005})	**S2005 * 30 per cent (S_{2020}-S_{2005})**	**S 2005 * 45 per cent (S_{2020}-S_{2005})**	**S2005 + 65 per cent (S_{2020}-S_{2005})**		**S2020**
RES minimum trajectory		**6.04%**	**6.91%**	**8.21%**	**9.96%**		**13%**
RES minimum trajectory (ktoe)		**1,169**	**1,368**	**1,621**	**1,963**		**2,554**

Source: (NREAP)

4.1.5 Széll Kálmán Plan 2.0

Dubbed the Széll Kálmán Plan 2.0[18] (SZKT 2.0), Hungary's national reform programme was prepared in April 2012, setting out long-term objectives for the country and for the government along the lines of the EU2020 Strategy. These correspond almost entirely with the goals set in mid-2010: significant increase of the employment rate, higher standards and better quality of education, more intensive use of renewables and more resources spent on innovation.

16 Hungary's Renewable Energy Utilisation Action Plan 2010–2020, p. 89 (Downloaded on 16 July 2012).

17 Hungary's Renewable Energy Utilisation Action Plan 2010–2020, p. 90 (Downloaded on 16 July 2012).

181122/2012. Government Resolution 1122/2012 (IV. 25.) Korm. on certain measures to be implemented as part of the extension of the Széll Kálmán Plan

The Plan notes that **buildings' energy development play a prominent role in the improvement of energy efficiency.** At present, we use 40 per cent of the total energy consumed in Hungary in our buildings; two thirds of which is attributed to heating and cooling. Some 70 per cent of the approximately 4.3 million homes do not meet the latest functional, technical and thermo-technical requirements, and the ratio is also similar in the case of public buildings. Therefore, a refurbishment of the existing building stock, having special regard to public buildings, is top priority for Hungary against an undertaking of an ambitious level, which our country is able to finance, including the available EU funding, the identification of innovative financing methods and the possibility of allocating revenues derived from various emission quotas, with regard to additional benefits emerging in the short term (for instance, economy boosting, job creation, reduced dependence on energy imports).

The Chapter ***Energy efficiency programmes*** in SZKT 2.0 states that, in respect of the population and the business sectors, the energy efficient refurbishment of traditionally built residential buildings, residential buildings erected with industrialised technologies and state and municipality buildings, as well as the building energy projects of businesses, must all be subsidised. For purposes of improving the energy efficiency of public institutions, the objective is to develop a long-term, complex series of measures which, through the improvement of the energy efficiency of public institutions, also contributes to the reduction of the energy costs of the central budget. We wish to achieve this by relying on a number of tools and solutions, such as energy management tools, assessments of the energy consumption of public services (e.g. building energy register) and complex energy efficiency retrofit projects.

Subject to approval by the European Commission, we are planning to launch programmes to the tune of HUF 120 billion, to be reallocated in 2012 from the Transport Operational Programme, for promoting energy efficiency projects within the framework of the Environment and Energy Operational Programme. Improving energy efficiency also necessitates a change of mentality, which in turn implies an energy and environment conscious attitude of consumers. In the interest of raising environmental awareness in society, we are planning to launch widespread energy and environmental consumer awareness programmes. The action plan for this programme will be developed in 2012. In addition to reducing energy consumption, these projects will also have major indirect impacts on employment and at a macroeconomic (taxes, legalisation of the economy) level as well.

4.2 Relevant regulations awaiting entry into force in building and energy policies

4.2.1 Directive 2010/31/EU on the energy performance of buildings (EPBD Recast)[19]

The Directive is a recast of Directive 2002/91/EC[20], which introduced a system of certification of the energy performance of buildings, and established a standard set of requirements for new buildings and the major renovation of buildings. The main point of the certification system is that for all public buildings and other buildings sold or rented out an energy performance certificate should be issued. This certificate is similar to the energy labels used for household appliances, but is prepared individually for every building or dwelling by an expert. The certification system has been in operation in Hungary since 2009, but has become mandatory for all building types only from January 2012. The purpose of this EU certification scheme is to reflect the energy performance of buildings in market prices and thereby encourage investments in energy saving.

It should be noted that the energy performance certificate includes the possible use of renewable energy sources, as the result is expressed in terms of primary energy. Wherever the energy demand of a building is met using renewable resources, primary energy use is significantly lower than in the case of traditional energy carriers.

Another major change for Member States introduced by the Directive is the **new approach manifest in the technical requirements**. This regulation is made up of three levels. The first level of requirements regulates the thermo-technical properties of building structures (e.g. facade walls, roof structures and fenestration). This in itself implies more stringent rules and resulted in the exclusion of certain inefficiently applied structures. The second level of regulation specifies a target value for the

19 Directive 2010/31/EU of the European Parliament and of the Council (19 May 2010) on the energy performance of buildings (recast)

20Directive 2002/91/EC of the European Parliament and of the Council (16 December 2002) on the energy performance of buildings.

so-called specific heat loss which relates to the entire building envelope. The third level aggregates the total energy consumption of the building reflecting also the properties of building mechanicals in addition to the building structures. Apart from heating, this kind of energy consumption includes the energy demand of hot water supply as well as the electricity demand of building mechanicals (e.g. fans and heat pumps) and other systems (e.g. lighting) in the building. Furthermore, this is where the positive effect of renewable energy sources can be detected, as specifically promoted by the Directive. The aggregated energy performance indicator must be expressed in primary energy. It should be noted that there is another, fourth level: buildings must be assessed for overheating during summer as their cooling requires three times as much energy than their heating.

Application of the Directive raised several issues which hindered the achievement of the original goals. For instance, Members States were granted too much discretion in defining the requirements and the method of certification, there were no sanctions associated with the certification system and no deadlines were set for the certification of public buildings (as these are not sold or rented out).

Directive 2010/31/EU adopted in 2010 corrects some of the flaws in the old Directive and adds a number of new important elements. Some elements of the Directive known as EPBD Recast stipulate extremely ambitious and difficult tasks for the Member States. The most important elements are the following:

- Member States must establish new minimum requirements for new buildings and those awaiting major renovation based on the calculation method defined by the EU to determine cost-optimal level calculated over the economic lifecycle (cost-benefit principle).
- Minimum requirements must be reviewed in every five years in order to reflect technical progress.
- After 30 June 2012 new buildings, renovations, renovation efforts that fail to satisfy the minimum requirements calculated according to the cost-optimal level may not be promoted.
- For new buildings, before construction would start, the technical, environmental and economic feasibility of alternative systems based on energy from renewable sources must be assessed. The following solutions may be considered: decentralised energy supply systems based on energy from renewable sources, district or block heating (particularly where it is based on energy from renewable sources).
- Alternative systems must be considered also in relation to buildings undergoing major renovation.
- Minimum requirements apply also to the renovation of individual building elements and building mechanicals.
- Encouraging the use of intelligent metering systems at newly builts and whenever a building undergoes major renovation (reference to Directive *2006/32/EC*).
- Member States must define the requirements applicable to nearly zero-energy buildings. After 31 December 2018 new buildings occupied or owned by public authorities must be nearly zero-energy buildings. After 31 December 2020 the construction of only nearly zero-energy buildings can be authorised.
- Members States must draw up plans for increasing the number of nearly zero-energy buildings scheduling their prevalence in percentage terms. These plans may include targets differentiated according to the category of building. Member States should stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings. The transformation of public buildings into nearly zero-energy buildings should be strongly promoted.
- Member States may only support energy efficient improvements of buildings if these reach or exceed the cost-optimal level. By 30 June 2011 and every three years thereafter, m Member States must report to the EU their existing and proposed funding systems and the use of EIB funds.
- Energy performance certificates must be clearly displayed in buildings occupied by public authorities and buildings frequented by the public (shops and shopping centres, supermarkets, restaurants, theatres, banks and hotels).
- By way of national energy efficiency plans, public authorities ought to take on a pioneering role in energy efficiency renovations.

- In addition to energy performance, energy performance certificates should provide information about carbon dioxide emissions, impact of heating and cooling on the energy needs of the building and primary energy consumption.
- The public must be informed about the existence of the certificate, its objectives and the available financial schemes which facilitate modernisation. Regional authorities must be involved in this process.
- Whenever building(s or parts thereof) are offered for sale or rent, the relevant energy performance category must be stated in the advertisement.
- Member States must lay down rules on penalties applicable to infringements of the provisions of the EPBD. The penalties must be effective, proportionate and dissuasive. Member States must communicate those penalties to the Commission within 2.5 years from the adoption of the EPBD. Delay is not an option.

4.2.2 The new Energy Efficiency Directive [21]

The EU has set itself the objective of achieving 20 per cent primary energy savings in 2020 and made this objective one of the five headline targets of the Europe 2020 Strategy for smart, sustainable and inclusive growth. To give fresh momentum to energy efficiency, the Commission put forward a new Energy Efficiency Plan (EEP) on 8 March 2011, setting out measures to achieve further savings in energy supply and use. **The legislative proposal transforms certain aspects of the EEP into binding measures.** The main purpose of the proposal is to make a significant contribution to meeting the EU's 2020 energy efficiency target. For it to be successful, the proposal must be promptly adopted and implemented in the Member States. The proposal also looks beyond the 20% target and seeks to set a common framework to promote energy efficiency in the Union beyond 2020.

The proposed Directive establishes a common framework for promoting energy efficiency in the Union to ensure the target of 20% primary energy savings by 2020 is met and to pave the way for further energy efficiency afterwards. It lays down rules designed to remove barriers and overcome some of the market failures that impede efficiency in the supply and use of energy.

For end-user sectors, the proposed Directive **focuses on measures that lay down requirements for the public sector, both in terms of renovating the buildings it its ownership and applying high energy efficiency standards to the buildings, products and services it purchases.** The proposal requires Member States to establish national energy efficiency obligation schemes. It requires regular mandatory energy audits for large companies and lays down a series of requirements on energy companies regarding metering and billing.

For the energy supply sector, the proposal **requires Member States to adopt national heating and cooling plans** to develop the potential for high-efficiency generation and efficient district heating and cooling, and to **ensure that spatial planning regulations are in line with these plans**. Member States must adopt authorisation criteria that ensure that installations are physically located close to points of heat demand and that all new electricity generation installations and existing installations that are substantially refurbished are equipped with high-efficiency CHP units. Member States should however be able to lay down conditions for exemption from this obligation where certain conditions are met. The proposal also requires Member States to establish an inventory of energy efficiency data for installations undertaking the combustion of fuels or the refining of mineral oil and natural gas, and sets requirements on priority/guaranteed access to the grid, priority dispatch of electricity from high-efficiency co-generation and the connection of new industrial plants producing waste heat to district or cooling networks.

Other measures proposed include efficiency requirements for national energy authorities, information and awareness-raising actions, requirements concerning the availability of certification schemes, measures to promote the development of energy services, and an obligation for Member States to eliminate obstacles to energy efficiency, notably the split of incentives between the owner and tenant of a building or among building owners. Finally, the proposal provides for the establishment of national energy efficiency targets for 2020 and requires the Commission to assess in 2014 whether the Union can achieve its target of 20 percent primary energy savings by 2020.

21 Proposal for a directive of the European Parliament and of the Council on energy efficiency and repealing Directives 2004/8/EC and 2006/32/EC

4.2.3 National Spatial Planning and Building Regulations (OTÉK)

Government Decree 253/1997 (XII. 20.) Korm. on the National Spatial Planning and Building Regulations (OTÉK), which is currently being amended, is one of the legal pillars regulating architects' design activity next to the Building Act and contains, among others, the following:

- rules and basic concepts relating to the application of spatial planning tools (municipality structure and regulation plan, local building codes);
- the range of buildings and structures that can be erected in the different zones of areas covered and not covered by buildings;
- conditions concerning the erection and the position of buildings within a plot of land;
- requirements pertaining to the position of buildings and the availability of public utility services;
- conditions regarding the construction of buildings and building structures;
- general requirements relating to independent building units;
- rules pertaining to existing buildings.

The issue of energy efficiency first emerges in connection with the general conditions for the creation of buildings. Pursuant to Article 50 (3) when building structures and their parts: solutions that comply with or are at least equivalent to the pertaining national standards on stability, solidity, fire safety, hygiene, protection of health and the environment, safe use, protection against noise and vibration, **energy savings and thermal protection**, and life and asset protection shall be used.

OTÉK is somewhat more specific later on: *"Buildings and their parts shall be designed and implemented and building materials, building structures and the equipment to be built-in selected and installed in a way so as to enable **the lowest possible energy consumption** in case of proper use."* It proceeds by stipulating that "the partition walls and technical building equipment in the building shall – in accordance with the relevant energy performance and thermo-technical specifications – as a whole be suitable for ensuring the appropriate air condition as required by the intended use of rooms".

OTÉK is currently under revision, the purpose of its amendment being to simplify and make its regulatory elements more realistic, to abolish unjustified cost-increasing requirements (without violating those on safety) and to create **a regulation that meets the expectations of the trade and is clear and unambiguous to all stakeholders concerned**.

With regards to the energy efficiency of buildings, the above mentioned basic requirements will, presumably, be supplemented by "allowing for equipment running on energy from renewable sources to be installed", a criterion that should be checked already during the design programme. The amended OTÉK is planned to **enter into force** together with the Building Act still under revision **on 1 January 2013**.

4.3 The existing regulatory and strategic background of VET and adult education.

4.3.1 General description of VET and adult education

The term vocational education traditionally refers to professional practice, which generally prepares students graduating from primary and secondary education for the practice of various professions that do not presuppose a tertiary qualification. Recently, the concept of VET has changed somewhat and, owing in particular to the process of European integration, has been re-interpreted. This, on the one hand, can be explained by the emergence of more knowledge-intensive professions, the loosening of boundaries between practice-oriented professions and university graduate occupations while also being the result of a wider-ranging European understanding of VET.

The deeper emphasis on vocational education, which facilitates adaptation to the labour market, propelled VET policy ever closer to employment policy, and received ever stronger support to promote

European integration. This also meant that **besides the formal modes of vocational education, adult education and continued education acquired greater significance in VET**.

Adult education in Hungary, that is, the training and further training of young career starters and adults after their compulsory education is organised across several training sectors and different institution types.

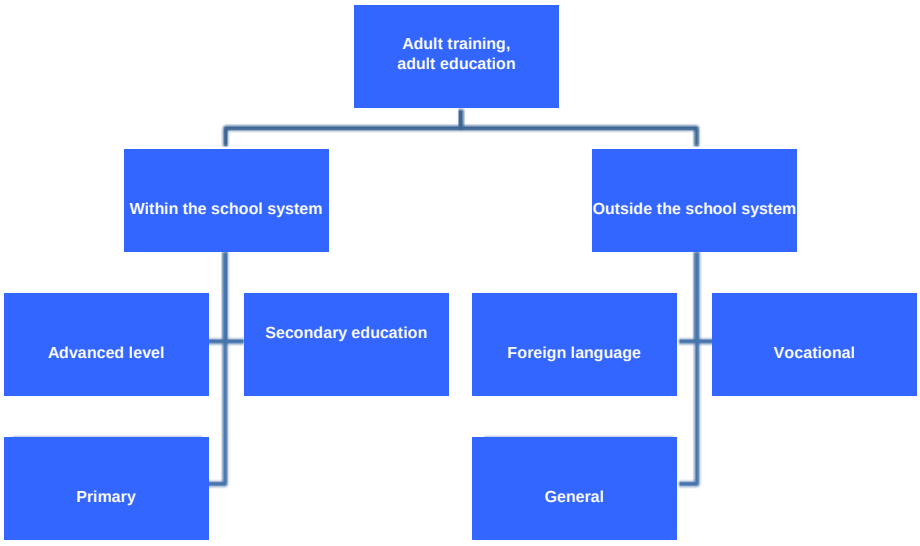
There are two basic sectors: trainings offered in and outside the school system. It is important to note that the former is often called adult education.

Adult training (adult education) as part of the school system follows the school structure: one can enrol in initial, secondary and advanced education in evening or correspondence courses. Initial and secondary qualifications are available to young people and adults who have not completed the eight-grade primary school or the four-grade secondary school and for some reason could not/cannot complete the desired education or get a vocational qualification before or after the school-leaving age, and wish to make up for this later on.

According to its purpose, training outside the school system can be general, foreign language-related or vocational. These training programmes include so-called employment facilitating courses, which are organised for the unemployed and job-seekers (young career starters or adults), courses for those wishing to obtain a vocational qualification or those already having one, as well as courses for employed persons who enrol for in-service training.

Since the end of 2001, training provided in the different training sectors have been regulated by the Adult Education Act, which is a framework law drawing on previous pieces of legislation.

Figure 7: The system of adult training and adult education



4.3.2 Vocational training outside the school system

Preparation of the content, organisation and delivery of training courses awarding vocational qualifications recognised by the state – included in the National Qualifications Register (OKJ) – is regulated by the provisions of the Adult and Vocational Education Act. The OKJ is issued in a government decree, but the content of the vocational and examination requirements of vocational qualifications is approved by the minister responsible for the given qualification. The OKJ determines which vocational qualifications can be awarded only in the school system and what are those pursued in adult education, or in both training/education systems. Since 2006 vocational qualifications have a

modular structure, meaning that basic vocational qualifications may divide into partial, branch-like and further qualifications (built on the basic one).

Entry requirements:

The vocational and examination requirements of OKJ-listed qualifications state what educational attainment or vocational qualification (competences) are required for enrolment for a given vocational programme. (Training institutions decide on admission to the training programme on this basis.)

According to the government decree establishing the OKJ:

– the award of so-called basic vocational qualifications do not presuppose the completion of basic education, i.e. primary school;

– for the award of secondary vocational qualifications – depending on the level of the qualification – the completion of primary school or a secondary school leaving certificate is needed together with the appropriate vocational competences, if any; There are vocational qualifications that are tied to a baccalaureate or some previous vocational attainment in addition to the secondary school qualification;

– advanced vocational qualifications require a baccalaureate or some former tertiary qualification.

Assessment and progress of participants:

Considering that the vocational qualifications contained in OKJ have a modular structure, fulfilment of the vocational requirements must be assessed at an end-of-module exam. This examination is organised by the training institution and once passed, a certificate is issued that is a precondition of enrolment for the qualifying examination.

Certificates, qualifications:

The examination requirements of vocational qualifications in the OKJ define for what modules and in particular through what examination activities (written, oral, practical) candidates must sit for an exam. Exams stipulated for the award of OKJ-listed vocational qualifications are state examinations, where the composition of the examination board is regulated and the chair of the examination board is nominated by the minister responsible for the given qualification. Based on the minutes of a successful qualifying examination the organiser of the examination issues a qualifying certificate. Examination records must be retained for 40 years at the National Institute for Vocational and Adult Education.

Education methods:

Training courses leading to an OKJ-listed qualification employ different methods where the main difference – compared with general, foreign language and non-vocational training – lies in the need for professional practice, its nature and content. The basic qualifications in formal VET have their own vocational curricula issued, these are so-called ‘central programmes’ which also contain the schedule of the training. These serve as guidance also for adult education outside the school system, but their application is not mandatory having regard to the special factors (e.g. consideration of prior learning).

4.3.3 Legislative background

VET is governed by six important laws that have been amended multiple times since their enactment and is supplemented by resolutions and other legislation.

The Public Education Act (Act LXXIX of 1993) regulates all levels and types of formal education and training starting from pre-school up to the post-secondary level. The act names the state as the entity responsible for ensuring the provision of public education and guarantees the right to free education to all. The provision of public education services is the obligation of local county and municipal governments. However, churches, economic organisations, foundations, associations, etc. can also establish their own educational institution. All school maintainers are eligible for support from the central budget according to the student headcount and the functions the institution carries out.

The operation, governing system and financing of institutions offering secondary and post-secondary vocational training are hence regulated by the Public Education Act. For ISCED 5B (advanced vocational programmes) vocational qualifications awarded by higher education institutions such aspects are regulated in the Higher Education Act (Act CXXXIX of 2005).

The Vocational Education Act (Act CLXXXVII of 2011) governs the conditions of continuing VET both for initial and further vocational training no matter if the training is delivered in or outside the school system. However, its provisions do not apply to ISCED 5A and 6 higher education programmes and so-called public authority training of adults.

Business organisations in Hungary are required to pay 'vocational education tax'. Its origins can be traced back to the 70's. The Act on vocational training contribution and support for the development of training (Act CLV of 2011) determines the conditions of payment and accounting as well as the distribution of funds available under the training allocation of the Labour Market Fund (MPA). Its provisions apply to both initial and continued vocational training.

The concept of adult education as well as its governing and institutional system are defined by the Adult Education Act (Act CI of 2001). The Act discusses the circumstances of institution and programme accreditation, the requirements pertaining to adult training contracts and the different forms of state support. The Act on the promotion of employment and unemployment benefits (Act IV of 1991) regulates state-funded training courses offered to the unemployed and other target groups.

4.3.4 Conclusions

Due to the shortcomings of current state-accredited training programmes, it is vital that professionals pursuing implementation and operation activities enrol in further training in the field of energy efficiency and renewable energy sources. In adult education, this can be realised in the form of in-service training, however, it is recommended for vocational qualifications which the questionnaire survey (see in detail: 7.2.3) identified as sought-after, but lacking in competence. These are the following: fenestration installation technician, building insulation installer, central heating and piping fitter, stonemason, building engineer technician and roofer. Refer to Annex 7 to see headcount data concerning those enrolling for and passing the examinations in VET within the school system.

As can be seen, vocational training provided on the basis of OKJ is rather stringently regulated, ensuring a certain quality assurance system. The disadvantage of this type of training is that, because of overregulation, these programmes cannot respond quickly to changing market needs, therefore more flexible accredited training programmes should be launched, which would still be subject to quality assurance by the state.

4.4 Relevant regulations under development in the field of adult education

4.4.1 The regulation of adult education in Hungary

Adult education refers to education outside the school system, which is implemented as a service according to the laws of the market. The state regulates adult education (Act CI of 2001) and funds training programmes.

Enterprises, institutions, organisations can also engage in adult education activities under the conditions specified by law. Training quality is assured by the accreditation system in adult education developed by the Adult Education Accreditation Board (FAT). Only accredited institutions can organise state-funded training courses.

The participation rate of the age group between 25 and 64 is 9.9% per year, which earns Hungary the last place among EU Member States (EU average is 36%).[22]

22 Concept of changing the regulatory system of adult education. Ministry for the National Economy, July 2012.

Based on the experience gained and the analyses produced since the introduction of the current form of adult education, the system has some major fundamental problems, therefore as at December 2011 a few changes were be effected:[23]

The employment centre compiles the priority list and guidelines for the operation of training tools based on the employment policy targets set for the given year. Another change is that, whenever a third vocational qualification is obtained, only programmes necessitating active employment status can be eligible for support.

The Act on vocational education contribution and the Vocational Education Act have also been amended. Act CLV of 2011 no longer allows those required to pay the vocational education contribution to reduce such contribution by the amounts spent on the training of their own workers.

A national adult education institution was established which has a countrywide network, the Türr István Research Institute the primary task of which is the development of public service work and making up for the handicap of disadvantaged people.

It is the government's goal to increase the number of training participants and the funds allocated thereto. For the period 2012–2014 a total of HUF 54 billion has been appropriated in the framework of the New Széchenyi Plan to cover the launch of adult education training projects. As a result, from the second half of 2012 approximately 330 thousand people will receive training aid.

The above measures will evolve into a complex system only after the re-regulation of the entire adult education system.

New rules governing the adult education system under development[24]

Establishing an adult education system which differentiates according to training goals:

Training courses delivered to mitigate disadvantages and prepare for work in social co-ops and public service work should clearly be separated from adult education. Remedial education is provided to that group of society over the mandatory school age who have not completed primary school education. They have the opportunity to obtain a primary school certificate or to acquire such entry competences which enable them to get a vocational qualification listed in the National Register of Vocational Qualifications (OKJ). The state-funded training of this special target group is implemented in a system of adult education institutions which is defined in several pieces of legislation and is delivered based on a central curriculum and training programme. These training programmes do not serve to satisfy primary labour market needs.

Other types of training programmes in adult education do seek to meet primary labour market needs directly, thereby ensuring employment for people and their adaptation to the changing market environment. These types of courses are expected to meet changing socio-economic needs quickly and in a flexible manner reflecting on the economy, its development and employment policy, and their regulation and funding should form part of state economic policy.

A proposal has been made for a new adult education act in which training programmes are appropriately differentiated, deliver the same quality as those within the school system, are controlled according to professional criteria and allow for the organisation of training courses which use the funds received to purpose, reflect the economy's needs and lead to a higher rate of employment.

The Hungarian Chamber of Commerce and Industry (MKIK) has a decisive role in the operation of the adult education system, compiles and maintains a register of off-OKJ VET courses, participates in the evaluation of training institutions' training programmes, in the inspection of accredited institutions by authorities and the assessment of applications for accreditation, thereby helping to mark out the key content-related directions for the renewal of the adult education system.

23ibid.

24ibid.

4.4.2 Conclusions

Accredited adult education outside the school system is capable of fulfilling the expectations identified by the BUSH project: provide further training for already qualified contractors and operators, at a level of quality assured by the state. Vocational qualifications proposed for further training are set out in Chapter 7.2.3, and the accreditation process necessary to launch new continued training courses is discussed in Chapter 6.1.3 “Accreditation systems”.

CHAPTER 5 – STATISTICS AND LITERATURE ABOUT THE HOUSING SECTOR AND THE ENERGY EFFICIENCY OF BUILDINGS

5.1 Building Statistics

5.1.1 Hungary's building stock: energy efficiency and other main characteristics

In 2010, a total of **40 percent of all energy use in Hungary is attributed to buildings, of which approximately 80 percent is heat-related** (heating, hot water and cooking). 70 percent of the country's building stock, which comprises about 4.3 million housing units, fails to meet today's thermal requirements, with public buildings also showing similar rates (Parliament, 2011)[25]. Thanks to the various residential energy efficiency programs implemented over the past years, trends have taken a positive turn; however, a flat in Budapest still consumes twice as much heating energy as a similar unit of the same floor space in Vienna does.

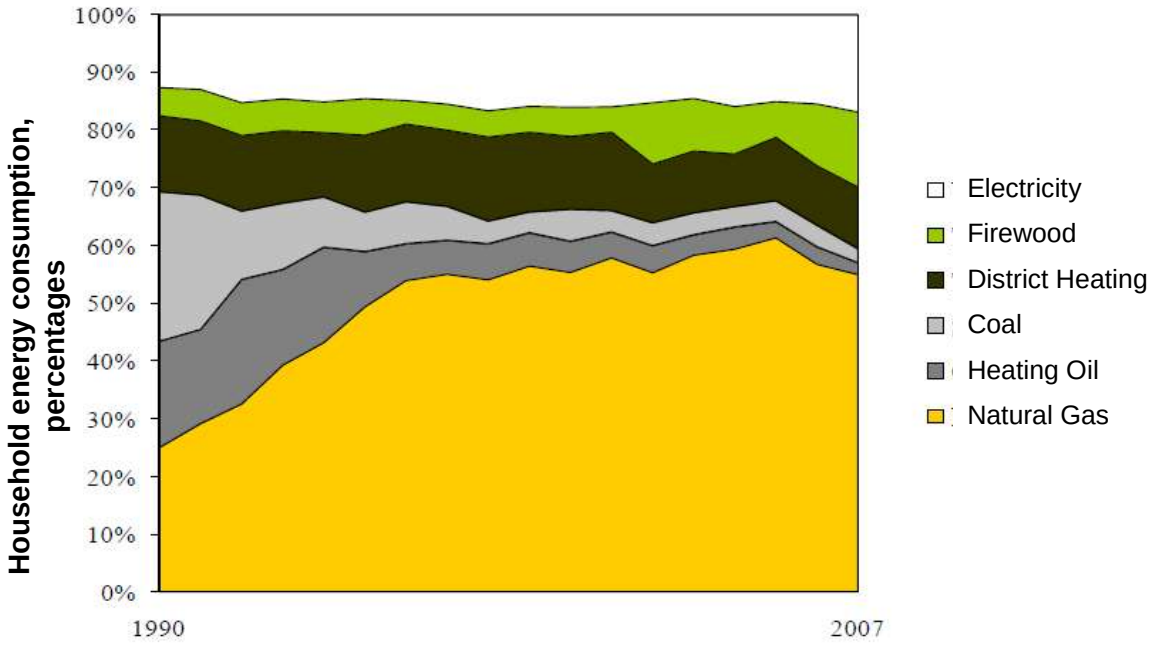
When compared to the EU average, Hungary ranks among the top ten out of the 27 Member States in terms of weather-adjusted residential energy use (for the 2000–2007 period, the average residential consumption in Hungary was 247 kWh/m^2 per year, as opposed to the European average of 220 kWh/m^2 per year) (European Climate Fund, 2010)[26]. Since the energy efficiency of Hungary's building stock falls behind the EU average, a prospective retrofit and modernisation scheme represents a particularly important potential in energy technology. Heating in buildings accounts for one of the major sources of CO2 emissions. Further underscoring the significance of an energy retrofit programme for buildings is the fact that this sector offers the most cost effective and the largest-scale means for primary energy savings, also allowing for various targets in environmental protection and energy policy (such as energy independence, enhanced safety of supply, lower greenhouse emissions) to be met. The energy efficiency of buildings is also among the EU's priority areas, for it has been confirmed as the segment where climate protection goals can be attained at the highest rate of efficiency.

The most important household fuel is natural gas, followed by firewood and district heating. With a relatively high utilisation rate in excess of 10 percent, firewood does not necessarily serve as a desirable solution. While indeed a renewable source, wood is typically incinerated in conventional stoves and fireplaces, most of which operate at a rather poor efficiency rate (20 to 30 percent), and its origin is also often questionable. The share of electricity use in households is significant, but mostly for purposes other than heat generation (see Figure 8).

25Parliament Resolution 77/2011 (X. 14.) on the National Energy Strategy

26 European Climate Foundation, 2011. Employment impacts of a large-scale deep building energy retrofit programme in Hungary (principal investigator: Diana Ürge-Vorsatz), Center for Climate Change and Sustainable Energy Policy (3CSEP), Central European University, Budapest

Figure 8: Household energy use in Hungary by energy carrier



Source: Energia Központ Nonprofit Kft.

For the time being, the use of other renewable sources remains insignificant, yet it is worth mentioning that certain systems operating with renewable energy are particularly suitable for use in buildings. These include solar collectors, solar panels and thermal pumps and indoor biomass boilers. Meanwhile, through district heating, basically all forms of renewables could play an important role in the energy efficiency of buildings: district heating primarily serves to provide heat indoors and allows for the application of geothermal solutions and high-output heat generation using various types of biomass. Furthermore, thanks to electric power distribution, buildings are also linked to energy generated from wind, biomass and water sources.

The following section offers an energy efficiency overview for each major building category.

Single Family Homes

Expert calculations made in recent years show the specific energy requirement of single family homes (CEU, 2010[27]). According to these, **detached family homes built before and after 1992 represent, respectively, an average annual consumption of 300 and 144 kWh/m^2**. The same figure stands at **121 kWh/m^2 for multi-family homes**. The study estimates that their total energy requirement for heating purposes represents approximately 70 percent of all household energy use. Another study, completed in 2011 by the energy policy NGO Energiaklub[28], quantified the primary energy consumption of family home dwellings between 360 and 550 kWh/m^2 per year, depending on the building materials used. Taking into account the typology established as part of the EnergyCity[29] project (also see Chapter 5.1), the latter appears to be more convincing.

There are no statistics or comprehensive survey data available for energy savings in renovated family homes, neither do reports published about certain government subsidy programmes contain a breakdown of results by dwelling type. The extent of energy savings a building retrofit can yield depends on whether renovation is only done on certain parts of a building – the most widely used solution at present – or a deep retrofit is carried out, which can bring energy consumption down to

27Ürge-Vorsatz D. et al., 2010. Employment impacts of a large-scale deep building energy retrofit programme in Hungary, Central European University, Budapest

28 Energiaklub, 2011. Negajoule2020 report: The energy efficiency potential in Hungarian residential buildings.

29Reducing energy consumption and CO2 emissions in cities across Central Europe (CENTRAL EUROPE Programme co-financed by the ERDF). http://www.energycity2013.eu/

near 15 kWh/m^2 per year, which is close to passive house standards. According to Energiaklub (2011), the thermal insulation combined with the replacement of fenestration in uninsulated single family homes resulted in primary energy savings of 50-60 percent. When done separately, however, either method yielded only about 30 percent in savings. Retrofitting the heating system only provides an additional 4–5 percent of savings in primary energy use. (Note that we disagree with such a low figure, for the installation of a condensing furnace alone brings in savings in excess of 5 percent). With these typical renovation technologies, the annual savings in specific primary energy use could range between 160 and 210 kWh/m^2 for single family homes.

Non-prefab condominiums

According to CEU calculations (2010), the specific energy use of **housing units in non-prefab condominiums stands at 207 kWh/m^2 per year**. This study also goes to determine that the heating energy requirement of housing units in non-prefab condominiums and historic landmark buildings add up to approximately 15 percent of household heating use. A similar estimate by **Energiaklub (2011)** showed specific primary energy consumption **for this dwelling type to range between 213 and 344 kWh/m^2 per year**.

There are no comprehensive statistics for retrofit projects completed so far for this dwelling type either. Here, too, the rate of savings in energy use attainable through renovation depends on the depth of the actual retrofit project implemented. According to calculations by Energiaklub (2011), savings in the primary energy consumption of brick condominiums due to the use of insulation and the replacement of fenestration could be between 15–25 percent, depending on the wall structure and building mechanicals. By retrofitting their heating system, primary energy consumption could be reduced by another 25–35 percent. When applied together, these technologies could reduce the specific primary energy consumption of brick-condominium units by 130–150 kWh/m^2 per year.

Condominiums with district heating

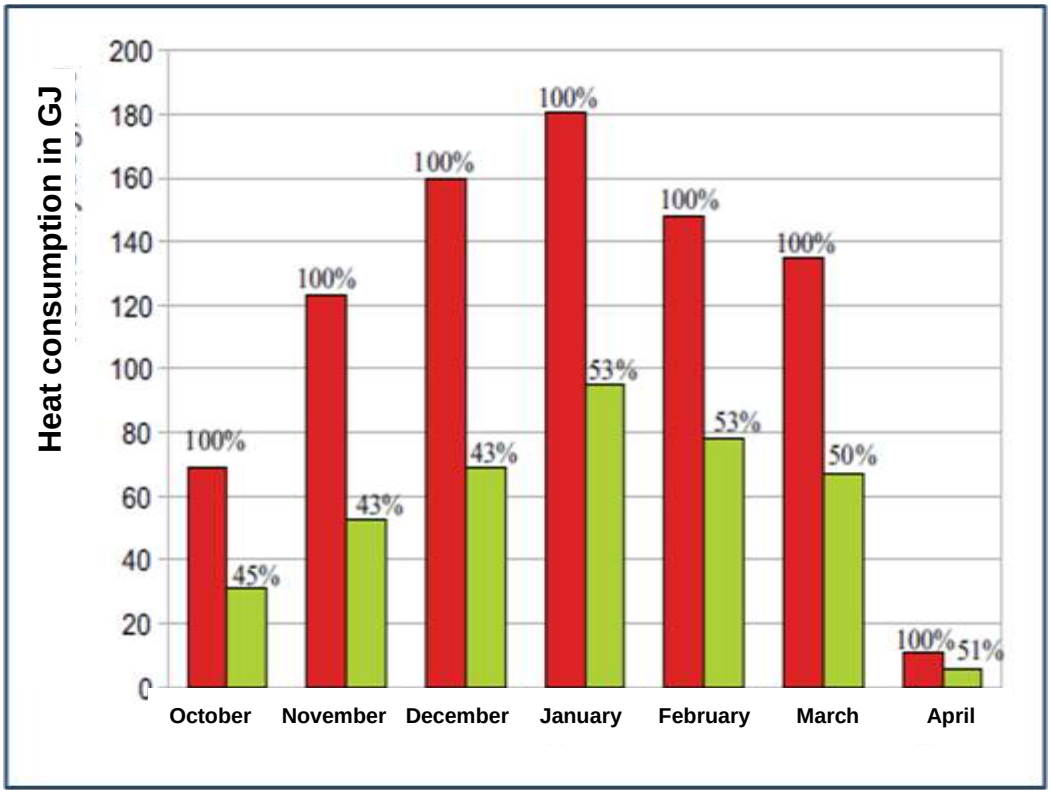
From the early 2000s to 2007, residential district heating use was on a declining trend, and subsequently moved around 23 PJ without adjustments for weather. Within this figure, household heating amounts to 17–18 PJ, and hot water use represents 5.5–6 PJ of energy. District heating sold to public buildings remains steady in the 4.2–5.2 PJ range, 90 percent of which is heating-related. (Hungarian Energy Office, 2010)[30].

According to CEU calculations (2010), the specific heating energy use of **housing units in prefab blocks stands at 230 kWh/m^2 per year**. The overall heating energy requirement of Hungary's 765,000 flats in prefab buildings (including district heating and otherwise) amounts to approximately 15 percent of all household heating consumption. By contrast, **Energiaklub's 2011** estimate showed a lower figure for prefab units which, ranging between **190–238 kWh/m2 per year**, remains below that of both single-family homes and brick condominium units.

In recent years, government-subsidised retrofit programmes mainly targeted the renovation of prefab buildings that use district-heating. Yet, **there are no statistics available as to how many of these units have been renovated and to what depth**. Similarly to other dwelling types, the rate of savings in energy use attainable through the renovation of prefab housing units depends on the depth of the actual retrofit project implemented. According to Energiaklub (2011), the use of typical insulation technologies and the replacement of fenestration yields 10 to 15 percent savings in primary energy use; however, retrofitting their heating system can only improve this figure by approximately 5 percent. (Note that we disagree with this estimate, as we believe that, by the insulation and mechanical retrofit of prefab buildings, overall energy use can be reduced by up to 50 percent). According to the study, use of these technologies can help bringing down the specific primary energy use of prefab condominium units to 130–140 kWh/m^2 per year.

30 MEH, 2010. Statistical *Yearbook* of Electricity, Natural Gas and District Heating, 2010, Hungarian Energy Office

Figure 9: A real-life example: a complex yet "average" energy efficiency retrofit of a four-storey, 20-unit prefab building resulted in total energy savings of 49 percent



Source: Retrofitting a prefab building, by Rajmund Prohászka (Építéstechnika vol. 2010/3, pp. 20–21)

See Annex 3 for our estimates on the specific energy use of residential buildings.

Public Buildings

According to the CEU study (2010), the overall heating energy consumption of public buildings is estimated at 5.1 TWh (18.4 PJ). Expert calculations carried out for the specific heating energy requirement of public buildings show that, depending on building type, **buildings constructed prior to 1993** – which makes up for the bulk of Hungary's current stock of public buildings – **require 207 to 230 kWh/m^2 per year**. A considerably lower annual figure, **ranging between 120-144 kWh/m^2, only applies to more recently constructed buildings, which account for about 15 percent of the building stock**. Certain renovation projects confirm that, just as in the case of residential units, a deep retrofit of public buildings could reduce heating energy use by up to 80 percent. At the same time, there is no literature available on the energy requirements for the cooling of public buildings, even though in today's state-of-the-art buildings this could sometimes exceed the amount of energy needed for heating.

Table 4: Energy performance of public buildings

function	size	constructed	technology	**specific heating energy requirement (kWh/m2 a)**	hot water (kWh/m2 a)	electricity (kWh/m2 a)	**total (kWh/m2 a)**
education	small *	pre 1990		**206**	15	22	**243**
	large*	between 1900–1945 and/or before 1990	traditional	**164**	10	20	**193**
		between 1946–1990	industrial				
healthcare	small *	pre 1990		**219**	3	31	**253**
	large	between 1900–1945 and/or before 1990	traditional	**204**	27	73	**304**
		between 1946–1990	industrial				
public administration	small *	pre 1990		**162**	4	42	**208**
	large	pre 1990		**122**	4	35	**161**
social services		pre 1990		**273**	26	34	**334**
cultural		pre 1990		**151**	3	18	**172**

Source: CEU (2010)

Note: *: small buildings comprise a maximum of two storeys across a gross floor space of approx. <700–1000m^2

On the whole, we can conclude that:

- **retrofitting the building stock for energy efficiency is an opportunity for both the EU and Hungary to make a difference and, in the energy supply of a more efficient building stock, renewables could be given a more major role**
- **at present there is no dependable information available allowing for assessments and forecast estimates to be made for the renewable-based energy use of various building types (public, residential, commercial and industrial).**

Proposal no. 3	We recommend the creation of a building stock model that, based on uniform typology and representative survey data, can be suitable for keeping track of the energy performance of Hungary's building sector.

5.1.2 Statistics About the Current Building Stock

Residential Buildings

During the census conducted in October 2011 by the Central Statistical Office (KSH), a total of 4.389 million housing units were reported. Out of this number – which includes dwellings, inhabited vacation cabins and other units, as well as institutional household units –, there were **4,383,000 dwellings,** up by 318,000 (a 7.8 percent increase) since the previous census of 2001.

In the past decade, the number of dwellings that are either left vacant or used for other purposes (e.g. office, doctor's office) or on a seasonal basis continued to increase, bringing down the share of actually **inhabited dwellings to 88.5 percent** of the entire housing stock. In terms of geographic distribution, no significant changes have been observed, with Central Hungary possessing two-thirds of the housing stock, every fifth dwelling located in Budapest and Pest County representing 10 percent of the country's entire housing stock.

As far as distribution by settlement category, Budapest's share in the housing stock has continued to increase somewhat; meanwhile, that of smaller municipalities has declined. On a national scale, Pest County produced the highest rate of growth, as the number of dwellings was up by 19.8 percent relative to 2001. **Budapest and other major Hungarian cities account for 71.4 percent of all dwellings and represent 69.6 percent of the entire population,** a 0.2 percent increase over the past 10 years (KSH, 2012)[31]. A quarter of all urban residents live in Budapest. As the cumulative result of a decreasing population and the growth in housing stock, in 2011 there were 251 residents for every 100 inhabited dwellings, meaning that Hungary's density standard has shrunk by nearly 6 percent since 2001.

According to KSH data, the country's 4.3 million dwellings include 2.7 million **family homes.** The majority of these – 2.2 million detached homes – were built before 1992, which comprise 51 percent of the entire housing stock. The remaining 0.5 million family home dwellings were constructed after 1992: most of these represent detached family homes and a smaller portion of the dwellings is located inside multi-family homes[32]. According to housing statistics, the number of newly built dwellings has been on a continuous decline since 2004, with only 12,655 units delivered in 2011. As far as dwellings in newly built residential buildings, construction of family homes rose to 53 percent from last year's 45 percent.

The share of **dwellings in non-prefab condominiums** versus the entire housing stock remains below 20 percent. There are also an additional 131,000 dwellings in historic landmark buildings, possessing similar energy efficiency characteristics. KSH statistics also confirm that, of all newly built dwellings, the share of those constructed in multi-storey, multi-unit buildings was 42 percent in 2011, down from 47 percent in 2010. The number of flats in residential communities failed to reach even 1 percent.

In the entire housing stock, there are 650,000 **dwellings using district heating.** While there is indeed a significant overlap, not all prefab buildings use district heating, just as not every buildings where district heating is available is constructed from prefab concrete. Some prefab buildings are fitted with their own central heating systems, and there are dwellings that, although constructed by way of traditional technologies, feature district heating. According to the CEU report (2010), the number of flats in buildings constructed by way of industrial technologies until 1992 is 765,000, substantially higher than the number of dwellings with district heating. As regards today's housing stock, the Central Statistical Office provided the following breakdown:

Table 5: Current building stock broken down by wall material

	Brick	Adobe	Prefab Concrete	Timber and Other	Poured Concrete
-1944	499 711	316 652	0	2 025	0
1945-1959	302 996	161 675	0	279	4 544
1960-1969	420 186	97 935	46 995	2 007	33 111
1970-1979	530 172	39 279	277 622	4 252	61 310
1980-1989	434 456	6 027	208 848	8 502	40 626
1990-1999	268 631	5 970	16 009	6 820	10 840
2000-2005	117 339	1 911	973	7 419	2 136
2006-2010	148 157	318	92	7 950	2 398

31 KSH, 2012. Preliminary data of the population census 2011, part 1.) Hungarian Central Statistical Office: www.ksh.hu

32Ürge-Vorsatz D. et al., 2010. Employment impacts of a large-scale deep building energy retrofit programme in Hungary, Central European University, Budapest

Source: KSH Micro Census and Housing Statistics Yearbook 2010

The table above only distinguishes between dwellings according to building material and not according to building type. However, from the aspect of building energy-efficiency, knowing the type (e.g. family house, condominium, prefab building etc.) would be important, as they significantly differ from one another in terms of specific energy consumption. For the proper interpretation of data, it is recommended that the following be taken into account:

- the Statistical Office also publishes, **for each construction year, the number of dwellings in buildings owned by natural persons and comprising 1 to 3 units**, as well as the number of dwellings in buildings comprising at least four units. Moreover, the number of dwellings owned by municipalities and other legal persons is also significant, representing 3.6 percent of the country's inhabited housing stock.
- on a similar note, the Statistical Office also makes available the number of newly built and terminated units, the former in a floor space breakdown and the latter according to construction year.

As for the composition of dwellings in terms of floor space, the gap between cities and smaller municipalities has widened. Budapest remains the top spot for small-footprint dwellings, with nearly 20 percent of the city's housing stock consisting of units with less than 40 sq. m of floor space. By contrast, this ratio in other cities and smaller towns stands at 7.1 and 2.5 percent, respectively (see Figure 10). **An average Hungarian dwelling measures 77 sq. m in floor space**. At 86 sq. m, this figure is the highest in Pest County, with Budapest's average of 64 sq. m closing the list.

Figure 10: Distribution of dwellings according to floor space, broken down by settlement type, October 2011

Source: Central Statistical Office, 2012

Besides publications by the Central Statistical Office, one of the most comprehensive materials available in the field is a study completed in 2011 under the title "Europe's Buildings Under the Microscope" (BPIE, 2011[33]), in which experts assessed the energy performance of buildings in different countries. Information about Hungary was provided by the Central European University. In the following section, we present data about the Hungarian building stock and **provide a comparison to those of other European countries.** Countries in the study were divided into three regions based on similarities in climate, building stock and market. Hungary belongs to the region of Central and Eastern Europe.

33BPIE, 2011. Buildings Performance Institute Europe (BPIE): Europe's Buildings under the Microscope, A country-by-country review of the energy performance of buildings. http://www.bpie.eu/eu_buildings_under_microscope.html

Figure 11a: Share of family homes and condominiums in Europe

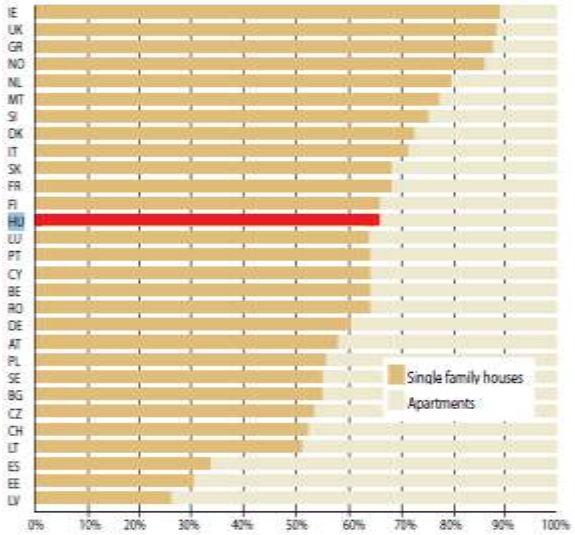
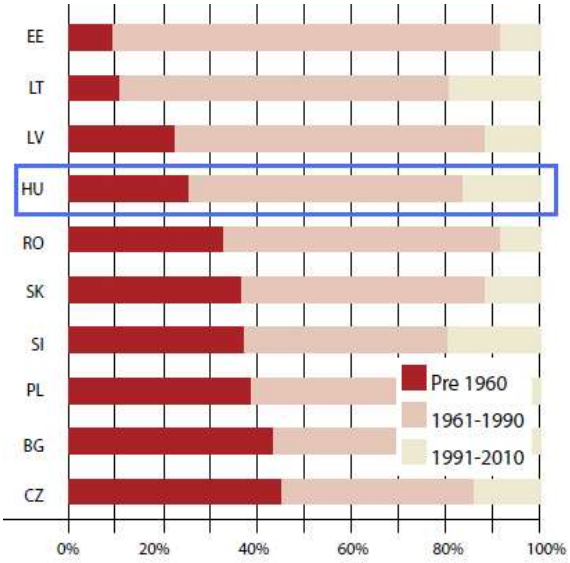


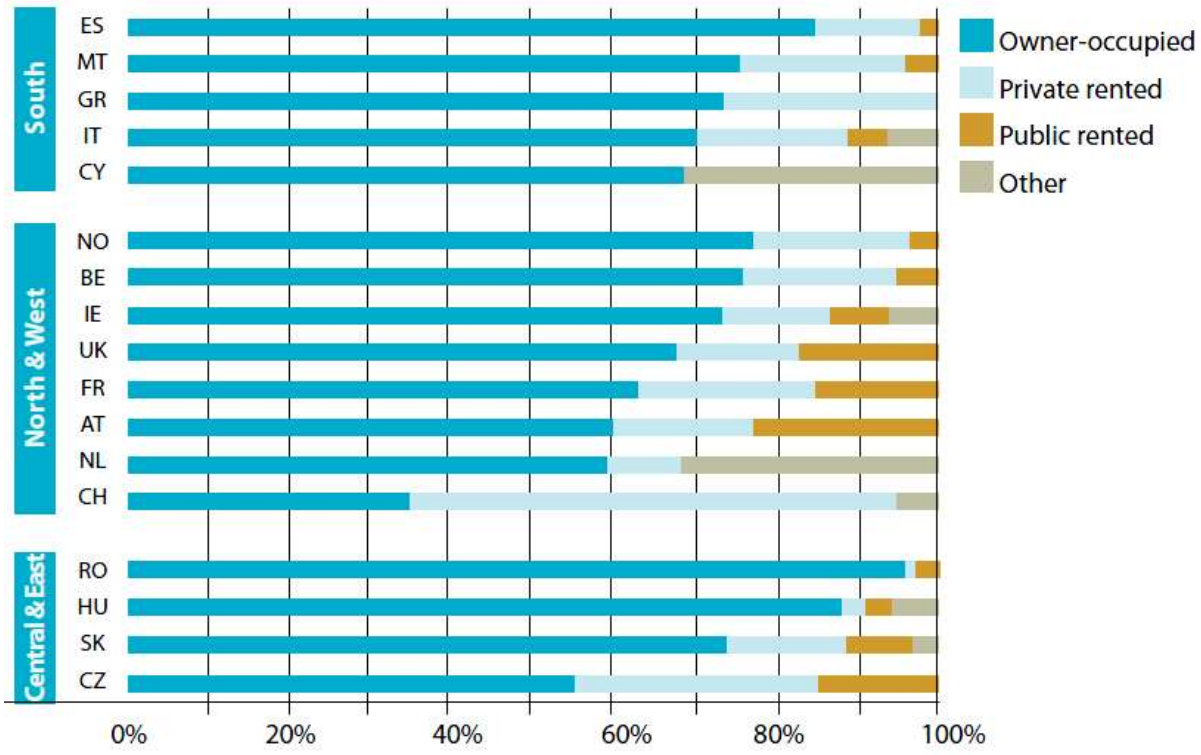
Figure 11b: Residential buildings in Central and Eastern Europe according to year of construction



Source: BPIE (2011)

Approximately 25 percent of Hungary's residential building stock was constructed before 1960 and 58 percent in the period between 1960 and 1990, with the remaining 17 percent built between 1991 and 2010. About 65 percent of our residential buildings comprises family homes, and another nearly 35 percent represents condominiums, roughly corresponding to the respective European average of 64 and 36 percent.

Figure 12: Ownership structure of residential buildings



Source: BPIE (2011)

As seen in the above figure, **approximately 87 percent of residential buildings are owner-occupied, which is one of the highest rates in Europe**. Meanwhile, rental units (both private and public) constitute another 6-7 percent, with the remaining nearly 7 percent representing other, primarily vacant, units.

Public Buildings

As far as building structure is concerned, the country's stocks of public and residential buildings are rather similar. However, they diverge a great deal in terms of function. According to Ürge-Vorsatz et al, 2009[34]**, there is a total of 32,167 public buildings in Hungary, more than half of which are multi-storey buildings made using industrial technologies.** Public buildings occupy an overall floor space of 28.7 million sq. m, which is an order of magnitude smaller than that of residential buildings. **More than three-quarters of public buildings were constructed before 1993.** The highest share of floor space constitutes primary and secondary schools, hospitals and medical centres, which together add up to more than 50 percent of the entire public building stock. Also belonging to this category are the country's fire stations, garages, warehouses, correctional facilities and military sites; however, no information of any kind is available on these. (Not even KSH statistics can be found, at least not with relevance to building energy efficiency.)

Table 6: Estimated parameters of Hungary's stock of public buildings

	Number of buildings	Average floor space in sq. metres	Total floor space in sq. metres	Share of total floor space
Pre-schools and nurseries	4,963	501	2,486 463	6%
Primary and secondary schools	8,160	1,365	11,138 400	29%

34Ürge-Vorsatz D., Novikova V., Korytarova K.: Széndioxid kibocsátás csökkentési potenciál a magyar közszektorban [Opportunities for cutting CO_2-emissions in the Hungarian public sector]. Budapest. 2009.

Universities	286	5,500	1,573 000	4%
GP offices	2,988	659	1,969 092	5%
Hospitals and medical centres	2,017	4,799	9,679 583	25%
Small administrative buildings	4,408	521	2,296 568	6%
Large administrative buildings	995	2,794	2,780 030	7%
Social buildings	2,732	1,329	3,630 828	9%
Cultural buildings	5,021	679	3,409 259	9%

Source: Ürge-Vorsatz et al (2009)

It must be noted that 2007 data by the KSH also included the construction year for each building under municipal ownership, but no such information on state institutions is available. Nor have we been able to obtain information on newly built and vacated public buildings. According to BPIE (2011), approximately 28 percent of Hungary's non-residential buildings are in private, and about 72 percent are in public ownership.

Buildings with other functions

As for industrial, service, agricultural etc. facilities and buildings, we were unable to collect any information whatsoever.

Proposal no. 4	We recommend that a representative survey be conducted, based on which a building typology according to energy efficiency (classification per building type) could be set up.

5.1.3 The energy performance of Hungary's building stock according to the available literature

In this section, an analysis of the sources of available literature will be presented, as a supplement to the sources referred to in Section 3.2.1.

Várfalvi study (1992)

Created in 1992, this remains the only truly comprehensive source of information regarding the energy performance of Hungary's building stock. For residential buildings erected after 1992, not even the Central Statistical Office maintains a detailed database.

Table 7: Energy efficiency of Hungary's residential buildings in 1992

1992		Building type				total
		single family house	multi-storey			
			traditional	terraced	industrial	
Number of units		2,365,000	577,700	201,600	794,300	3,938,600
Vacant units		109,400	40,000	9,900	6,000	165,300
Thermal insulation	u > 1.3 W/m2K	1,865,000	57,800	157,300	0	2,080,100
	1.3 > u > 0.7 W/m2K	350,000	433,300	40,300	635,400*	1,459,000
	u < 0.7 W/m2K	150,000	85,600	4,000	158,900	398,500

Source: Várfalvi et al.[35]

Note: * as for industrial buildings, the planned values for prefab concrete blocks are significantly degraded by thermal bridges, as well as deficiencies in structure, manufacturing and installation; therefore, earlier prefabs ought to belong to the „U > 1.3 W/m2K" category.

As seen in the above table, **most existing buildings score very low in thermal performance** (48 percent in the very poor (U > 1.3 W/m^{2}K) and approx. 35 percent in the poor (1.3 > U > 0.7 W/m^{2}K) category), which means these are responsible for a considerable portion of all energy consumption in buildings.

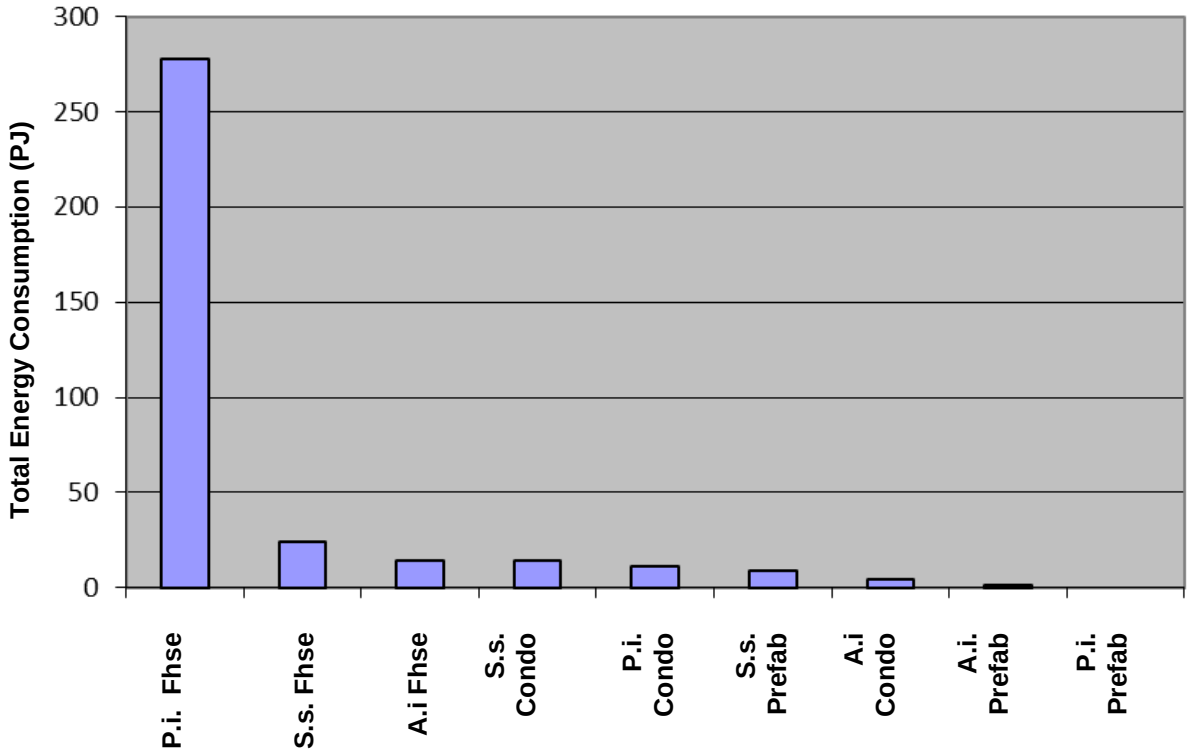
Study by the Independent Ecological Centre (2007)

Prepared as a **background paper for the National Climate Change Strategy**, a study by the Independent Ecological Centre (Medgyasszay et al., 2007)[36] used the above table for its estimates on the country's CO_2 emission potential. For purposes of this study, residential buildings were divided into three categories according to size and construction technology: family houses built with traditional technologies, blocks of flats and industrial prefabs, which were further broken down into subcategories based on thermal performance as seen in Table 7 above. Theoretical calculations for each of these subcategories were followed by the modelling of Hungary's entire building stock. According to the study, **75 percent of all energy consumption for residential heating can be attributed to poorly maintained family houses** (see Figure 13). When it comes to total energy use, the surface-volume ratio also plays a key role – in addition to thermal transmittance (the U value) –, hence the significance of the energy consumption of family houses in relation to multi-unit condominiums.

35Dr. JánosVárfalvi, Dr. András Zöld: Energiatudatos épületfelújítás [Energy awareness in building renovation]. Lecture notes, with support from Magyar Terranova Építőanyagipari Kft. and the Foundation for the Development of Architecture. Budapest, 1994

36P. Medgyasszay, S. Horváth, E. Beliczay, B. Licskó, Sz. Meydl, I. L. Varga: Az éghajlatváltozás csökkentése és az alkalmazkodás lehetőségei az épített környezet alakításával [Mitigating Climate Change and the Possibilities for Adaptation by Shaping the Built Environment] (2007)

Figure 13: Energy consumption of Hungary's building stock (calculated)



Source: Medgyasszay et al.

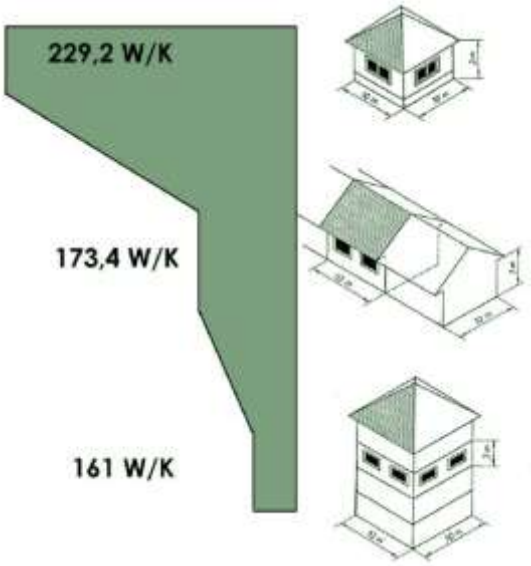
Legend: P.i. – poorly insulated (U > 1.3 W/m^{2}K); S.s. – Substandard prior insulation (1.3 > U > 0.7 W/m^{2}K); A.i. – Adequate or better insulation under prior standards (U < 0.7 W/m^{2}K); Fhse – family house; Condo – Condominium; Prefab – prefab concrete block.

Novikova study (2008)

A **2008** PhD thesis by **Aleksandra Novikova** (Central European University) assessed various options for lowering the CO2 emissions of Hungary's housing stock. For the modelling of the building stock, Novikova set up various categories according to size (family or multi-unit), construction date and sometimes building technology (traditional or industrial). Whether a dwelling unit is adjoined by other heated spaces or stands fully detached also makes a difference in terms of energy use; therefore, the author introduced these subcategories as well. **Heating energy demand values for semi-detached or fully detached units are estimates, by having those applicable to fully attached units multiplied by 1.3.** By assigning theoretical geometries and building materials to each building type, their theoretical heating energy demand could be calculated.

Figure 14 illustrates the deviation between the energy use of detached and attached units, further confirming the above 1.3 multiplier.

Figure 14: Heat loss in building types of the same volume (calculated)



Source: Ertsey et al.[37]

KÉK study (2010)[38]

In its working paper entitled **Complex Building Energy and Climate Protection (KÉK) Programme**, the Hungarian Association for the Building Materials Industry sought to provide guidance for calls for bids in energy efficiency. In addition, retrofit schemes of prefab blocks, condominiums, family houses and public buildings were assessed, also setting forth several recommendations for newly constructed buildings. Establishing the average specific energy demand for these four building types, the working paper provided calculations on expected energy savings and formulated recommendations regarding possible tender conditions. These information also appear in the National Energy Strategy 2030.

NegaJoule study (2011)[39]

By way of a representative nationwide statistical survey conducted under **Project NegaJoule 2020**, Energiaklub wished to acquire hitherto unavailable basic national data, making it possible to visualise and interpret the energy use of residential buildings in various models. Moreover, they also performed economic and technical analyses in order to map out whatever savings options were possible. Data was collected in a questionnaire survey involving 2000 households.

Building types were divided into base categories according to advancements in construction method, which were further broken down – first according to building material, then according to heating and hot water systems. **A total of 74 different building and household types were created.** Measurement data was then added to appropriate parts of the typology, and the results were extrapolated onto the country's total of 3.8 million households (the latter figure according to 2008 data by the KSH). As for the typology, it must be noted that calculations were based on fictitious building types.

Typical sizes for each building type were estimated, and primary energy use was calculated using theoretical building material parameters. As a result, the overall primary energy demand for heating and hot water purposes in Hungary's residential buildings was measured at 360 PJ – or **one-third of the country's total primary energy consumption –, 81 percent of which was attributed to family houses, 12 percent to condominiums and 6 percent to prefab concrete blocks**.

37A. Ertsey, P. Medgyasszay, M. Osztoluczky: Energiagazdálkodás az épített környezetben [Energy management in the built environment], Szent István University

38Hungarian Association for the Building Materials Industry, Complex Building Energy and Climate Protection (KÉK) Programme, Working Paper: Intervention Schemes for the Energy-Efficient Building Programme under the New Széchenyi Plan. 2010, vol. 3

39Energiaklub, 2011. Negajoule2020 report: The energy efficiency potential in Hungarian residential buildings.

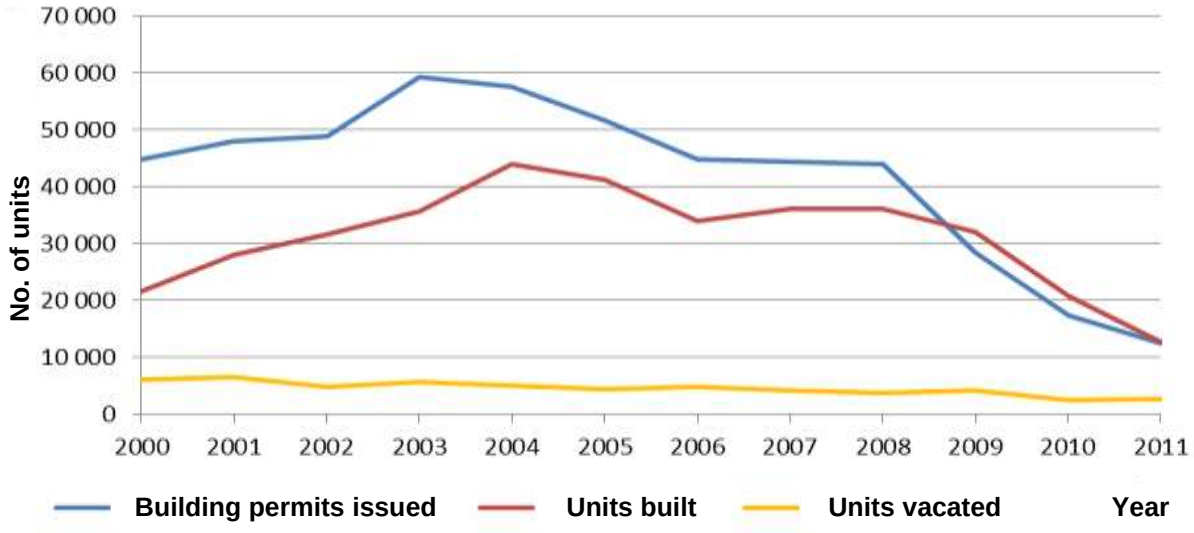
For estimates in certain literature comparing the energy performance of residential buildings, refer to Appendix 3.

5.1.4 New constructions and renovation in recent years

New constructions

In the era of planned economy, housing construction averaged at 80,000 units per year. However, in this period, mass production – that is, the meeting of pre-defined quantitative targets – was of ultimate importance. Following Hungary's transition to the market economy, as the involvement of the state grew less and less, so did the number of units built per year.

Figure 15: Dwelling units built and vacated between 2000 and 2011



Source: KSH (Hungarian Central Statistical Office)

As seen in the above chart, a marked increase in housing construction after 2001 was first followed by a period of stagnation, then, as the combined result of the economic crisis and the discontinuing of incentives, by **2011 the number of units built nosedived to an all-time low.**

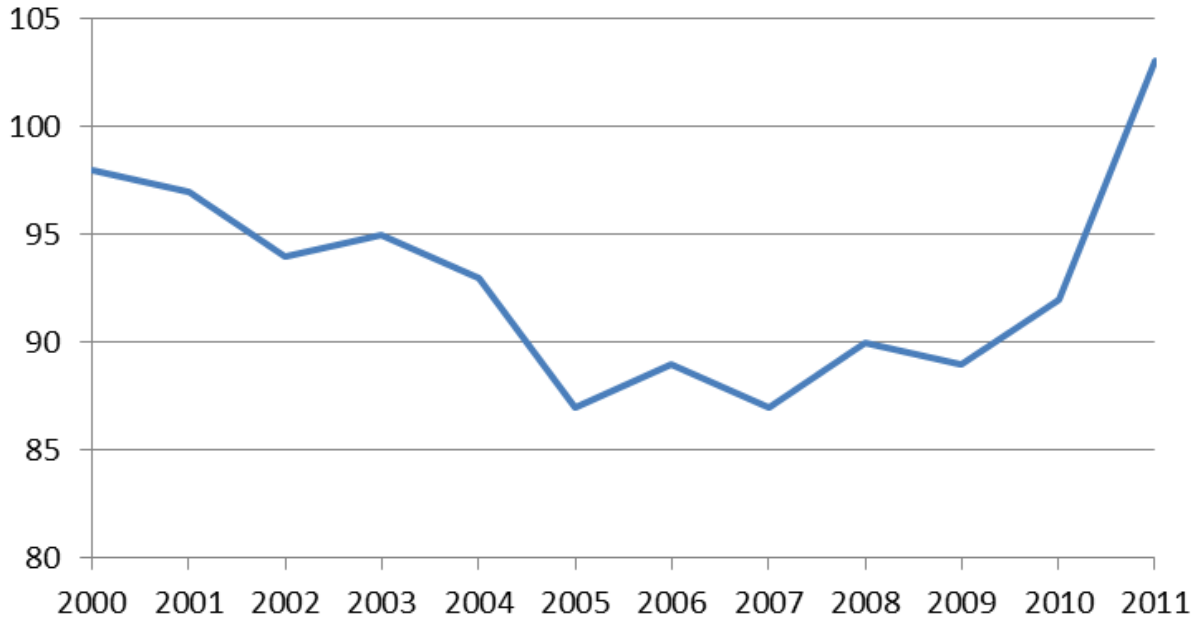
Table 8: Housing stock and density

Area	Number of dwelling units				Occupants per 100 units			
	1980	1990	2001	2011	1980	1990	2001	2011
Central Hungary	1,035,539	1,133,500	1,214,503	1,350,205	293	262	236	220
Central Transdanubia	360,018	401,874	421,786	444,621	314	278	267	246
Western Transdanubia	329,650	357,635	383,927	420,762	313	282	261	236
Southern Transdanubia	337,920	369,013	382,791	403,969	314	276	259	233
Northern Hungary	447,696	481,748	496,868	512,199	313	275	260	233
Northern Great Plain	509,803	556,136	587,950	619,098	312	278	264	239
Southern Great Plain	521,792	553,382	576,828	598,101	280	252	239	219
total	**3,542,418**	**3,853,288**	**4,064,653**	**4,348,955**	**2,139**	**1,903**	**1,786**	**1,626**

Source: KSH (Hungarian Central Statistical Office)

Housing density has over the past 30 years fallen to 76 percent of 1980 levels. Also worth noting that, while the number of units shows a marked decrease, the average floor space for a newly built unit rose steeply last year.

Figure 16: Average floor space of newly built dwelling units, 2000-2011



Source: KSH (Hungarian Central Statistical Office)

Renovation

Since **no official data concerning the current rates of renovation in Hungary's building stock is available at the KSH**, estimates need to be used. Therefore, researchers of the study "Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary" worked with an assumed renovation rate of 1.3 percent per year, which corresponds to approximately 4.5 million sq. metres. This is in line with the findings of other studies that have been prepared in the region: Novikova (2008) estimated 1 percent, Janssen (2010) used 1.2 to 1.4 percent for EU Member States, Petersdorff et al. (2004) established 1.8 percent for the EU-15, meanwhile Lechtenböhmer et al. (2009) worked with natural and accelerated renovation rates of 1 and 2.5 percent, respectively, for the EU-27.

During the NegaJoule questionnaire survey, it was revealed that **only a very low percentage of residential buildings have so far undergone energy efficiency retrofit programmes:** outside insulation was retrofitted at about 25 percent of households, whereas the heating system was reconditioned at only 16 percent.

5.1.5 Missing data, information and recommendations

No up-to-date database of nationwide relevance is available for Hungary's building stock. It is therefore recommended that a national survey be conducted, one that is based on the most comprehensive and realistic typology of residential buildings, thereby allowing for the better estimation of potentials and proposals. Even less information can be found on the dimensions and energy parameters of public buildings, with industrial and agricultural building data also awaiting to be processed. To date, neither statistics, nor literature (estimates) are available on the following:

- number of buildings with low energy use,
- annual rate of energy-efficient new constructions and renovations

As part of the EnergyCity Project, a building typology was created, allowing for energy assessments in the Hungarian building stock. (At present, Hungary lacks a system of building typology that could be used in policy decisions, nor have there been any surveys carried out on the basis thereof.) The typology comprises the most common building types. When defining a building type, the following aspects were taken into account:

- Must be of a "common" building, examples of which are abound across the country.
- Geometric features (e.g. floor plan layout, mass and scale, relation to neighbouring buildings, glass surface ratio) must be "typical", as these – especially the cooling surface versus heated volume ratio – are decisive factors in calculating the energy performance of buildings.
- Structural characteristics must be representative. In this regard, the construction year is of great importance, for it makes identification easier. Therefore, construction year was selected as a separate feature.
- Energy carrier or heating mode used – this was more significant when buildings were broken into subcategories.

For the typology created according to these aspects, refer to Table 9 and Appendix 2. Table 9 provides an overview of key building types and assists in the interpretation of Appendix 2. Fields highlighted in orange indicate periods when buildings of a given type were being constructed. Fields left white show that the building type was not popular in a given period. Buildings erected after 1990 are not included in the typology, given the fact that a deep retrofit for these will not be necessary within the next two decades. Public buildings are also omitted, because their great variety makes typification a highly complex task. It is worth taking note of the fact that, when compared to the housing stock, the number of public buildings is insignificant.

Subcategories are contained in Appendix 2. These are defined according to building height or number of floors, as well as typical energy carrier and heating mode. Naturally, only heating modes that are common for a given type were taken into account.

Table 9: An overview of the proposed building typology

					pre-1945	1946-1965	1966-1980	1981-1990
			BUILDING TYPE	FLOOR PLAN	A	B	C	D
Residential Buildings	Family Houses	1	Standalone house	Horizontal				
				Square				
		2	Terraced	Fully attached				
				Semi-detached				
	Condominiums	3	Small condominium	Multi-unit detached				
				Terraced, fully attached				
				Terraced, semi-detached				
		4	Large condominium	Multi-unit detached				
		5	Urban block of flats, small	Terraced, fully attached				
				Terraced, Semi-Detached				
		6	Urban block of flats, large	Terraced, fully attached				
				Terraced, semi-detached				
		7	Prefab concrete block	Line building				
				Tower block				

Source: authors' own work
Note: Categories A through D represent codes for each building period

One can conclude that pre-1991 residential buildings that have yet to be renovated and represent the bulk of the building stock all need a deep energy retrofit programme without exception, for these clearly fail to meet currently effective requirements (category C) and today's technical standards (0-100 kWh/m^2 per year). Depending on building type, specific heating energy demand ranged between 120 and 600 kWh/m_2 per year, with smaller buildings and family houses performing the worst, for these carry the largest specific cooling surfaces. While this is in line with the findings of the aforementioned studies by Energiaklub and CEU, the measurements also suggest even more extreme conditions. Despite popular belief, prefab concrete blocks are the least imperfect of all building types reviewed, because their perimeter structures contain thermal insulation and the specific cooling surface per m^3 of volume is relatively low.

6. ADULT EDUCATION AND ADULT TRAINING: A STATUS REVIEW

6.1 The Current Status of Adult Education and Adult Training in Hungary

6.1.1 Characteristics of the Adult Education System

Adult training and education in Hungary may be provided in either of the following two forms:

(a) as part of the state-subsidised school system comprising primary, secondary, post-secondary and higher education levels, in accordance with pertaining legislation (see 4.3.3); with participants legally acquiring student status;

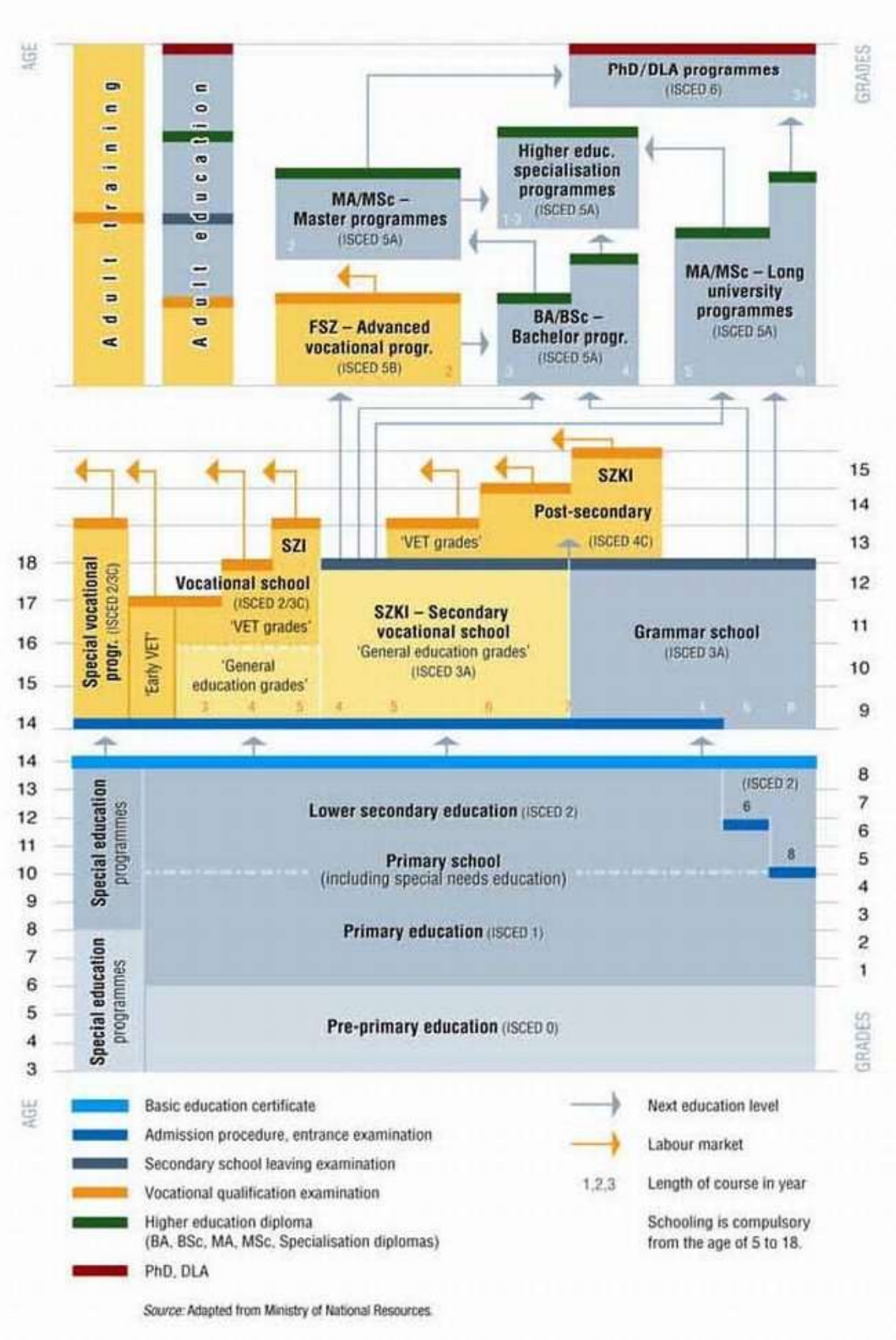
(b) adult training outside the school system, which can be provided by private firms and public institutions alike, with pertaining organisation structures, legal and financing framework subject to Act CI of 2001 on Adult Education, often resulting in the acquisition of officially recognised qualifications listed in the National Register of Vocational Qualifications (OKJ).

For purposes of clarity, formal education and training between pre-school and post-secondary levels are referred to as public education irrespective of whether the given institution has been established by a state, municipal or private organisation. This is operated and regulated by the state, with funding provided from the central budget. Initial vocational education and training (IVET) generally takes place at (upper) secondary, post-secondary and higher education levels, even though young people may obtain their first vocational qualifications in adult education as well. The OKJ contains state-recognised qualifications, as well as partial qualifications and further build-ons none of which provide for advancement in the school system on its own. A vocational qualification entitles its holder to engage in professions specified in the professional and examination requirements (SZVK). Also set forth in these requirements are the criteria for admission, examination and evaluation, with tasks and learning outcomes also listed for each separate training module.

A qualification entitles its holder to fill one or several positions in a certain occupation and may include, besides its own modules and in accordance with its relevant SZVK, additional shared modules also forming part of the curricula of other qualifications. A partial qualification entitles its holder to fill at least one position, with the SZVK containing certain modules of a qualification. Based on the qualification as specified in the relevant SZVK, a qualification build-on typically includes its own module(s) and entitles its holder to fill additional position(s). A qualification build-on may be based on multiple qualifications, provided they are recognised as prior learning.

Whether advancement in the school system is possible depends on the type of school the individual has completed and the type of qualifications acquired. A school reform that arose in the late 1990s was targeted at establishing a more comprehensive education system, with an examination following 10th grade and raising the minimum enrolment age in vocational education from 14 to 16 years. However, this concept was soon abolished by the next government, leaving behind significant uncertainties regarding the role and purpose of grades 9 and 10. Nevertheless, the reform did bring about the current structure of (upper) secondary and post-secondary education and training, also changing the nature of formal IVET. While a number of countries maintain a combined use of general education and vocational subjects in their vocational programmes, IVET in the Hungarian school system comprises the following two parts: The first part focuses on general education and certain basic vocational training, and includes what are referred to as general education grades. The second part, consisting of the so-called vocational grades, provides professional education leading to a partial qualification. By elevating the vocational part to post-secondary level (ISCED 4C), the school reform of the 1990s transformed the upper secondary component of vocational secondary schools into a preparatory vocational pathway.

Figure 17: The Education System in Hungary



Source: Adapted from Ministry of National Resources.

Spread over a total of 8 years, basic education consisting of primary school and lower-secondary education typically takes place in primary schools (ISCED 1A-2A). Some specialist grammar schools also offer lower-secondary education (in grades 7-8 and 5 through 8; ISCED 2A). Following the completion of primary and lower-secondary education, students may opt for one of three learning pathways in upper-secondary education. While two of these provide direct access to higher education, the third path does not:

(a) grammar schools (ISCED 3A) offer general education in four years (five in the case of bilingual schools) and provide a secondary school leaving certificate, which is a prerequisite for admission in higher education. Moreover, fourth (fifth) grade students may advance to post-secondary vocational education (see below).

(b) vocational secondary schools offer a combination of general education and pre-vocational grounding (ISCED 3A) in four years (five in the case of bilingual schools) and prepare students for a secondary school leaving certificate while also providing them with a qualification (ISCED 4C), thus requiring them to choose between higher education and the labour market. It is at the student's discretion to decide whether to take a secondary school leaving examination and a vocational examination thereafter, following completion of the vocational grade, or to only opt for the latter, if permitted by the relevant legislation on vocational education. (In the case of certain vocational qualifications, a successful completion of grade 12 in secondary school is sufficient, without the need for a school leaving certificate.) The duration of vocational programmes depends on the qualification to be attained. To most students, this represents a one-year programme, for their trade group-related grounding is recognised towards the qualification.

(c) Vocational schools (ISCED 2C or 3C) operate in grades 9 and 10 and whatever is required for the acquisition of the given qualification, in accordance with the National Register of Vocational Qualifications (OKJ). If students at a vocational school are being prepared for multiple qualifications, the number of vocational grades in each programme may vary, depending on the time required for preparation.

Vocational schools offer vocational education at the following levels:

Level	Definition	ISCED level
21	partial qualification of basic level not requiring the completion of studies; may be acquired through vocational training outside the school system, at special vocational schools or in the Bridge II Programme.	2
31	partial qualification of lower secondary level built upon the completion of primary school or the theoretical and practical knowledge elements (hereinafter: input competences) defined in the relevant SZVK; may be acquired through vocational training outside the school system, at special vocational schools or in the Bridge II Programme.	3
32	vocational qualification of lower secondary level, built upon the completion of primary school or the input competences defined in the relevant SZVK; may be acquired through vocational training outside the school system.	3
33	qualification build-on of lower-secondary level, based upon a qualification requiring completion of primary school and available through vocational training outside the school system	3

34	vocational qualification of secondary level, built upon the completion of primary school or the input competences defined in the relevant SZVK; may be acquired typically through vocational training within the school system.	3
35	qualification build-on of secondary level, based upon a qualification requiring completion of primary school and available through vocational training in the school system	3

There exist some special types of vocational school programmes: (a) in art schools, vocational training may be provided simultaneously with general education and commence as early as the lower-secondary level (in grade 5 or 7); (b) special vocational schools and skills developing special vocational schools, both providing education to students with special needs, may either offer ISCED 2C qualifications listed in the National Register of Vocational Qualifications (OKJ) or simply resort to developing skills required for one's entry to the labour market and starting out independently.

Example

Drywall Builder

A Level 34 – and therefore secondary – qualification, it is built upon the completion of primary school (8th grade) or the input competences specified in the relevant professional and examination requirements. Training length: 3 grades of vocational training in the school system, or between 960 and 1440 hours outside the school system. The qualification is subject to a valid medical certificate. Theoretical and practical training represent, respectively, 30 and 70 percent of the curriculum. Successful completion of the training is subject to a level examination. In the school system, the duration of continuous practical training is 140 hours following the 9th grade and 160 hours after the 10th grade. Range of occupations accessible to the holder of the qualification: other specialised construction activities (FEOR 7539). Drywall builders are responsible for the preparation, repair and dismantling of installed indoor structures, floors and lofts, as well as fire protection finishes and dry plaster. Following the completion of studies and a successful complex examination, a qualified drywall builder is able to interpret the contents of available technical documentation and use basic architectural terminology. Able to construct installed partition walls, prepare and clad arched structures, fill joints and grouts, install and affix sheets of suspended ceiling or drywall, create dry floors, install raised floor elements, create poured raised floors, construct fire protection finishes, prepare the cladding of angular and vertical surfaces in loft areas, specify the planes for curtain walls and shaft walls, glue dry plaster and comply with applicable HSE regulations.

The modular structure of individual training programmes is a significant part of vocational (and adult) education.

In a modular structure, curricula are arranged into specific modules that are easily and flexibly interchangeable.

In the VET system, the vocational requirement module comprises a designated part – or, in the case of unique qualifications, all – of the professional requirements applicable to the given qualification. The vocational requirement module represents a separate element of a curriculum and may encompass several subjects or a more distinct segment thereof.

The relevant professional and examination requirements (SZVK) comprise the qualification identifier as per the National Register of Vocational Qualifications (OKJ), the qualification's name and its assigned FEOR (ISCO 88) number, the access requirements – competences and educational prerequisites – for the course, the conditions of medical eligibility, aptitude and the practical training specified. Furthermore, it contains the name of the profession most likely to be filled with the

qualification, as well as a short description of activities and tasks (work profile) at hand. Also listed here is the balance of time devoted to theory and practice versus total training time, the number of vocational grades, the opportunity for a level examination, the identifier(s) of vocational subject module(s) belonging to the vocational training, the preconditions for and contents of a complex examination, the possible cases, modes and conditions of exemption from certain segment(s) of the examination and other pertaining regulations, a list of minimum tools and equipment required for a successful completion of the training and the examination, as well as the duration of continuous practical training (in the case of programmes within the school system) to follow the study period. Moreover, the fact that whether competences acquired through formal or informal learning, in the school system, vocational training, higher education or employment, or the maturity exams taken in relevant vocational preparatory subjects or the possession of a vocational examination (if any) can be credited towards the completion of professional requirements is also specified here.

Detailed recommendations for the curricula of individual qualifications are contained in a vocational curriculum framework. Such recommendations include, based on the vocational requirement modules, the system of vocational subjects and their detailed content, a specification as to whether the given vocational subject belongs to theoretical or practical training, the share of required subjects in each grade, the timeframe available for the fulfilment of requirements, the breakdown and proportion of theoretical and practical training, as well as the vocational requirement module that a given vocational subject represents.

At the end of the vocational training, students are required to take a complex vocational examination. Outside the school system, however, the complex vocational examination is subject to the passing of an examination of module completion that is organised by the training institution involved. The purpose of an examination of module completion is to assess whether the participant has acquired, at an adequate level, the skills and knowledge specified for each requirement module in the SZVK.

Modular training courses recognised by the state are listed in the National Register of Vocational Qualifications (OKJ).

Modules towards a given qualification are subject to Government Decree 217/2012 (VIII. 9.) on the vocational requirement modules of qualifications recognised by the state.

The decree also includes a detailed description of each vocational requirement module. All competences pertaining to a qualification and set forth in its SZVK are contained in the vocational requirement modules, the latter comprising relevant task and competence profiles (vocational knowledge and skills, personal, social and method competences).

Requirement modules are also used to create a so-called "module map", which indicates the vocational module or modules, as well as their correlations, of individual qualification(s).

Modifying the state-monitored OKJ and the inclusion of additional vocational training programmes is a lengthy process, and it may take several years before the first professionals acquiring qualifications as a result of such modifications can enter the labour market. The inclusion of accredited training courses that, while their availability is subject to market demand, are also backed by a state guarantee is less time consuming, and the vocational programme itself can be offered under more flexible terms.

6.1.2 Employer and employee contribution in vocational adult training and education financing

Study Leave

Under the effective Labour Code, certain types of study leave are permitted (see 6.1), provided the employee is enrolled in formal education in the school system or if continuing education is mandatory in the given position or required by the employer. In case of the former, employees may be entitled to an absence of four workdays per examination and an additional 10 days for working on their theses. The duration of additional study leave is at the discretion of the employer taking into consideration the certificate issued by the educational institution at hand, warranting the duration of study. In this case, study leaves shall constitute unpaid leaves – except for studies in primary education (ISCED 1A-2A). When participation is mandated by the employer, however, study leave

shall be considered paid. Employees may also be eligible for study leave in other cases, subject to the provisions of a learning agreement concluded with their employers.

Provisions on reimbursement

The Labour Code also stipulates the aspects of the learning agreement on the basis of which an employer may support the studies of its employees. In most cases, employers agree to paid study leaves (or require that hours lost due to study be made up at a later date) and are willing to cover costs including tuition, books and exam fees, sometimes even travel and other expenses. In exchange for the above, employees undertake to maintain their employment for a specified period that is typically equivalent to the duration of study, for a maximum of five years.

6.1.3 Accreditation Systems

This Chapter presents the accreditation processes that are essential to the acceptance of any new training course. Accreditation processes are applicable to accredited training courses made possible by market demand.

Before getting into the details, let us take note of why it is worth getting a training course accredited, even though this is not mandatory for any programme. The process includes two parts, the first being the accreditation of the institution, and the second involving the accreditation of the programme at hand.

Why is it recommended for an institution to be accredited?

1. Application for training aid

Pursuant to Government Decree 149/2012 (VII. 6.), companies may be eligible for training aid for purposes of adult education, which shall be directed towards their employees (e.g. language courses or various professional training programmes). The training aid may be spent at any accredited adult training institution.

2. Participation in tenders

Nowadays, participation in virtually all training-related tenders is subject to institutional, and often to programme accreditation.

3. OKJ examinations

Only accredited institutions are eligible to hold OKJ examinations.

4. Prestige

Clients, partners and participants all tend to have a greater level of trust in the courses offered by an accredited institution. The systems and processes used at accredited institutions are verified, which represents a certain type of quality assurance for the clients.

Why is it recommended to have programmes accredited?

1. VAT-free training

Under the VAT Act, courses in an accredited programme may be offered VAT-free.

2. Conditions of institutional accreditation

One of the conditions of getting an institution accredited is that the institution must be capable of delivering accredited programmes. In other words, accrediting an institution cannot be possible without accredited programmes.

The accreditation of programmes is a procedure whereby various quality aspects of a training program are assessed. Simply put, the Act on Adult Education mandates that all institutions possess a so-called training programme containing a description of the training completed. Throughout the programme accreditation process, experts assess whether the programme is in compliance with specified quality criteria. The accreditation of programmes takes place on a voluntary basis.

Content and accreditation of a training programme

All courses in vocational training – including adult education – require a training programme. Mandatory elements of a training programme are:

(a) competences that may be acquired during the training,

(b) conditions of access and participation,

(c) planned course length,

(d) forms of training (individual study, group activities, distance learning),

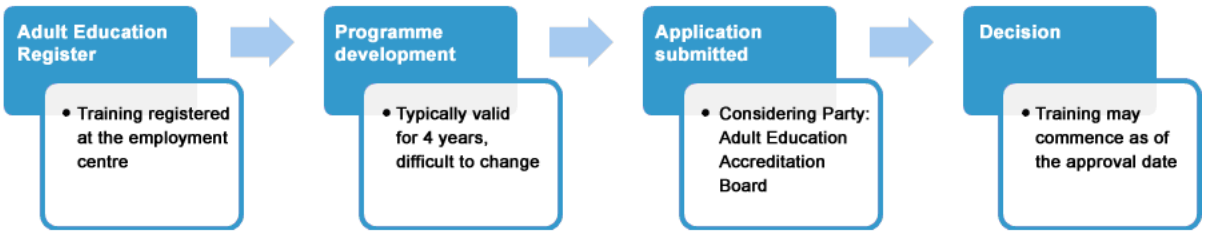
(e) units (modules) of the curricula, as well as their purpose, content and scope, plus the number of hours of theory and practice assigned to each module,

(f) maximum group headcount,

(g) a description of the appraisal system measuring the participants' performance,

(h) conditions of issuing a certificate of completion for the training or its individual units (modules).

Figure 18: The programme accreditation process



Accreditation of institutions engaging in adult education according to Act CI of 2001 (excerpt)

Section 12 (1) The institutes of adult training included in the registry according to Section 8 may request their accreditation on the basis of conditions defined in a separate provision of law. The purpose of institutional accreditation – in the interest of adults participating in the training and other stakeholders – is to ensure that the institute conducts its adult training activities in accordance with the higher quality requirements defined in the separate provision of law concerning accreditation.

(2) The Adult Education Accreditation Board (hereinafter referred to as FAT) shall issue the certificates of accreditation on the basis of an accreditation procedure.

(3) The basic condition of the accreditation procedure is that the institute of adult training should have at least one already implemented, accredited training programme, and that in addition to the training it should also offer services related to such training.

(4) The accreditation of institutes of adult training shall expire after a term of four years.

(5) Institutes of adult training shall submit their application for accreditation to the National Institute of Vocational and Adult Education.

(6) The body maintaining the registry of the institutes of higher education shall submit to FAT the list of institutes of higher education that conduct vocation-oriented training in addition to non-subsidised training as defined in Section 56 of the Higher Education Act, with information as defined in a separate provision of law. FAT shall issue certificates of institutional accreditation in accordance with the list of institutes of higher education without conducting an accreditation procedure.

(7) If a provider, duly entitled to the free provision of services and having been endorsed in a certification system that is recognised by an EEA country, seeks to have its adult education activities, engaged as part of its cross-border services, accredited, it shall be sufficient to provide, in its application for accreditation, proof of compliance with requirements that do not form part of the requirements of said EEA country.

(8) In the case of applications for institutional accreditation submitted by institutes of vocational training fulfilling tasks of public education, as defined in a separate provision of law, FAT shall conduct a simplified accreditation procedure.

(9) In the case of applications for institutional accreditation submitted by institutes of vocational training fulfilling tasks of public education, as defined in a separate provision of law, FAT shall conduct a simplified accreditation procedure. The scope of other cases serving as the basis of a simplified institutional accreditation procedure, as well as the detailed rules of the procedure shall be set forth by a government decree.

(10) The institute engaged in adult training services shall be required to pay a procedure fee for the accreditation procedure, the amount of which shall be set in a separate provision of law[80].

Figure 19: The institutional accreditation process

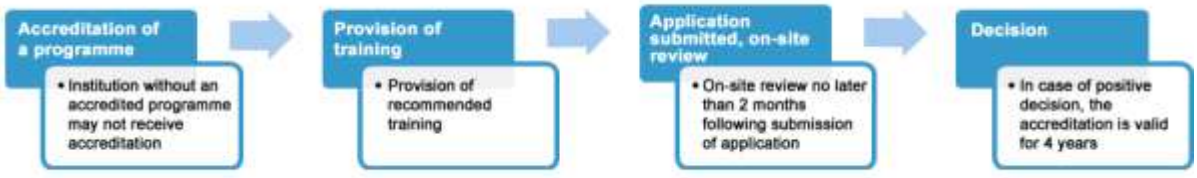
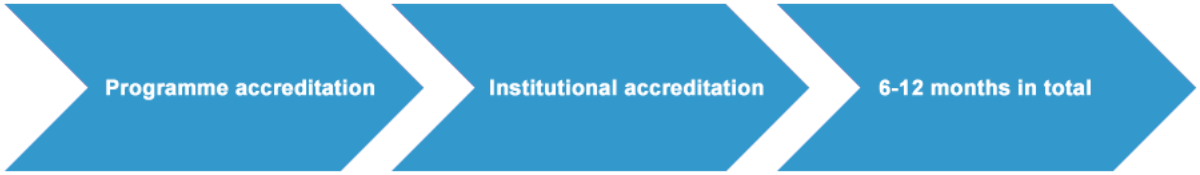


Figure 20: The overall accreditation process



6.1.4 Challenges

• Low image and attractiveness of VET as a route to becoming a skilled worker, as higher-level qualifications bring higher returns. This and a lack of advancement have made vocational schools the last resort for learners who have poor prior education, low aspiration and motivation and/or come from disadvantaged backgrounds. This leads to quality problems and high drop-out rates. To address these problems, VET policy introduced remedial programmes, most recently 'early VET', and is placing more emphasis on work-based learning.

• Very low participation of adults in education and training activities, coinciding with one of the lowest employment rates in the EU. Long training programmes and very few opportunities to have non-formal/informal learning and work experience recognised, seem to be disincentives. However, the government intends to increase participation from 2.7 percent in 2009 to 8 percent in 2013 (the EU benchmark for 2010 was 12.5 percent; for 2020 it is 15 percent).

6.1.5 Conclusion

On the whole and in a somewhat simplified manner, the realisation of training courses that can be recommended as part of the Build Up Skills Hungary Project seems reasonable in the form of accredited adult education. Inclusion in the National Register of Vocational Qualifications and training are lengthy processes, and the system cannot always keep track with the quickly changing market demand. It is recommended to have basic professions (such as bricklayer and carpenter) added to the register, for the content of related training courses is likely to remain unchanged even on the long term. Through the accreditation process, accredited adult education also provides a certain level of state-backed quality guarantee; however, the content of courses and the launch of new training programmes can be managed in a more flexible manner, allowing for technological and market demands to be met in a more effective manner. Nevertheless, the National Register of Vocational Qualifications will not be ignored in the following chapters, either, as existing training courses will be mapped and their professional and examination requirements (SZVK) evaluated.

6.2 The National Register of Vocational Qualifications

6.2.1 Justification for and development of the National Register of Vocational Qualifications

Serving as the registry of qualifications recognised by the state, the National Register of Vocational Qualifications (OKJ) was first prepared and issued in 1993 in the form of a legislative provision containing a total of 955 qualifications. This was a milestone in Hungary's VET system, for the hitherto fragmented system of various levels and scopes of validity was now replaced by a uniform structure of nationwide validity.

Although the outcome of tri-partisan consensus, given the state of the economy its establishment was not based on job analyses. While this was acceptable under the circumstances, we can today see that an absence of internal correlations makes it very difficult to manage and maintain the OKJ. Vocational qualifications are indeed listed in the same register, yet the entire arrangement lacks transparency and whether certain trainings overlap or are linked to one another cannot always be ascertained. There are occupations that can be practiced with 5-10 different qualifications, which means there is indeed a significant overlap between their content.

An advancement both in terms of function and content, Hungary’s admission to the OECD in 1996 was made possible under the condition that both the ISCED (International Standard Classification of Education) and the ISCO (International Standard Classification of Occupations) be introduced. To that end, the ISCED-level has been determined for each qualification listed in the OKJ.

The purpose of ISCED is to provide an integrated and consistent framework for the collection and reporting of internationally comparable education statistics, irrespective of the institutions or organisations providing them or the form in which they are delivered.

The OKJ was revised and harmonised in 2001, containing a total of 812 qualifications divided into four clusters. For more than a decade, developers had been motivated primarily by the fact that other countries operated with fewer qualifications, and therefore decision-makers in VET sought a shift towards reduction. Meanwhile, more significant content elements also emerged. Qualifications are now separated into four main clusters including humanities, technological, socio-economic and agricultural fields, each containing 21 trade groups. This breakdown into trade groups makes it easier to have relevant prior learning validated and recognised.

Updated on an annual basis, the register reflects all structural and content changes in which the representatives of ministries responsible for VET and of other stakeholders (economic chambers, professional organisations, vocational training institutions etc.) have reached a consensus.

In each phase of development, the structure of occupations and the OKJ were being adjusted in order to meet society's expectations and correspond to the economic reality as well. The primary goal is to ensure that market demands be taken into account in VET both in and outside the school system, thereby facilitating a lifelong learning process for everyone regardless of age.

6.2.2 Systemic relations of the National Register of Vocational Qualifications

6.2.2.1 The International Standard Classification of Education (ISCED)

The ISCED defines the terminology, methods and classification that are recommended for use in education statistics.

As a prerequisite for the international comparison of education statistics and indicators, there must be a framework programme available through which data collected on educational programmes of similar content, as well as comparative analyses of reports created thereon, could be presented. Consequently, this framework represents a multi-dimensional structure highly capable of the comprehensive statistical description of education and learning systems, along a set of variables that are of key interest in international comparisons and overlaps. On the basis of the established classification system and its accepted methodology, a uniform assembly system of educational statistics – manifested in the OKJ, and the levels and fields of education – was worked out. Therefore, the OKJ includes ISCED classifications as well. At present, Hungary's VET system can be considered EU compliant, for its use of ISCED codes allows for the structured representation of schooling, occupations and positions

6.2.2.2 Level codes, trade groups and the order of training[40]

21	**partial qualification of basic level** not requiring the completion of studies; may be acquired through vocational training outside the school system, at special vocational schools or in the Bridge II Programme.
31	**partial qualification of lower secondary level** built upon the completion of primary school or the theoretical and practical knowledge elements (hereinafter: input competences) defined in the relevant SZVK; may be acquired through vocational training outside the school system, at special vocational schools or in the Bridge II Programme.
32	**vocational qualification of lower secondary level**, built upon the completion of primary school or the input competences defined in the relevant SZVK; may be acquired through vocational training outside the school system.
33	**qualification build-on of lower-secondary level**, based upon a qualification requiring completion of primary school and available through vocational training outside the school system
34	**vocational qualification of secondary level**, built upon the completion of primary school or the input competences defined in the relevant SZVK; may be acquired typically through vocational training in the school system

40Government Decree 150/2012 (VII 6)

35	**qualification build-on of secondary level**, based upon a qualification requiring completion of primary school and available through vocational training in the school system
51	**partial qualification of upper secondary level**, subject to the availability of a secondary school leaving certificate; can be acquired outside the school system
52	**partial qualification of upper secondary level**, subject to the availability of a secondary school leaving certificate, and primarily acquired outside the school system
53	**qualification build-on of upper secondary level**, subject to the availability of a secondary school leaving certificate, built upon an existing qualification, and acquired outside the school system
54	**advanced vocational qualification**, subject to the availability of a secondary school leaving certificate, and primarily acquired within the school system
55	**qualification build-on of advanced level**, subject to the availability of a secondary school leaving certificate, built upon an existing vocational qualification, and primarily acquired within the school system
62	vocational qualification subject to the availability of a higher education degree

Trade Groups	
1	Health
2	Social services
3	Education
4	Art, cultural education, communication
5	Mechanical engineering
6	Electro technology – electronics
7	ICT
8	Chemical engineering
9	Architecture
10	Light industry
11	Wood industry
12	Printing
13	Transport
14	Environmental protection - water management

15	Economics
16	Administration
17	Commerce-marketing, business administration
18	Catering and tourism
19	Other services
20	Agriculture
21	Food industry
22	Public service

Delivery mode	
N	Full-time programme
E	Evening programme
L	Correspondence programme
S	Other
TK	Training outside the school system (courses with specified number of hours)
T	Distance learning

6.2.2.3 Hungarian Standard Classification of Occupations (FEOR)

The OKJ has been harmonised with the Hungarian Standard Classification of Occupations (FEOR) as well. Each occupation is identified by a four-digit number, the so-called FEOR code, which is assigned to all qualifications. Currently, FEOR-93 is in effect.

It must be noted that the classification of occupations can only reflect the structure of a national labour market. One of the most important principles in defining an "occupation" is that **it is the actual content of the activity engaged in that matters**, with the level of expertise, knowledge and skills that are deemed necessary for the given occupation also playing a key role in the definition of occupational groups. Therefore, the level of qualification and schooling required for the occupations listed in the system cannot be left ignored.

6.2.2.4 The length of VET

It is due to changes in the school structure that the length of VET is specified in terms of grades. This allows for traditional vocational schools, which were faced with a severe crisis in the 1990s, to organise their education schedule of the four grades so that a minimum of two grades are devoted to vocational training.

The conditions of learning towards various vocational qualifications and the pertaining examination criteria are all specified by the OKJ. A new element from 2001 onwards is that, in the case of qualifications not requiring a secondary school leaving certificate as a prerequisite, completion of the final grade of secondary school will suffice. This also enables those not seeking to obtain a maturity certificate or having failed the secondary school leaving examination to achieve vocational qualifications that are built upon the completion of secondary school.

One and two year remedial programmes provide poor learners, disadvantaged or disabled students with a second chance for getting into vocational education. Under the Public Education Act, those living with a disability may have the length of their studies extended, based on special programmes, to twice the duration specified in the OKJ. As for vocations that can be taught outside the school system, the "notes" section of the register includes information as to whether the programme can be offered to the disabled as part of the school system.

For VET outside the school system, the register prescribes a maximum number of contact hours, for the actual duration of a given programme may vary according to the participants' knowledge and prior learning that can be recognised.

6.2.2.5 Changes to the OKJ, inclusion criteria

Decrees concerning the OKJ shall always be applied in a phasing out system. Starting with the first day of a school year, students may be enrolled in VET that are primarily aimed at obtaining OKJ-listed qualifications within the public school system only if the central schedules (curricula) for mandatory subjects have been issued and teaching materials necessary for theoretical training are available.

Amendments and modifications to the OKJ shall always be preceded by stakeholder negotiation. To ensure continuous improvements, the minister co-ordinating VET shall maintain an OKJ committee for the 21 trade groups, in co-operation with ministers in charge of qualifications.

One of the important strategic objectives of developing the occupational structure, and therefore the OKJ, is to establish harmony between state responsibility and the rapid changes necessitated by the economy. To that end, the OKJ can clearly define the occupations where the responsibility of the state lies – in addition to teacher training and the distribution of textbooks – in the provision of per-capita support, thereby ensuring that the conditions of VET within the school system can be met. As regards these training areas, an economy-based definition of the needs, requirements and examination possibilities is a strategic goal that raises the possibility – already in the medium term – of linking the functions responsible for vocational qualifications to professional associations or organisations that are capable of guaranteeing rapid change and appropriate quality.

With the occupational structure being renewed on a permanent basis, it is very important that a hierarchy of vocational education courses should develop. This has been ensured – since 1997 – by the inclusion of master craftsman training courses in the OKJ, thereby enabling the inclusion of the highest level of master craftsman qualification in the vocational system.

For a number of occupations, the fact that relevant qualifications may only be obtained within the school system provides a certain level of protection. Not only do these programmes tend to run longer, but their underlying strict procedural order also requires the type of control only the school system can provide.

An important aspect of the OKJ is that the shares of theory and practice versus total training time are specified for all vocations taught, whether in or outside the school system. The reason for this is to provide information to educational institutions and financing parties about the nature of VET programmes.

Another essential feature of the OKJ is that for the various vocations there is an indication of special requirements that are linked to certain preliminary vocational requirements or to prerequisites for the practice of a given vocation in the future. For instance, there may be special regulations relating to health status, or requirements relating to language and other skills that are prerequisites for training courses or for the taking of examinations.

Naturally, for users it is also very important that in the tables of the OKJ they may find references to the legal regulations prescribing the requirements of vocational education and examinations, which in turn contain the main requirements that apply to the training programme.

Stakeholders involved in VET are entitled to submit proposals concerning the inclusion of new qualifications in the OKJ or the modification or deletion of already existing OKJ-entries. In order to ensure that only valid and well-founded inclusion requests are submitted, it is important that bodies involved in the given VET or in its impacts to the labour market (professional organisations, economic

chambers, employment centres and other organisations and institutions) also be inquired at. Once prior negotiations with professional organisations, economic chambers, employment centres and other organisations and institutions have been held, the proposals shall always be submitted to the minister responsible for the given qualification.

6.3 Vocational training courses related to energy efficiency and renewable energy that have been implemented based on the National Register of Vocational Qualifications

6.3.1 Training content

The following table includes OKJ qualifications available as of 2012. The latest revision of the OKJ, published on 6 July 2012 but not yet in effect, saw most qualifications used as the basis for this report being eliminated, with facility energy technician being the only course in the fields of energy efficiency and renewable energy. This is followed by a chart arranging professional and examination requirements (SZVK) according to the following aspects: operation, administration, implementation, resource management and planning.

It is important to point out that in the currently effective OKJ the number of courses related to energy efficiency and renewables has been drastically reduced; however, since professional and examination requirements are not yet available, these courses are omitted from this version of the study. In their absence, we will be using the National Register of Qualifications (OKJ) that was in effect until 1 September 2012.

Table 10: OKJ qualifications available until 2012

Vocational Qualification Name	**Partial Qualification**	**Year of Registration**	**Responsible Minister**
Energy technology operator			
Energy technician	Facility energy technician		
Energy technician	Renewable energy technician		
Piping and equipment mechanic in building engineering	Energy recovery equipment mechanic	2006.	Minister of Social Affairs and Labour
Building and material handling mechanic/technician	Energy conversion equipment operator	2006	Minister of Economy and Transport and the Minister of Social Affairs and Labour
Environmental technician	Energy systems environmental specialist		
Environmental technician	Nuclear energy technician		
Assistant engineer	Energetics engineering assistant		

Energy generation and recovery technician	Renewable energy management technician	2004	Minister of Social Affairs and Labour

6.3.2 Conclusion

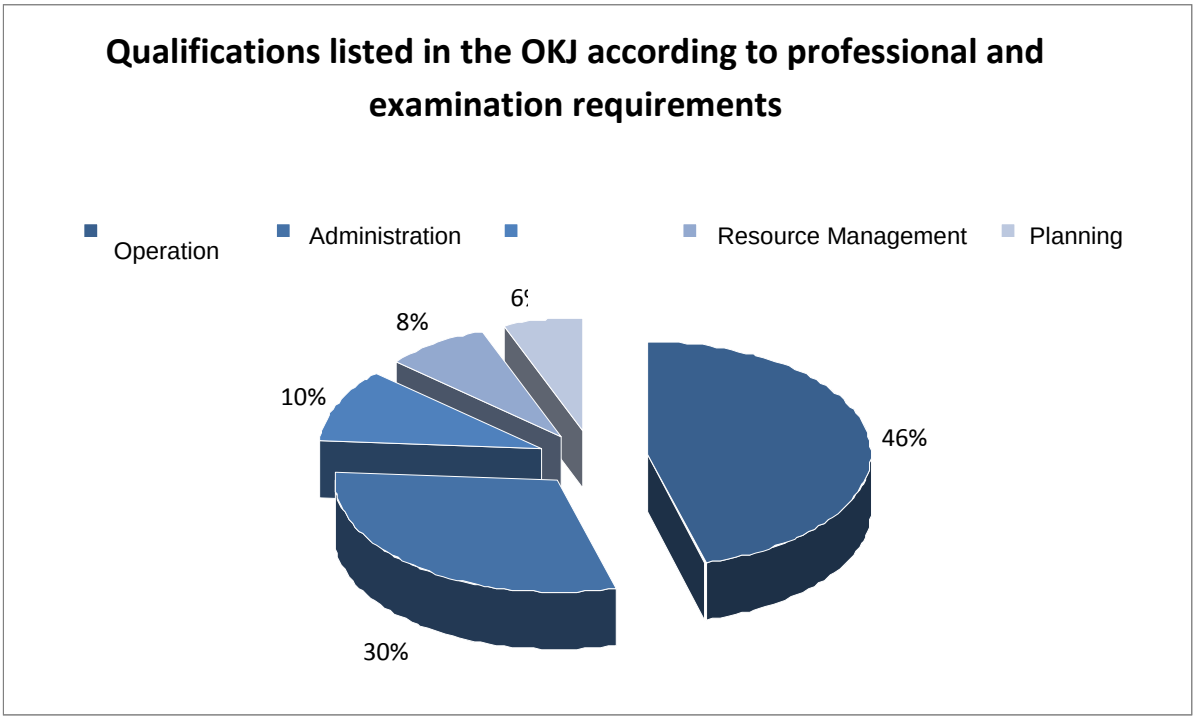
We have assessed the number of examination applicants and the number of examinees passing the examinations for each of the above qualifications over a three-year period (2009-2011). The VET programmes reviewed were the following:

- Energy technology operator
- Energy technician
- Piping and equipment mechanic in building engineering
- Building and material handling mechanic/technician
- Environmental technician
- Assistant engineer
- Energy generation and recovery technician

From the above, only energy technology operator and environmental technician programmes were listed among sought after qualifications that show relevant market demand. Interest toward the environmental technician qualification was only relevant when offered within adult education (Appendix 5). The resulting figures are rather low: while higher-level vocational programmes in energy efficiency and renewable energy are gaining popularity, the number of examinees was on a decline both in vocational and adult education. This might tilt the occupational structure into imbalance: although the number of people successfully completing their higher-level vocational courses does match market demand, the same does not apply to secondary level vocational training or adult education. Clearly, state-run training programmes are unable to keep up with – or even lag behind – the demands of technology and the market; the objective of the BUSH Project is therefore of absolute necessity.

Professional and examination requirements (SZVK) were categorised according to the following aspects: operation, administration, implementation, resource management and planning. We have found that tasks related to implementation in the OKJ effective until 1 September 2012 are underrepresented, accounting for a mere 10 percent of all tasks at hand. The inclusion of a focus group of qualified implementation specialists in the BUSH Project is therefore highly recommended.

Figure 21: OKJ-listed vocational training programmes in the fields of energy efficiency and renewable energy until 1 September 2012: classification of professional and examination requirements according to task profile



6.4 Training programmes related to energy efficiency and renewable energy offered based on market demand

Environmental awareness in Hungary has increased and continues to grow, both in connection with and irrespective of the energy and environmental goals of the European Union. Furthermore, the objectives and philosophy of energy efficiency are also seeping into everyday life, particularly when it comes to buildings, mostly residential. Property owners and real estate managers are beginning to realise en masse that green investments, in addition to the aspects of environmental protection and sustainability, can also function as financial operations with a secure return on investment, and the profits thereby generated on the long term can exceed the initial costs. As a response to such demand that is rooted in both cultural and economic levels, businesses and construction segments of the economy that are focusing on building energy retrofit programmes and on the use of renewable energy sources are experiencing permanent growth. Consequently, this strengthening green construction industry represents demand for labour, which Hungary's adult education system intends to satisfy.

6.4.1 Types of training available

Having reviewed the qualifications listed in the latest National Register of Vocational Qualifications [41] – which, while published on 6 July 2012, has not yet taken effect – based on the national module map[42], it is safe to assert that, in the case of the architecture and engineering trade groups that might be potentially involved in energy retrofit projects (e.g. such as bricklayer, building insulation installer, as well as various qualifications related to

41 With the publication of Government Decree 150/2012 (VII 6) on the National Register of Vocational Qualifications and on the rules of procedure concerning the amendment thereof, certain changes are made to the underlying system and the naming of qualifications.

42 http://site.nive.hu/okjmodulterkep/ (Downloaded on 16 July 2012)

building engineering, electro-technology and electronics, and the timber industry etc.)[43] the competencies related to energy efficiency and renewable energies have only been partially integrated at modular, task and competency level. Furthermore, the shared limitations of certain qualifications unrelated to one another at modular level have not been defined, either. As regards the *Renewable energy management technician* training programme, the module *Tasks of a renewable energy management technician* contains competencies of energy efficiency and renewable energy specifically applicable to building engineering. It must be noted that the professional and examination requirements stipulating the actual criteria for individual qualifications are only expected to be made public once the latest OKJ has been published. In the programme accreditation database of the National Labour Office[44] two OKJ-accredited training programmes are listed under the entry *Energy recovery equipment mechanic*: one offered by a Vác-based non-profit company and another by the Kaposvár-based TISZK[45] (Regional Integrated Vocational Training Centre). It must be noted that, as of 1 September 2008, the maintainers of public educational institutions, the business entities taking part in the organisation of practical training and higher educational institutions may establish vocational training centres (TISZKs) for carrying out the tasks related to vocational training defined in the Public Education Act. According to the government's intentions, these centres can render the fragmented VET system of individual regions more effective while also improving their transparency.

Previously effective qualifications registers[46] only contained competencies relating to energy efficiency and renewable energy in traces, as none of these had been considered current a decade ago. That is, professionals having previously obtained qualifications in training courses within the architecture trade group or in training programmes relating to building engineering within the engineering trade group could not have studied these technologies. Meanwhile, most of them are still working in their respective trades, perhaps near or at the peak of their careers. These professionals could represent a major target group for any adult education course related to energy efficiency and renewable energy. In their case, the special competencies pertaining to these two fields could best be delivered through adult education programmes, which are either accredited or non-accredited outside the OKJ system, given the fact that they already possess OKJ qualifications.

This part of the study is therefore focused on trainings that do not form a part of the national adult education system (and thus do not result in the acquisition of an OKJ qualification). Given the definition of adult education,[47] we now refrain from assessing training courses offered within the school system, nor do we consider any special public education programmes, or graduate or post-graduate courses.

Qualifications may be classified according to qualification type and level. Accredited programmes of higher categories are most likely to provide for the acquisition of more widespread and in-depth competencies, although it must be noted that this study did not include a detailed content inquiry of individual courses and subjects taught. For accredited programmes, the programme accreditation database of the National Labour Office[48] was used as a reference. Accordingly, training programmes offered elsewhere and advertised as accredited without actually being listed in the database (on account of the accreditation either having expired or not having been acquired in the first place) are not included in the study.

The situation gets more complex at the level of non-accredited programmes. However, it is still worth taking note of some of the more complex training programmes of this kind that, mostly named after a given qualification or occupation, typically comprise multiple sessions and provide both general and specific competencies. A summary of Hungary's accredited and non-accredited training courses offered in energy efficiency and renewable energy is contained in Appendix 4. Please note that this is

43 For the list of occupations reviewed in the study, refer to the footnote of point 6 in the document entitled 'BUILD UP Skills– Hungary –Analysis of the national status quo'

44 https://www.nive.hu/index.php?option=com_content&view=article&id=297 (downloaded on 16 July 2012)

45 For more information on Regional Integrated Vocational Training Centres, visit http://www.szakkepesites.hu/szakiranyu/tiszk.html

46 https://www.nive.hu/index.php?option=com_content&view=article&id=297 (downloaded on 16 July 2012)

47 Section 3 (2) (a) of Act CI of 2001 on Adult Education

48 https://www.nive.hu/index.php?option=com_jumi&view=application&fileid=5 https://www.nive.hu/index.php?option=com_jumi&view=application&fileid=5 (downloaded on 16 July 2012)

a non-exhaustive list, for the authorities are unable to keep a registry of non-accredited training programmes – which therefore do not form a part of the state-backed quality assurance system either.

The third category represents shorter programmes usually in the form of seminars, training sessions, workshops or conferences, which tend to investigate a given segment within the subjects of energy efficiency and renewable energy. These can vary from informational, awareness or educational programmes offered by non-profit organisations to those run by for-profit corporations. In most cases, clearly due to certain marketing considerations, the latter are linked to a given product or technology and typically represent brief, single-session programmes. Therefore, rather than being considered true training programmes, these belong to the category of marketing functions. The share of such "product demo" type events among shorter programmes related to energy efficiency and renewable energy is higher than that of programmes held by non-profit organisations.

The lowest threshold for the category of shorter programmes is hard to define; it is difficult to determine to what extent a conference on energy efficiency or renewable energy may be considered a training programme. In a broader sense, it ought to count as one, even though it fails to fulfil the requirement of adult education in that it is not "directed at the acquisition of a qualification" per se. Nevertheless, for purposes of encompassing a wider spectrum, this part of the study has examined a few of such "borderline" cases as well.

It must be noted here that our study was focused on "visible" training programmes that have been announced to the public (irrespective of the conditions of entry), that is, in-house training and further training conducted within an organisation – which in many cases are subject to confidentiality on account of the company know-how – were not considered. Yet, again for the purpose of a wider spectrum, examples of such in-house corporate training are also provided.

6.4.2 Education and training entities

Stakeholders involved in the development and organisation of training courses may be divided into **three categories**. A growing number of educational institutions (also) engaging in adult education are now offering courses in energy efficiency and renewable energy. This confirms that there is indeed a real and growing market demand for such qualifications. For purposes of this study, the term 'educational institution' refers to an organisation whose main profile typically comprises education and training, and which is also engaged in adult education relating to the subjects at hand, irrespective of whether run by the state, a municipality or a private entity, or whether representing a non-profit or a for-profit institution. (The study does not assess training programmes within the school system, for that excludes adult education.)

As environmental awareness gains momentum in Hungary, the country's NGOs and 'semi NGOs' have geared up to contribute to the areas of energy efficiency and renewables. Training courses are being offered by a range of civil organisations and non-profit actors; most of these represent brief seminar-type events and are free of charge. Examples will be provided.

Industry players represent the third segment of training entities, whose "proximity" might have to do with their ability to respond quicker to demands of the labour market. Their business interests result in a pressing need for competencies in energy efficiency and renewable energies to be covered in their respective employee training. This mostly includes clusters, industry associations, chambers, wholesalers and manufacturers.

6.4.3 The breadth of training

For each training reviewed, its breadth that also includes the scope – or the target group that the given training is aimed at – is of fundamental importance. This implies a very broad spectrum between training programmes of a more general nature, which are aimed at practically everyone and therefore only provide more superficial scientific knowledge, and highly specialised programmes of further training having significant professional content. Naturally, there is a clear correlation between the dimensions of the target group, or the scope of training, and its overall content and depth.

Another dimension of training breadth is the training size, which refers to the headcount of actual participants, or the training capacity. It must be noted that, unfortunately, information from publicly available data, often including capacity-related information, are usually unavailable.

6.4.4 Further aspects

The study looks at individual training courses from a "technical" aspect as well. To that end, training length, session frequency and schedule are listed whenever available. This kind of information is obviously correlated to the nature and content of training. Here, we must distinguish between single-session courses (seminar, training session, workshops and conferences) and longer programmes spanning over multiple sessions.

Training programmes were also evaluated in terms of financing and were separated into the following three groups – whenever data was available: full tuition and reduced tuition (indicating subsidisation of some sort) training, as well as those offered free of charge.

Whenever it was possible, the training location was also specified in relation to its scope. However, whether a given training or its related application process has been closed was not considered a separate aspect. The list is obviously non-exhaustive as it only features the range of training programmes relevant for the inquiry.

Appendix 4 includes a summary table of all training programmes reviewed.

6.4.5 Accredited training courses

The first group comprises accredited training courses. Programmes concerning renewable energies have become strikingly apparent in accredited adult education, primarily aimed at the delivery of building engineering competencies in relation to solar energy. The rationale behind this is that household-level solar technologies, if operated in optimal dimensions, can be suitable to substitute the energy obtained from public utility networks. Parallel to advancements in technology, however, other training programmes in building engineering related to energy efficiency and renewable energy are also expected to be launched, for instance to meet the needs of condominiums and public institutions that represent higher levels of energy consumption.

Accredited adult education tends to favour engineering courses over architectural training. What this means is that accredited training courses that are connected to energy efficiency – and thus are aimed at improving the energy utilisation rate of buildings – are underrepresented in Hungarian adult education. As regards the technologies pertaining to newly built passive houses, there are certain non-accredited training programmes that relate to the architecture trade group, but training courses having to do with the insulation retrofit of buildings, for instance, seem to be in scarcity.

For the number of participants having successfully completed accredited training courses in energy efficiency and renewable energy, see Appendix 6. Based on this, it can be established that the number of examination applicants and of examinees passing examinations have been on an increasing trend over the past three years, unlike the statistics of OKJ qualifications. Our assumption that accredited training courses – given their shorter duration and more flexible curricula – are more suitable in meeting rapidly changing market demands seems vindicated.

6.4.6 Non-accredited courses

Non-accredited programmes – including both longer, multi-session courses and shorter, seminar-type events – are more likely to take place in continuing education for architecture or engineering, rather than in the contractor segment of the construction industry. All of these training programmes are subsidised by the various chambers.

Another category of non-accredited training is represented by the various awareness and informational programmes aimed at the potential end users of technologies relating to energy efficiency and renewable energies. These include both longer and shorter programmes and typically involve municipal or residential target groups.

Related to these are courses aimed at the training of professionals providing such awareness and informational programmes. Of particular importance in this regard are the renewable energy advisor training, offered by the Türr István Training and Research Institute, and the course by the Energiaklub that rather resembles a pilot project.

As regards in-house company training, those organised by Fenntartható Otthon Zrt. are worthy of mention. This company has recognised a segment in the otherwise stagnating construction market of newly erected buildings that could present a hidden potential for growth – and that is the now inevitable energy retrofit of existing buildings with the use of renewable energies. A part of the company's training programmes is directed toward the education and training of mentors who engage in advisory work relating to the sustainability of buildings in terms of energy efficiency. Other training courses by the company serve to assist the preparation of technical partners engaging in the implementation of individual projects in energy efficiency and renewable energies.

7 DISCREPANCIES BETWEEN FACTS AND NEEDS

7.1 Training needs

Under the EU's Renewable Energy Directive, from 2018 onwards public institutions are required to operate as low-energy buildings and after 2020 every new building should consume zero energy.

The energy efficiency of buildings in Hungary falls well behind the EU average (40 per cent of the country's energy use is attributed to buildings of which 27 per cent serves the operation of heating and cooling equipment) making the retrofit and modernisation of existing buildings a priority area for the domestic construction and energy sector. The above statistics reveal that the energy efficiency of buildings offers the most potential for energy savings and is also the area where EU climate protection goals can best be fulfilled, with building engineering playing a prominent role.

In light of the above, the subject of increasing energy efficiency and the use of renewables should be incorporated into the adult education system directed at the qualified labour force in the construction sector. The ever greater expectations of the profession and the market for cost-effective investments and implementation, along with the EU's environmental policy and requirements (e.g. reduction of CO_2 emissions), demand that innovative solutions and technologies allowing for the rate of energy efficiency to be assessed at household, industrial and community level and for the optimal use of the specific energy carriers – taking into account criteria of cost-effectiveness and environment protection – gain greater ground in the curriculum of (vocational) education for the building industry.

The aim is to develop and introduce adult education programmes for qualified construction professionals that would acquaint them with energy-efficient solutions using energy from renewable sources, while also paying attention to the EU 2020 goals concerning zero-energy buildings.

Initial education for the building industry should be part of a modular training scheme to include related further (vocational) courses, completing which students would be able to recycle renewable resources and to perform tasks related to energy and cost-efficient architectural and building engineering solutions.

The target group of training participants primarily comprises qualified craftsmen and foremen. However, there is a specific condition in (Eastern-Europe) Hungary that should be borne in mind. In Hungary in general, but all the more so within the construction sector, only a few per cent of employees speak a foreign language. Training programmes should therefore cover this area (technical terminology) too, since there are numerous information and teaching materials and studies that remain unknown to Hungarian professionals as they have no command of any foreign language. Besides the language barrier, internet use is another problem for generations over 40, and current VET curricula usually do not make room for the acquisition of necessary skills.

Obviously, not only training participants, but also training providers must contribute to the success of training programmes. Instructor training and their in-service training are central to the entire process. The appeal of the teaching profession and career must be created and restored.

Social recognition of the greatest achievements in teaching or research can be improved by making them as apparent as possible in notable economic achievements. To do so, better cooperation between education and the business sector is desired. Transforming sponsorship and partnership conditions leaves more elbow room for budgeting and results in stronger commitments from the private sector to public duties.

Another issue to be tackled is the alignment of society's expecations toward VET and the system itself. It is basically impossible to predict demand for vocational knowledge and skills as needs change quickly. As for the individual, this demand can be managed by setting up institutions for career orientation and guidance, but integrating in-service training into the general education system is also necessary, as is stimulating and maintaining demand for adult and further education throughout an entire career, which tends to last ever longer.

Considering that measures in the field of VET policy are to remain within the boundaries of national legislation, European integration efforts focus on the transfer and dissemination of

experience. A knowledge base for VET policy should be created, and successful national practices should be promoted and disseminated across all member states. Those programmes and solutions should be prioritised, giving effect to the principles of efficiency and equity as these ensure the long-lasting achievement of the goals set. Investment in VET is an investment in economic and social capital, improving society's knowledge is therefore an ultimate aim, but that ought to be accompanied by the social recognition and acceptance of traditional VET. The same holds true for the promotion of the different tiers of education and VET in engineering and natural sciences, as Europe can only retain its leading role in the global economy if it preserves our old advantages in these fields.

7.2 Training needs – results of the questionnaire survey and the interviews

During primary data collection in the project we used a questionnaire to establish how the building economy's[49] needs and expectations concerning the qualification of professionals match the course offering of training institutions.

The questionnaire survey produced data from 218 construction companies and 29 training institutions. As regards their size, the vast majority of respondents from the building economy comprised micro, small and medium enterprises offering contractor services, mostly in the field of building engineering. (For more details about the composition of the sample, see Chapter 2.3.) For purposes of this study, we shall treat the opinion of these undertakings as expressing the demand of the industry, and take the answers returned by the training institutions to represent the supply side.

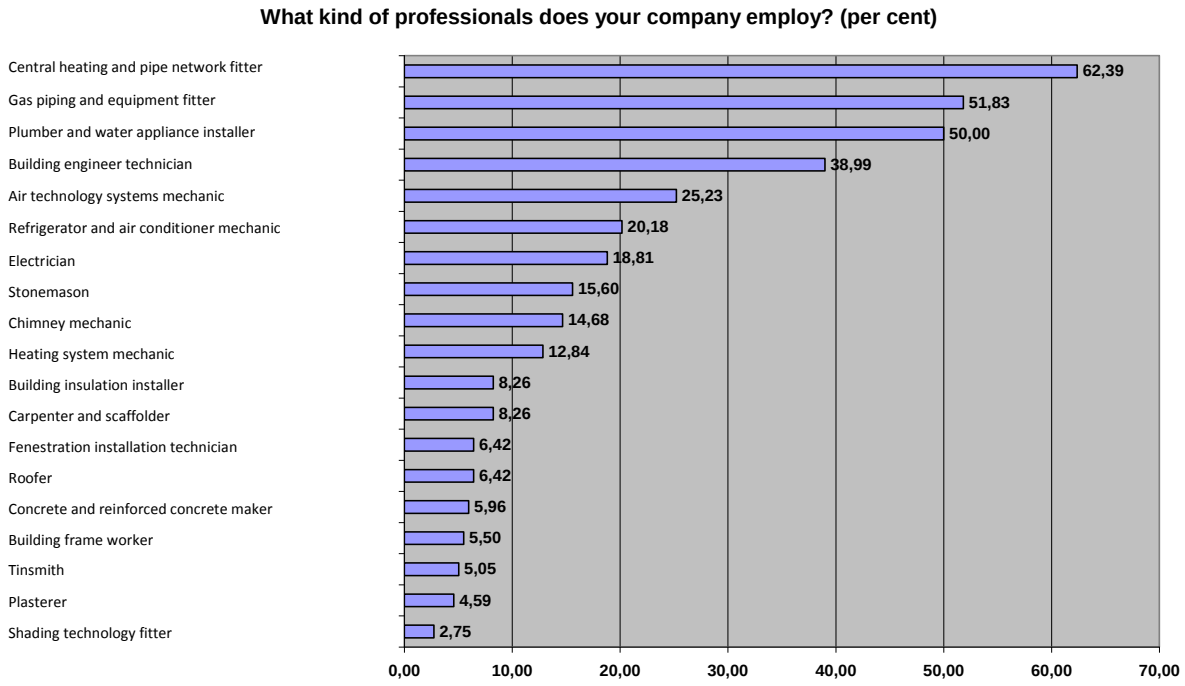
Our aim was not to measure satisfaction with or the expectations towards higher education and VET, but building industry players' demand for professionals, in particular when retrofitting buildings for energy efficiency. Needs were assessed according to both quantitative and qualitative criteria. Many Hungarian construction professionals get their qualification in adult education which often also entitles them to engage in a given activity. Nonetheless, there are activities the pursuit of which is not bound to any entitlement, hence to any specific qualification, such as the installation and repair of fenestration units. Accordingly, instead of relating our questions to vocational qualifications or educational attainment, we linked them to activities and the pertaining necessary competences. This approach was confirmed by the fact that the range of professions listed in the National Qualifications Register (OKJ), the legislative background of adult education, has changed on several occasions during past years and was under transformation also when our project took place. We wanted to exclude professions the existence of which was uncertain as the long-term goal of the project is that there be progressive professionals in the building industry who are capable of pursuing certain activities. (Before sending out the questionnaires, they were reviewed by experts familiar with vocational and adult education and also conversant with the building industry to find out if the terms we used were adequate and unambiguous. The experts found that the list of professionals the project partners compiled was suitable for use in the questionnaires.)

The simplest way to compare companies' expectations with the course offerings of training institutions is to examine the relationship between the employment rate of the professionals concerned and their training.

Among the construction companies interviewed, it is typically professionals in building engineering who are able to find employment. At least 20 per cent of respondents are employed either as central heating and piping fitters, gas piping and equipment fitters, plumbers and water appliance installers, building engineer technicians, air technology systems mechanic, refrigerator and air conditioner mechanic. Professionals in general construction trades such as carpenters and scaffolders, building frame workers, fenestration installation technicians, roofers and plasterers represent less than 10 per cent of the employees of the companies included in the sample.

49 The sample is not representative: the profile of 86 per cent of the respondent companies is building engineering.

Figure 22: Prevalence of professionals employed by construction industry respondents[50] in relation to all respondents (per cent)



Source: BUSH project survey

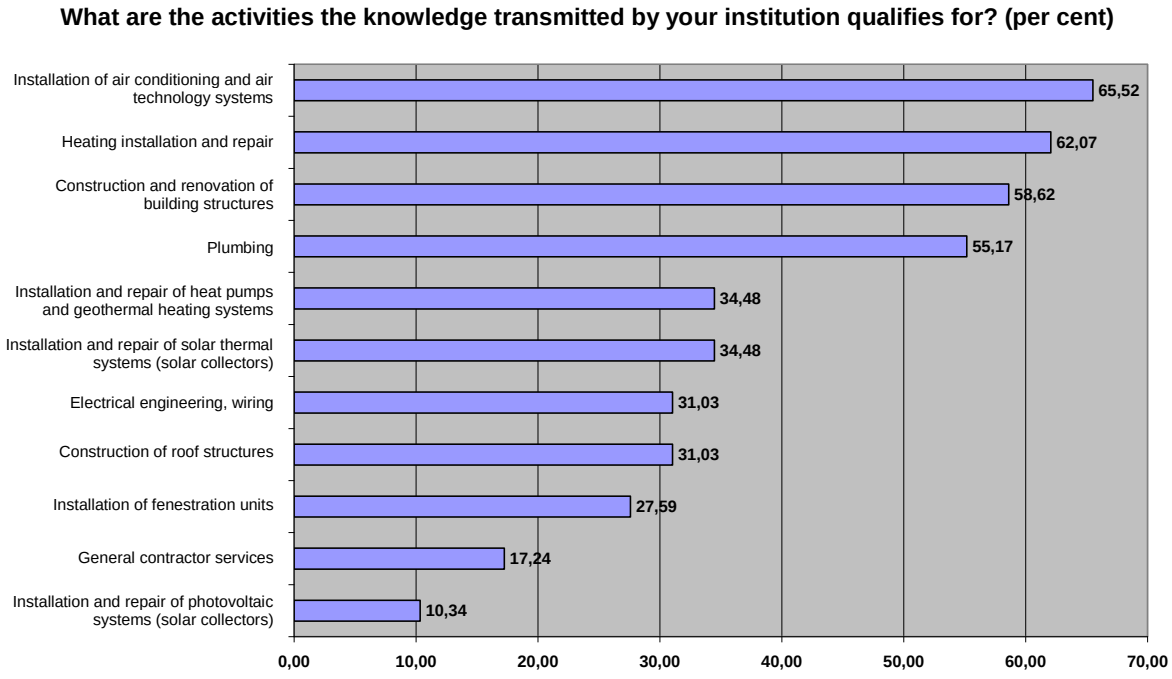
It is important to compare the above diagram with the programmes offered by training institutions. There are questionnaire data available on the training offers by institutions, showing what percentage of the respondents provides training for the pursuit of a given construction activity. (Respondents were allowed to specify more than one activity.) The most common activities qualifications offered by the respondent training institutions qualify for are as follows:

- Installation of air conditioning and air technology systems (65 per cent of respondents)
- Heating installation and repair (62 per cent of respondents)
- Consruction and renovation of building structures (59 per cent of respondents)
- Plumbing (55 per cent of respondents)

It is important to note that this does not mean that these training programmes are offered in at least half of the training institutions; it merely indicates that at least half of the respondents work at a place where a training programme required to engage in the given activity is available.

50 The sample is not representative: the profile of 86 per cent of the respondent companies is building engineering.

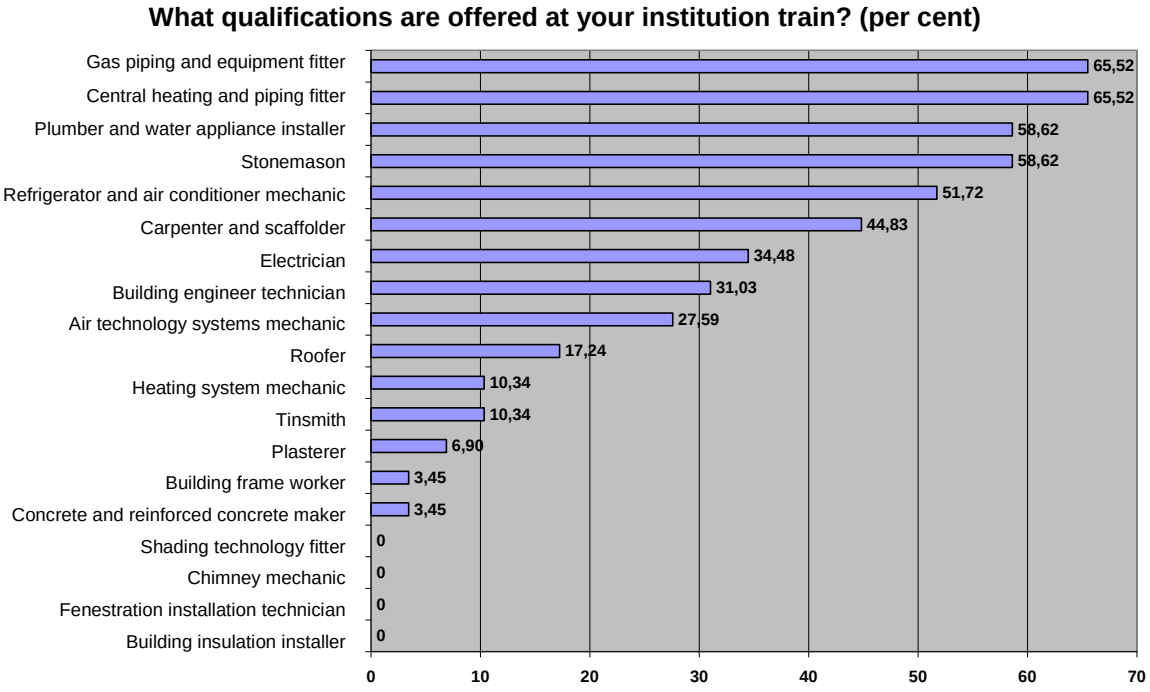
Figure 23: Activity profile of the knowledge transmitted in training institutions



Source: BUSH project survey

Based on the questionnaire survey, the circle of professionals trained by the training institutions can also be identified. When asked about the qualifications their institutions offered, respondents were allow to select multiple answers. Since there could be several instructors from the same training institution answering our questionnaire, the diagram shows what percentage of respondents work at an institution where the given qualification is offered.

Figure 24: The most frequent vocational qualifications training institutions offer



Source: BUSH project survey

Setting the data in the above table against the industry's needs we see that the professions taught at training institutions are exactly the most frequently hired professionals at construction industry respondents:

- central heating and piping fitter,
- gas piping and equipment fitter,
- plumber and water appliance installer,
- building engineer technician,
- air technology systems mechanic.

Stonemason training is another programme frequently mentioned by training institutions (cited by 59 per cent of respondents), while only 16 per cent of construction industry respondents employ stonemasons.

7.2.1 Quantitative demand for professionals

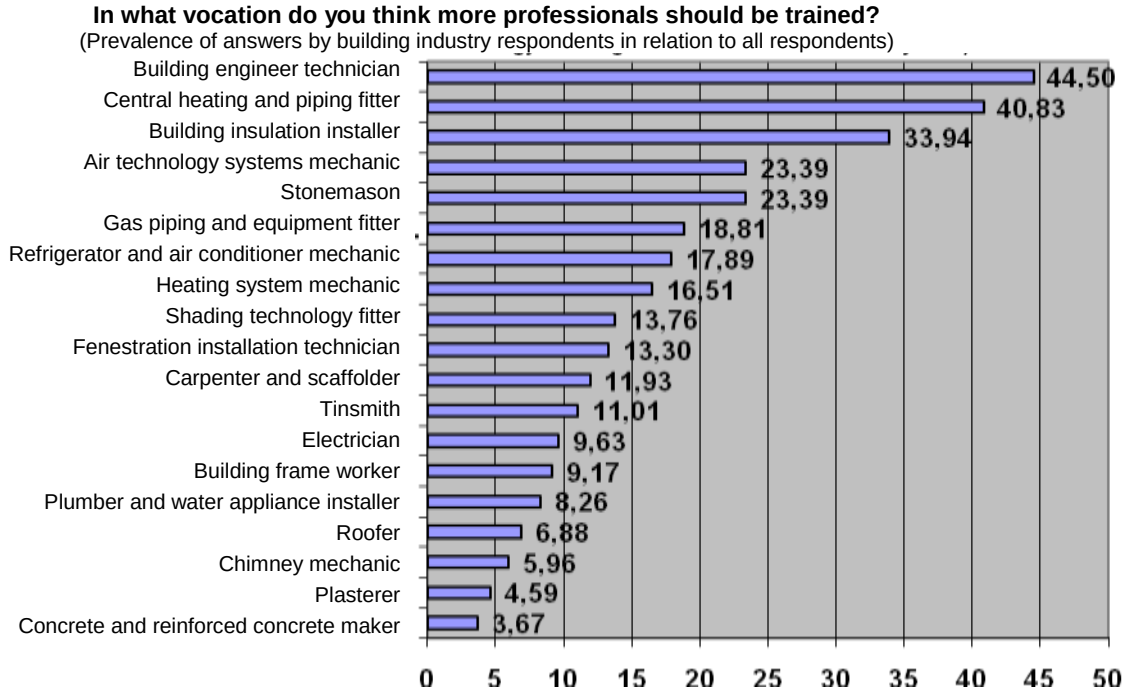
Our questionnaire contained a query asking in what qualifications should there be more professionals. The professions most often listed by respondents from the building sector included building engineer technician (45 per cent of respondents), central heating and piping fitter (41 per cent of respondents) and building insulation installer (34 per cent of respondents). These are the professions that typically have a major influence on building retrofits for energy efficiency. However, one should be prudent when using these data as the majority of respondents were building engineers,

that is, the sample was not respresentative of the entire building industry. It is true though that an energy-efficiency retrofit of the heating system is the task of building engineering companies.

24 per cent of the construction companies involved in the survey believed that more stonemasons should be trained despite the fact that only 16 per cent of them actually employed stonemasons. We see that one of the most frequent qualifications offered by institutions is stonemasonry, meaning that training institutions are ready to satisfy the quantitative demand for stonemasons. It is likely, therefore, that for this profession it is rather *good* stonemasons whom companies are lacking – a review of the qualitative expectations, i.e. expectations concerning competence is needed to find out.

As regards professions indicated by less than 10 per cent of the respondents, there are probably enough professionals available on the market (electricians, building frame workers, plumbers, roofers, chimney mechanics, plasterers, concrete and reinforced concrete makers).

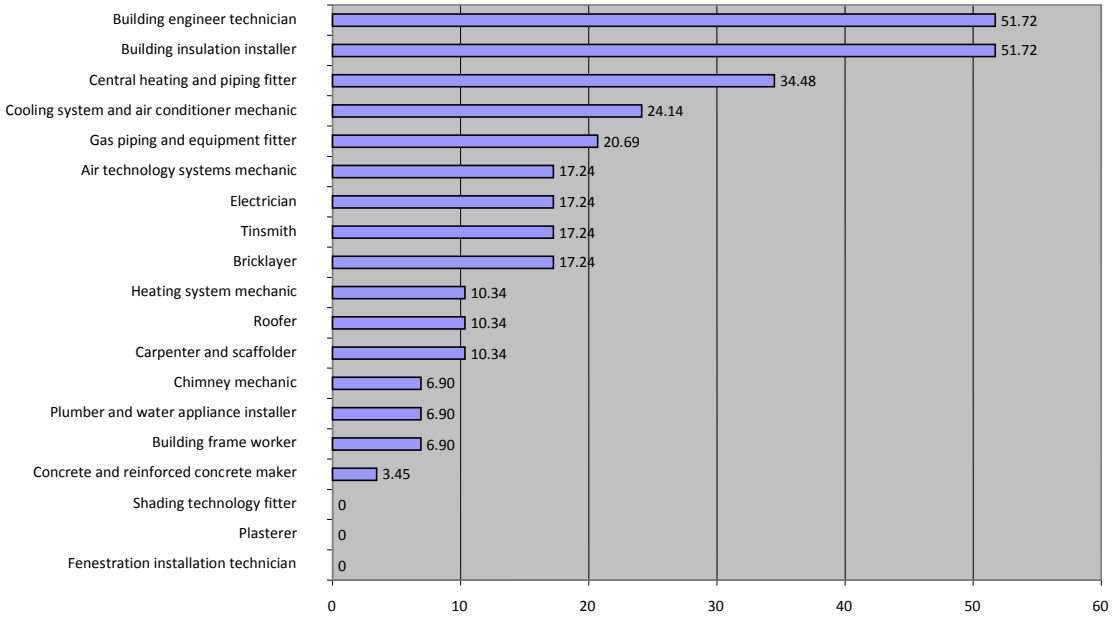
Figure 25: Demand for professionals by vocation (respondents from the construction sector)



Source: BUSH project survey

The same question was answered by training institution employees yielding similar results. Training institutions believe too that more tradesmen are needed for building engineering professions and they also find it important to have more qualified building insulation installers on the labour market.

Figure 26: Demand for professionals by vocation (respondents from training institutions)



Source: BUSH project survey

It is worth giving a second glance at the diagram in Figure 25, which shows the prevalence of programmes in the current course offering of training institutions. It can be concluded that the actual offering of training institutions assigns a prominent place (in terms of prevalence) to several professions for which representatives from the demand side think more should be trained. Accordingly, the following conclusions may be drawn:

- Although there are professionals in demand on the labour market, demand for them greatly exceeds supply.
- Professionals in demand are still training for their profession, which explains why there is greater demand for them.
- Professionals in demand migrate to other trades.
- Professionals in demand leave the country.

From another perspective, training institutions respond well to industry expectations, as they offer training programmes that are sought after.

The questionnaires sent out to training institutions also examined what training programmes the institutions *planned* to introduce. Few programmes have been indicated, and again, it is important to note that, based on the answers, we could only assess the number of respondents whose institutions planned to introduce a given programme, but not the number of such institutions.

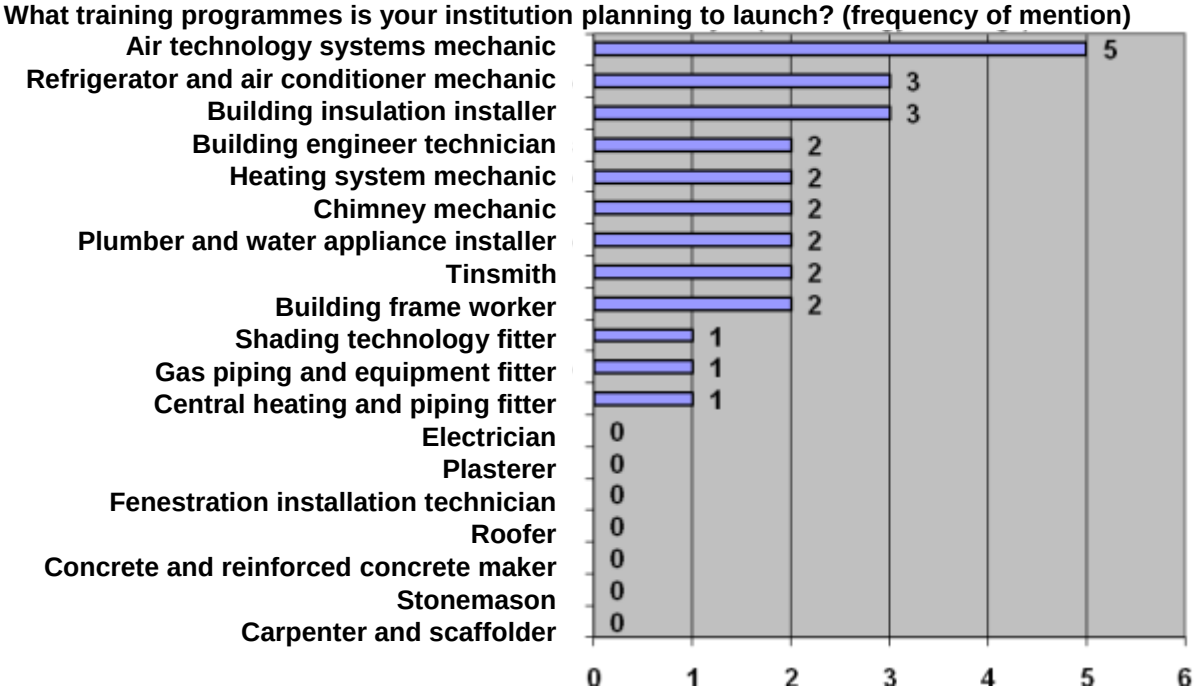
More institutions are planning to provide training for air technology systems mechanics (5 respondents), refrigerator and air conditioner mechanics (3 respondents) and building insulation installers (3 respondents). Owing to the small number of training institutions reviewed, we may only draw careful conclusions, though it is worth comparing the needs of building industry players with the plans of training institutions. Respondents from the building industry think more professionals should be trained for the trades below:

- building engineer technician,
- central heating and piping fitter,
- building insulation installer,

- stonemason,
- air technology systems mechanic.

These specialty areas correspond with the planned programmes mentioned by at least 20 per cent of building industry respondents Diagram 27 below showing the current offering of training institutions reveals that training institutions react to labour market demand quite well: with the exception of stonemasonry, the professions listed above are either on their current offer or among the programmes planned.

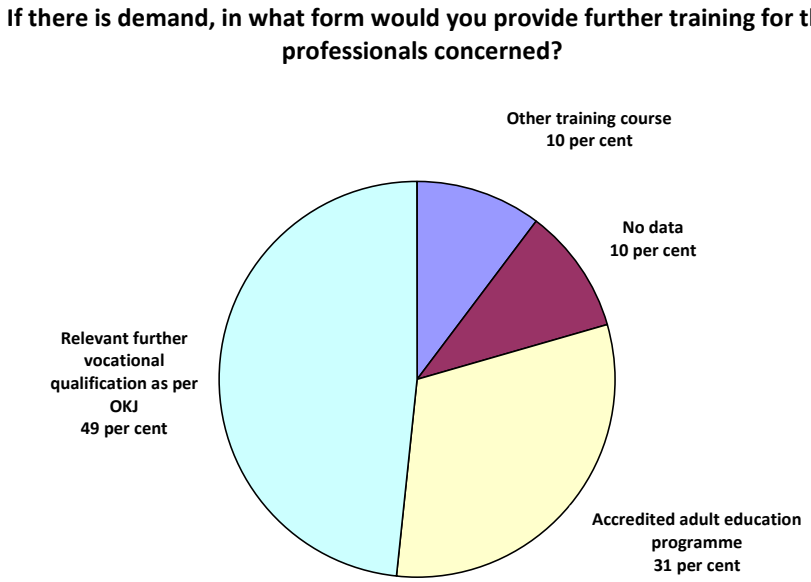
Figure 27: Training programmes to be introduced



Source: BUSH project survey

According to the questionnaire results, the majority of training institutions would provide such programmes either as a related further vocational qualification listed in the National Qualifications Register (OKJ) (14 mentions), or within the framework of an accredited adult education programme (9 mentions).

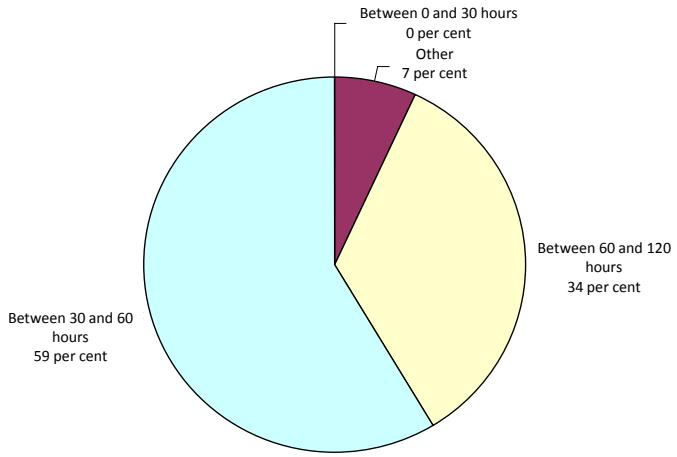
Figure 28: Preferred training forms



Source: BUSH project survey

In terms of course length, respondents preferred forms where institutions deliver courses with at least 30 to 60 hours (17 mentions) and 60 to 120 hours (10 mentions) of training. One respondent indicated a 240-hour course as their choice.

Figure 29: Preferred course length



Source: BUSH project survey

7.2.2 Qualitative demand for professionals

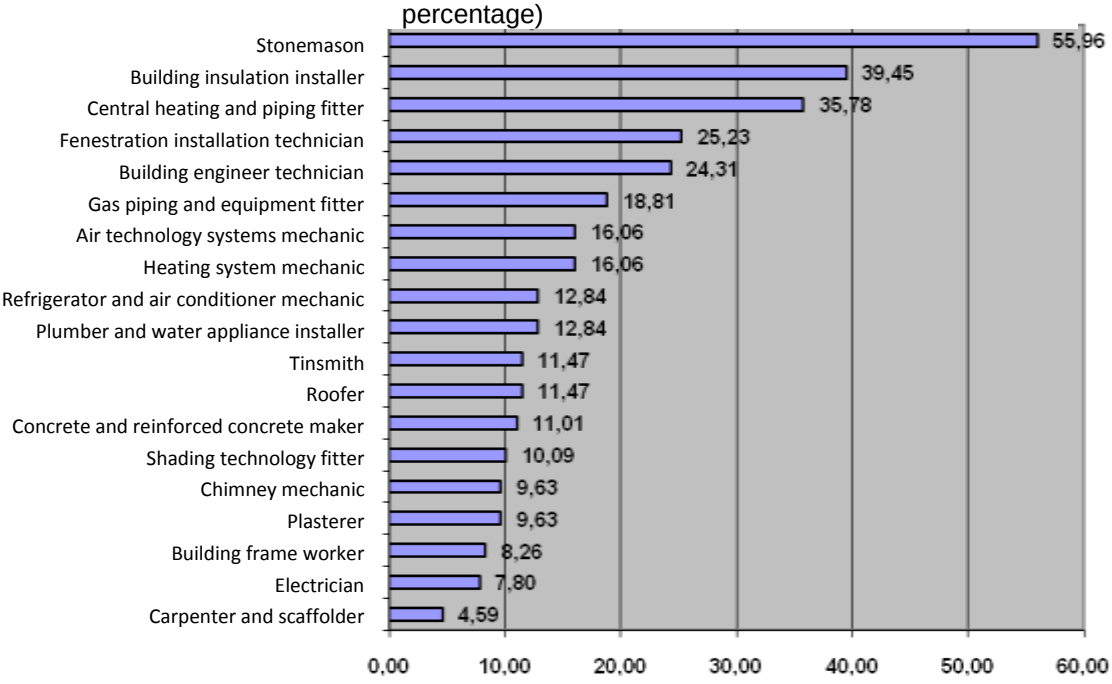
Apart from exploring the quantitative demand for professionals, another important concern is whether their competence enables them to carry out efficient building energy retrofit projects. To answer this question, one may again rely on construction industry experience. Both target groups of respondents were asked in which vocations they thought the competence of professionals should be improved. The answers returned give an insight into the percentage of respondents who named a given profession as they had the option of indicating more than one area.

56 per cent of respondents specified stonemasonry – an outstanding rate. More than half of the respondents think that there is plenty of room for improvement as regards the competence of building insulation installers and central heating and piping fitters.

For professions selected by less than 10 per cent of respondents, industry players apparently do not need that much enhancement.

Figure 30: Competencies in need of improvement by vocation (respondents from the construction sector)

In which vocations do you think professionals' competence should be improved?
(respondents from the construction sector – frequency of mention in relation to all respondents, percentage)

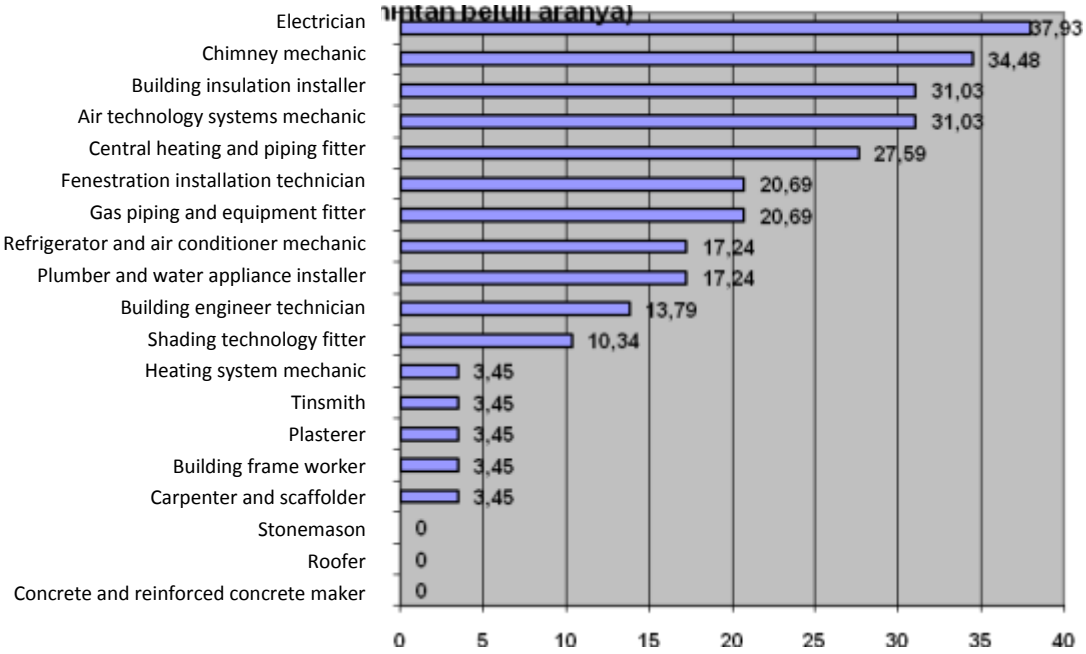


Source: BUSH project survey

56 per cent of the respondents chose stonemasons as the profession in need of improvement in terms of competence – a notable rate –, yet none of the employees from training institutions found the competence of stonemasons to be inadequate in the field of energy-efficiency. We see a similarly significant difference with electricians and chimney mechanics, except the other way around: employees at training institutions identified these areas as those in need of improvement, whereas only a few respondents from the construction sector agreed (less than 10 per cent). The training and further training of building insulation installers, central heating and piping fitters and fenestration installation technicians were identified as an area in need of development by both respondent groups.

Figure 31: Competencies in need of improvement by vocation (respondents from training institutions)

In which vocations do you think professionals' competence should be improved? (Prevalence of answers by training institutions within the sample)



Source: BUSH project survey

Those professions for which respondents think more workers should be trained AND in which the competence of professionals should at the same time be improved constitute a priority target group of this project. Professions to be subjected to further review and likely in the need of improvement are as follows:

1) in the opinion of respondents from the construction sector

- building engineer technician,
- central heating and piping fitter,
- air technology systems mechanic;

2) according to the respondents from training institutions

- building insulation installer,
- central heating and piping fitter,
- gas piping and equipment fitter.

Similarly, professions for which only a few think more workers should be trained and only a few advocate the improvement of competence need no further inquiry in the project. In the consistent opinion of the two respondent groups, these are the following:

- plasterer,
- building frame worker,
- carpenter and scaffolder,

- roofer,
- concrete and reinforced concrete maker.

7.2.3 How adequate is the competence of professionals considering the importance of the given specialty area? (Gap analysis)

By way of a gap analysis of the different types of professionals, we can get a clearer picture of the areas in need of improvement. The point of a gap analysis is to express satisfaction with the competence of the representatives of a certain profession relative to the importance of the profession concerned. To do so, we included two questions in the questionnaire for both respondent groups:

1) How important do you think the following professions are for the energy retrofit of buildings?

2) How adequate do you think the competence of the following professionals is for an efficient energy retrofit of buildings?

Answers to both questions were assigned to a 100 point scale after which the values calculated for importance were subtracted from the values signifying competence. The gap values thus obtained indicate how the competence of the representatives of a given profession relates to the importance of the given specialty area during energy retrofits.

Analysis of the gap values:

A negative gap value indicates that representatives of a given profession perform worse than expected. A value converging to zero shows that the competence of the professionals concerned meet expectations, whereas positive values signify overperformance, i.e. better-than-necessary or better-than-expected performance.

Gaps with an absolute value between 0 and 10 typically need no further inquiry, as these represent performance which is normal or slightly different from normal still meeting expectations.

Vocations with an absolute value between 10 and 20 require more attention, and absolute values above 20 imply serious criticism.

Table 11: Gap values in the case of respondents from the construction sector

Professional	IMPORTANCE value	COMPETENCE value	GAP value
Building insulation installer	93.58	66.11	**-27.47**
Stonemason	73.40	47.41	**-25.99**
Central heating and piping fitter	91.89	67.19	**-24.70**
Fenestration installation technician	91.06	67.25	**-23.81**
Plasterer	72.69	53.58	**-19.11**
Roofer	70.38	52.02	**-18.36**
Air technology systems mechanic	85.98	68.20	**-17.78**

Gas piping and equipment fitter	84.68	68.11	**-16.57**
Building engineer technician	90.60	74.84	**-15.76**
Heating system mechanic	79.25	63.69	**-15.57**
Shading technology fitter	82.52	67.08	**-15.45**
Building frame worker (e.g. light structures)	74.06	59.63	**-14.43**
Refrigerator and air conditioner mechanic	81.75	69.54	**-12.21**
Carpenter and scaffolder	59.62	48.29	**-11.33**
Chimney mechanic	67.74	58.61	**-9.12**
Tinsmith	58.42	49.40	**-9.02**
Electrician	67.38	59.91	**-7.48**
Plumber and water appliance installer	65.85	58.89	**-6.96**
Concrete and reinforced concrete maker	48.43	43.07	**-5.36**

Source: BUSH project survey

Table 12: Gap values in the case of respondents from training institutions

	IMPORTANCE value	**COMPETENCE value**	**GAP value**
Fenestration installation technician	93.85	65.38	**-28.46**
Building insulation installer	96.00	68.46	**-27,54**
Central heating and piping fitter	87.69	60.80	**-26.89**
Stonemason	77.39	53.85	**-23.55**
Building engineer technician	91.20	68.00	**-23.20**
Roofer	78.26	56.15	**-22.11**
Air technology systems mechanic	83.33	63.85	**-19.49**
Gas piping and equipment fitter	81.54	62.31	**-19.23**
Refrigerator and air conditioner mechanic	80.77	63.20	**-17.57**
Building frame worker	78.40	61.54	**-16.86**
Shading technology fitter	76.67	60.00	**-16.67**
Heating system mechanic	75.83	59.23	**-16.60**
Plasterer	74.40	58.46	**-15.94**
Plumber and water appliance installer	70.43	56.15	**-14.28**
Chimney mechanic	68.70	54.62	**-14.08**

Concrete and reinforced concrete maker	59.09	46.96	**-12.13**
Electrician	65.83	56.00	**-9.83**
Tinsmith	61.74	52.80	**-8.94**
Carpenter and scaffolder	59.20	51.54	**-7.66**

Source: BUSH project survey

Evolution of gap values in the current survey:

In accordance with the above, mainly those vocations need attention where the gap displays a high negative value. According to construction companies' opinion as suggested by the gap values, the professions and vocations most in need of development are as follows:

- fenestration installation technician,
- central heating and piping fitter,
- stonemason,
- building insulation installer.

The professions and vocations most in need of development as understood by training institutions are the following:

- fenestration installation technician,
- building insulation installer,
- central heating and piping fitter,
- stonemason,
- building engineer technician,
- roofer.

These are the professions where the gap value exceeded -20. The views of instructors at training institutions more or less correspond with the opinion of construction companies.

Since both training institutions and construction companies were concerned about subpar competence in the same professions, it can be concluded that raising the standard of these professions must be a priority.

The further training of professionals engaged in building engineering also needs some consideration, however, our competent respondents were a lot less likely to detect any serious problems here – gap values typically fell below 15. This means that these shortcomings cannot be neglected, but the problems here do not shake the foundation of the specialty areas concerned.

7.2.4 Obstacles to training professionals who meet expectations, as suggested by questionnaire survey results

The questionnaire survey shows the preparation of which professionals according to the construction companies represented by the respondents should be accorded more priority for the implementation of energy retrofits to contribute to the achievement of the 2020 goals. We believed it was also important to examine to what extent respondents thought it was realistic to have professionals who meet their demands at hand considering the currently available training offer and its

quality and what hinders the emergence of an appropriate supply of professionals. We asked two important groups of players of the building economy – construction companies hiring professionals and training institutions setting the groundwork for their expertise – what they thought the major problems that impede the training of professionals who meet market demand were. This was asked as an open ended question yielding a variety of answers, yet some main categories and themes could be easily distinguished. Having reviewed the answers. the following major set of problems could be identified in the two respondent groups:

Respondents from the construction sector

I. Financial and economic barriers:

- professionals' high share of the costs of adult education
- loss of work hours and absence from work due to time-intensive training programmes
- return on investment (money, time and energy) uncertain
- insufficient incentives for companies to engage in in-house training
- companies have nothing or little to invest in vocational and futher training
- lack and underfinancing of professional practice (scarcity of tools in apprentice workshops, obsolete equipment)
- lack of support for investments (e.g. renewable energy)
- deterioriating market demand and supply

II. Barriers at the structural and system level:

- timing of further training not in line with the seasonal burden of professionals (e.g. training gas piping fitters during autumn and winter)
- overcentralisation (focus on Budapest) and a low number of training places
- low standard of training, inadequate vocational content of programmes
- no transfer of a system-centered approach and the principles of energy efficiency
- lack of passion for and commitment towards the profession
- poor prospects for a fair wage and difficulties of finding a job
- migration from the profession
- professionals leave the country
- lack of prestige of physical (manual) labour

Respondents from VET and educational institutions

I. Financial barriers

- lack of appropriate state funding for training institutions
- scarcity of up-to-date technical books, teaching materials, educational DVDs and CDs
- lacking in-service training of instructors (getting acquainted with new technologies, gathering practical experience)

II. Barriers at the structural and system level:

- frequent change and unpredictability of government programmes
- constant change of profession structure
- shortcomings of and disproportion between vocational modules (e.g. overlap between teaching materials, disproportionate distribution of contact hours among curricular parts)
- small number of suitable instructors (lack of preparedness, expertise, up-to-date knowledge and a practical approach)
- students enter vocational education without basic general knowledge

The above set of problems reflects the opinion of the target groups of our survey and contain important information for project partners. However, without subjecting the answers received to further scrutiny and identifying, categorising and gaining a deeper understanding of the real problems this issue cannot be tackled efficiently.

7.3 Monitoring needs

7.3.1 Regional Development and Training Committee; funded training programmes

In VET the development of enterprises is monitored by region. Until 2011 the development of VET and professions was supervised by the Regional Development and Training Committee (RFKB); from 2012 onwards it makes proposals to that effect together with the respective chambers and in consideration of the workplace trends observed in the various regions. In 2012 RFKB was transformed into county level organisations to facilitate more efficient operation with the chambers assuming a more dominant role: they have the powers of an authority, and as such can involve experts in monitoring and impose penalties. Every year they contact several companies and enterprises either by way of personal interviews or questionnaires to map up the given region's development trajectory. Among others, they inquire about orders, the course of development and want to know in what areas, with what qualifications and in what numbers they wish recruit professionals. In other words, a demand-based VET system must be developed. It is vital for the given region to have a VET system in which participants are trained in the numbers and for the professions that meet economic needs, while the training content also matches market expectations.

However, training possibilities must be considered,, namely, whether the personal and – especially for professional practice – material conditions allow for the required number of professionals to be trained.

It is the duty of the state to provide those lacking enough information with forecasts concerning the expected trends in demand and supply and the changes in vocational requirements on the basis of appropriate data and scientific analyses.

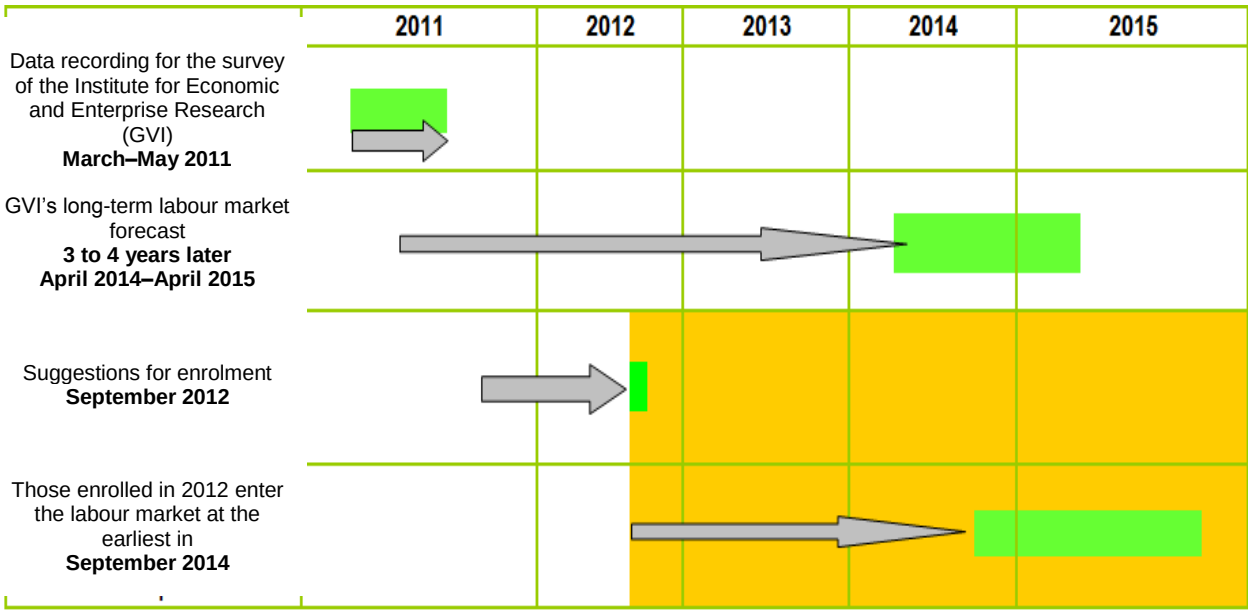
Presentation of labour market trends and promotion of sought-after professions can facilitate the making of right career choices; refining the financing system of formal VET can, in turn, influence the training and enrolment structure of formal VET.

- Vocational qualifications that are specified as sought-after – meaning demand is at least 2.5 times higher than actual enrolment – professions (in a region) in a piece of legislation are entitled to special support.
- Vocational qualifications where demand is at least one fifth (20 per cent) of actual enrolment are entitled to support.
- Vocational qualifications where prospective demand is less than 20 per cent of actual enrolment are not entitled to support.

Besides quantitative enrolment indicators, more emphasis should be laid on quality education. More focus is needed on professions in demand in order for structural transformation to shift towards sought-after professions.

The building industry is expected to witness continued decline in employment in most of the regions. The situation of the building industry is special, because this sector employs unskilled workers in the highest numbers. Development of the sector will, however, bring about a new situation as the ratio of unskilled employees will decrease while demand for well-qualified and trained professionals will rise. The figure below outlines one such short-term projection:

Figure 32: Prospective demand for professionals in the building industry



Source: MKIK

8. CHALLENGES AND OBSTACLES

The availability of an appropriate number of adequately qualified professionals in the construction industry is essential for the 2020 targets set both by the European Union and Hungary to be realised. In order to allow for suitable recommendations to be made in the future, the current situation of the building economy and vocational education must be assessed and obstacles and challenges identified.

Our assessments included the review and interpretation of both primary and secondary data. Feedback given by experts from affected organisations and stakeholders during the desktop research, the questionnaires (particularly its open questions) and roundtable talks together present an outline of the obstacles that lay ahead of training. It was in light of these that challenges in the creation and development of training programmes relating to energy efficiency and renewable energy use were defined.

In the following section, the challenges deemed important by the trade panel of the project consortium are listed for each main category. Some of them appear in earlier chapters of the Study, others are based upon the topics covered at the first roundtable talks and included as a progressive argument. The rationale behind this categorisation is that challenges within a given category are educational, economic, structural in nature or related to shortcomings in human resources. At future discussions within the project, concerns that result from a lack of information and can thus be mitigated or eliminated by way of proper communication will need to be identified.

Structural and policy challenges

- general decline of the building sector
- lack of awareness and use of the renewable sector on the part of the government
- low efficiency rate and poor structure of tenders
- instability of and frequent changes in government programmes
- constantly changing vocational structures in construction
- absence of unambiguous guidance and supervision by a chamber for each vocation concerned
- excessive centralisation of educational facilities

The above issues became apparent mostly when responses to the questionnaire survey were evaluated. Each item on the list augments the effects of the other, sometimes going as far as over-emphasising the significance of a challenge. It is therefore important that these be addressed together in their context. An *effective* subsidisation and incentive scheme to boost investments in renewable energy use and energy efficiency, a planning framework leveraging on best practices and experiences (both on the level of the building economy and in training), as well as the related transfer of information must all take place within a well laid-out system.

Challenges related to training and education

- lack of adequately qualified instructors possessing up-to-date competencies
- specialisation and further education of instructors remain unsolved
- poor level of training quality, inadequate professional content

- poor literacy of students entering vocational training
- lack of a systemic approach and the transfer of energy efficiency principles
- deficient and disproportionate course modules

The findings of our questionnaire survey indicated that, in order for proper training programmes to be launched, a host of obstacles must be overcome by improving the vocational education system and raising the professional competence of instructors. While these challenges could and should be addressed on their own, it is important to have them assessed together in their context.

For instructors, a specialisation and continuing education system must be developed, allowing for competency improvement and enabling them to familiarise with new technologies and the latest skills and knowledge. As an objective of the BUSH Project, the appropriate technical/professional content of these programmes is to be worked out during the specification of the roadmap, based on Build Up Skills Pillar II. At this stage, a great deal of emphasis must be placed on the survey's findings which state that all-embracing system knowledge and practice-oriented programmes relevant to a given qualification should be given a more decisive role in vocational education for the construction industry. Chapter 6.4.1 mentions the recently updated OKJ module map, which remains unavailable to date. The relationship between professional modules must be checked during the project, and continuous monitoring activity is recommended at later stages in the course of 2013 as regards experiences and findings relating to the new OKJ. We therefore consider it useful to hold roundtable meetings in this regard.

Challenges related to human resources, issues necessitating a change in approach

- lack of reputation of blue collar labour
- dismal income prospects, difficulties in finding employment
- lack of professional commitment
- migration from the trade
- migration from the country

The above challenges represent a set of overlapping issues that also require government intervention. However, what would be most commendable here is to see an increasing number of companies and trade associations of the industry getting involved.

Economic and financial obstacles

- declining market needs and demand
- lack of advanced textbooks and teaching materials
- lack of practical training and insufficient funding
- absence of appropriate state support for training institutions
- inadequate level of incentives for companies to get involved in creating opportunities for practical training

- companies cannot allocate appropriate funds for vocational education and specialisation programmes or are unable to budget at all
- qualified professionals find adult education a costly investment
- time-consuming courses result in loss of hours worked
- dates of specialisation programmes inadequately optimised (seasonal work)
- uncertainty of pay-off

Economic obstacles emerge on the sides of training institutions and professionals engaging in the building economy alike. Here, too, it would be highly recommended that, rather than looking at individual challenges, the situation be considered in its full context. Given the current dire situation the construction industry is faced with, current levels of demand cannot ensure the sustainability of companies or warrant that investments are not only necessary but worthwhile measures that can also pay off. Further, a paradigm shift is needed in this area (trust that investing in knowledge pays off), but a considerable part of the problems call for government intervention separately as well. Incentives and measures, capable of accelerating the professional development of enterprises while also fostering collaboration between industry players towards said development, should be introduced.

Possible courses of action concerning each of the challenges identified in this chapter will be elaborated in the roadmap. This will be founded upon interviews that we intend to carry out for a more in-depth understanding of obstacles listed herein, as well as on roundtable talks forming the basis of our status quo analysis.

9. CONCLUSIONS AND RECOMMENDATIONS

With a view to facilitating the attainment of 2020 targets set out both at national and EU level, this Study seeks to provide an overview of *the opportunities and needs in the Hungarian education system in relation to energy efficiency and the use of renewables in buildings*. Given the obsolescence of Hungary's building stock, there is significant potential in energy conservation; however, due to a downturn across the entire building economy, such potentials are difficult to exploit. Beyond improving the energy performance of buildings, there is also a need for qualified construction workers[51] capable of carrying out their tasks while taking into account the principles of sustainability and utilising technologies that are constantly evolving. To that end, the currently available vocational education system must be put under close scrutiny so as to unveil its deficiencies. Although Hungary's vocational education system aspires to stay abreast of market needs, there are certain shortcomings in the specialisation of construction workers and professionals as far as the acquisition of skills in energy efficiency and the use of renewable energies is concerned.

In different strategies and action plans, the prevailing government laid the groundwork for fulfilling the energy efficiency targets set out under the EU 2020 Strategy. However, their implementation in education, training and the building economy as a whole should be facilitated on a continuous basis by way of further legal and economic incentives.

In keeping with the structure of our Study so far, our recommendations below are presented separately for the areas of construction and vocational education. Proposals by the BUSH consortium offer solutions to the various deficiencies and issues unveiled in chapters focusing on different fields.

Recommendations for the construction industry

As a general statement, our recommendations call for necessary action by decision-makers and the industry while reflecting on a systemic approach and long-term strategic thinking.

Discussing the status quo and significance of the building economy and the construction industry in Hungary's national economy, Chapter 3 of the Study establishes that the construction industry is set to stagnate throughout 2012, and even under optimal circumstances, positive changes are not likely to take place before 2013-2014. It is up to this transitional period to ensure the availability of qualified human resources in fields related to energy efficiency and renewables, currently experiencing a skill shortage, by educating professionals who will be highly skilled in matching already existing technologies with market demands. To that end, and for the purpose of capturing an all-embracing snapshot of the status quo that can be updated on an annual basis, **we recommend that government bodies in charge of the building economy and construction prepare, on an annual basis and in a level of detail identical to that of the 2010 paper, evaluation reports on the status of the construction industry, for submission to the Government**. **Over the long term, a Building Economy Strategy based on these reports should be created, to be used in action plan(s) facilitating a rebound for the construction industry.**

Chapter 4 of the Study assesses the national policy and regulatory background both in terms of the building economy and education. Based on the accounts of partners collaborating in the BUSH Project, employers and employees alike find it overly difficult to keep track of changes in legislation besides their day-to-day duties. **In addition to providing extensive support to gathering information on their own, we recommend the reinforcement of communication channels through which "end users" can learn more effectively about opportunities and planned changes affecting their sector.**

Assessing various statistics and literature about the housing sector and building energy, Chapter 5 establishes that available statistics only distinguish between the number of dwelling units according to building material and not by building type. However, from the aspect of building energy, knowing the type of a building (e.g. family house, condominium, prefab tower block etc.) would also be important,

[51] Physical workers at construction sites and renovations. Examples: roofer, bricklayer, insulation technician etc.

for their specific energy use can vary to a great extent. **It is therefore recommended that a representative survey be conducted, based on which a building typology according to energy efficiency (classification per building type) could be set up.**

Conclusions on vocational education

Chapter 6 of the Study provides an overview of the status quo in adult training and education, concluding that **the realisation of training courses that can be recommended as part of the BUSH Project seems reasonable in the form of accredited adult education. The applicability and relevance of this form of vocational education to the construction industry will be evaluated during the development of the roadmap.** Inclusion in the National Register of Vocational Qualifications and training are lengthy processes, and the system cannot always keep track with the quickly changing market demand. Through the accreditation process, accredited adult education also provides a certain level of state-backed quality guarantee; however, the content of courses and the launch of new training programmes can be managed in a more flexible manner, allowing for technological and market demands to be met in a more effective manner. This is further confirmed by data contained in Appendix 6: the number of applicants for accredited programmes is growing, meanwhile the number of those signing up for courses under the OKJ indicates a decrease. **At present, accredited programmes are primarily targeted at the transfer of building engineering competencies in connection with solar energy.** The rationale behind this is that household-level solar technologies, if operated in optimal dimensions, can be suitable to substitute the energy obtained from public utility networks.

Chapter 7 examines the deviations between facts and needs unveiled during a questionnaire survey. During the survey, data submitted by a total of 218 construction enterprises and 29 training institutions were analysed. As for company size, most respondents representing the building economy were micro, small and medium enterprises engaged in contracting, with the majority specialising in building engineering. **Rather than measuring the level of satisfaction or expectations regarding specific fields of vocational education, our questionnaires were targeted at gauging stakeholders' demand for professionals, particularly when it came to deep energy retrofit projects of buildings**.

The most compelling survey data came as the results of the so-called gap analyses, which express levels of satisfaction with the competence and expertise of representatives from various vocations in relation to the relevance of their respective vocation. Vocations requiring the most progress to upgrade: fenestration installation technician, building insulation technician, central heating and piping fitter, stonemason, building engineer technician and roofer. **Since training institutions and construction companies both indicated the same vocations as representing substandard levels of quality and competency, we can conclude that embracing these vocations must be a priority objective.**

The objective is, therefore, to have vocational training course(s) launched that can meet the expectations of supply and demand on the labour market in accordance with prevailing needs, while also establishing the culture of contracting in energy efficiency and renewable energies.

The obstacles assessed and recommendations set forth in this empirical study provide sufficient grounds for the BUSH consortium to elaborate a roadmap in the coming stages of the project. That prospective document will contain specific proposals on developments necessary in construction-related vocational training, thereby facilitating the implementation of Hungary's targets for 2020 in relation to building energy.

10. REFERENCES

Decree No. 7/2006 (V. 24.) TNM of the Minister without portfolio on the energy characteristics of buildings

BPIE, 2011. Buildings Performance Institute Europe (BPIE): Europe's Buildings under the Microscope, A country-by-country review of the energy performance of buildings. http://www.bpie.eu/eu_buildings_under_microscope.html

T. Csoknyai, A. Talamon, Á. Csík, M. Retek, 2010: Hazai épülettipológia és alkalmazási lehetőségei [Hungary's building typology: Possible modes of application], Épületgépészet, December 2010 volume

EPBD (2002). Directive of the European Parliament and of the Council on the energy performance of buildings (2002/91/EC).

A. Ertsey, P. Medgyasszay, M. Osztoluczky: Energiagazdálkodás az épített környezetben [Energy management in the built environment], Szent István University

D. Ürge-Vorsatz: Employment impacts of a large-scale deep building energy retrofit programme in Hungary. Center for Climate Change and Sustainable Energy Policy (3CSEP), Central European University, 8 June 2010.

KSH, 2012. Preliminary data of the population census 2011, part 1.) Hungarian Central Statistical Office: www.ksh.hu

Hungarian Association for the Building Materials Industry, Complex Building Energy and Climate Protection (KÉK) Programme, Working Paper: Intervention Schemes for the Energy-Efficient Building Programme under the New Széchenyi Plan. 2010, vol. 3

Government of Hungary (2012): The Széll Kálmán Plan 2.0

P. Medgyasszay, S. Horváth, E. Beliczay, B. Licskó, Sz. Meydl, I. L. Varga (2007): Az éghajlatváltozás csökkentése és az alkalmazkodás lehetőségei az épített környezet alakításával [Mitigating Climate Change and the Possibilities for Adaptation by Shaping the Built Environment] (2007) Downloaded from the website http://klima.kvvm.hu/documents/14/nes_epiteszet.pdf.

Negajoule 2020 http://www.negajoule.hu/

Ministry of National Development (2012): National Energy Strategy 2030.

ODYSSEE-MURE project 2010:

http://www.odyssee-indicators.org

http://www.energiakozpont.hu/nemzetkozi-kapcsolatok/odyssee-mure-2010

Government Decree No. 253/1997. (XII. 20.) on the National Spatial Planning and Building Regulations

Ürge-Vorsatz D., Novikova V., Korytarova K.: Széndioxid kibocsátás csökkentési potenciál a magyar közszektorban [Opportunities for cutting CO2-emissions in the Hungarian public sector]. Budapest. 2009.

Dr. János Várfalvi, Dr. András Zöld: Energiatudatos épületfelújítás [Energy awareness in building renovation]. Lecture notes, with support from Magyar Terranova Építőanyagipari Kft. and the Foundation for the Development of Architecture. Budapest, 1994

László Zachár: A felnőttképzés rendszere és főbb mutatói [The adult education system and its key indicators] http://www.oki.hu/oldal.php?tipus=cikk&kod=felnottkepzes-zachar-felnottkepzes

Tables, Figures

APPENDICES

Appendix 1. A SWOT analysis of Hungary's building economy[52]

STRENGTHS				WEAKNESSES			
Social Environment	**Economic Environment**	**Legal Environment**	**Employment and Human Resources**	**Social Environment**	**Economic Environment**	**Legal Environment**	**Employment and Human Resources**
• Considerable motivation at individual level to build and to shape living environments • Considerable attention by society towards the shaping of the built environment • Built environment as the most important element of local and national identity • Most of our building heritage is under national or local protection • Highly important locations of the country are World Heritage sites	• Building economy is one of the largest elements in the national economy • High employment numbers, job creation is significant • Building economy is potentially significant in the reduction of the shadow economy • Quality of the built environment is closely linked with the quality of living •	• Active professional panels and organisations • Legal deregulation of the building economy backed by consensus of the trade. • A joint willingness to ensure preference of work quality •	• Availability of traditional instructors, amassed knowledge base • Internationally acclaimed architects and engineers • Established system for continuous education in architecture and engineering •	• Significance and opportunities of the building economy unknown to politicians • Government's tasks related to managing the building economy have yet to be formulated • Building economy is one of the areas most vulnerable to corruption, yet no effective steps are being taken against corruption • As the area is anything but transparent, the share of grey and black market employment is significant –	• Lack of organised information, databases and statistics that are required to understand and analyse the functions and processes of the building economy • Absence of a life cycle approach and of long-term thinking • Low rate of efficiency, downward price-quality spiral • Dual company structure in the construction industry – no transition between a few big and thousands of small firms	• Poor compliance rate • Unpredictable and murky permit processes • Lack of competitive policy – aspects of quality in public procurement are overlooked, with price being the overly dominant factor • Politicians are not adequately aware of the importance of construction. •	• Absence of professional competences • Vocational education is unorganised and obsolete – poor reputation of skilled labour • Uncontrolled use of funding in vocational education • Lack of an education that focuses on both demand and usage

[52] Építésgazdasági Stratégiai Munkabizottság összefoglaló jelentése a nemzetgazdaságért felelős miniszter részére. *(A summary report by the Strategic Work Committee for the Building Economy for the Ministry for National Economy)*, Tamás Noll et. al, 2011. (Ministry for National Economy, June 2011)

				particularly in services related to the usage phase	• Lack of standards and of a uniform quality requirement system • Absence of conventions, definitions and rules of the trade • Correlations between the built environment and GDP not adequately disclosed		

OPPORTUNITIES	THREATS
• Opening of EU markets – opportunity for technology transfers • Channelling of EU funds into the construction industry • Cooperation of professional organisations – realisation of mutual dependence, of being parts of the same system, and quality work by all stakeholders is essential for positive results • Positive discrimination of trademarks and guaranteed product quality • Opportunities in building export – in the areas of white collar jobs and shortage skills • International relationships and co-operations • Emergence of competitive business structures in design, contracting and services • Preference given to the usage phase and the establishment of a feedback system provide for a more reasonable operation throughout the entire value chain •	• Opening of EU markets – skill drain • EU funds ebbing off • Domestic architecture losing ground • A building economy that lacks planning (conception) just keeps drifting without values • Contradicting priorities in rural and municipal development • Unilateral, controlled developments for the benefit of certain interests • Fictitious demand for construction • Usage phase continues to be out of focus • Excessive migration of qualified managers and workers may increase

Appendix 2. Suggested building typology based on energy efficiency

Building Type	Floor Plan	Height	Heating Energy Source	Specific Primary Heating	Energy Class
A1	Multi-Unit Horizontal	Single Storey	Gas Boiler	508	H
			Biomass	430.6	G
		Two-storey	Gas Boiler	393.6	H
			Biomass	364.8	H
A3	Multi-Unit Detached 	6-11 m	Central Gas Boiler	261.7	G
			Gas Combi Boiler	300.87	G
			District Heating	265.73	G
		11-15 m	Central Gas Boiler	258.18	G
			Gas Combi Boiler	280.15	G
			District Heating	266.29	G
		15-18 m	Central Gas Boiler	244.98	G
			Gas Combi Boiler	268.89	G
			District Heating	250.85	G
	Terraced, Fully Attached	6-11 m	Central Gas Boiler	167.02	F
			Gas Combi Boiler	195.46	F
			District Heating	182.16	F
		11-15 m	Central Gas Boiler	164.73	F
			Gas Combi Boiler	192.87	F
			District Heating	179.4	F
		15-18 m	Central Gas Boiler	163.62	F
			Gas Combi Boiler	191.8	G
			District Heating	178.4	F
	Terraced, Semi-Detached	6-11 m	Central Gas Boiler	222.62	F
			Gas Combi Boiler	254.71	G
			District Heating	242.57	F
		11-15 m	Central Gas Boiler	220.36	F
			Gas Combi Boiler	254.88	G
			District Heating	242.73	G
		15-18 m	Central Gas Boiler	218.99	G
			Gas Combi Boiler	253.72	G
			District Heating	241.65	G
A4	Multi-Unit Detached 	11-15 m	Central Gas Boiler	301.64	G
			Gas Combi Boiler	348.54	H
			District Heating	330.05	H
		15-18 m	Central Gas Boiler	289.12	G
			Gas Combi Boiler	334.48	H
			District Heating	316.94	H

Suggested building typology based on energy efficiency (cont'd)

Building Type	Floor Plan	Height	Heating Energy Source	Specific Primary Heating	Energy Class
A5	Terraced, Fully Attached	6-11 m	Central Gas Boiler	292.63	G
			Gas Combi Boiler	336.53	H
			District Heating	318.86	H
		11-15 m	Central Gas Boiler	272.62	G
			Gas Combi Boiler	307.24	H
			District Heating	291.55	G
		15-18 m	Central Gas Boiler	264.8	G
			Gas Combi Boiler	298.97	
			District Heating	283.84	G
		18-21 m	Gas Convector	260.95	G
			Gas Boiler	294.8	H
			District Heating	279.95	G
	Terraced, Corner	11-15 m	Central Gas Boiler	323.08	H
			Gas Combi Boiler	364.6	H
			District Heating	339.4	H
		15-18 m	Central Gas Boiler	312.64	H
			Gas Combi Boiler	353.05	H
			District Heating	328.64	H
		18-21 m	Central Gas Boiler	303.88	H
			Gas Combi Boiler	350.36	H
			District Heating	326.12	H
A6	Terraced, Fully Attached	15-18 m	Central Gas Boiler	308.27	H
			Gas Combi Boiler	355.99	H
			District Heating	330.86	H
		18-21 m	Central Gas Boiler	297.69	H
			Gas Combi Boiler	337	H
			District Heating	313.36	H
	Terraced, Semi-Detached	15-18 m	Central Gas Boiler	213.45	G
			Gas Combi Boiler	241.61	H
			District Heating	224.34	G
		18-21 m	Central Gas Boiler	197.65	G
			Gas Combi Boiler	223.9	H
			District Heating	207.72	G

Suggested building typology based on energy efficiency (cont'd)

Building Type	Floor Plan	Height	Heating Energy Source	Specific Primary Heating	Energy Class
B1	Multi-Unit Horizontal 	Single Storey	Gas Boiler	581.1	H
			Biomass	466.4	G
		Two or Three-Storey	Gas Boiler	342.4	G
			Biomass	272.2	F
	"kockaház"	Single Storey	Gas Boiler	574.2	H
			Biomass	455.3	G
B3	Multi-Unit Detached 	6-11 m	Central Gas Boiler	346.12	G
			Gas Combi Boiler	388.3	G
			District Heating	343.23	G
„szocreál"		11-15 m	Central Gas Boiler	334.05	G
			Gas Combi Boiler	372.65	G
			District Heating	348.58	G
		15-18 m	Central Gas Boiler	321.07	G
			Gas Combi Boiler	345.61	G
			District Heating	322.83	G
	Terraced, Fully Attached	6-11 m	Central Gas Boiler	291.44	G
			Gas Combi Boiler	326.15	G
			District Heating	305.84	G
		11-15 m	Central Gas Boiler	275.37	F
			Gas Combi Boiler	313.03	G
			District Heating	293	G
		15-18 m	Central Gas Boiler	265.53	F
			Gas Combi Boiler	305.78	G
			District Heating	285.7	G
	Terraced, Semi-Detached	6-11 m	Central Gas Boiler	332.49	G
			Gas Combi Boiler	345.86	G
			District Heating	324.22	G
		11-15 m	Central Gas Boiler	299.46	G
			Gas Combi Boiler	332.95	G
			District Heating	311.57	G
		15-18 m	Central Gas Boiler	302.26	G
			Gas Combi Boiler	325.7	G
			District Heating	304.27	G

Suggested building typology based on energy efficiency (cont'd)

Building Type	Floor Plan	Height	Heating Energy Source	Specific Primary Heating	Energy Class
C1	Multi-Unit Horizontal	Single Storey	Gas Boiler	416.34	G
			Biomass	355.9	G
		Two-storey	Gas Boiler	313.51	G
			Biomass	275.49	G
C3	Multi-Unit Detached 	6-11 m	Central Gas Boiler	254.8	F
			Gas Combi Boiler	293.64	G
			District Heating	273.19	G
		11-15 m	Central Gas Boiler	240.77	G
			Gas Combi Boiler	278.28	G
			District Heating	259.34	G
		15-18 m	Central Gas Boiler	231.03	F
			Gas Combi Boiler	267.57	G
			District Heating	249.18	G
	Terraced, Fully Attached 	6-11 m	Central Gas Boiler	286.76	G
			Gas Combi Boiler	304.31	G
			District Heating	284.29	G
		11-15 m	Central Gas Boiler	266.27	G
			Gas Combi Boiler	288.32	G
			District Heating	268.96	G
		15-18 m	Central Gas Boiler	252.94	G
			Gas Combi Boiler	276.98	G
			District Heating	258.13	G
	Terraced, Semi-Detached	6-11 m	Central Gas Boiler	313.39	G
			Gas Combi Boiler	355.5	G
			District Heating	332.02	G
		11-15 m	Central Gas Boiler	313.31	G
			Gas Combi Boiler	358.53	H
			District Heating	315.47	G
		15-18 m	Central Gas Boiler	338.16	G
			Gas Combi Boiler	336.24	H
			District Heating	304.24	G
C7	Line Building	4 Storey	District Heating	171.61	F
		10 Storey	District Heating	175.51	G
	Tower Block	10 Storey	District Heating	175.51	G
		15 Storey	District Heating	123.89	E

Building Type	Floor Plan	Height	Heating Energy Source	Specific Primary Heating	Energy Class
D1	Multi-Unit Horizontal	Single Storey	Gas Boiler	367.58	G
			Biomass	306.29	F
		Two-storey	Gas Boiler	262.78	G
			Biomass	228.03	F
D2	Terraced, Fully Attached	Two-storey	Gas Boiler	207.07	F
	Terraced, Semi-Detached	Two-storey	Gas Boiler	233.6	F
D7	Line Building	4 Storey	District Heating	171.61	F
		10 Storey	District Heating	175.51	G
	Tower Block	10 Storey	District Heating	175.51	G
		15 Storey	District Heating	123.89	E

Notes:

In each table, the second column from the right contains the specific energy consumption for primary heating calculated according to building type, whereas the last column on the right represents the energy efficiency rating as per Government Decree 176/2008 (with A+ being the best and I the poorest categories). All figures represent actual values calculated for an existing building of the given category. Calculations were performed using the Energopt software and in accordance with Decree 7/2006 (V. 24.) TNM of the minister without portfolio.

Appendix 3. Comparison of available literature on specific heating energy demand

Literature		KSH (Hungarian Central Statistical Office)	Studies by the Central European University		EnergyCity building typology		NegaJoule 2020		Study by the Independent Ecological Centre		Complex Building Energy and Climate Protection (KÉK) Program
Parameter reviewed		-	specific heating energy demand (kWh/m^2 per year)		specific heating energy demand (kWh/m^2 per year)		primary energy consumption (kWh/m^2 per year)		specific heating energy demand (kWh/m^2 per year)		specific heating energy demand (kWh/m^2 per year)
	Construction year		fully attached dwelling unit	semi-detached dwelling unit[a]	building sub-type		wall material	according to building mechanicals	extent of insulation		
single family house	old (pre-1991)	-	230	299	peasant house (adobe) single-storey brick multi-storey brick	388 397 316	adobe brick gas silicate	360 - 441 397 - 546 394 - 458	u > 1.3 W/m2K 1.3 >u > 0.7 W/m2K u < 0.7 W/m2K	444.8 198.6 128.7	320
	contemporary (1992-2007)	-	125	163	modern family house	133	brick	397 - 546	-	-	-
	new (2007-2025)	-	105	137	-	-	-	-	-	-	100
condominium	old (pre-1991) traditional	-	180	234	"tenement"	-	brick	213 - 344	u > 1.3 W/m2K 1.3 >u > 0.7 W/m2K u > 0.7 W/m2K	294.4 149.8 93.0	200
	industrial	-	200	260	block small prefab large prefab	- 125 119	prefab	190 - 238	u > 1.3 W/m2K 1.3 >u > 0.7 W/m2K u > 0.7 W/m2K	- 70.4 45.8	-

	contemporary (1992-2007)	-	125	163	modern condominium	-	brick	213 - 344	-	-	-
	new (2007-2025)	-	105	137	-	-	-	-	-	-	100

Notes:
For the NegaJoule 2020 project, data represent primary energy demand.
a) heating energy demand values for semi-detached units are estimates, by having those applicable to fully attached units multiplied by 1.3 [Novikova]
b) according to previous measurements, the actual thermal transmittance of prefab buildings is worse than the theoretical value, thereby increasing the per-square metre primary energy use by approximately 15 percent [NegaJoule]

Appendix 4. Existing training courses in Hungary (both accredited and non-accredited) in energy efficiency and renewable energy technology

Accredited training courses

Course No.	Course Name	Training Provider	Training Provider Address			Accreditation valid through
PL-5153	Opportunities in the use of renewable energy sources	KR Spektrum Kutató- Fejlesztő és Szolgáltató Korlátolt Felelősségű Társaság	Gyöngyös	Mátrai út	36.	14.01.15
PL-5152	Installation, deployment and servicing of solar equipment	J. L. SEAGULL Vocational School	Salgótarján	Meredek út	9.	14.01.15
PL-6288	Energy recovery equipment mechanic	Kaposvár-TISZK Térségi Integrált Szakképző Központ Kiemelkedően Közhasznú Nonprofit Korlátolt Felelősségű Társaság	Kaposvár	Virág u.	32.	25.01.16
PL-6525	Renewable energy sources I.	M-12/B Ingatlanforgalmazó Korlátolt Felelősségű Társaság	Budapest	Maglódi út	12 /B.	04.04.16

PL-3400	Energy recovery equipment mechanic	Naszály-Galga Szakképzés Szervezési Társaság Nonprofit Kiemelkedően Közhasznú Kft.	Vác	Naszály út	31.	29.07.13
PL-4522	Renewable energy management specialist	Town Library and Culture Hall	Biharkeresztes	Hősök tere	12.	28.07.14
PL-5435	Solar collector systems and related installation technologies	„Cseszt Regélő" Térségfejlesztési Közhasznú Nonprofit Korlátolt Felelősségű Társaság	Csesztreg	Petőfi Sándor út	2.	04.05.15
PL-2245/001	Plumber and pipe fitter, water appliance installer	Egri TISZK Térségi Integrált Szakképző Központ Kiemelkedően Közhasznú Nonprofit Kft.	Eger	Kertész út	128.	15.04.13

Number of students having applied for and successfully passed examination in an accredited training course

2009					
Vocational Qualification No.	**Vocational Qualification Name**	**Number of Applicants for Examination**	**Number of Examinees**	**Number of Examinees Passing the Exam**	**Training Form**
1/2009	Renewable energy sources I.	11	11	11	Outside the formal school system
1/2009	Renewable energy sources II.	5	2	2	Outside the formal school system
31-582-09-0010-31-01	Energy recovery equipment mechanic	4	4	4	Outside the formal school system
52-522-05-0010-52-02	Renewable energy technician	11	11	10	Outside the formal school system
2010					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
31-582-09-0010-31-01	Energy recovery equipment mechanic	15	14	14	Outside the formal school system
31-582-09-0010-31-01	Energy recovery equipment mechanic (on the basis of Decree No. 2/2006 (VIII. 8.) of the Minister of Labour and Social Affairs)	2	2	2	Outside the formal school system
52-522-05-0010-52-02	Renewable energy technician	58	45	43	Outside the formal school system
54-544-02-0010-54-03	Renewable energy technician	18	18	18	Outside the formal school system
9999	Renewable energy management specialist	21	18	0	Outside the formal school system

2011					
Vocational Qualification No.	**Vocational Qualification Name**	**Number of Applicants for Examination**	**Number of Examinees**	**Examination Passed**	**Training form**
31-582-09-0010-31-01	Energy recovery equipment mechanic	2	2	2	Outside the formal school system
52-522-05-0010-52-02	Renewable energy technician	80	69	68	Outside the formal school system
540020	Technical and technician qualifications (master courses in renewables and geothermal energy)	52	52	0	Outside the formal school system
9999	Solar collector systems and related installation technologies	20	20	20	Outside the formal school system
PL-5153	Opportunities in the use of renewable energy sources	6	6	6	Outside the formal school system

Non-accredited courses

Course Name	Training Provider	Training Provider Category	Target Audience	Course Headcount	Course Length	Tuition	Location
Solar collectors and heat pumps	Aqua Oktatási Stúdió	Training Institution	applicants holding degrees / qualifications in technical fields	non-specified, offered continuously	one day	HUF 8,000 + VAT	Budapest
Low-temperature heating systems	Aqua Oktatási Stúdió	Training Institution	applicants holding degrees / qualifications in technical fields	non-specified, offered continuously	one day	HUF 8,000 + VAT	Budapest
Energy-awareness in buildings	Dzone Stúdió Kft,	N/A	architects, engineers	N/A	16 modules covered in 8 sessions	HUF 97,600 + VAT	Budapest
Energy awareness in buildings and residential areas	Dzone Stúdió Kft,	N/A	municipal decision-makers, professionals	N/A	16 modules covered in 8 sessions	HUF 97,600 + VAT	Budapest
Intelligent buildings: the secret to energy savings	Hungarian Chamber of Engineers, Hungarian Chamber of Architects	N/A	architects, engineers	N/A	one session	HUF 3,000	Budapest

EU energy auditor	BME Institute of Continuing Engineering Education	Training Institution	companies and professionals in the industry	non-specified, offered continuously	73 classes	HUF 182,000 + VAT	N/A
Green Basic Training	Fenntarthat ó otthon Zrt.	for-profit	company employees and partners	distance learning + classroom training	modular scheme	tuition-based or free of charge	distance learning
Cutting bills - energy advice for low-income families	Energiaklub, international consortium	non-profit	international project	40 energy advisors (8-10 from Hungary)	N/A	N/A	N/A

Appendix 5. Number of people having obtained qualifications over the past three years (2009-2011) in the fields of energy efficiency and renewable energies listed in the National Register of Vocational Qualifications, with name of qualification

Source: VNY 2009-2011 (trainings in and outside the formal school system)					
2009					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-04-0000-00-00	Energy technology operator	10	10	10	Outside the formal school system
52-522-04-0000-00-00	Energy technology operator	11	11	11	Outside the formal school system
2010					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-04-0000-00-00	Energy technology operator	13	13	13	Outside the formal school system
2011					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
-					

Source: OSAP1665 2009-2011 (adult education data)					
2009					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-04-0000-00-00	Energy technology operator	10	10	10	Outside the formal school system
52-522-04-0000-00-00	Energy technology operator	11	11	11	Outside the formal school system
2010					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-04-0000-00-00	Energy technology operator	13	13	13	Outside the formal school system
52-5470-04	Environmental technician (indicating specialisation)	10	10	10	Outside the formal school system
2011					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
-					

Appendix 6. Number of people having obtained accredited qualifications over the past three years (2009-2011) in the fields of energy efficiency and renewable energies listed in the National Register of Vocational Qualifications, with name of qualification

2009 (in vocational training)					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-05-0010-52-02	Renewable energy technician	17	17	14	Within the formal school system
52-522-05-0010-52-02	Renewable energy technician	18	16	14	Outside the formal school system
2010 (in vocational training)					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
54-544-02-0010-54-03	Renewable energy management technician	18	18	18	Within the formal school system
52-522-05-0010-52-02	Renewable energy technician	18	18	18	Within the formal school system
52-522-05-0010-52-02	Renewable energy technician	50	41	39	Outside the formal school system
54-544-02-0010-54-03	Renewable energy management technician	18	18	18	Outside the formal school system
2011 (in vocational training)					

Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-05-0010-52-02	Renewable energy technician	21	21	20	Within the formal school system
54-544-02-0010-54-03	Renewable energy management technician	31	31	25	Within the formal school system
52-522-05-0010-52-02	Renewable energy technician	81	73	71	Outside the formal school system

2009 (in adult training)					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-05-0010-52-02	Renewable energy technician	11	5	4	Outside the formal school system
2010 (in adult training)					
Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-05-0010-52-02	Renewable energy technician	58	45	43	Outside the formal school system
54-544-02-0010-54-03	Renewable energy management technician	18	18	18	Outside the formal school system
2011 (in adult training)					

Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
52-522-05-0010-52-02	Renewable energy technician	81	73	71	Outside the formal school system

Appendix 7. Number of examination applicants and successful examinees in training courses that, while in demand according to the gap analysis, represent low attainment levels

2009

Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
31-582-09-0010-31-03	Central heating and piping fitter	41	41	41	Within the formal school system
54-582-01-0000-00-00	Building engineer technician	19	19	19	Within the formal school system

2010

Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
31-582-09-0010-31-03	Central heating and piping fitter	230	230	217	Within the formal school system
31-582-15-1000-00-00	Bricklayer	3	3	3	Within the formal school system
31-582-17-0000-00-00	Roofer	27	27	27	Within the formal school system
54-582-01-0000-00-00	Building engineer technician	248	248	238	Within the formal school system

2011

Vocational Qualification No.	Vocational Qualification Name	Number of Applicants for Examination	Number of Examinees	Number of Examinees Passing the Exam	Training Form
31-582-09-0010-31-03	Central heating and piping fitter	323	323	310	Within the formal school system
31-582-15-1000-00-00	Bricklayer	811	805	755	Within the formal school system
31-582-17-0000-00-00	Roofer	33	33	27	Within the formal school system
54-582-01-0000-00-00	Building engineer technician	215	215	202	Within the formal school system

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.