



**BUILD UP Skills Austria**

# **National Roadmap**

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#### **Further information**

More details on BUILD UP Skills Austria can be found at [www.buildupskills.at](http://www.buildupskills.at)

More details on BUILD UP Skills can be found at [www.buildupskills.eu](http://www.buildupskills.eu)

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

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Note: Personal descriptions apply to both sexes

## 0 Foreword

The new requirements concerning the energy performance of buildings ("nearly zero energy") are a major challenge for the construction industry in Europe. The European Commission has therefore launched in all European Member States projects for the initiative "BUILD UP Skills" (BUSk), to ensure the optimal level of training for specialists in the implementation of energy efficiency in renovation and new construction. This is necessary because without any further measures the energy targets are not achievable due to known deficiencies in the quality of workmanship. Another key argument is the economic significance: due to imported energy currently 270 billion € flow out from the EU area; about 40% for the building sector. This level of energy imports is increasingly seen as a risk factor.<sup>1</sup>

BUILD UP Skills are expected to essentially contribute to the implementation of the energy efficiency plan of the European Union<sup>2</sup>, aiming to assist in increasing the energy independence of the EU.<sup>3</sup>

*The national roadmap developed under BUILD UP Skills should explain how to overcome barriers and identified skills gaps in the various professions in such a way that the building sector can contribute to the 2020 energy targets.*

*Therefore, the recipients of the roadmap are all players with the potential to contribute to overcome these barriers and skill gaps. Besides the organisations already involved in the national qualification platform, the roadmap is of interest to all the stakeholders who are in a position to support and undertake those initiatives consistent with the priorities and measures identified in the roadmap.*

*The developed roadmap must be endorsed by relevant national public authorities and key stakeholders like social partners, craftsmen, building and industry associations, vocational training institutions, etc. (the list will vary from country to country) in order to become part of the national strategy in the sector.*

### Further information

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

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<sup>1</sup> Marie Donnelly, Director for Renewables, Research and Innovation, Energy Efficiency, DG Energy, BUILD UP Skills meeting Brussels, 28 November 2012

<sup>2</sup> Energy Efficiency Plan 2011" [COM(2011) 109 final – Not published in the Official Journal], [http://europa.eu/legislation\\_summaries/energy/energy\\_efficiency/en0029\\_en.htm](http://europa.eu/legislation_summaries/energy/energy_efficiency/en0029_en.htm)

<sup>3</sup> Citations from the catalogue of requirements of the EU for the National Roadmaps

## 1 Executive summary

The initiative BUILD UP Skills Austria should create the general conditions to provide the **know-how of craftsmen in construction and related industries** through appropriate measures for the new requirements of the European Buildings Directive.

The qualification needs in the building sector in Austria derived from the analysis of the “BUILD UP Skills Status quo report” and the stakeholder discussion process within the platform were defined as follows:

**Cross-crafts-training:** Improving the cross-trade understanding at the construction site with a focus on energy in the overall system “building”. The development of a broadly coordinated modular qualification concept is recommended in close cooperation of corporate associations that collaborate on the development and dispatch their staff to vocational training.

**Quality Coach on-site:** This new service is proposed to increase the quality of the workmanship. The task profile "Quality coach on-site" is built on an appropriate qualification and of an organisational concept in combination with company associations and Public Employment Service Austria (AMS).

**Additional qualification for the inspection of heating and air conditioning systems is needed** to ensure qualified staff for the inspection of heating, ventilation and air conditioning systems following the recommendation of the Buildings Directive.

**Train the Trainer:** A training of teachers in vocational schools was recommended as a result of the stakeholder discussion. In February 2014 the first seminar will take place in one of the colleges of education for vocational training teachers in Austria.

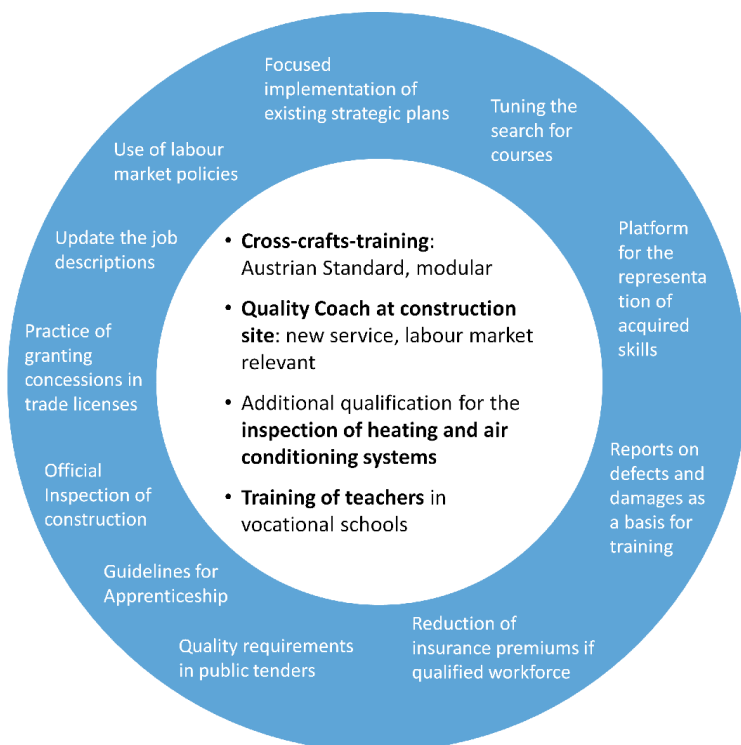


Figure 1: The Action plan is presenting core measures and eleven accompanying measures, indicates the timeline and the stakeholders and gives a rough estimation of the resources for the implementation of the identified measures. Graphics: 17&4 Consulting

Due to all relevant Austrian stakeholders could be actively involved into the development process the majority of stakeholders underlined their effort to support the implementation of the roadmap by signing an endorsement document. So far the following public authorities and stakeholders confirmed their official commitment to the roadmap:

- Federal Ministry for Education, Arts and Culture
- Federal Ministry of Economy, Family and Youth
- Federal Ministry of Agriculture, Forestry, Environment and Water Management
- Federation of Industries
- Chamber of Labour
- Chamber of Agriculture
- Province of Vienna
- Province of Styria
- Energy Agency Carinthia
- Energy Agency Burgenland
- Province of Vorarlberg
- Province of Lower Austria
- Energy Agency Tirol
- Federal guild of chimney sweeper
- Institute for Research on Qualifications and Training of the Austrian Economy
- Association of Thermal Insulation Industry
- Austrian Biomass Association
- Federal guild of timber construction
- Verein komfortlüftung.at
- Wirtschaftsförderungsinstitut der Wirtschaftskammer Österreich (vocational training institute)
- Austrian Institute of Technology
- Ecology Institute
- Green jobs Austria
- Construction Academy Austria
- IG Passivhaus Austria

## 1.1 Reasons for the National Roadmap

Measures for the needed improvement are primarily a responsibility of Member States. Due to the European principle of freedom of movement for workers (Article 39 paragraph 1 of the EC Treaty) within the EU, further coordination at the international level is required. The national BUILD UP Skills platform provides the framework for a moderated discussion. The participation in this process is encouraged, however voluntary. Governments and interest groups are to be updated in the discussion process and inspired to propose their own ideas.

The roadmap presents those strategies, which out of the discussion process have proved productive, to ensure the energy performance of buildings through appropriate quality of workmanship. To date, stakeholders have showed a willingness to support new strategies. However, there have been measures presented that – in the eyes of the consortium – greatly assist in the achievement of the objectives, but to which no consensus has yet been reached.

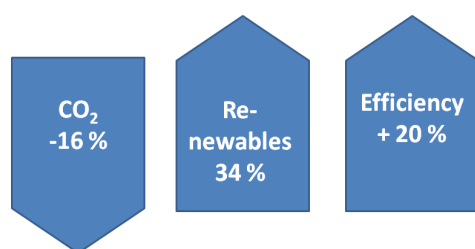


Figure 2: **The Austrian targets** in the energy and climate change package of the European Union (20/20/20 Targets); Source: Energy Efficiency Plan 2011 [COM(2011) 109], Graphics: 17&4 Consulting

The Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the Energy Performance on Buildings (briefly EPBD: 2010)<sup>4</sup> provides in Articles 3-9 minimum requirements for the energy performance of buildings.

In the Austrian Institute for Construction Engineering (OIB<sup>5</sup>) document "definition of lowest-energy building and establishing interim targets in a National Plan in accordance with Article 9 (3) to 2010/31/EU" the new requirements for thermal insulation and energy savings – thus the energy performance – are indicated for Austria.

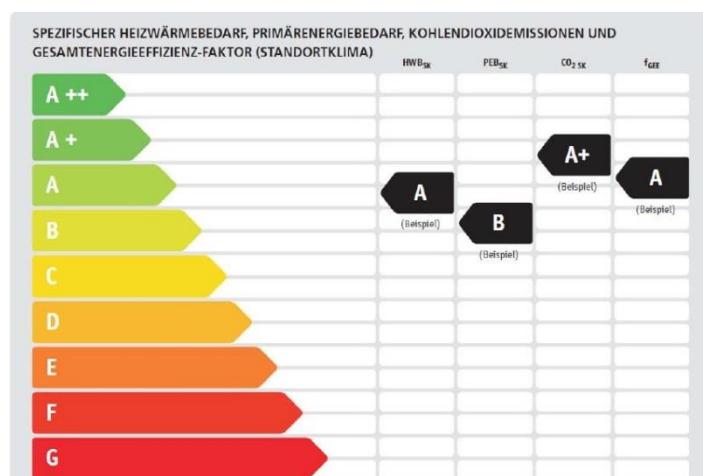


Figure 3: Energy performance certificate according to OIB Directive 6 Energy savings and heat retention [2011]. The proposed limits for the primary energy need and CO<sub>2</sub> emissions (local climate) as of 2020 are more demanding compared to current minimum requirements and can only be achieved with a professionally implemented insulation and efficient building services engineering: primary energy need max. 160 kWh/(m<sup>2</sup> a), CO<sub>2</sub> max. 24 kg/(m<sup>2</sup> a)

<sup>4</sup> Energy Performance of Buildings Directive

<sup>5</sup> Austrian Institute for Construction Engineering (Österreichisches Institut für Bautechnik, OIB)



The EPBD further demands: *"To ensure the **quality of the passes on the energy performance and the inspection of heating and air conditioning systems** throughout the Union, an independent **control system** should be established in each Member State."* (2010/31/EU, L 153 / 16, item 27)

The effectiveness of European Directives depends on the legal implementation as well as on the enforcement in the Member States. Due to the **reporting obligation** it is assumed that increased attention will be given to the enforcement. In the future, a failure in achieving energy values will be increasingly seen as a **deficiency**, on the one hand because the EU Directive requires control of the implementation of the EPBD, on the other hand because the reported energy consumption data are to be understood as *"conditional property, under consideration of the determination of the inevitable bandwidth"*.<sup>6</sup>

Article 16 of the EPBD calls for "reports on the inspection of heating and air conditioning systems

*(1) An inspection report shall be issued after each inspection of a heating or air-conditioning system. The inspection report shall contain the result of the inspection performed in accordance with Article 14 or 15 and include recommendations for the cost-effective improvement of the energy performance of the inspected system."*

**Renewable Energies Directive**, Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC[1]: The Member States of the European Union have agreed that by the year 2020 throughout the EU, the share of renewable energy in total energy consumption will be at least 20%. In order to reach that goal each of the Member States has to determine its share of renewable energies to be achieved by 2020 in their total energy consumed.

The Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources contains i.a. the following requests:

- **Certification for installers** of solar thermal, heat pump, biomass
- **Implementation of applications for energy efficiency and renewable energies** in building regulations and codes
- Removal of information and **training gaps**

**Mobility on the labour market:** in education and vocational training significant initiatives have been launched in recent years, allowing for lifelong learning while supporting the mobility of labour within the European Union. This is based on the realisation of the greatest possible transparency within the European education systems.<sup>7</sup> In April 2008 the European Parliament and the Council adopted the recommendation on the establishment of a **European Qualifications Framework for Lifelong Learning** (EQF). The primary **objective** of the EQF is to make national qualifications **transparent** throughout Europe and thus to facilitate the **mobility** between education systems and the labour market.<sup>8</sup> After the removal of restrictions on the employment of persons from outside the EU in May

<sup>6</sup> Energieausweis-Vorlage Gesetz 2012 – EAVG 2012, §6

<sup>7</sup> [www.bmukk.gv.at/europa/eubildung/nqr/nationaler\\_qualifikationsrah.xml](http://www.bmukk.gv.at/europa/eubildung/nqr/nationaler_qualifikationsrah.xml)

2011<sup>9</sup>, it became clear that the construction sector is one of the areas most affected. It therefore has to be in the interest of Austria to clearly **clarify** the **qualification requirements** for these workers and to **regulate** those through transparent processes.

## 1.2 Objectives of the national strategy for capacity building

Through the initiative BUILD UP Skills the general conditions should be created to provide the **know-how of craftsmen in construction and related industries** through appropriate measures for the new requirements of the EPBD:

- Contribution to the achievement of the EU energy objectives (20/20/20; EPBD)
- Reduction of construction deficiencies and damages, especially of defects in terms of missing the values indicated in the energy performance certificates
- Ensure the required number of appropriately qualified personnel under special consideration of young trainees
- Structural improvements in the education sector so that lifelong learning in the target area gets more attractive and strengthened



Figure 4: The aims of BUILD UP Skills in the functional chain. Graphics: 17&4 Consulting

BUILD UP Skills are to guarantee the skills and competencies of the operators ("blue collar worker"), issues of planning in the construction sector are considered in the framework of this roadmap only if they are important for the activity profiles of the target group.

## 1.3 The way to the Roadmap

The project "BUILD UP Skills Austria" initiated a **national strategic process** that has brought together the relevant actors in the field of qualification, training and education in the meaning of a common platform in order to develop a national roadmap to improve the skills of craftsmen in the building sector. This roadmap should guarantee within the framework of a broad **recognition process** that the developed strategies become the basis for the targeted development of education and training in Austria ([www.buildupskills.at](http://www.buildupskills.at)). The National Roadmap builds on the **status quo report**<sup>10</sup> and on the discussions about the strategic process (workshops and bilateral talks) as well as written responses from the education and training community to the discussion paper "Handlungsfelder" (fields of activity)".

<sup>8</sup> Handbuch für die Zuordnung von Qualifikationen zum Nationalen Qualifikationsrahmen – Kriterien, 2011; [www.oead.at/fileadmin/III/dateien/lebenslanges\\_lernen\\_pdf\\_word\\_xls/nqr/EQR-Zuordnungsbericht/Anhang\\_4\\_Handbuch\\_Simulationsphase\\_NQR\\_Kriterien\\_Annex\\_Ref\\_Bericht\\_DE\\_EV.pdf](http://www.oead.at/fileadmin/III/dateien/lebenslanges_lernen_pdf_word_xls/nqr/EQR-Zuordnungsbericht/Anhang_4_Handbuch_Simulationsphase_NQR_Kriterien_Annex_Ref_Bericht_DE_EV.pdf)

<sup>9</sup> [www.mobilitypartnership.eu/Documents/Mobility%20in%20Europe%202012%20-%20Executive%20summary.pdf](http://www.mobilitypartnership.eu/Documents/Mobility%20in%20Europe%202012%20-%20Executive%20summary.pdf)

<sup>10</sup> [www.buildupskills.at](http://www.buildupskills.at)

Simultaneously in Austria a **master plan to ensure the human resources in the field of renewable energy**<sup>11</sup> is developed, the results thereof feed into the strategy development BUILD UP Skills.

To promote the implementation of the EU directives and to improve the exchange of information between the EU Member States, the European Commission under the Intelligent Energy Europe Programmes (IEE) initiated the European Community project "Concerted Action" (**Concerted Action on the Renewable Energy Sources, Concerted Action EPBD**). It is recommended that Build UP Skills were to coordinate with Concerted Action.

The development of the roadmap is in accordance with the initiative klima:aktiv (coordination of vocational training) and using resources of **klima:aktiv**<sup>12</sup>.

"BUILD UP Skills Austria" was launched in November 2011, the National Roadmap was finalized in **May 2013**.

## 1.4 Strategic Background

The European Commission expects the National Roadmaps to provide:

1. Identification of the required **skills** (skill needs)
2. Identification of the **need for training** in the affected sectors
3. Identification of the **barriers** that impede the implementation of the 2020 targets
4. **Measures** to meet these needs
5. Strategies to increase the **attractiveness** of the training measures
6. **Monitoring concept** to observe the achievement of objectives

The investigations and discussions as part of the BUILD UP Skills platform have shown that the required capacity building cannot only be achieved on the **supply side**, meaning solely by expanding and improving the training offer. In Austria there is a variety of educational institutions that – if there is demand – were able to develop, enhance and expand the necessary offer. An offer of additional training is only reasonable and feasible if at the same time commerce and industry announce an adequate demand. **Impulses from the demand side** are seen as a key prerequisite.

Starting points for improvements in the subject-specific education system currently exist mainly in the structural area.

For this reason, though the roadmap points to a "theoretical" training need, the majority of the recommendations concern the need for the improvement of conditions contributing to identify the necessity of *"Skills for high quality implementation of energy efficiency and renewable energy measures in buildings"* and to create demand.

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<sup>11</sup> <http://masterplan-energie2020.at>

<sup>12</sup> [www.bildung.klimaaktiv.at](http://www.bildung.klimaaktiv.at)

## 2 Skills, qualification need and barriers

The construction sector in Austria comprises about 80,000 employees, amongst them 55,000 labourers<sup>13</sup>, broken down into the associations and workers relevant to BUILD UP Skills:

Association	Company	Employees	Labourers	Apprentices
Construction	5,602	83,432	58,323	3,740
Roofers, glaziers and plumbers	1,872	17,782	11,904	1,824
Building support industry	3,053	26,394	19,419	5,076
Timber construction	2,000	13,000	6,916	1,363
Technicians for sanitary, heating and ventilation	3,074	33,113	18,669	4,771
Technicians for electrical engineering, building, alarm, communications	3,421	39,204	19,801	5,132
Building industry	52	28,746	18,682	857

Table 1: WKO employment statistics in the chamber systematics; annual values 2011 (12 monthly average); 1. processing; data of timber construction according to information from Holzbau Austria

Necessary vocational training measures to realise the BUILD UP Skills goals concern structural engineering. An identification of the workers merely employed in structural engineering is difficult, because in the construction industry, depending on the order situation, a high turnover rate is given - including also cyclical compensation effects between civil and structural engineering.

The detailed description of the employment structure and the identification of training needs in the relevant sectors of the construction industry are included in the BUILD UP Skills status quo report.

### 2.1 Building trade, building industry, timber construction

**In the building trade and also in the building industry a relevant additional need for workers in Austria is not expected due to the EPBD**, as the quality requirements for new construction and renovation - in particular through funding criteria - are already relatively high compared to other European countries. A renovation obligation is currently not up for discussion. Even if the renovation rate in Austria would increase from a current approximate 1% to 3%, no significant additional need for workers is expected according to stakeholders, since the industry responds with internal regroupings (eg balancing between civil and structural engineering), known from experience.

However, the demographic development is important to keep in mind, characterised by a sharp decline in young trainees in combination with increasing retirements.

The discussions of the BUILD UP Skills platform have shown qualitative training needs in the following areas:

- Improving the **cross-trade understanding at the construction site** with a focus on energy in the overall system “building” (for a detailed description see Appendix)
- **Renovation of old buildings**
- Qualifications for **Quality Coaches on-site** (see section 3.5)

<sup>13</sup> www.statistik.at

The **quantitative training need** can only be roughly estimated within the national BUILD UP Skills initiative. The statistics of the corporate structure in Austria (see Figure 3) shows that about 70% of companies have 1-9 employees. Assuming that per company on average 2 people are definitely sent to vocational training in order to achieve relevant improvements, there is a training need of approximately 14,000 people. As in the construction industry, the proportion of in-house training is relatively high, this might lead to a higher training rate, if the necessity for it is seen. Additional training needs in timber construction are estimated to be relatively low due to the already special requirements.

	Building trade	Building industry	Timber construction	Sum
Qualification needs	14,000	3,000	1,000	<b>Ca. 18,000</b>

Table 2: Additional qualification needs in the field of structural engineering (persons till 2020)

## 2.1 Building services engineering

An additional demand for labour is declared **for construction-related work** in execution, eg installation of renewable energy systems in the building sector. But this can probably be largely covered from the expected decline in fossil energy technologies. The master plan Human Resources Renewable Energy Technologies thus expects new qualification needs mainly due to changed operator requirements.<sup>14</sup>

The exact derivation of the qualification needs has large uncertainties. On the one hand it is about scenarios; on the other hand, the status of existing qualification through certification is only rudimentary. Merely estimates based on available data can therefore be given.

In the field of gas, water, heating, ventilation, and air conditioning there are around 30,000 employees working, of which about 19,000 operate as installers.

Yet as “innovative heating systems” in Article 15a of the agreement referred, the systems become standard, as they now also have to be considered in compliance with building regulations (OIB Directive).

Basic skills for renewable energy technologies have been taught in the apprenticeship and master training for several years now. Via the BUILD UP Skills platform it was encouraged to draw comparison on the competences for the installation of renewable energy technologies listed by the Concerted Action of the EU<sup>15</sup>.

<sup>14</sup> Kurzbericht im Rahmen des Projekts „Masterplan HR EE“, Arbeitspaket 2 (Dipl.-Wirtschaftsing. (FH) Dipl.-Energiewirt (FH) Robert Freund/Energie.Effizienz.Beratung, DI Susanne Supper/ÖGUT, 2012), [www.masterplan-energie2020.at/](http://www.masterplan-energie2020.at/)

<sup>15</sup> Previously unreleased, use was clarified.

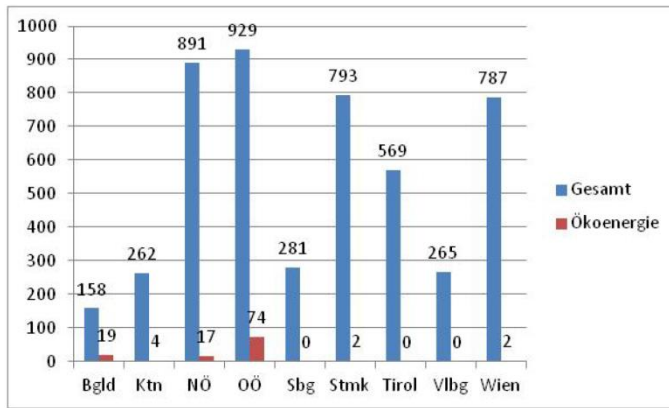


Figure 5: Apprentices in apprenticeship professions of installation engineering and building services engineering, In total and in the special module eco-energy technology, 2012, Source: WKO apprentices statistics, Graphics: Institute for Research on Qualifications and Training of the Austrian Economy, ibw

The new demands have been partially already taken into account for the introduction of the voluntary eco-energy management module in the training of the installer<sup>16</sup>. The current number of graduates (125 in 2011<sup>17</sup>), however, can meet the labour requirements for the installation of renewable energy technologies only to a limited degree.

A comprehensive and informative list of all people in Austria qualified specifically for the installation of renewable energy technologies is currently not available.

The successful completion of a specialised vocational training (e.g. certification courses) is a comprehensible proof of competence. Taking the **criterion of the successful and documented completion of specialised vocational trainings**, the numbers appear to be low in the following paragraphs. The number of participants is higher, but without upright certificate no evidence of qualification is given.

Informally acquired skills are not yet adequately visible. Appropriate means of recognition are not yet implemented in the required breadth.

Since in particular older installers have learned little in their training on "Innovative heating system", training need is mainly given here. The responsible national guild assumes that this would be controlled or adjusted by the market anyway.

**Heat pump:** This technology has been relevant since the year 1980 (4,600 systems installed)<sup>18</sup>. *"In 2001 the distribution of heat pumps started, parallel to the market diffusion of energy-efficient buildings, which allows for an energy-efficient use of this technology through low heating demand and low heating flow temperatures."*<sup>19</sup>

Since 2001, the AIT<sup>20</sup>, partly in cooperation with the WIFI, conducts courses to become a heat pump installer with a subsequent certification option to become an "EU certified heat pump installer" Quality Label for Heat Pumps. Currently, 93 people hold an upright certificate of AIT<sup>21</sup>, 480 people

<sup>16</sup> Status Quo Report, Build Up Skills Austria

<sup>17</sup> Lehrlingsstatistik 2011, Bundesinnungsgruppe Metall-Elektro-Sanitär-Kfz

<sup>18</sup> „Die Anwendung von Wärmepumpen in Österreich – Auswirkungen auf die Elektrizitätsversorgung“ (Hannes Holzer, Ludwig Kumer, 1981)

<sup>19</sup> Faninger (2011): „Die Bedeutung der Wärmepumpe in der Energiestrategie Österreich 2020“ (Vortrag im Rahmen des 3. Wärmepumpenforums 2011)

<sup>20</sup> Austrian Institute of Technology

<sup>21</sup> www.ait.ac.at

have been trained so far. A detailed description within the meaning of a competence matrix for this training can be found in the appendix (p. 147) in the BUILD UP Skills status quo report.

Other courses were offered from bfi, WIFI, AIT and others; however, information about the number of people trained and the level of qualification achieved is not available.

The installation of heat pump systems requires multidisciplinary knowledge in the fields of HVAC, electrical and refrigeration engineering. The OIB-definition of **low-energy buildings** (see Chapter 1) provides for the implementation of the EPBD inter alia progressively stricter requirements on the primary energy demand and the CO<sub>2</sub> emissions by the year 2020. Ensuring the energy performance reported in the energy performance certificates now requires special attention when using electricity. Various methods have been used previously to determine the seasonal performance factor (SPF) of heat pumps. Now the SPF in Austria has to be calculated according to the principles of the "OIB Directive 6" and to the "ÖNORM H 5056". The adjustment on the circumstances of the building plays a significant role. It must be ensured that the efficiency of heat pumps in operation corresponds to the reported values (including also those of the funding criteria). Various field tests show that specified seasonal performance factors in operation are often not achieved.

A corresponding training need can be derived due to these new requirements. Judging from the benchmark bio heat installer and the number of installed heat pumps (about 16,000 per year)<sup>22</sup>, refresher trainings for a few hundred people for the installation of energy-efficient heat pumps is needed, even if one takes into account that several courses have been completed already.

Installation of heat pump systems: qualification need is about 500 - 1,000 people

**Solar Thermal:** This technology is also used in Austria since the 1980s, currently 35 certified solar thermal technicians for planning and installation are listed at the AIT. A total of 53 persons have been certified and 45 applications are in process. 639 people have been trained in certification courses so far, 461 people in shorter practitioner training.

www.solarwärme.at is providing a list of solar installers by province and distance, amongst them the above mentioned AIT certified installers. The term "solateur" is known in Austria, but a list of persons designated as "Solarteur<sup>®</sup>" is currently not available.

Field tests also reveal problems in the workmanship, according to the association, only about a quarter of the systems are running properly, especially combined systems (eg partial solar space heating in combination with biomass boiler and storage tank) are representing a major challenge in terms of an efficient operation.

**Bio heat:** The brand "Bio heat installer<sup>®</sup>" is legally protected. A designated Bio heat installer<sup>®</sup> must have completed successfully the five-day basic seminar and can demonstrate profound knowledge in installation. The certificate is awarded for a period of three years, to extend for further three years a training session has to be completed. This training is conducted since 2000 by the Austrian Biomass Association in close cooperation with the installer guilds. During this time, approximately 1,200 people participated in the basics training. In 2012, 730 installers were listed as Bio heat installers (this group has also completed the vocational training). The training was expanded in 2010 within the scope of the cooperation with klima:aktiv and now finishes with an examination, so the requirements of the EU Renewable Energy Directive are met. Previous graduates from these trainings are offered

<sup>22</sup> BMVIT (2012): Innovative Energietechnologien in Österreich - Marktentwicklung 2011

more training to help understand the efficiency of the solar thermal plants and combined systems. It is within this realm that further training is needed.

There is steady interest in the basics seminars (also in 2013 4 basics seminars with a total of 65 participants were conducted). An upward trend in small scale bio heat in Austria has been observed. Austria is a technology leader in this field. Living room devices and compact boiler systems have gained prominence. All biomass systems are becoming more energy-efficient (eg combination with solar thermal, optimized systems and hydraulics). Also in the coming years, basics seminars have to be offered in order to account for these developments and to meet the demands for competent craftsmen.

The listing of 730 people as Bio heat installers shows the potential for particular energy technology training in Austria.

According to information from the Austrian Biomass Association there is currently no possibility of a personnel certification after ISO 17024, as no accreditations for a test body are awarded at the moment by the Ministry of Economy.

Qualification needs for bio heat and combination with solar thermal: training need in the next 7 years: 1,400 people; additional need for basics training in the next 7 years: 420-560 people

**Photovoltaics:** The AIT courses to become PV technicians are currently in a strong demand; they include planning and installation and have been attended by 1,050 people so far. Currently 59 people are certified, (35 applications are still in process), of which 21 PV technicians for the both areas planning and installation. The question which authorities (trade law) for the installation of PV systems are required has not been clarified yet adequately.

Due to the dynamic development it is particularly difficult to estimate the qualification need here, but should be in the range of up to 1,000 people.

**Ventilation:** The faulty workmanship of this key technology for the lowest-energy standard is documented by several studies - and it occurs in many cases. Currently 62 tested comfort ventilation technicians are listed on [komfortlüftung.at](http://komfortlüftung.at). The audit does not entirely correspond to the ISO 17024 yet. If it is assumed that due to the increasing demands on the energy efficiency, the demand for efficient ventilation systems with heat recovery (comfort ventilation) will continue to increase, the need for qualification is high here: in Austria about 50,000 flats are annually completed, approximately 1% of the building stock, and about 30,000 homes refurbished. Installing a ventilation system in a third of them represents about 27,000 plants without considering the non-residential buildings. If a qualified installer installs up to 50 units per year, a qualification need of over 500 people is given, taken into account already specially qualified installers.

The review of the curricula and examination regulations of the HVAC installers and other surveys show that there is only basic coverage in ventilation systems, and quality criteria necessary to achieve the BUSk Objectives are not yet sufficient. This applies to requirements for energy efficiency and other claims essential for the acceptance of the systems<sup>23</sup>.

**Inspection of heating systems:** the EPBD asks for *Reports on the inspection of heating systems*:

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<sup>23</sup> [www.komfortlüftung.at](http://www.komfortlüftung.at), Quality criteria (Qualitätskriterien)



*Article 14 (1) Member States shall lay down the necessary measures to establish a regular inspection of the accessible parts of systems used for heating buildings, such as the heat generator, control system and circulation pump(s), with boilers of an effective rated output for space heating purposes of more than 20 kW. That inspection shall include an assessment of the boiler efficiency and the boiler sizing compared with the heating requirements of the building.*

**Article 16 (1)** *An inspection report shall be issued after each inspection of a heating or air-conditioning system. The inspection report shall contain the result of the inspection performed in accordance with Article 14 or 15 and include **recommendations** for the cost-effective improvement of the **energy performance** of the inspected system.*

*An inspection report shall be issued after each inspection of a heating or air-conditioning system. The inspection report shall contain the result of the inspection performed in accordance with Article 14 or 15 and include recommendations for the cost-effective improvement of the energy performance of the inspected system.*

In the considerations there is also the following recommendation given:

*(26) In order to minimise the administrative burden on building owners and tenants, Member States should endeavour to combine inspections and certifications as far as possible.*

The training need is currently difficult to estimate, since the necessary competences are not yet clarified. The scope of testing goes beyond the previous inspections; for example with the inclusion of *control system and circulation pump and the checking of the boiler dimensioning*. There is a new need for recommendations, whereupon the recommended connection with the issuing of certificates implies a higher demand for training.

The assumption is based on even closer to defining training needs for the authorized persons. Lists of the auditors are available in the federal states, their numbers vary significantly, for example, Salzburg has about 150 persons authorized for measuring<sup>24</sup>, Upper Austria 260<sup>25</sup>, Lower Austria around 1,800<sup>26</sup>. Putting the number of households with 3,34 million and the number of buildings<sup>27</sup> with 2,046,712 (of which 282,257 non-residential buildings) in relation, a training need in Austria of about 3,000 people appears to be realistic.

	Heat pump	Solar thermal Bio heat	Photovoltaics	Ventilation	Heat system checking	Sum
Qualification needs	1,000	2,000	1,000	500	3,000	<b>7,500</b>

*Table 3: additional qualification needs in the building engineering sector (persons till 2020)*

In sum, an additional qualification need for 2020 of approximately 25,000 people in construction and building services engineering can be expected in order to ensure the requirements of workmanship quality in Austria corresponding the EU objectives.

Training for 25,000 people by 2020 are feasible due to the existing capacity of the educational institutions in Austria. Currently over 5,000 people per year are trained in the areas of energy

<sup>24</sup> [www.salzburg.gv.at/heizungsanlagen-messbefugte.pdf](http://www.salzburg.gv.at/heizungsanlagen-messbefugte.pdf)

<sup>25</sup> [www.land-oberoesterreich.gv.at/cps/rde/xbcr/ooe/AUWR\\_Pruefnummernliste\\_Feb2013.pdf](http://www.land-oberoesterreich.gv.at/cps/rde/xbcr/ooe/AUWR_Pruefnummernliste_Feb2013.pdf)

<sup>26</sup> [www.noel.gv.at/bilder/d67/Alph-Liste-Internet\\_12-2012.xlsx](http://www.noel.gv.at/bilder/d67/Alph-Liste-Internet_12-2012.xlsx)

<sup>27</sup> [www.statistik.at](http://www.statistik.at)

efficiency and renewable energy in the building sector according to the BUILD UP Skills status quo report. In this collection, the precise definition of "blue collar worker" is not exactly possible, but the numbers show that the theoretically derived education need could be well covered.

Imparting other skills - seen as necessary - can be covered by existing services. The therefore essential developments of education offer and accompanying measures are presented in the following.

### 3 Measures

Training for approximately 25,000 people requires a structured approach:

- Clear definition of the learning objectives covering the essential requirements of the NQF
- Course offer, attractive and coordinated with the BUILD UP Skills Strategy
- Coordination with funding instruments
- Quality assurance and monitoring

A well-planned course alone does not guarantee the participation of the target group to the degree necessary. Although the voluntary use of training can be reinforced by a bunch of measures to increase the attractiveness of training measures, it is questionable how far the identified quantitative training needs can be met with it.

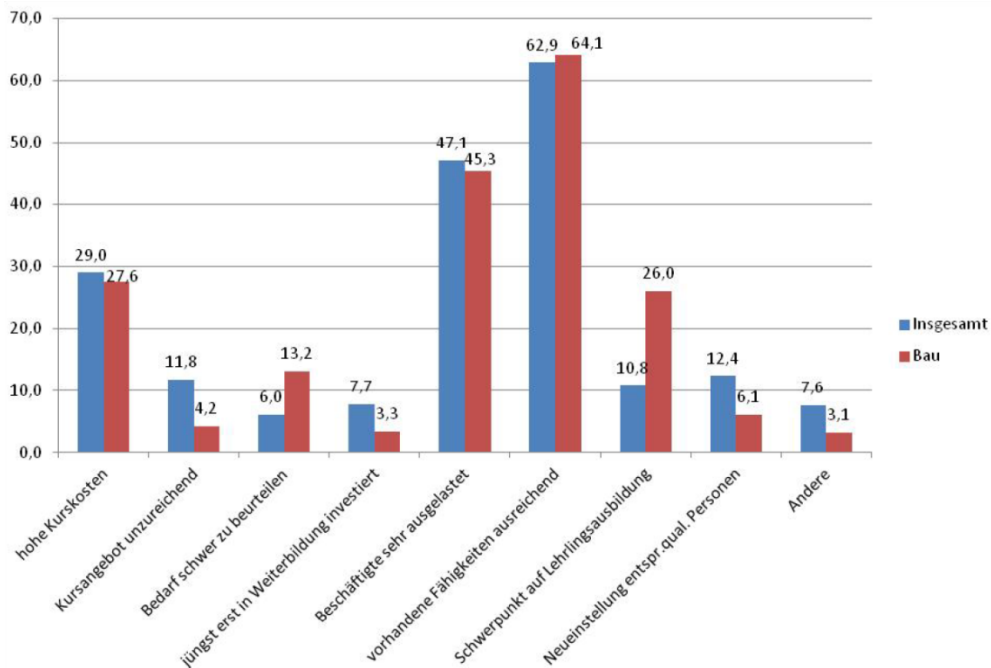


Figure 6: Reasons why enterprises do not train, Source: Statistics Austria, In-house vocational training, 2013; Grafik: ibw

Obligations in the field of training were assessed very differently under the Platform BUILD UP Skills. The opportunity to provide training for certain requirements as a precondition should nevertheless be discussed further: incorporating training in trade law, funding criteria, which take into account the skills of the workers.

Labor market policy instruments must be used optimally; currently there is the coordination with the criteria for the next funding from the European Social Fund (ESF) and the European Regional Development Fund (ERDF). These points are further elaborated in section 3.3

### 3.1 Increasing the demand for training offer

In order to improve the **know-how of craftsmen in the construction and construction-related industries**, there are – in case legal obligations are out of the question – basically the following direct and indirect ways to influence.

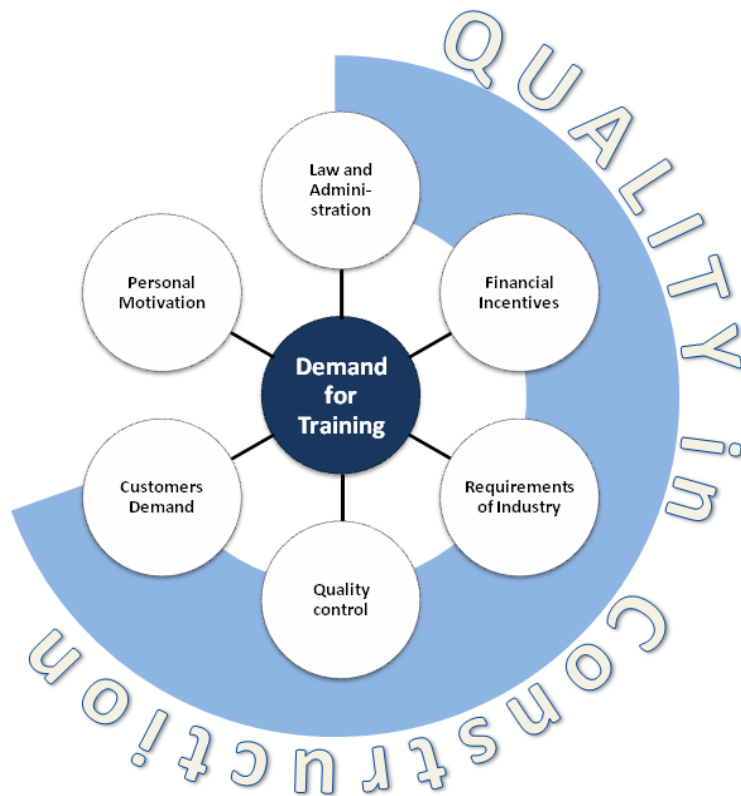


Figure 7: Factors of influence on the demand and use of services for vocational education and training. A change of one or more factors results in a change in education behaviour. Graphics: 17&4 Consulting

### 3.2 Implementation of existing strategic plans (selected items)

Many issues important for the strategy have been described in this document. The following selection shows which of them are to force specially to achieve the BUILD UP Skills goals - in coordination with each of the actors mentioned in the strategies.

#### **Austrian strategy for lifelong learning „LLL:2020“ (Federal Ministry for Education, the Arts, and Culture, BMUKK)<sup>28</sup>**

- *"Increase the proportion of employees who make use of training during working hours and have only completed compulsory education as highest level of education, from 5.6 percent in 2007 according to "Adult Education Survey" to at least 15 percent in 2020*
- *Increase participation in vocational training as measured by the LLL structural indicator of 13.7 percent in 2010 to 20 percent by 2020*
- *Establishment of quality standards for training courses and qualifications of instructors for their post-formation phase by 2015*
- *Implementation of the "National Qualifications Framework"<sup>29</sup> (NQF) by 2012 and implement a validation strategy for the recognition of non-formal and informal learning by 2015"*

<sup>28</sup> [www.bmukk.gv.at/medienpool/20916/lll-arbeitspapier\\_ebook\\_gross.pdf](http://www.bmukk.gv.at/medienpool/20916/lll-arbeitspapier_ebook_gross.pdf)

## Master plan Greenjobs (Federal Ministry of Agriculture, Forestry, Water and Environment Management, BMLFUW)

- *E09 promotion of investment in thermal insulation and energy-efficient construction*
- *E13 sustainable and innovative public procurement and contracting*

## AMS Standing Committee on New Skills (AMS Public Employment Services Austria)

- *Review the concept of the New Skills courses "Update the skills of job seekers and employees through New Skills courses"*
- *Implementation status of the recommendations "To further strengthen higher qualification of unqualified people by extraordinary final apprenticeship examination (LAP)"*
- *Implementation status of the recommendations "Completion of AMS training with **certification which can be mapped in the NQF**"; the LLL strategy refers to the improved representation of skills profiles (p. 40).*

## Master plan to ensure human resources in the field of renewable energies<sup>30</sup>

- Coordination of BUILD UP Skills with the measures recommended in the Master plan to takes place.

## 3.3 Law and administration

### Practice of granting authorities in trade licenses

The training to become masters in construction and construction-related industries in Austria largely includes the points that are needed for the required workmanship quality in terms of the EPBD.

But workmanship is often carried out on the basis of partial permissions, which, according to the permissions of guild representatives are often exceeded. Especially in border regions, companies are increasingly active in neighbouring countries; specific investigations on the quality of the studies are not available.

One-person companies (EPC) show an upward trend (industry and crafts total: around 60% EPCs, WKO Members Statistics 2010). For example, in Lower Austria many installers already work as an EPC, in many cases, these are former employees of the manufacturing industry, which seem to follow systematically this path. Also purchase over the internet means that the qualified industry is less involved.

These developments do not support the required optimization of the energy efficiency in the building system. Increasing the requirements for the qualification for the commercial access would be an option. However, many EU countries have no regulations in this respect; therefore, a European solution seems difficult currently.

The commercial legal limits of "individual skills" were softened with the last change about 20 years ago and should be sharpened again. The project consortium therefore proposes to adopt clear rules for "**individual skills**", which also provide the applicability of adequate evidence of practice. In the

<sup>29</sup> [www.bmukk.gv.at/europa/eubildung/nqr/nationaler\\_qualifikationsrah.xml](http://www.bmukk.gv.at/europa/eubildung/nqr/nationaler_qualifikationsrah.xml)

<sup>30</sup> <http://masterplan-energie2020.at>

granting of trade law permits clear guidelines (edicts) of the authority to regulate the area of discretion are recommended.

The **trade law powers** are to be revised the increased energy efficiency requirements accordingly, with particular emphasis on ancillary rights (eg, installation of windows and doors).

**Incorporating training in industrial law** within the framework of the platform BUILD UP Skills has been discussed as a possible and productive accompanying measure; however, the political implementation appears difficult in the short term. As part of the Roadmap, the recommendation will be given to discuss the opportunity further, in the short term an adoption of the district authorities could regulate the issuing of trade licenses accordingly.

### Inspection of heating and air-conditioning systems

The EU Buildings Directive 2010 (2010/31/EU) asks for the inspection of heating systems and gives recommendations.

*“Reports on the inspection of heating and air-conditioning systems*

*(1) An inspection report shall be issued after each inspection of a heating or air-conditioning system. The inspection report shall contain the result of the inspection performed in accordance with Article 14 or 15 and include recommendations for the cost-effective improvement of the energy performance of the inspected system.*

*The recommendations may be based on a comparison of the energy performance of the system inspected with that of the best available feasible system and a system of similar type for which all relevant components achieve the level of energy performance required by the applicable legislation.”*

As stated in chapter 1 Qualification requirements, the requirement of the EU is a crucial basis for qualification schemes to be prepared whereupon the involvement of ventilation seems to make sense. However, the regulatory framework (powers) for implementation in Austria has not yet been clarified sufficiently. It is therefore necessary to **clarify the conditions quickly and establish them as uniformly as possible**.

### Labour market policy and funding for training measures

Measures of labor market policies and funding are powerful political tools that could be used more efficiently to achieve the European energy goals through appropriate coordination.

*The **Public Employment Service (AMS)** offers a wide range of (financial) support for career development and for further training for persons who are already unemployed, are in danger of losing their jobs or who have difficulty in finding a suitable job. In 2010, the funding for active and activating labour market policy amounted to the sum of € 2,043 million. € 687m was spent on training and further training measures.*<sup>31</sup>

*The **European Social Fund (ESF)** is one of the two Structural Funds with which the European Union strives to reduce the differences between the Member States and promote economic and social cohesion. The ESF contributes to the creation of jobs. It helps people attain educational and training*

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<sup>31</sup>

[www.bmask.gv.at/siteEN/\\_Labour/Labour\\_Market/Service\\_for\\_job\\_seekers\\_and\\_companies/Further\\_training\\_and\\_funding\\_from\\_the\\_AMS](http://www.bmask.gv.at/siteEN/_Labour/Labour_Market/Service_for_job_seekers_and_companies/Further_training_and_funding_from_the_AMS)

*qualifications and to reduce disadvantages on the labour market. ... All the Member States develop their own strategy in the framework of an Operational Programme. ... The current funding period lasts from 1st January 2007 until 31st December 2013. In Austria, the European Social Fund provides a budget of 472 million Euros for this period.*<sup>32</sup>

*“By context management, especially through funding instruments and tax laws and by better **linking of education with labor market policy instruments**, professional training is integrated in a comprehensive LLL strategy.”*<sup>33</sup>

**Qualification support for employees:** Encouraging employees for the purposes of the target set by the AMS “*supports for career advancement*” is a major incentive for further education, particularly in the target area of the workers. It contributes to securing jobs and should therefore also be retained in the new funding period.

**Success factors** for courses that support capacity building for BUILD UP Skills: Focus on basic skills, cooperation with companies, qualification alliances and recognition of qualifications. These requirements should be included in the **consultations** for the next **funding period of the European Social Fund**. The proposal “Quality Coach on-site” is to be pursued further in this context (see chapter 3.5).

The funding of enterprises for training of staff has been described by the stakeholders as too little known. The **information on funding opportunities** should be improved.

### 3.4 Structural improvements in the educational sector

The educational offer for the construction and building services engineering is seen at a high level in Austria. As evidence for this the activity of many companies also in foreign countries as well as individual excellent performances, for example at apprenticeship competitions, are mentioned.

Basic education and training are closely related. It was therefore necessary to work on both parts in the context of BUILD UP Skills to ensure the requirements of the EPBD.

Vocational education and training in Austria are offered by the state (vocational training school, higher technical education institute, college, university of applied sciences etc.) and private organizations and companies (eg training and further education in the field of building services).

Private providers of training and education are mostly profit-oriented, whereby the primary goal of education and training is often overshadowed by economic interests and competitive situations. In addition to the developments of the educational institutions, in-house seminars and product training are widely used by companies in Austria. A coordination of individual education programs in the field of training is often not the case. From a customer perspective the training offer can be described as “confusing”.

An important issue is the comparability of trainings. It must be clearly defined what the content of the course is, what knowledge and skills the course participants have after completion and what proves useful in the participant’s career planning. With the introduction of the rules of the **National Qualifications Framework NQF**, course offers should be further developed in terms of a more

<sup>32</sup> [www.esf.at](http://www.esf.at)

<sup>33</sup> Österreichische Strategie zum lebensbegleitenden Lernen, bmukk, [www.bmukk.gv.at/medienpool/20916/lll-arbeitspapier\\_ebook\\_gross.pdf](http://www.bmukk.gv.at/medienpool/20916/lll-arbeitspapier_ebook_gross.pdf)

precise description (competence orientation). The **focus on learning outcomes** will be required in the LLL strategy, *"Further development of school curricula and the curricula at universities according to the criterion learning outcomes. This also applies to the curricula of training institutions, if they are to be classified in the NQF."* In schools this has to be implemented by the school year 2015 /16.

The **focus on the NQF** is to promote, even if this system is not implemented yet. Courses with NQF adequate representation of **competence profiles** and its recognizable reference to BUSk issues are therefore to **foster preferably**.

Currently, there are many different **web portals for course searches** available, which are operated by institutions of the federal states, the country, by education providers, or others, but do not include every offer. Particularly at the award of the contract in connection with public funding it is to arrange that web-based course searches are designed in a way that interested parties come to a **complete and meaningful search result** by reasonable effort.

**Educational standards** for energy efficiency and renewable energy technologies are defined by different actors. Since January 2005, the section "Vocational education school system, adult education and school sport" in the Federal Ministry for Education, Arts and Culture is working on the development of standards in the field of vocational training. Educational standards are developed in Austria as general standards and are primarily understood as a "standard for the outside". That is, they comprise those core competencies that should be acquired sustainably at the end of each formation. In addition, educational standards in vocational training make an important contribution to support a competency-based educational design.

An example can be found in the technical-industrial and arts-industrial schools<sup>34</sup>. Here, education standards are described using "descriptors of the construction technology training priorities". If the EU Buildings Directive is also decidedly not mentioned here, so there are corresponding general requirements, such as *"The students know of the various building classes the structural requirements on the components."* It is up to the teacher to establish this relationship currently.

Educational standards with respect to the EU Buildings Directive are scarcely developed for further education. To meet the new requirements of the EU Buildings Directive in the field of implementation, it is mainly to ensure that **educational standards for the skills for an implementation free from defects are developed**. In the field of the Federal Guild HVAC (heating, ventilation and air conditioning systems) there is a training guide in preparation for companies providing apprenticeships to be completed in summer 2013. The new regulations for examinations for the master craftsman's certificate are already adapted and due to enter in force on 1.7.2013. In parallel, it is worked on a common structure for the examinations.

You can find **educational standards for personal certifications**<sup>35</sup> (ISO 17024 or other systems). They are elaborated from the providers of these certifications. Relevant providers for the area of BUSk are AIT (solar thermal, heat pumps, PV, comfort ventilation in preparation) and quality Austria (Energy Performance Certificate Professional) and the Passive House Institute (certified passive house craftsmen).

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<sup>34</sup> [www.bildungsstandards.berufsbildendeschulen.at/fileadmin/content/bbs/AGBroschueren/Fachrichtungsstandard\\_Bautechnik20110712.pdf](http://www.bildungsstandards.berufsbildendeschulen.at/fileadmin/content/bbs/AGBroschueren/Fachrichtungsstandard_Bautechnik20110712.pdf)

<sup>35</sup> Liste der akkreditierten Zertifizierungsstellen für Personen (EN ISO/IEC 17024) des Wirtschaftsministeriums



*“Member States shall ensure that certification schemes or equivalent qualification schemes become or are available by 31 December 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps. (...)”<sup>36</sup>*

The approaches to **person certification** are to be further developed under the assumption of the EU Directive (2009/28/EG) taking into account *equivalent qualification schemes* as well as the recommendations of the EU project **Quali-Cert**<sup>37</sup>, a corresponding system for the field of **small-scale biomass boilers** is also required.

However, the field of "certification" is controversial because an EU-wide recognition of certifications of persons is not yet in line with the existing vocational training and authorization rules in Austria.

**Examination regulations** currently contain rather commonly held requirements. Since they have an essential function of orientation, a more detailed elaboration and clarification is needed to support the achievement of educational standards. For example, final examinations are very different; **questionnaires** for orientation (in terms of an educational standard) with special regard to the Busk topics are recommended.

The National Guild HVAC has a catalogue of topics for the final apprenticeship exam, certified by the Federal Ministry of Economy, Family and Youth. A similar catalogue of topics for the examination for the master craftsman's certificate is in preparation, the new examination takes

**Public presentation of skills:** To make the benefits for the graduates used optimally, it is important to process all relevant information in a clear way and make it public. Specifically that concerns on the one hand a clear and straightforward presentation of the skills acquired through the completion of the respective courses. On the other hand, graduates and courses attended and completed by them should be publicly cited. Such lists are already available in some areas (e.g. person certification, klima:aktiv competence partners<sup>38</sup>). A relevant effectiveness in terms of customer demand is only expected if this is valid throughout Austria, is always up to date and includes all training providers.

On one hand, the end user thus has a way to check whether the operator he selected really possesses the skills publicised, on the other hand companies can verify the information in the CV of a job seeker. Funding agencies could, in the case of additional points for the integration of skilled professionals, also rely on this data. Thus, it is also a quality feature for the offered courses, because their content and mediated skills are displayed publicly and transparently.

## **Modular systems in vocational education and training**

In order to allow a modular systematisation, educational offers should be defined, which can be classified in terms of the NQF, these are here referred to as "**competence modules**". The "competence modules" are to be specified for the relevant professional groups in terms of educational standards and coordinated with the construction industry.

The skills and competencies primarily necessary for the implementation of the Buildings Directive concern the following areas:

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<sup>36</sup> DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EG und 2003/30/EG

<sup>37</sup> [www.qualicert-project.eu/](http://www.qualicert-project.eu/)

<sup>38</sup> [www.maps.klimaaktiv.at/profis](http://www.maps.klimaaktiv.at/profis)

- window installation, air tightness of buildings, thermal insulation,
- heating system inspection, installation and optimization of heating, cooling and ventilation systems,
- cross-trade understanding.

It is to ensure that these **skills and competencies** in every vocational education and training for the trades of the construction and subconstruction industries at the level of **working procedures** are **defined** with respect to **standards** and other **guidelines**. The descriptions shall be prepared in coordination with the requirements of the NQF (focus on competences). Education providers build these competence modules into their offer and an approval for other qualifications would need to be regulated.

The guild of sanitation, heating and ventilation points out that a modulisation has already been carried out in its field.

The **inclusion of existing modules** is possible, for example, certified ETICS fabricators, certified heat pump installers, certified solar thermal installers.

**Basics of energy consulting** (Module A, Consortium Energy Consulting) will be implemented in basic education and vocational training of the construction and construction-related industries, thus the - often not thoroughly considered - cross-trade understanding concerning the energy performance can be improved.

As operationally applicable result there are recognised certifications relevant for vocational training available that can be achieved in several ways.

## Teaching staff

Because curricula are generally held, "it all depends on the people involved" (quote BUSk platform), so it appears productive to target the quality assurance of teachers / trainers. Although there are certain obligations of training for teachers generally, it is thereby not ensured that training on energy-related topics will be made use of. It is therefore up to the training providers to ensure the quality of its teaching staff also in terms of new European requirements.

In the school sector, offers of the colleges of education should be developed that are directed particularly at the leaders of professional groups in which teachers in vocational schools respectively in technical colleges for professional education exchange technical knowledge. Thus, through already existing networks of teachers, a multiplier effect for the dissemination of current, BUSk-relevant knowledge can be used.

One possibility is the evidence of appropriate **voactional training** as a **requirement** for the exercise of **teaching**, eg education certification for coaches, which is recorded in a central database. The type of training could be arranged on the basis of a competence grid to be developed for teachers in the area of construction and subconstruction industry with the employer / principal of the educational institution in terms of employee interviews.

An incentive for teachers for training consists in **subsidies for courses** that are only assigned when teaching staff is employed that is verifiable (training qualifications eg) up to date.

*"One possibility is a stronger acceleration of trainings for trainers in vocational schools and in companies. In the vocational school this could be increasingly trainings in cooperation with*

*companies, e.g., presentations and explanations of new plant technologies or field trips to plant manufacturers.” (Build Up Skills Status-quo-Report)*

## Target group oriented vocational training

The BUSk strategy aims on the one hand at training offers attractive for the target groups, on the other hand, at the creation of conditions so that these offers are also accepted to an appropriate level. On the question of lifelong learning, there are already two Council of Ministers lectures. It is aimed to make learning more attractive, also to consider the needs of the economy.

More detailed information is available about the motivation for vocational training in the field of construction academies: Over 65% of the trainees express an interest in vocational training; this number has increased by about 10% since 1999. 14% of respondents have already made use of training, 19% are currently in training. The results show that training for human resources development of the company brings positive effects (eg, higher loyalty to the company).<sup>39</sup>

Mandatory measures for vocational training seem hardly productive, according to the experience of stakeholders; hence the motivation for training must be strengthened. The demand for training can be enhanced by:

- Courses that are **coordinated with the construction industry**, so that graduates of these courses will be preferred at employments.
- To further develop qualifications - successful in the content and structure – to a **standard** distinguishable and valuable for companies (eg certified EIFS<sup>40</sup> skilled workers as a role model for other associations, passive house craftsman courses)
- Fix appropriate and **attractive training methods**: On the job training – learning on-site, see also project idea, quality assurance representative on-site; encourage, promote, implement and evaluate adequate pilot projects
- Further development of approaches for an **educational certificate** for workers (based on Europass)

Studies showing that better **skilled workers cause fewer defects and damage** are not yet available, but could be a good argument for employers to pay higher wages.

Not least, the **end consumer** must be informed directly. It is important within the general public to emphasize the importance of the highest quality on-site. The project consortium recommends to realize this through easy to understand, broad-based information material (see "bau fair!"). This material could be arranged by the authority, for example, when handling applications for funding or building, and be available for download on relevant websites.

## Improving the attractiveness of apprenticeships

The situation of apprenticeship training shows that under the current conditions, a high level can be achieved (see international success of the Austrian apprentices at competitions), however often complaints of inadequate skills exist.

<sup>39</sup> Ausbildung in den Bauakademien, ibw 2012,

[www.ibw.at/components/com\\_redshop/assets/document/product/1355822651\\_kurzexpertise\\_ausb\\_bauakademien.pdf](http://www.ibw.at/components/com_redshop/assets/document/product/1355822651_kurzexpertise_ausb_bauakademien.pdf)

<sup>40</sup> Exterior Insulation Finishing System

The lack of attractiveness of apprenticeships is noticed by the falling number of apprentices, adding to high dropout rates (the dropout rate in some areas of apprenticeship training in construction and subconstruction industry is at about 50%). There are statements of auditors to the final examinations of apprenticeships that the achievement of learning objectives is difficult to ensure; however, also regional differences are evident.

*"The number of apprentices threatens to drop over the next 14 years from current 40,000 to almost 24,000. This is caused by the low birth rate and the trend to higher education."*

*"The result is a blatant lack of skilled workers and migration of companies. The business location Austria and our dual system of vocational education - as an important locational factor - are therefore at serious risk." (cooperative education concept)*

*"Increase the proportion of apprentices and apprenticeship graduates passing the vocational matriculation examination from around 2 percent in 2008 to 10 percent in 2020." (LLL strategy p. 4)*

The problem is known in the trade guilds, countermeasures have been tried for some time now. Image campaigns such as "Apprentice hero"<sup>41</sup> can be supportive, but the basic problems must also be accurately analysed and solved.

The solution of the problem often relies on immigration, but an apprenticeship on the construction site has currently no attractive image for many young immigrants. Poorly or untrained workers need appropriate offer for vocational education and training.

**Companies providing apprenticeship** have an important role as educators. For the apprenticeship of clerk there is a **training guide** as a practical guide available, another one is being created for the apprenticeship of installation technology. Such guidelines are also recommended for the apprenticeships of brick layers, carpenters, electricians, and roofers. In the training courses for employers providing apprenticeship relevant information can be given.

In the field of HVAC, clarifying the role of the special modules (green energy technology, process and control technology, planning of building services) is required, also as training in the scope of adult education (in the vocational training school) and equality with tertiary education (scholarships).

Since in practice apprentices in companies, in some cases, can not learn the full range of activities - this applies in particular to BUSk-issues - the possibility of a **training association** already exists:

*"If all the training content can not be taught in full (sic), there is the possibility of apprenticeship training under an apprenticeship training alliance whereby supplementary training measures are implemented in another company suitable for this operation."<sup>42</sup>*

It is to examine whether this possibility could be used more in future.

The **cooperative education** spans a roof over all degrees of vocational education and training in the tertiary education sector and enables the transmission of secondary education up to Bachelor Professional (corporate education concept of WKO, Austrian Economic Chambers):

*"The goal is, given the impending skills shortage, to make vocational education more attractive (especially the apprenticeship), by offering further preparatory training courses for high-skilled occupations and management positions via cooperative education. Within the special fields also the*

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<sup>41</sup> <http://www.lehrlingshelden.at/2013/>

<sup>42</sup> [www.wko.at/wknoe/ba/Das%20erstmalige%20Ausbilden%20von%20Lehrlingen-08.pdf](http://www.wko.at/wknoe/ba/Das%20erstmalige%20Ausbilden%20von%20Lehrlingen-08.pdf)

*transparency towards (private) universities and colleges should be ensured - if necessary, combined with additional qualifications.”*

Access to cooperative education is opportune for mainly vocational qualifications (for example, apprenticeship graduates, master craftsmen, foremen, business administrators and technicians). This requires a successfully completed apprenticeship examination. A school leaving examination (Matura) or a certificate of general educational development is not required, but professionally qualified can - with proof of professional qualification - study at the cooperative education as well.<sup>43</sup>

**Apprenticeship with school leaving examination:** the model has been around since 1997. Since fall of 2008, apprentices can sit the final examination even free. Classes are held in a block schedule, but theoretically, candidates can also take part examinations without preparation classes (German, modern foreign language, mathematics and a special field from the apprenticeship profession). The lessons take place in parallel to in-company training and parallel to the attendance at the vocational training school. The training time might need to be extended as a result.<sup>44</sup>

Other models are industry-wide training in Germany<sup>45</sup> as well as secondary academic school upper level with apprenticeship and industry apprenticeship.

The project consortium points out that all young people should be **informed on possible training paths** already in the decision phase.

The updating of **job descriptions** is done in intervals of several years. For updates in relation to the energy-related descriptions a working group with the participation of the social partners, the Institute for Research on Qualifications and Training of the Austrian Economy, ibw and vocational training schools will be established by the Federal Ministry of Economy, Family and Youth, BMWFJ.

### 3.5 Quality in the construction sector

The control of quality, required by the building laws and funding, plays an important role in **ensuring the energy targets** and influences the **demand for training** essentially, as the companies have to take action if the inspections are not satisfying. The EU Buildings Directive requires: *“In order to ensure the quality of energy performance certificates and of the inspection of heating and air-conditioning systems throughout the Union, an **independent control mechanism** should be established in each Member State.”*

*“Since local and regional authorities are critical for the successful implementation of this Directive, they should be consulted and involved, as and when appropriate in accordance with applicable national legislation, on planning issues, the development of programmes to provide information, training and awareness-raising, and on the implementation of this Directive at national or regional level. Such consultations may also serve to promote the provision of adequate guidance to local planners and building inspectors to carry out the necessary tasks.”*

**This request provides an essential basis for the requirements on the qualification schemes to be prepared by BUILD UP Skills and must be coordinated with the federal states.**

<sup>43</sup> [http://portal.wko.at/wk/dok\\_detail\\_file.wk?angid=1&dodid=1879127&conid=636056&stid=676927](http://portal.wko.at/wk/dok_detail_file.wk?angid=1&dodid=1879127&conid=636056&stid=676927)

<sup>44</sup> [www.wko.at](http://www.wko.at) (Abteilung Bildung)

<sup>45</sup> [www.arbeitsagentur.de/nn\\_453912/Navigation/zentral/Unternehmen/Ausbildung/Ausbildungsformen/Ueberbetrieblich/Ueberbetrieblich-Nav.html](http://www.arbeitsagentur.de/nn_453912/Navigation/zentral/Unternehmen/Ausbildung/Ausbildungsformen/Ueberbetrieblich/Ueberbetrieblich-Nav.html)

## Quality control at construction inspections

The understanding must be created that in future as part of the control system the following points relevant to the operators will be checked:

- Consistency of declared components and qualities in the Energy Performance Certificate in planning (planning protocol) and in the implementation
- Performance of systems over inspection protocols
- The functioning of the corresponding databases (currently ZEUS, AGWR database, product databases [www.produktdatenbank-get.at](http://www.produktdatenbank-get.at), [www.baubook.at](http://www.baubook.at)) should be explained in appropriate courses shortly.

There are basically two types of construction inspections:

1 The usage permit by the construction authority (the final inspection by the authorities), in which a check is carried out in accordance with the building regulations (it is only allowed to move in after the final inspection by the authorities).

2 The acceptance of the building works or partial performances by the constructor or his authorized representatives, where the completion of the contract is confirmed and verified.

A recommendation in this roadmap is that official inspection checks in the construction sector should in no case be reduced (the job-site inspection after completion is no longer performed in some federal states), but are to be strengthened on the contrary, especially with regard to energy aspects. As a consequence, the monitoring of calculated indicators in the energy performance certificate should be improved (especially solar yields at larger plants, seasonal performance factors of heat pumps).

The field inspection by which the constructor acknowledges the works of its contractors as met is basically regulated in ÖNORM B 2110, Austrian Standards Institute. In the inspections, the energy efficiency should be checked. In addition to the standard **inspection protocols** there are a number of additional recommendations and checklists, as the standard inspections currently do not contain the essential criteria of energy efficiency. The inspection protocols should be adapted by the guilds and associations where necessary (eg inspection of ventilation systems according to the protocols of the association [komfortlüftung.at](http://komfortlüftung.at), air tightness test as a standard at the inspection of buildings with air conditioning).

The **information of clients** (and constructors) about differences in quality should be strengthened in order to boost the demand for higher value offers and implementation in the market (see, eg initiative [www.baufair.at](http://www.baufair.at): checklist for selection of construction companies; klima:aktiv competence partner [www.maps.klimaaktiv.at](http://www.maps.klimaaktiv.at) / professionals). This is an important prerequisite in order that qualitative differences in the training show an impact in the market.

**Trade transitions** on-site are a problem area. § 150 of the trade law and the so-called "ancillary rights" (control which execution a trade is allowed to "work over" into the next trade) are in constant discussion. Quality assurance at the interfaces should be a higher priority in vocational education and training.

The execution of construction work through companies with limited powers as a sub-contractor can threaten the quality.

On the part of the Austrian Economic Chambers / Construction Guild is noted that quality assurance measures must be practicable and inappropriate bureaucratisation is to be avoided.

Clear quality requirements are well suited as a basis for practical training, eg in the context of enterprise networks. An example is the IG Passivhaus (community of interest), which sees itself as a network for information, which according to statute, understands quality and vocational training and fosters corresponding training activities.

### Quality coach on-site

In order to ensure economic success, learning and in-company education in many industries are part of corporate strategies to support communications, learning and change processes. In-house trainers are not yet widespread in the construction sector according to the Institute for Research on Qualifications and Training of the Austrian Economy, ibw.

The concept "Quality coach on-site", developed within the scope of the platform and welcomed by many, takes effect here: Older, experienced, e.g. less fit building professionals (e.g. builders after a herniated disc) compliment the construction management respectively the local construction supervisor on-site by improving the skills of workers meaning "on the job training" and pay special attention to the proper execution in the problem areas listed above. This requires appropriate vocational training. The qualification requirements include: cross-trade comprehension, quality assurance referring to in-between inspections (avoid common mistakes, especially in terms of thermal insulation systems, building tightness, building services engineering); ancillary rights.

The activity of quality coaches, on the one hand, can be affected through the existing arrangements for local construction supervision on-site, eg in terms of an additional meaning an active assistance (see Guidelines for estimating costs of planning services<sup>46</sup>):

*Point 1.3. Monitoring the execution of the work for compliance with the regulatory prescriptions and the construction contract including implementation plans and specifications according to the recognized rules of technology and the relevant regulations (eg OIB Directive 6); 3. Quality control, 3.1. Plausibility check of the quality standards represented in the planning, 3.2. Quality control and dimensional check in the framework of a required test and the duty to warn)*

The second option is the use as an assistant for construction management, whereas here the focus will be on monitoring the proper execution of all building construction trades as well as the guidance of the building staff.

The activity of the quality assurance coaches could be used jointly by several companies meaning corporate alliances, especially also qualification associations. Qualification associations offer small businesses the opportunity for capacity building, but since there are currently no known activities for it in the construction sector, the development of appropriate networks should be particularly pushed.

Persons qualified as Quality coaches are to be available in a pool for voluntary usage.

The financing of the required training is seen as a classic Public Employment Service Austria, AMS measure, as the target group of older workers is a priority.

<sup>46</sup> [http://portal.wko.at/wk/dok\\_detail\\_file.wk?angid=1&docid=1936154&stid=690690](http://portal.wko.at/wk/dok_detail_file.wk?angid=1&docid=1936154&stid=690690)



Funding of the execution of work for the particular company can be carried out within the framework of a placement foundation. This is a labor *market policy action plan of a foundation unit that is one or more companies whose personnel needs of the labor market can not be provided, and is based on the targeted qualification of potential future employees.*<sup>47</sup> Funding for employment as well as additional country-specific financing are possible.

Contributions of companies to finance the measure are expected, since the companies benefit from better workmanship and less structural damage. The collaboration between the Public Employment Service Austria AMS and the economy takes place through the participation of companies in the pre-selection of participants; in return, on the part of the AMS employments are expected after a certain date. The measure is also economically meaningful: later retirement, use of know-how (productive ageing<sup>48</sup>).

### Detection of defects and damages as a basis for training

The basis for effective improvement measures should be the **type and frequency of the mistakes** in the construction and installation phases which result in a lower than required energy performance. An institute for structural damage was already founded on the initiative of the National Guild of Construction and of the builder's risk insurance.

The **research for structural damage** is very important for the construction industry, but it is almost impossible to finance it through existing research funding instruments, because the measures to reduce structural damage are not seen as an innovation. In terms of a suitable description of the concept of innovation (Innovation must be discovered/invented, introduced, used, applied and institutionalized.<sup>49</sup>) the continuation of the series of structural damage reports should be ensured through funding, the study of the implementation quality should be strengthened, and especially in the field of building services engineering expanded. In addition to the classical structural damage, defects limiting the energy efficiency are especially important to take into account.

The processed results are to be included in vocational education and training ("The 10 most common mistakes and how to avoid them" - in the areas of building tightness, thermal insulation systems, heat pumps, solar systems, heating installation, etc.).

A contribution to or an absorption of costs by institutions that are interested in the reduction of shortcomings in the execution of work (insurance companies, manufacturers eg via associations) was discussed and is recommended by the project consortium.

### Insurance

Other proposals refer to insurance which rates premiums by relative damage frequency and risk assessment. In this context, clearer rules on the definition of construction defects and damage have been proposed by the insurance industry. In the **insurance for construction supervision, public liability**, as well as in **builder's liability insurance** more favorable insurance premiums are already provided for firms with higher qualified staff. Insurance companies react very quickly to current

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<sup>47</sup> [www.ams.at/\\_docs/900\\_implacementstiftungen\\_info\\_f\\_unternehmen.pdf](http://www.ams.at/_docs/900_implacementstiftungen_info_f_unternehmen.pdf)

<sup>48</sup> [www.ams.at/\\_docs/PA\\_Impulse\\_08.pdf](http://www.ams.at/_docs/PA_Impulse_08.pdf)

<sup>49</sup> <http://wirtschaftslexikon.gabler.de>



changes in the market. Other risk-reducing measures, such as training related to damage frequency will therefore be of increasing importance for insurance holders.

### Quality requirements in public calls for tenders

Qualitative aspects related to the **energy performance** should be better taken into account in the (public) calls for tenders and their **compliance checked** in more detail.

The requirement specification for **sustainable public buildings** by the department for structural engineering from the office of the federal state government of Vorarlberg shows how - in addition to technical requirements - the process of networked planning and quality assurance can be placed at the center of attention.<sup>50</sup> Similar processes should be implemented in all building administrative departments.

**Qualification certifications** of the performers could be important for the criteria of calls for tenders, for example by therefor taking into account additional points in awarding processes. Such arrangements would need to be developed in line with the public representation of skills, as proposed in chapter 2.3. Thus, the companies are made clear that further training is needed. For more extensive orders, bigger companies are also encouraged to update the skills of their employees to the current required level.

## 4 Action plan

The Action Plan is divided into measures (M) and accompanying measures (A). It was created to complete the work of the platform BUILD UP Skills Austria in accordance with the measures formulated in chapter 3.

### M1: Coordination of the vocational training offer

Objective: coordinated training offer, harmonised with the main actors for approximately 25,000 persons

Time: 2014 to 2020

Measures: Ensuring the coordination of the training offer including existing structures such as within the framework of the Austrian climate protection initiative. The courses are conducted by educational institutions as part of cooperation agreements. The coordination is responsible for customising the training offer. The coordination endorses the clear definition of the learning objectives and course concepts compatible to the NQF, provides for attractive and tailored to the BUILD UP Skills Strategy courses including funding options and supports the implementation in agreement. The quality assurance, which is conducted by the education providers, is the basis of the overall monitoring, which is carried out by the coordination.

Resources: The task can largely be handled by the existing klima:aktiv coordination of education and training, the initiative is scheduled till 2020. Additional resources should be provided to cover the additional focus in the field of implementation as well as for monitoring and reporting of BUILD UP Skills. Cost estimate for additional activities is 20,000 € p.a., provided that the klima:aktiv coordination of education and training persists.

<sup>50</sup> [www.vorarlberg.at/vorarlberg/bauen\\_wohnen/bauen/hochbauundgebaeudewirtschaft/start.htm](http://www.vorarlberg.at/vorarlberg/bauen_wohnen/bauen/hochbauundgebaeudewirtschaft/start.htm)

Stakeholders: Federal Ministry of Agriculture and Forestry, Environment and Water Management, Federal Ministry of Economy, Family and Youth, National Guilds of Construction and of HVAC, educational institutions, funding agencies

### **A1: Focused implementation of existing strategic plans**

Objective: use of existing strategic processes for BUILD UP Skills

Time: immediately

Measures: The status of implementation of the identified points of existing strategic plans (Austrian Strategy for Lifelong Learning, Master Plan Green Jobs, Public Employment Service Austria - Standing Committee on New Skills, Master Plan Human Resources Renewable Energy) is to evaluate taking into account the thematic relationship and the target groups and a corresponding implementation report is to create.

Resources: can be handled within the framework of Measure 1

Stakeholders: persons responsible for the implementation of the strategic plans are from the respective ministries (Federal Ministry for Education, the Arts and Culture, Federal Ministry of Economy, Family and Youth, Federal Ministry of Labour, Social Affairs and Consumer Protection, Federal Ministry for Transport, Innovation and Technology)

### **A2: Practice of granting powers in trade licenses**

Objective: to ensure qualification through readjustment of the powers in the Industrial Code

Measure: Decree that regulates the granting of trade licenses from the district authorities regarding the required qualifications in more detail. The granting of trade licenses must be arranged in a way that the competence of the energy efficient implementation of energy-relevant systems becomes a crucial criterion.

Time: 2014

Resources: in the framework of administrative activities

Stakeholders: district authorities in coordination with guilds and the Federal Ministry of Economy, Family and Youth

### **A3: Using instruments of labourmarket policy**

Objective: using instruments of labourmarket policy

Measures: Support for workers within the meaning of the Public Employment Service Austria AMS target setting "*support for career advancement*" is particularly in the target area of the workers a major incentive for vocational training. It contributes to securing jobs and should therefore be retained in the new funding period.

The coordination of the New Skills Initiative of the Public Employment Service Austria (AMS Standing Committee on New Skills) with BUILD UP Skills and the Industrial Association is done in the "follow-up workshops" in the business clusters "Construction and Building Ecology" in April 2013.

The use of funding opportunities for vocational training has to be strengthened through appropriate measures, particularly in the area of information.

Time: immediately

Resources: no additional resources needed

Stakeholders: Social partners, Federal Ministry of Labour, Social Affairs and Consumer Protection

#### **A4: Coordination of the search engines for courses**

Objective: clear arrangement of the course options

Measures: coordination of the search engines for courses (does not apply to private education providers)

Time: immediately

Resources: This measure could largely be funded from savings when parallel structures are merged

Stakeholders: providers of the course searches, funding agencies, educational institutions

#### **A5: Representation of skills**

Objective: Public representation of verified skills acquired through training

Measures: coordination of existing representations and establishment of an appropriate database for representation and application

Time: immediately

Resources: this measure could partly be financed from savings when parallel structures are merged

Stakeholders: guilds, educational institutions

#### **A6: Supervision of works**

Objective: improved supervision of the planned construction process in relation to the energy relevance, since this is one of the most essential prerequisites for the increased use of training

Measure: ensure the check within the scope of the final inspection by authorities (occupancy permit); in federal states where a completion report is sufficient, adequate control samples have to be drawn

Time: 2013-2020

Resources: in the field of the provincial government authority, no specification is possible here

Stakeholders: construction divisions at the provincial level

#### **A7: Detection of defects and damages as a basis for training**

Objective: prevention of structural damage

Time: 2013-2020

Measure: extending the research on structural damage

Resources: research on structural damage, climate and energy fund KLI.EN, to seek co-financing through affected insurances and manufacturers' associations

Stakeholders: funding agencies, guilds, professional institutions

### **A8: Reduction of insurance premiums for qualification**

Objective: create an incentive for training through more favourable insurance premiums

Measure: hold conversation with the insurance companies

Time: 2013-2020

Resources: can be handled within the framework of Measure 1

Stakeholders: guilds

### **A9: Quality requirements in public calls for tenders**

Objective: clear quality requirements in public calls for tenders

Measures: check of standardised technical specifications and inspection routines, implementation of procurement guidelines

Time: immediately respectively according to the EU Directive

Resources: in the field of authorities, no specification possible

Stakeholders: provincial government authority, municipalities, federal government (including outsourced companies)

### **A10: Update the job descriptions**

Objective: job profiles describe energy-relevant skills in the construction sector

Measures: to update the job profiles in terms of energy-relevant descriptions a working group with the participation of the social partners, the Institute for Educational Research ibw and vocational training schools is set up by the Federal Ministry of Economy, Family and Youth

Time: 2013 - 2014

Resources: in the field of administration

Stakeholders: Federal Ministry of Economy, Family and Youth, Federal Ministry for Education, the Arts and Culture, social partners, Institute for Educational Research ibw

### **A11: Guidelines for vocational education**

Objective: companies providing apprenticeships impart the energy-relevant skills

Measure: Creation and distribution of guidelines for vocational education for enterprises providing apprenticeships with practical instructions and special consideration of the energy importance for the apprenticeship professions of brick layers, carpenters, electricians, roofers, in addition to the guidelines for installation technology already in preparation.

Resources: not specified here

Stakeholders: national guilds

## **M2: Cross-trade vocational training**

Objective: To contribute to building the skills of the operators and skilled workers in the Austrian construction industry, which are necessary to achieve the lowest-energy building standards. The trainings shall be designed in a way so that a sufficient broad effect can be reached. The corresponding education and training need by the year 2020 comprises a total of about 25,000 people.

Measures: Phase 1: Development of a broadly coordinated qualification concept according to the description given in the Annex, including implementation and first implementation steps; Phase 2: to ensure the continuation of the intended extent until 2020

Time: Phase 1: 2013-2015, Phase 2: 2015-2020

Resources: Phase 1: 300,000 €; funding from the EU, contributions of the economy

Stakeholders: close cooperation of corporate associations that collaborate on the development and dispatch their staff to vocational training; educational institutions in the construction industry, where the developments take place; specialised institutions for the design of the qualification concepts and assurance of the learning outcomes

## **M3: Quality coach on-site**

Objective: Increasing the quality of the workmanship

Measure: develop a task profile "Quality coach on-site", of an appropriate qualification and of an organisational concept in combination with company associations, Public Employment Service Austria (AMS) funding of the activity of about 50 quality assurance managers in a pilot phase

Time: 2013-2020

Resources: development of a task profile and qualifications: 30,000 €, organizational concept: 10,000 €, Public Employment Service funding of the activity: 50 people, 50% of wage costs: € 1,5 million p.a.

Stakeholders: guilds, Federal Chamber of the Architects and Engineering Consultants, Public Employment Service Austria and other funding agencies, educational institutions

## **M4: Additional qualification for the inspection of heating and air conditioning systems**

Objective: to ensure qualified staff for the inspection of heating, ventilation and air conditioning systems

Measures: Clarification of the legal framework (powers) to carry out the inspections, including the recommendation of the Buildings Directive to connect inspections and the issuance of energy performance certificates, check for existing and additional required skills for the recommendations on the energy performance in inspection reports, implementation in vocational education, development of appropriate training. The training can be designed only after defining the framework, coordination between the federal states is recommended.

Time: current, according to the EU Directive

Resources: design of training about 20,000 €, implementation is carried out by the conventional conditions in the education market

Stakeholders: Federal Ministry of Agriculture and Forestry, Environment and Water Management, provincial institutions, guilds HVAC, chimney sweepers, standardisation committees, vocational education providers

## **M5: Training of the teaching staff at vocational training schools**

Objective: teaching staff is up to date

Measures: options of colleges of education for vocational training teachers

Recommendation to vocational education providers and funding bodies (proof of appropriate training, to ensure the offer of adequate "train the trainer" seminars)

Time: immediately

Resources: development of a training concept, implementation largely in the context of existing structures

Stakeholders: Federal Ministry for Education, the Arts and Culture, funding agencies, educational institutions

## 5 Monitoring

The monitoring system is carried out according to the requirements of Intelligent Energy Europe: **Monitoring** of the progress of the proposed measures, namely definition of indicators and of follow-up activities necessary to monitor and report on the implementation of the proposed measures.

Referring to the measures and accompanying measures, the monitoring indicators (MI) and monitoring measures (MM) are described as following:

### **M1: Coordination of the training offer**

MIM1: number of people trained per year, number of employees, structural damage declines; space heat demand falls

MMM1: screening of information on relevant training options and their graduates; review of statistics on structural damage; review of the national greenhouse gas inventory of the Environment Agency Austria

### **A1: Focussed implementation of existing strategic plans**

MIA1: implementation report

MMA1: review implementation report und where necessary set controlling measures

### **A2: Practice of granting powers in trade licenses**

MIA2: decrees have entered into force

MMA2: review the decrees on the trade law

### **A3: Using instruments of labourmarket policy**

MIA3: support services for career advancement are accepted; new information regarding funding is available

MMA3: review and evaluation of the Public Employment Service Austria statistics regarding the number of participants and usage of funding

### **A4: Coordination of the search engines for courses**

MIA4: clear and complete course offer concerning BUSk-relevant topics is available on an internet platform

MMB4: progress reports on the creation of this central information offer

### **A5: Representation of skills**

MIA5: public representation of verified skills in a central data base

MMA5: progress reports on the creation of this central information offer

### **A6: Check of the workmanship on-site**

MIA6: percentage of the checked workmanship on-site increases by the factor X

MMA6: demand in the construction divisions of the federal states

**A7: Detection of defects and damages as a basis for training**

MIA7: report on structural damage is extended by BUSk-relevant activities; structural damage declines

MMA7: report on progress for extending the research on structural damage and its reporting

**A8: Reducing insurance premiums when qualification**

MIA8: insurance contracts are adapted

MMA8: review of the minutes of meetings of guilds and insurance; qualitative survey of graduates and their companies; survey of insurance companies, which deal with structural damage

**A9: Quality requirements for public calls for tenders**

MIA9: public calls for tenders include quality requirements suggested by BUSk

MMA9: interview with the Federal Procurement Agency; including the platform for sustainable procurement

**A10: Update of the job profiles**

MIA10: job profile descriptions are up to date

MMA10: interview with stakeholders

**A11: Guidelines for vocational education**

MIA11: guidelines for vocational education are up to date

MMA11: interview with stakeholders

**M2: Cross-trade training**

MIM2: cross-trade training exists; number of participants

MMM2: review of the statistics on the participants; listing of the offered courses

**M3: Quality coach on-site**

MIM3: number of quality assurance representatives on-site

MMM3: survey of the Public Employment Service Austria responsible persons and the companies involved

**M4: Additional qualification for the inspection of heating and air conditioning systems**

MIM4: an appropriate qualification offer exists

MMM4: demand in the Federal and energy agencies (KLEA)

**M5: Training of the teaching staff at vocational training schools**

MIM5: seminars take place, teaching staff at vocational training schools is up to date

MMM5: demand at the colleges of education



## APPENDIX:

An important result of the work of the Platform BUILD UP Skills Austria is the elaboration of required qualification measures. First starting points for cross-trade trainings are outlined here. In the second stage of BUILD UP Skills (Pillar 2) appropriate project proposals for funding from the Intelligent Energy Europe will be submitted.

### Cross-trade training

#### General requirements

##### Objective:

Contribution to building those skills of operators and skilled workers in the Austrian construction industry, which are the most needed according to the results of “BUILD UP Skills Austria” for the achievement of lowest-energy building standards.

##### Conditions:

- The trainings shall be designed in a way so that a sufficient broad effect can be achieved and the qualification requirements can be covered in a range of about 24,000 people by the year 2020.
- The qualification measures are an Austria-wide standard, which is supported by the affected economic sectors.
- The qualification measures are embedded in a modular concept that significantly appeals for participants (eg credit for further qualification).

##### Learning objectives:

- Provide the necessary understanding of the importance and requirements of lowest-energy building standards
- Knowledge of common bad workmanship that affects the achievement of the values in energy performance certificates – developing the necessary skills
- The understanding of the interaction of trades should be strengthened through hands-on tasks

##### Target group:

Construction managers, foremen, skilled workers in construction and related industries

Primary: bricklayers, timber construction, carpenters, technicians for plumbing, heating, ventilation, electrical engineering, building services and communications

Also: roofers, glaziers and plumbers, potters, painters, joiners and window carpenters, metal technicians, builder’s support industry

### Requirements for the course standard “Cross-trade training on-site”

#### Austrian-wide standard

- The development of an Austria-wide standard with modular extensions is desirable. These include inter alia the Austrian courses to become a passive house craftsman and courses on other building designs that reach the lowest-energy standard.
- The implementation of the courses takes place with the relevant educational institutions and is assured by a yet to be defined more precisely contractual agreement.

### **Course description**

According to the intentions of the NQF - even if exact compatibility currently does not seem possible, key points are clear enough to describe:

General course objective, entry requirements, target group, summary/overview of the content, practical components, learning targets catalogue (details see below), examination regulations, certificate/document, possibility of representation in the European points rationing scheme ECVET (European Credit system for Vocational Education and Training), lecturers, schedule, course location, contacts, opportunities of utilising funding for organisers and participants

### **Training documents**

To be created by utilising documents which have been developed through public funding or taking already existing materials (at appropriate cost-benefit ratio)

### **Minimum period**

Basic module 2 days, coordination with more extensive courses, clarification of crediting

### **Course provider requirements**

- Proof of a thematically relevant portfolio
- Equipment and availability of facilities for practical work: producing airtight and windproof construction with consideration of other installation work, measurement of air tightness of buildings, adhesive technology; window/door installation and manufacturing of connectors, roof windows, blinds boxes and shading devices; system controlled ventilation with measuring and control devices; wall mountings
- Coach: proof of a yet to be developed train-the-trainer daytime seminar or proof of passive house craftsmen coach
- Check/ensure the learning success: independently solved tasks in the course process, photo documentation and confirmation of the coach
- Monitoring: notice to a to be defined BUSk monitoring agency
- Evaluation: feedback of participants, further enquiry at the company one month after course completion
- Modularity and transferability: description in a way that allows for an assessment of ECVET
- Cost: about € 250 per participant without funding

### **Notes on developing a catalogue of learning objectives:**

In each course, all three areas are to be dealt with; the weighting may vary depending on the target group. Courses could also be conducted on suitable construction sites with appropriate trainers. The listing is offered as a first orientation and is to be understood as minimum program for workers only active in operation. The learning outcomes have to be ensured personally (form for taking the minutes and photo documentation).

Create an understanding by learning from real life situations:

- The participant should be able to take a position in a conversation to the following questions: Why does a building need energy, in which dimensions? What are the problems of high energy consumption? What is the Energy Performance Certificate and what does it have to do with the quality of workmanship?

- The participant should get to know project examples (buildings with poor energy efficiency, building standard 2007, lowest-energy buildings, passive house) and draw a comparison with their own living situation
- The participant should be able to answer the most important questions of an average resident to the Energy Performance Certificate (general knowledge of the units W, kWh, heating demand, primary energy input, CO<sub>2</sub>, total energy efficiency factor fGEE)

Building envelope, especially practical exercises:

- The participant can roughly estimate (rule of thumb) the dimensions of heat losses (transmission and ventilation/leaks) and gains (solar, internal)
- To know and understand the relevant information on building and insulating materials (for example, lambda value on insulation packaging) (consequences of use of other materials, for example when supply problems)
- Windows and doors can be installed in coordination with standards and optimized referring to thermal bridges,
- To be able to identify, know and avoid frequent errors in the air-tightness
- Detect errors in a blower door test,
- Recognize thermal bridges and correct implementation mistakes; to know how mistakes are becoming visible through thermography (image descriptions)

HVAC:

- The participant understands by the examples shown that building engineering systems (reference systems) only work efficiently for the lowest-energy house standard in the energy performance certificate if the building conditions are right
- The participant knows the most important points on which cross-trade agreement with renewable energy technologies, low temperature heating systems and comfort ventilation systems are required.
- The participant independently detects errors associated with ventilation system:
  - Air quality control of the system during construction
  - Interference of the flow, of the flow efficiency
  - Additional points see various studies (Bildung of tomorrow, komfortlüftung.at)

Specializations (further seminars):

- Handling of the (thermal) refurbishments of old building structures, according to the role model of already existing training for old craft techniques. Based on this, there should be courses in the future, which deal with the provision of the building physical function of these old buildings, in order to create an understanding of specifically modern and damage-free (thermal) refurbishments.
- Assembler trainings for the installation of renewable energy systems

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The Austrian project team wants to express its gratitude to the following persons for their important contributions to the Austrian roadmap:

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Table 4: Contributors to the Austrian roadmap (reference: 17&4 Consulting Ltd.)



## 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.

### Austrian consortium:

