



*TUNE UP!*

EU SAVE 13

**17&4 Organisationsberatung GmbH**  
**Institute for Advanced Studies**

## **EU SAVE 13 TUNE UP!**

### **Partners:**

bfi- Berufsförderungsinstitut Vienna  
Associacio Ecoinstitut d'Ecologia Aplicada  
Ecoserveis Barcelona  
Handwerkskammer Hamburg ZEWU  
UNICA - Unione Italiana Consulenti Ambientali  
Ecological Institute Veronica

This report is based on the outcome of a project: EC Contract 4.1031/P/00-013/2000: Development of a distant-learning training module on energy efficient integrated building design in Urban Environment and Pilot action involving the production and promotion of modules for the initial training for building professionals and craftsmen/technicians”

### **5) Results of the project and Recommendations**

## 1. Introduction

The *TUNE UP!* project was part of the European Project Programm SAVE 13 and was focussed on the development of a *guideline TUNE UP!* to incorporate energy efficiency into training plans for building professionals and craftsmen/technicians. The Institute for Advanced Studies was involved in the project with support and advisory in developing and establishing the guideline and to accompany the project development with a social science approach.

The specific targets of the *guideline TUNE UP!* , developed in the frame of the second objective, were:

- Promotion of exchange of experience and know-how in the field of energy efficiency
- Improving coordination between international, Community, national, regional and local activities
- Synergies between energy policy on local/national/European level and vocational training institutions.
- A new dynamic approach to integrate energy efficiency in vocational training based on a practical ready to use *guideline TUNE UP!*.
- *TUNE UP!* implements energy efficiency not only from a technical point of view, it also represents the state of the art in social science to guarantee a maximum of success.
- *TUNE UP!* is a program with participation of representatives of all geographical parts of Europe, a key issue for efficient transfer of experience and good practice within the European Union.
- *TUNE UP!* shall be disseminated to initiate follow up activities in many European cities.

The project team found a lot of interest in the *TUNE UP!* approach during the whole project period and could start a dialogue between institutions and persons who are active in vocational training and administration on various levels.

The project *TUNE UP!* is finished now, but the effects on vocational trainings will be sustainable. The project has already initiated ideas for follow up projects, invitations to the project partners to report about *TUNE UP!* on seminars or other events and request for consulting for design of vocational training.

Therefore the project was a great success for the initiators and for all cooperation partners.

The following publication will therefore give some insights into the project outcome. For more information see: <http://www.ee.uni-lj.si/SAVE13> >>*TUNE UP!* homepage

Margit Leuthold, Institute for Advanced Studies  
Johannes Fechner, 17 und 4 GmbH

## 2. TUNE UP! Aims and methods

TUNE UP! is a new dynamic method to incorporate energy efficiency and renewable energies in vocational training institutions, focus on training for building professionals, craftsmen/technicians.

The method is based on the practical guideline TUNE UP! designed to be applied in vocational institutes. The guideline TUNE UP! is presenting information how to start a “tuning up process” for Sustainable Energies in adult education. TUNE UP! has developed a useful toolbox with checklists, questionnaire, Good Practice catalogue.

Target group of this guideline is manager of vocational institutions, course manager, Energy Agencies in touch with education. The guideline was developed as a pilot action within the EU-SAVE program by vocational institutions, energy agencies, environmental NGOs, representing four geographical parts of Europe.

Guideline TUNE UP! is offering:

- \* Screening Tool - interview based screening method for training courses
- \* Good Practice - Catalogue of ideas for vocational training courses
- \* Seminar concepts – Transfer workshop and Train the Trainer Seminar
- \* Recommendations for follow up activities

### Screening Tool – interview based screening method for training courses

The European Commission identifies three main objectives of Community energy policy that take account of the environmental dimension:

- to promote energy efficiency/saving;
- to increase the share of production, and use, of cleaner and renewable energy sources;
- to reduce the environmental impact of the production and use of energy sources.

→ (GENERAL PROVISIONS, Integrating the environment into Community energy policy, <http://europa.eu.int/scadplus/leg/en/lvb/l28071.htm> )

New concepts of Life Long Learning make it possible to communicate aspects of energy efficiency via vocational education measures.

*“Networks of energy educators would be encouraged to develop energy management course material geared to comply with the EC policy based on the more appropriate multi-media technology and to disseminate this material as widely as possible. In the industry sector, industry associations would be motivated to develop and energy management programs and educational materials specific to their industry and distribute such materials throughout their specific industrial sector.”*

→ THE SAVE II AND ALTENER PROGRAMS, [http://europa.eu.int/en/comm/dg17/25fee\\_en.htm](http://europa.eu.int/en/comm/dg17/25fee_en.htm)  
Action program of the Committee: Specific Actions for Vigorous Energy Efficiency – SAVE (92/C/23/04)

The Screening Tool is designed to screen **vocational courses - to gather and to produce information**. The chosen approach was broad, the aim was to improve the aspects of energy efficiency in vocational courses. This method was worked out and used within the European project SAVE 13/TUNE UP! The screening covers aspects of:

1. Training concepts
2. Key-Qualification (competence for communication, counseling, quality management)
3. Technology, know-how and skills

The results cannot not be used for any kind of official ranking or labeling. The Screening Tool was developed for vocational training courses for skilled workers (manual workers, craftsmen), training on the job, train the trainer, “open universities”, distant learning courses, initial training e.g. for solar energy, heat pump installation, biomass heating systems, energy consulting and excludes all kind for education such as apprenticeship, second education system, academic education on university and similar level (for e.g. technicians, architects)

**The method** is following a systemic approach and is based on working theses.

We think that RUE and RES (Rational use of energy and Renewable energy sources) would be promoted best, if craftsmen/skilled workers ...

- have a benefit from the course for their professional career
- improve their communicative and co-operative skills
- know more about the background of energy use
- learn about best available technologies
- learn in their working team, i.e. if more than one employee from a single firm attends the course
- learn to use information sources further on
- are motivated to improve their working processes and life long learning
- craftsmen also can offer some qualification as counselors

The Screening Tool covers a wider range of aspects incl. organization aspects. E.g.: it matters if the course provider has special interests (e.g. in selling energy or special technologies). The number of participants and the continuity show if the course is a relevant contribution for sustainable energy systems.

Communication is regarded as an important key qualification, because it was experienced, that many mistakes and poor quality of buildings and housing techniques often are results of misunderstanding and bad communication systems between all who are involved in the building process. Better communication would lead to an improvement of quality standards and would low down additional costs caused by installation mistakes and cancellation.

On the other hand sustainable building technology integrates also socio-economic aspects of the building process for optimizing the building process and the positive environmental effects.

So the questions of this Screening Tool should give some ideas about potential improvement and raise interest in comparing the course with other courses.

### How to use this Tool?

The idea is to use it as a guideline for interviews. There are two modes of operation to work with the screening tool: *Description* and *Code* for quick view. It will be necessary to speak with the course manager or trainer and to order course material and some statistic data (number of participants, costs,...). Interviews with participants are also useful.

In the field **Description** one should give a short description (information, background information) regarding to the screening question. The **description** should point out **key issues**, remarks about **further information**, etc. The answers are open and should be evaluated on a qualitative level.

In the field **Code** you should fill in green, yellow or red (please refer to the comments). You find comments (go there with **cursor**) for the selection of color and you can **print out comments** as a list.

If there are numbers mentioned in the comments, please fill also in the number (means e.g. B 1).

→ With **Alt+A** you can produce a green field in this formular, **Alt+B** is yellow, **Alt+C** is red. If you press return you produce a square!

**The color mode stands for a rough evaluation:**

**A – green:** standard, high quality, well known, traditional, established, ...

**B – yellow:** attention, there exist some problematic issues – but may be interesting, innovative potentials

**C – red:** not efficient, bad quality management, aspects of renewable energy and efficient use of energy missing, important elements are missing, ...

**The general Description of the course should answer the following questions:**

- *Name, address and contact to the provider*
- *How and why the course was established:*
- *What/who was the initiative to start this course?*
- *Cooperation with public administration, companies, Institutes etc:*
- *Are there other courses offered in related fields?*
- *Are there any special problems (e.g. missing financial means for ...)*
- *What about future plans?*

***After a check, if the training is suitable to the evaluation concept, the following screening tool should be used:!***

1. Who is offering the course?		
	Description	Code <sup>1</sup>
<b>1.1 Institutional setting/kind of institution</b>		
1.1.1 Public education institution, (new) training organization, training company <sup>2</sup>		<b>A (green)</b>
1.1.2 Mostly financed by the state - privately financed or mixed financed <sup>3</sup>		<b>B (yellow)</b>
<b>1.2 Course settlement</b>		
1.2.1 Location: institute – training on the job - distance learning offer <sup>4</sup>		<b>C (red)</b>
1.2.2 Content management: information <sup>5</sup> website, folder, etc.		

<sup>1</sup> Color code is only an example

<sup>2</sup> 1.1.1 A - Public education institution, B – Private training organization or training company, C – no training institution

<sup>3</sup> 1.1.2 Mixed financing may contribute to continuity, private financing may stimulate a competitive situation, public financing allows education broader concepts... A – mixed financed; B – mostly public financed (e.g. basic financial support); C – only private financed

<sup>4</sup> 1.2.1 A – course is including training on the job (in company) and distance learning elements, (internet, incl. meetings and practical exercises), B – some elements as follows: ..., C – none

1.2.3 Integration <sup>6</sup> of the course into daily professional routines		<b>A</b>
<b>1.3 Equipment</b>		
1.3.1 High, middle, low actual technical standard <sup>7</sup>		
<b>1.4 Reputation/credibility of vocational training organisation</b>		
1.4.1 High reputation <sup>8</sup>		
1.4.2 The Vocational institution is active in the following international co-operation projects:		
<b>Assessment 1: Institutional setting designed for effective implementation</b>		<b>A</b>

<b>2. Who is the target group?</b>		
<b>2.1 Required qualification level of the target group</b>		
2.1.1 Common systematic skills or open for everybody <sup>9</sup>		
2.1.2 Target group <sup>10</sup> is specified		
<b>Assessment 2: Target group and qualification level is well specified</b>		

<b>3. Teaching-staff, training design, methodology, evaluation</b>
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<sup>5</sup> 1.2.2 *this should be a personal estimation of the person in charge of the screening* ! Information about: target of training, topic, methodology, curriculum, A – well prepared and presented, B – incomplete, C - not transparent or not sufficient.

<sup>6</sup> 1.2.3 It turned out that it is effective to involve trainings into companies routines. This means also: training not for single persons but for teams. A - training is integrated in (daily) work, like consulting for building-teams, training mainly provided on the building site; see: Wärmeschutz mit Qualität, [www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de), C – training offer for individual participants without integration

<sup>7</sup> 1.3.1 Equipment means: facilities for practical exercises, e.g. heat pump installation, A – high standard (equipment for most of possible theoretical and practical exercises exists), B – middle standard (equipment for selected theoretical and practical exercises exists or is available), C – 1) low actual technical standard (equipment for theoretical and practical enterprises is only partly available) or 2) equipment is not available.

<sup>8</sup> 1.4.1 *this should be a personal estimation of the person in charge of the screening* ! High reputation means: The institution/organization is well known, well reputed for the target group. Please take into account: awards, bench-marking, certified ISO 9000. A – highly recommended, B – good name, C – not ascertainable, bad reputation.

<sup>9</sup> 2.1.1 Preconditions are necessary to homogenize the common level of the participants and to enable efficient learning. A - Clear precondition as common systematic skills (apprenticeship); B – apprenticeship and further specialization; C – open for everybody.

<sup>10</sup> 2.1.2 Target professions are specified e.g. bricklayer and construction builder, roofer, plumber, carpenter, sheet-metal worker: A – yes, as follows: ..., C – not specified.

<b>3.1 Trainer qualification</b>		
3.1.1 Trainer qualification <sup>11</sup> : theory – practice - communicative and adult learning skills		
3.1.2 Number of professionals <sup>12</sup> measures for cooperation between teaching staff:		
3.1.3 Train the trainer: how is the further education for trainers organized?		
<b>3.2 Who is the seminar leader?</b>		
3.2.1 The responsible person <sup>13</sup> (personal and content) is available or not		
Assessment 3.1-3.2: Teacher staff is qualified and sufficient		
<b>3.3 What is the training design and the methodology?</b>		
3.3.1 Module system, duration, time flexibility, training on the job, co-ordination with employer and employee <sup>14</sup>		
3.3.2 Training is focused on practice relevance, systematic skills, key-qualification <sup>15</sup>		
3.3.3 Methodology: Well adapted to the needs of target group <sup>16</sup>		
3.3.4 Training materials: standard and attractiveness <sup>17</sup>		

<sup>11</sup> 3.1.1 Training requires more than technical know how: Theoretical – practical - communicative and adult learning skills. A – all three qualifications, B – mostly experts with either additional special training qualification or professional experience (e.g. university professor), C – only one.

<sup>12</sup> 3.1.2 To provide different points of view more trainers are useful (for longer courses). But in this case measures for cooperation are essential. A – more than 10 trainers, high level of qualification (see above), measures for cooperation, B – 2-10 trainers with experience and additional competences, C – single trainer.

<sup>13</sup> 3.2.1 A – the person who is responsible for the training is present (e.g. moderated seminar), B – available in case of troubles, C – Seminar leader is not available or unclear.

<sup>14</sup> 3.3.1 Module systems have turned out to be more attractive. Training design: A - training on the job and coordinated with employer and employee, B – 1) modular time (friendly to working people) or 2) flexible in time and duration, C – fix training design. 3.3.2 Training focuses on A – practice with case studies, systematic skills and key-qualification; B – two of them (practice and systematic skills or practice and key-qualification ...); C – only one of them.

<sup>15</sup> note: key-qualifications are communicative competences (with customers, service sector, within building team), counseling competences (training for counseling, environmental topics), quality management competences (practical know-how and knowledge about schemes, energy concepts, networking).

<sup>16</sup> 3.3.3 *this should be a personal estimation of the person in charge of the screening!* Is the methodology attractive for the target group? Use of multi media, interactive methodologies, working group learning, mix of theory and practice: A – well prepared and presented, B – standard, C – only frontal teaching, or methodology is not clear



<b>3.4 What kind of success evaluation is implemented?</b>		
3.4.1 Evaluation <sup>18</sup> of: success, satisfaction of participants, feed-back, controlling		
Assessment 3.3-3.4: Training design is well planned and evaluated		
<b>General Assessment 3.1 to 3.4:</b>		
Assessment 3: Quality management of the vocational course		

4. What is the impact/effect/output of the training?		
<b>4.1 Certification</b>		
4.1.1 National – international degree, validation <sup>19</sup>		
4.1.2 Type of examination: standardized or casual <sup>20</sup>		
<b>4.2 What is the actual training situation?</b>		
4.2.1 Number of trainings carried out until now <sup>21</sup>		
4.2.2 Number of participants who finished until now <sup>22</sup>		
4.2.3 Price of training offer: per training hour/duration of training hour <sup>23</sup>		
Assessment 4: The training amount and the results are reasonable and do have influence on (national) scale		

<sup>17</sup> 3.3.4 this should be a personal estimation of the person in charge of the screening! training material is: A – comprehensive, well structured and attractive for further use (e.g. handbook, internet), B – only one aspect from A, C – only single copies, hand outs from different lecturers.

<sup>18</sup> 3.4.1 A – evaluation covers success, satisfaction of participants, trainer feed-back, controlling, after each training; B – evaluation covers some aspects; C – no evaluation.

<sup>19</sup> 4.1.1 A – degree is international accepted (official examination, legal tender), B – national degree with high prestige or legal tender, C – none or degree without practical value. 4.1.2 Page: 9

A – standardized theoretical and practical examination, B – theoretical and/or practical examination, C - attendance list, no examination. 4.2.1 Page: 9

A – more than 50 training courses, B – more than 10 training courses, C 1) 1-10 courses or 2) only one (e.g. model project).

<sup>20</sup> 4.1.2 Page: 9

A – standardized theoretical and practical examination, B – theoretical and/or practical examination, C - attendance list, no examination

<sup>21</sup> 4.2.1 Page: 9

A – more than 50 training courses, B – more than 10 training courses, C 1) 1-10 courses or 2) only one (e.g. model project).

<sup>22</sup> 4.2.2 A – more than 500, B – more than 100, C – 1) 50-99 or 2) 1-49 persons.

<sup>23</sup> 4.2.3 Price of training offer: per training hours/duration of training hour - only for statistical information, not included in assessment, Duration of training in hours (total) - only for statistical information, not included in assessment; Please estimate the prize per 30, 45, 60 minutes/hour (in EURO).

5. Key-Qualifications of communication, counseling and quality management		
5.1 Communication		
5.1.1 Training on communication with customers and service affected persons (e.g. inhabitants of residential buildings <sup>24</sup> )		
5.1.2 Organization of communication within a building team <sup>25</sup>		
5.2 Qualification for counseling in the building sector		
5.2.1 Training for energy counseling <sup>26</sup>		
5.2.2 Schemes of energy information <sup>27</sup> energy-certification of buildings, eco-labeling, other ...		
5.2.3 Information about energy concepts for different lines of business <sup>28</sup>		
<b>Assessment 5: The training amount and the results are reasonable and do have influence on improving human potential</b>		

6. Innovation of technological/practical know-how		
6.1 Information on the frame conditions for sustainable energy use		
6.1.1 Is the general aim in terms of energy policy of the course supplying institution transparent <sup>29</sup> ?		
6.1.2 Does the training include information about ...		
Climate change and Kyoto target <sup>30</sup>		

<sup>24</sup> 5.1.1 A – yes, there are training elements on communication with customers, B – communication with customers is mentioned but without practical training, C – no communication concept.

<sup>25</sup> 5.1.2 Perfect communication within the building team is an essential contribution to higher quality in buildings. A – yes, there are training elements on communication within a building team., B – communication is mentioned but without practical training, C – no communication concept.

<sup>26</sup> 5.2.1 A – A theory based approach for counseling is provided include. practice, evaluation of practice consulting, materials are provided e.g. handbook for energy counseling, B – some information for counseling is provided, C – no information for counseling.

<sup>27</sup> 5.2.2 The SAVE guideline recommends and now the Buildings Directive demands energy passes for houses. A basic knowledge about energy labeling should be provided in all courses. A – yes, actual schemes as follows ...; C – no, there are no actual schemes of energy information provided.

<sup>28</sup> 5.2.3 Energy concept are available (e.g. in Austria) for various lines of business and they give information about average energy demand, saving potentials, recommended measures, A – Yes, as follows ...; C – no.

<sup>29</sup> 6.1.1 *this should be a personal estimation of the person in charge of the screening* ! Consider: Which are the general aims of the institution? Are there interests in selling energy? A – yes, it is transparent, keywords as follows: ..., B – partly, C – no

EU “white paper on Renewable Energy and the upcoming new European Buildings Directive <sup>31</sup> ”		
Local Climate protection/Energy programs <sup>32</sup>		
6.1.3 Financing Information about subsidies for RUS, RES <sup>33</sup>		
Third party financing or other type of financing <sup>34</sup>		
Life cycle costs <sup>35</sup>		
6.1.4 Green electricity <sup>36</sup> General information, national targets, provider, costs		
<b>6.2 Use of European Standards, Information sources and literature, European Cooperation</b>		
6.2.1 Relevant European standard <sup>37</sup> are presented		
6.2.2 The vocational institute is active in European cooperation projects as follows:		
6.2.3 Use of literature, CD-ROMS, data banks from European programs, web-sites <sup>38</sup> as follows:		
Assessment 6.1-6.2: Information on frame conditions is comprehensive		

### 6.3 Design Procedure in general<sup>39</sup>

<sup>30</sup> 6.1.2 A – yes, concrete information about emission reduction and motivation for climate protection, B – partly, C – no, information not up to date or not objective

<sup>31</sup> The White Paper on Renewable Energy presents the European Action Plan for Renewable Energy Sources by 2010. The Buildings Directive must be implemented until 2006 and will require additional qualification, see TUNE UP! Guideline; A – yes as follows: ..., C – no.

<sup>32</sup> The linkage between regional or local energy programs and vocational trainings should be improved, A – yes, energy programs are presented as follows: ..., B – mentioned, C – no.

<sup>33</sup> 6.1.3 When skilled workers are in contact with customers they can inform about Page: 11 subsidies. This could move people to invest in energy saving technologies. A – information is complete and actual, B – general, C – no.

<sup>34</sup> Information about new financing models as „contracting“ (third party financing) as it is used e.g. for solar facilities, heating systems, ... A – yes, B – partly, C – no.

<sup>35</sup> Life cycle costs show “the truth” and often are good arguments for energy efficiency. Participants learn about life cycle costs: A – yes, B – partly, C – no.

<sup>36</sup> 6.1.4 Green electricity from renewable energy sources.

<sup>37</sup> 6.2.1 For this check you can use the list “European Standards” (see below), A – relevant European standards are presented, B – partly, missing is ..., C – no.

<sup>38</sup> 6.2.3 Participants learn about the efficient use of information sources. A – yes, as follows: ..., B – partly, as follows: ..., C – no.

6.3.1 Does the training include information about ...		
6.3.2 Building lay out: orientation, shape, internal layout <sup>40</sup> , ...		
6.3.3 Low energy housing, Passive House standard <sup>41</sup>		
6.3.4 Relevant computer design tools <sup>42</sup>		
<b>6.4 Building technology</b>		
6.4.1 Basic information about Building Physics and Building ecology <sup>43</sup>		
6.4.2 Basic information on low energy building <sup>44</sup>		
6.4.3 Passive Solar Systems and Techniques, Solar radiation Calculation of solar gains “Passive House Windows” <sup>45</sup>		
6.4.4 Passive Cooling Natural ventilation, evaporation, ground cooling, radiative cooling <sup>46</sup> ...		
6.4.5 Advanced insulation standards Wind tightness (Blower Door Test) U-values and thermal comfort Perfect details (window, edges, ...) Thermal bridges (EN ISO 10211) <sup>47</sup>		
<b>6.5 Housing - Information on ...</b>		
6.5.1 Use of renewable energy (solar, biomass <sup>48</sup> ...)		
6.5.2 Lighting (daylighting, efficient lighting systems,...)		
6.5.3 heat pump <sup>49</sup>		

<sup>39</sup> 6.3 The following questions (6.3-6.5) will be worked out best when we compare the course with similar courses.

<sup>40</sup> 6.3.2 A-yes; B-partly; C-no.

<sup>41</sup> 6.3.3 Passive houses have no conventional heating system but advanced energy performance (heat energy demand < 15 kWh/m<sup>2</sup>a), More information on [www.passivhaus.de](http://www.passivhaus.de), A – yes, C – no.

<sup>42</sup> 6.3.4 Use of computer tools (e.g. for energy consulting, dimensioning of solar facilities,...) A – yes, the following program is presented/delivered including practical exercise: ..., B – is presented but without practice, C – no.

<sup>43</sup> 6.4.1 Aspects of energy efficiency are included. A – yes, B – partly, C – no.

<sup>44</sup> 6.4.2 Energy demand (kWh/m<sup>2</sup>a), thermal mass (avoid add. cooling systems), A – yes, B – partly, C – no.

<sup>45</sup> 6.4.3 A – yes, B – partly, C – no.

<sup>46</sup> 6.4.4 A – yes, B – partly, C – no.

<sup>47</sup> 6.4.5 A – yes, incl. practical demonstrations and calculations, B – partly, C – no.

<sup>48</sup> 6.5.1 A – yes, incl. practical demonstrations and calculations, B – partly, C – no.

6.5.4 heating systems (low temperature, combination with RES, ...) Solar collectors (dimensioning, EN, certification, ... <sup>50</sup>		
6.5.5 advanced HVAC (heat, ventilation air-condition) systems <sup>51</sup> ...		
Assessment 6.3-6.5: Information about building and housing technology is comprehensive		
Assessment 6: Information in total is comprehensive, innovative technologies are integrated		

## Comments

1.1.1 A - Public education institution, B – Private training organization or training company, C – no training institution

1.1.2 Mixed financing may contribute to continuity, private financing may stimulate a competitive situation, public financing allows education broader concepts... A – mixed financed; B – mostly public financed (e.g. basic financial support); C – only private financed

1.2.1 A – course is including training on the job (in company) and distance learning elements, (internet, incl. meetings and practical exercises), B – some elements as follows: ..., C – none

1.2.2 *this should be a personal estimation of the person in charge of the screening* ! Information about: target of training, topic, methodology, curriculum, A – well prepared and presented, B – incomplete, C - not transparent or not sufficient

1.2.3 It turned out that it is effective to involve trainings into companies routines. This means also: training not for single persons but for teams. A - training is integrated in (daily) work, like consulting for building-teams, training mainly provided on the building site; see: Waermeschutz mit Qualitaet, [www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de), C – training offer for individual participants without integration

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1.4.1 *this should be a personal estimation of the person in charge of the screening*! High reputation means: The institution/organization is well known, well reputed for the target group. Please take into account: awards, bench-marking, certified ISO 9000. A – highly recommended, B – good name, C – not ascertainable, bad reputation

2.1.1 Preconditions are necessary to homogenize the common level of the participants and to enable efficient learning. A - Clear precondition as common systematic skills (apprenticeship); B – apprenticeship and further specialization; C – open for everybody

<sup>49</sup> 6.5.3 We suggest to compare this course with <http://www.arsenal.ac.at/erneuerbare/waermepumpen/installateur.htm> : A – main features are provided, B – partly, as follows ... , C – no.

<sup>50</sup> 6.5.4 We suggest to compare this course with Wiener Solarschule A – yes, B – partly, C – no.

<sup>51</sup> 6.5.5 A – yes, B – partly, C - no

2.1.2 Target professions are specified e.g. bricklayer and construction builder, roofer, plumber, carpenter, sheet-metal worker: A – yes, as follows: ..., C – not specified

3.1.1 Training requires more than technical know how: Theoretical – practical - communicative and adult learning skills. A – all three qualifications, B – mostly experts with either additional special training qualification or professional experience (e.g. university professor), C – only one

3.1.2 To provide different points of view more trainers are useful (for longer courses). But in this case measures for cooperation are essential. A – more than 10 trainers, high level of qualification (see above), measures for cooperation, B – 2-10 trainers with experience and additional competences, C – single trainer

3.2.1 A – the person who is responsible for the training is present (e.g. moderated seminar), B – available in case of troubles, C – Seminar leader is not available or unclear

3.3.1 Module systems have turned out to be more attractive. Training design: A - training on the job and coordinated with employer and employee, B – 1) modular time (friendly to working people) or 2) flexible in time and duration, C – fix training design

3.3.2 Training focuses on A – practice with case studies, systematic skills and key-qualification; B – two of them (practice and systematic skills or practice and key-qualification ...); C – only one of them note: key-qualifications are communicative competences (with customers, service sector, within building team), counseling competences (training for counseling, environmental topics), quality management competences (practical know-how and knowledge about schemes, energy concepts, networking)

3.3.4 *this should be a personal estimation of the person in charge of the screening!* Is the methodology attractive for the target group? Use of multi media, interactive methodologies, working group learning, mix of theory and practice: A – well prepared and presented, B – standard, C – only frontal teaching, or methodology is not clear

3.3.5 *this should be a personal estimation of the person in charge of the screening!* training material is: A – comprehensive, well structured and attractive for further use (e.g. handbook, internet), B – only one aspect from A, C – only single copies, hand outs from different lecturers

3.4.1 A – evaluation covers success, satisfaction of participants, trainer feed-back, controlling, after each training; B – evaluation covers some aspects; C – no evaluation

4.1.1 A – degree is international accepted (official examination, legal tender), B – national degree with high prestige or legal tender, C – none or degree without practical value

4.1.2 A – standardized theoretical and practical examination, B – theoretical and/or practical examination, C - attendance list, no examination

4.2.1 A – more than 50 training courses, B – more than 10 training courses, C 1) 1-10 courses or 2) only one (e.g. model project)

4.2.2 A – more than 500, B – more than 100, C – 1) 50-99 or 2) 1-49 persons

4.2.3 Price of training offer: per training hours/duration of training hour - only for statistical information, not included in assessment, Duration of training in hours (total) - only for statistical information, not included in assessment; Please estimate the prize per 30, 45, 60 minutes/hour (in EURO)

5.1.1 A – yes, there are training elements on communication with customers, B – communication with customers is mentioned but without practical training, C – no communication concept

5.1.2 Perfect communication within the building team is an essential contribution to higher quality in buildings.

A – yes, there are training elements on communication within a building team., B – communication is mentioned but without practical training, C – no communication concept

5.2.1 A – A theory based approach for counseling is provided include. practice, evaluation of practice consulting, materials are provided e.g. handbook for energy counseling, B – some information for counseling is provided, C – no information for counseling

5.2.2 The SAVE guideline recommends and now the Buildings Directive demands energy passes for houses. A basic knowledge about energy labeling should be provided in all courses. A – yes, actual schemes as follows ...; C – no, there are no actual schemes of energy information provided

5.2.3 Energy concept are available (e.g. in Austria) for various lines of business and they give information about average energy demand, saving potentials, recommended measures, A – Yes, as follows ...; C – no

6.1.1 *this should be a personal estimation of the person in charge of the screening ! Consider: Which are the general aims of the institution? Are there interests in selling energy?* A – yes, it is transparent, keywords as follows: ..., B – partly, C – no

6.1.2 A – yes, concrete information about emission reduction and motivation for climate protection, B – partly, C – no, information not up to date or not objective

6.1.2 The White Paper on Renewable Energy presents the European Action Plan for Renewable Energy Sources by 2010. The Buildings Directive must be implemented until 2006 and will require additional qualification, see TUNE UP! Guideline; Page: 15

A – yes as follows: ..., C – no

6.1.2 The linkage between regional or local energy programs and vocational trainings should be improved, A – yes, energy programs are presented as follows: ..., B – mentioned, C – no

6.1.3 When skilled workers are in contact with customers they can inform about subsidies. This could move people to invest in energy saving technologies. A – information is complete and actual, B – general, C - no

6.1.3 Information about new financing models as „contracting“ (third party financing) as it is used e.g. for solar facilities, heating systems, ... A – yes, B – partly, C – no

6.1.3 Life cycle costs show “the truth” and often are good arguments for energy efficiency. Participants learn about life cycle costs: A – yes, B – partly, C – no

6.1.4 Green electricity from renewable energy sources

6.2.1 For this check you can use the list “European Standards” (see below), A – relevant European standards are presented, B – partly, missing is ..., C – no

6.2.3 Participants learn about the efficient use of information sources. A – yes, as follows: ..., B – partly, as follows: ..., C – no

6.3 The following questions (6.3-6.5) will be worked out best when we compare the course with similar courses.

6.3.2 A=yes; B-partly; C=no

6.3.3 Passive houses have no conventional heating system but advanced energy performance (heat energy demand  $< 15 \text{ kWh/m}^2\text{a}$ ), More information on [www.passiv.de](http://www.passiv.de) , A – yes, C – no

6.3.4 Use of computer tools (e.g. for energy consulting, dimensioning of solar facilities,...) A – yes, the following program is presented/delivered including practical exercise: ..., B – is presented but without practice, C – no

6.4.1 Aspects of energy efficiency are included. A – yes, B – partly, C – no

6.4.2 Energy demand ( $\text{kWh/m}^2\text{a}$ ), thermal mass (avoid add. cooling systems), A – yes, B – partly, C – no

6.4.3 A – yes, B – partly, C – no

6.4.4 A – yes, B – partly, C – no

6.4.5 A – yes, incl. practical demonstrations and calculations, B – partly, C – no

6.5.1 A – yes, incl. practical demonstrations and calculations, B – partly, C – no

6.5.3 We suggest to compare this course with  
<http://www.arsenal.ac.at/erneuerbare/waermepumpen/installateur.htm>  
A – main features are provided, B – partly, as follows ... , C – no

6.5.4 A – yes, B – partly, C – no

6.5.5 A – yes, B – partly, C – no



### 3. Evaluation out-come

The application of the objectives of European and national energy policies in vocational training has been evaluated with the help of the above described screening method. A broad range of training courses were screened in the different partner countries. This was done in form of interviews. Further research could be made especially in the Transfer- and Train the Trainer workshops.

#### 3.1. Overall information

The following directives and programs were selected for the vocational training sector to outline the European energy policy:

##### **Council Directive 92/42/EEC of 21 May 1992 on efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels**

This Directive, which comes under the SAVE programme concerning the promotion of energy efficiency in the Community, determines the efficiency requirements applicable to new hot-water boilers fired by liquid or gaseous fuels with a rated output of no less than 4 kW and no more than 400 kW, hereinafter called 'boilers'.

➔ [http://europa.eu.int/servlet/portail/RenderServlet?search=DocNumber&lg=en&nb\\_docs=25&domain=Legislation&coll=&in\\_force=NO&an\\_doc=1992&nu\\_doc=42&type\\_doc=Directive](http://europa.eu.int/servlet/portail/RenderServlet?search=DocNumber&lg=en&nb_docs=25&domain=Legislation&coll=&in_force=NO&an_doc=1992&nu_doc=42&type_doc=Directive)

##### **Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products**

...6. Energy economy and heat retention:

The construction works and its heating, cooling and ventilation installations must be designed and built in such a way that the amount of energy required in use shall be low, having regard to the climatic conditions of the location and the occupants.

➔ [http://europa.eu.int/smartapi/cgi/sga\\_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31989L0106&model=guichett](http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31989L0106&model=guichett)

##### **DIRECTIVE on the energy performance of buildings**

The objective of this Directive is to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic conditions and indoor climatic requirements, local conditions and cost-effectiveness. This Directive is regarded as an essential driving force for the implementation of sustainable energy in vocational training by *TUNE UP!*

This Directive lays down requirements as regards:

- the general framework of a common methodology for calculating the integrated energy performance of buildings,
- the application of minimum standards on the energy performance of new buildings,
- the application of minimum standards on the energy performance of large existing buildings that are subject to major renovation,
- energy certification of buildings, and for public buildings, prominent display of this certification and other relevant information, and
- regular inspection, of boilers and of central air-conditioning systems in buildings and in addition an assessment of the heating installation in which the boilers are older than 15 years.

➔ [http://europa.eu.int/eur-lex/en/com/greffe\\_index.html](http://europa.eu.int/eur-lex/en/com/greffe_index.html).

##### **ENERGY EFFICIENCY- Action Plan**

Inspired by the objectives of the Kyoto Agreement this Action Plan pursues three goals:

- protection of the environment,
- a more sustainable energy policy and

- enhanced security of supply

The Action Plan also provides for an improved energy efficiency **labelling scheme**: the existing **Community scheme is to be better applied**, and **publicity** will be a key element in guaranteeing its impact. Following an agreement with the United States, a Regulation is to be adopted to apply the "Energy Star" labelling scheme for such products as computer monitors.

→ <http://europa.eu.int/scadplus/leg/en/lvb/l27034.htm>

The Action Plan also provides for coordination with the "Eco-label" award scheme. These labelling schemes should also be implemented in vocational courses.

➔ <http://europa.eu.int/comm/environment/ecolabel/>

### **The SAVE Programme**

The SAVE Programme – TUNE UP! is a contribution to this programme - is designed as :

- an important element of the Community's CO2 reduction strategy
- a specific programme in support of legislative and non-legislative measures to encourage the rational use of energy resources
- a non-technology programme and policy instrument which complements the 5th framework programme on research

→ *SAVE at DG TREN website:* [http://europa.eu.int/comm/energy/en/pfs\\_4\\_en.htm](http://europa.eu.int/comm/energy/en/pfs_4_en.htm)

### **Intelligent Energy For Europe**

This new programme is structured in four specific areas: rational use of energy and demand management (SAVE), new and renewable energy sources (ALTENER), energy aspects of transport (STEER), and promotion at international level in the fields of renewable energy sources and energy efficiency (COOPENER). First Aims of the "Intelligent Energy For Europe" Programme – utilise the potential for improving energy efficiency as far as economically possible and reduce energy consumption by 1% a year in order to make two-thirds of the potentially achievable savings (18% by 2010) and thereby achieve a reduction in CO2 emissions estimated at about 40% of the EU's Kyoto commitment.

→ [http://europa.eu.int/eur-lex/en/com/greffe\\_index.html](http://europa.eu.int/eur-lex/en/com/greffe_index.html).

### **The European White Book on Renewable Energy**

The White Paper on Renewable Energy is a comprehensive document and presents the European Action Plan for Renewable Energy Sources by 2010

- 15 Million m<sup>2</sup> solar collectors
- 1,000.000 Photovoltaic systems
- 10,000 MW of wind turbine generators
- 10,000 MW of combined heat and power biomass installations
- 1,000.000 dwellings heated by biomass
- 1,000 MW of biogas installations
- 5 Million tonnes of liquid bio fuels
- 100 communities aimed at 100% renewable energy sources supply

→ *This White Paper can be downloaded in European languages:*

<http://europa.eu.int/en/comm/dg17/legislat.htm#599final>

This report treats the following aspects as a starting point for the dialogues with decision makers. To obtain a maximum of information this report is not planned for dissemination. Good practice is presented in the "Good Practice Catalogue".

- How effective are European, national and local energy policies embodied within (framework) syllabi, lecturer notes and materials of the (involved) co-operation partner institutions (vocational training institutions)?

Results see 3.2. Lessons learned in the participating European countries.

- Which selected information concerning energy efficiency could be essential for updating vocational training?

The Screening was the basis for the Transfer Workshops and Train the Trainer seminars. There the selected information was presented.

### **European policies or programs are widely unknown**

We found out that the state of information of the target groups generally is rather poor as far as it concerns European policies or programs and new developments on European level. The policies mentioned above were widely unknown by trainers and also by course managers. But the majority of people interviewed during the screening phase showed a high interest in information exchange and inputs on European level, especially the presented Buildings Directive found a lot of interest.

The responsible persons for the course management are key persons who should be informed continuously about European energy policy.

### **Sustainable Energy use is not yet identified as a topic for vocational training.**

The *TUNE UP!* Team sometimes found persons who are charged for environmental issues, but this does not mean that Sustainable Energy is included in their awareness. When people spoke about environment protection, they more often thought about waste, water and air pollution. Exception: Special courses on energy topics like solar energy. Although the knowledge and the interest of the project target groups in Sustainable Energy should be raised generally, there is a difference from North to South. This could be found out in **Italy** very clearly: in the North of Italy energy efficiency in buildings is seen as a more important topic due to climate conditions, even though there is a big need in the South as well. As the training for installers and craftsmen is not so strictly organised as in Northern Europe, the information flow is very low towards that target groups. More interest and information can be found from architects and planners. This is also reflected by the interest on the project, which comes mainly from the planners' side.

### **New key qualifications**

Quality of buildings is a main precondition for successful Sustainable Energy use. For this kind of quality management special key qualifications are essential: ability for teamwork, communicative skills to avoid misunderstandings and a general understanding of the whole building. Practice on communication and teamwork learning can generally be found more frequently in Austrian and German courses. In vocational training in Spain or Italy communication aspects are hardly mentioned. Recommendations derived from this evaluation are implemented in the *TUNE UP!* Guideline.

## **3.2. Overall outcome of screening**

The results of the screening show that the tool is a sufficient instrument for a good evaluation and quality control of courses. At least some courses could be identified which provide a good training offer in the named qualification areas (e.g. course 1, 5, 6, 16, 17, 18). The coloured fields show, where fields of improvements and of challenges can be found.

With this tool it is now possible to name some general problems and challenges:

**2.1 The institutional setting** is not optimal in many courses, either because of their dependency on request or the lack of interest in public framework setting. To establish a sufficient institutional setting a co-ordinated climate-policy strategy is needed which provides a long-term training program (at least about 3 or five year program), embedded in a local and regional climate-policy strategy.

- 1.2 **The teacher staff** seems to be in “green area”, means in good conditions (qualification etc.), except in some specialized fields. But still there is a need for improvement.
- 1.3 **The target groups** often seem to be not specified enough. The more open the target groups are defined, the more unspecified the training offers are. More over there is a need for a base-line qualification of participants to come to high-level training outcome.
- 1.4 **The training design** often is inadequate (too long, non flexible, no use of IT, ...) – here we found more “red” zones than in other framework conditions. So a future program co-ordination should give more attention to adequate and attractive designs.
- 1.5 **The general impact** of the training on sustainable energy seems to be comparatively small (number of participants in relation to professionals in this field). In this context more co-operation between public and private organisations (public-private partnership) is needed to translate a climate-strategy into concrete business actions.
- 1.6 **The idea to provide key qualification** is realised in Austria and Germany more often than in Spain and Italy. In this context a broader exchange about training concepts is recommended.
- 1.7 **Information on Energy** in general (energy policies, climate protection) is not as well implemented as detailed technical information. Nevertheless it is obvious, that the introduction of sustainable energy needs good arguments and general understanding.

3. This concrete results show that there is a need of further training programs and further awareness raising-programs within EU-climate politics, as well as in training institutions as in public institutions and enterprises.

Another result was that these screenings were the basis for the selection of the Good Practice examples. The third version of the Screening Tool will be available in English, German, Spanish, Catalan and Czech language and are part of the *TUNE UP!* Guidelines.

## 3.2 Country reports

### 3.2.1 Spain

The Spanish educational system has been historically conservative and has separated scientific and theoretical disciplines from the professional training.

The education reform of 1990 (LOGSE) improves the status of formal professional training. However, RUE and RES are not included as a “professional family”.

In our opinion, and despite the improvements, professional training is mainly focused on classical training for plumbers, bricklayers and similar courses of this type are not very innovative.

Those courses might be more innovative, are generally given by private centres.

In Spain, occupational-vocational training is often equivalent to training addressed to unemployed people. This fact explains the poor offer for technicians or craftsmen.

The available courses on vocational training in Spain have been searched consulting universities, educational centers and related web sites; Professional Associations; Public Administrations and personal contacts.

The courses found can be divided in the following categories:

- Vocational training for unemployed people or skilled workers
- Specialization training courses addressed to architects, engineers, graduated students in general
- Distant learning courses
- Introductory courses

*For professionals there is not a real offer for training on the job, modules systems, etc.*

Most of the professional qualifications for plumbers, electricians, builders, etc. are based on work experience without previous training.

*Courses following relatively strict frame conditions*

Courses addressed to unemployed people are totally focused in providing the students a profession and the skills for job seeking. According to some educational centers they do not incorporate innovative courses because in their opinion there is not enough market for it.

The profile and contents of some offered courses are mainly based on the parameters established by the "thermal solar energy installer" real decree RD 2223/1998. This decree makes the courses' amount of hours non flexible and fixed on 300. More courses on solar thermal energy than in photovoltaic energy are offered, as consequence of the decree. The courses do not offer the basic knowledge on plumbing training. The students completing the training do not acquire the professional profile that the installing companies demand.

*Innovative approach: Company provides training for subcontractor*

Despite the above-mentioned there are companies that tried to change this situation. Constructions Rubau S.A. is a building company that operates all over Spain.

It has implemented the ISO 14.001, a model of Total Quality (work, health & environment) and also a system for environmental management.

They are very proud of their training on the job system, which is addressed not only to their own staff but also to suppliers. A score system evaluates the environmentally friendly practices of subcontractors. RUBAU recently has edited a Green Building Guide, which includes 35 good practices already implemented by different subcontractors.

*Lack of communication*

In our visits and conversations with the actors (educational centres and firms) a lack of communication has been detected. Consequently, there is no feedback to incorporate the needs of the firm into the contents of the courses or to incorporate new courses. Information on Vocational Training is not easy to find. People looking for this type of training do not know how and where to find the offers

*Not many innovative elements*

Generally, vocational training does not include innovative elements. Some technological concepts seem to be not applicable in the mediterranean climatic context, like the Blower-door-test. The most relevant concept here is cross ventilation as passive cooling.

Organizations sensible to innovation are institutions, which already have been participating in European programs like LIFE or ALTENER.

There are not many distant/on-line learning courses, but the existing ones are of high quality.

Distant-learning courses are very well prepared (course material, links, practical exercises based on simulation programs) and have a high level of continuity, improving and up dating course materials, attendance courses are more improvised and have the tendency to change trainers.

In general there is a lack of middle/low- grade professional profile that incorporates RUE and/or RES (not only in building but also in other professional families).

There is no offer for energy counseling training.

### **3.2.2. Italy**

Professional training in Italy is more based on "learning on the job" than on a comprehensive vocational training as in Germany or Austria. Therefore the concept of life-long learning and vocational training for professionals is developing only since some years. A new school reform facilitates new training offers and is leading to significant change in mentality. Anyhow, a broad range

of courses in the sector of the project has been found, mainly for architects and planners, but also for installers and other craftsmen.

In general, European Energy Policy is part of many courses screened in various aspects, but there is more potential. Courses financed by the European Social Fund (ESF courses) are a good opportunity for training of new professional profiles and focusing on innovative topics, but sometimes they tend to have few participants. Still there is a need of European funded initiatives which should attempt to establish a sustainable structure for training offers.

The screening results show that there is a quantity and equipment gradient from North to South Italy and differences in methodology between South-Tyrol and the rest of Italy. While courses in South-Tyrol are more orientated to the German and Austrian methodologies, also with many practical training parts, courses in the rest of Italy are designed in different ways.

Many courses do not offer enough practical training, only some courses have sections with practical exercises. Generally the methodology is based on presentations and has little interactivity parts and so far there is a limited use of new media. Communication skills that are now given importance e.g. in Germany and Austria - are little considered.

Qualified vocational training courses often have a “market problem”. One reason is that the public sector does not yet valorises “innovative qualifications”. Companies don’t apply In-house training.

#### *Change in mentality*

The concept of life-long learning and vocational training for professionals is developing only since some years. A new school reform facilitates new training offers and is leading to significant change in mentality. Anyhow, a broad range of courses in the sector of the project has been found, mainly for architects and planners, but also for installers and other craftsmen.

In general, European Energy Policy is part of many courses screened in various aspects, but there is more potential. Courses financed by the European Social Fund (ESF courses) are a good opportunity for training of new professional profiles and focusing on innovative topics, but sometimes they tend to have few participants.

#### *More practical aspects should be implemented*

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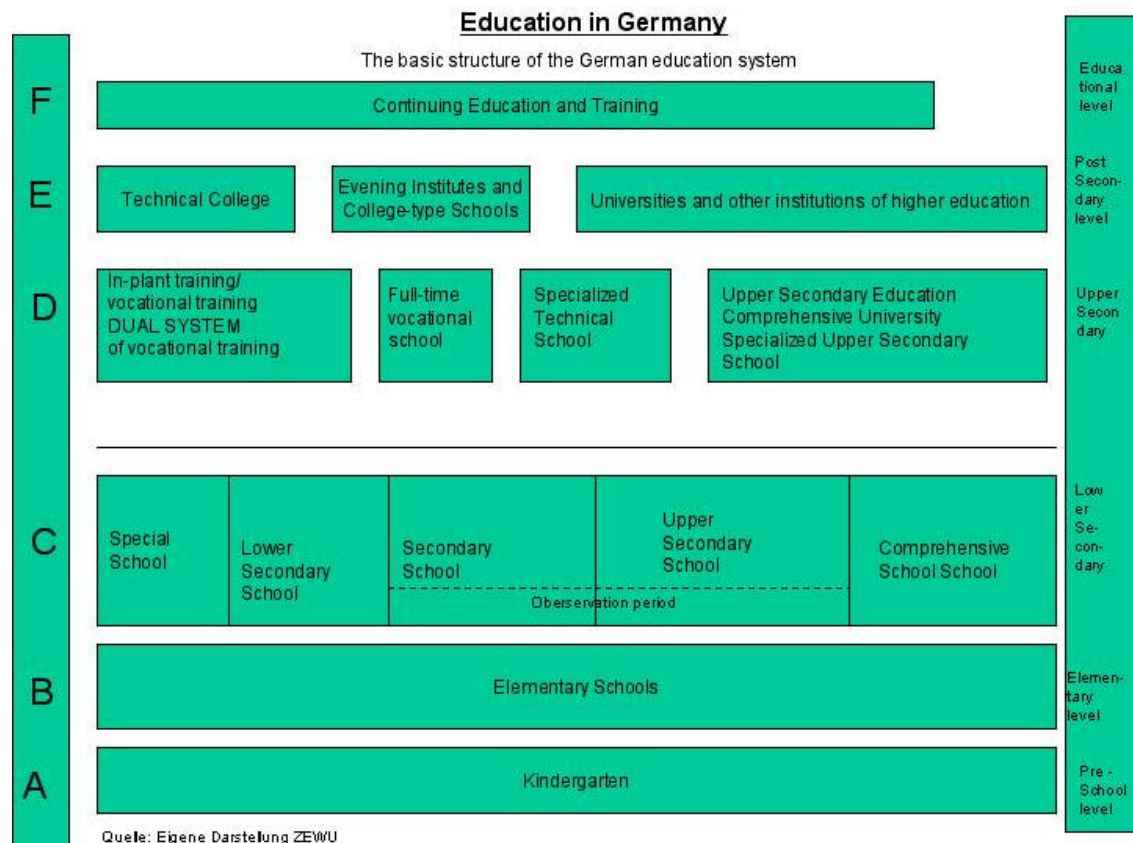
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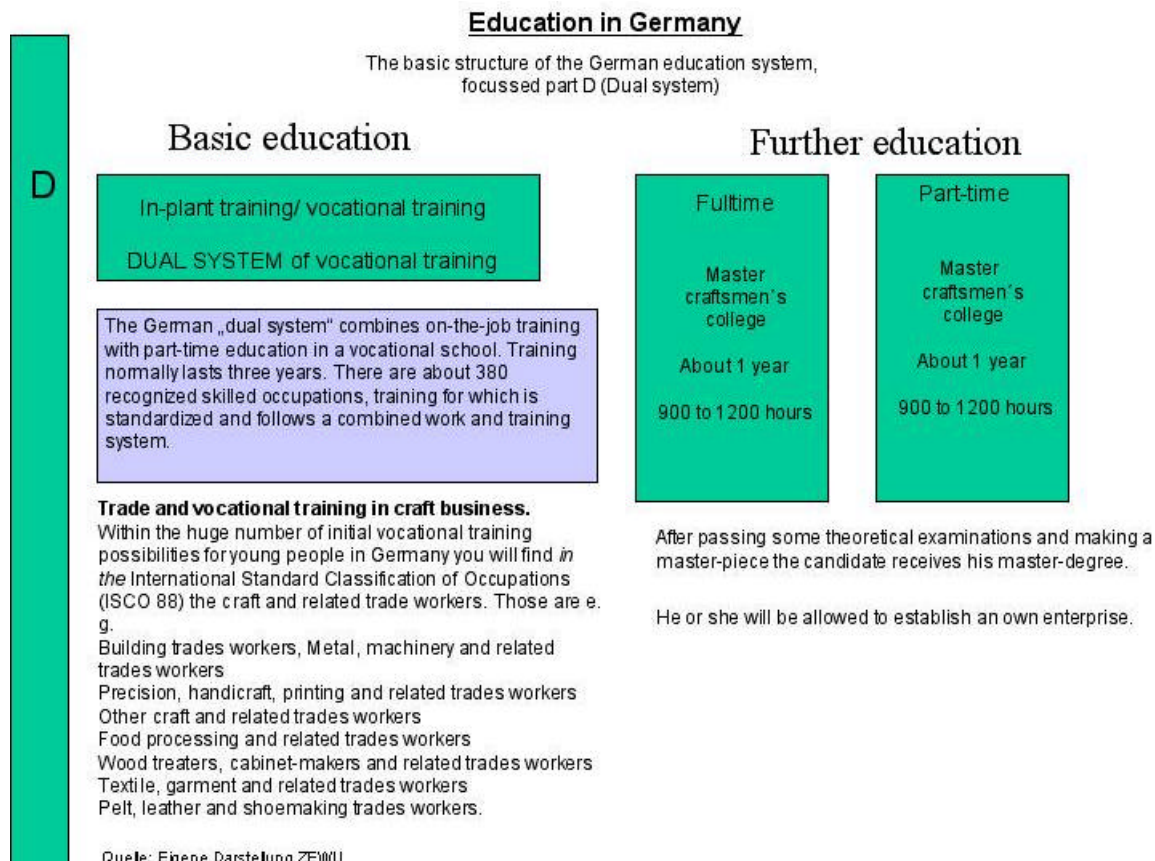
In-house training in companies is practically not applied.

UNICA started to work with ANCITEL, the service organisations of the Italian association for local communities, who showed a high interest in the *TUNE-UP!* project. The two organisations officially agreed on collaborating in the field of training for energy efficiency and renewable energies for local community staff.

### 3.2.3. Germany

Comparing to the other project partner countries the project research shows a very great variety of courses in different education institutions in Germany. Therefore an overview over the education system in Germany should show the different entries for formal education and training offers.





There is a large variety of courses in different education institutions in Germany.

The courses vary in terms of period (1-day to several weeks), required previous experience, degrees, theoretical and practical elements and different costs.

Therefore the following list can only give an overview of groups of offering institutions.

#### *Chambers*

Skilled Crafts, Commerce, Architecture, Engineers e.g.: Environmental Centres of the Chambers of Skilled Craft (see TUNE UP! course-list [www.17und4.at/downloads/tuneupcourselist.doc](http://www.17und4.at/downloads/tuneupcourselist.doc) )

#### *Organisations / Associations / NGO`s*

Initiative Arbeit und Klimaschutz, Hamburg ([www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de))

Bundesinitiative Zukunftsorientierte Gebäudemodernisierung e.V. ([www.initiative-jetzt.de](http://www.initiative-jetzt.de))

Solarzentrum, Hamburg ([www.solarzentrum-hamburg.de](http://www.solarzentrum-hamburg.de))

#### *Private Education / Training Companies*

Volkshochschulen ([www.vhs.de](http://www.vhs.de))

Deutsche Gesellschaft für Sonnenenergie ([www.dgs-solar.org](http://www.dgs-solar.org))

#### *Manufactures of Specialised Production*

Bau-Medien-Zentrum GmbH & Co. KG, Düren-Gürzenich ([www.baumedienzentrum.de](http://www.baumedienzentrum.de))

#### *Energy Agencies*

Deutsche Energie-Agentur ([www.deutsche-energie-agentur.de](http://www.deutsche-energie-agentur.de))

Energieagentur NRW, Wuppertal ([www.ea-nrw.de](http://www.ea-nrw.de))



### *Government*

Federal Government, Federal States

Federal Environmental Ministry ([www.bmu.de](http://www.bmu.de))

Federal Environmental Agency ([www.umweltbundesamt.de](http://www.umweltbundesamt.de))

### *Scientific Institutes*

Fraunhofer Gesellschaft ([www.fhg.de](http://www.fhg.de))

### *Driving forces*

- Changes of the legal regulations in Germany (new law for energy saving = Energie-Einspar-Verordnung = EnEV) require special activities in vocational education.
- Awareness in public (consumers, building principals, architects, craftsmen) for energy saving and rational consumption/use Endeavour to get the public authorities to finance energy saving projects, further developing of existing houses in order to fulfil the international and national climate declaration (e.g. Kyoto).

### *Interpretation of the German Screening Results*

The screening results of the chosen courses in Germany demonstrate that there is a possibility for building professionals to get profound knowledge in energy saving courses, e.g.:

- Building Energy Consultant – Gebäude Energie Berater (GEB)
- Initial Consultant for Energy Saving in existing houses (IBE)

It also certifies a high quality and a good acceptance for these courses.

The impact of the **GEB-course** generally can be seen as relatively good. Although there have been just 7 courses with a little more than hundred participants in Hamburg the building professionals undergo a standardized education program, like in other education centers in the country too, and achieve a **nation-wide accepted degree**. The course will persist not only because of the positive reaction of the target group (e.g. craftsmen, architects) but also because new **legal regulations** (New law for energy saving = Energie-Einspar-Verordnung, EnEV) require expanding activities in the vocational education of building professionals. In the future there will be a **need of experts to control these regulations**.

For the **IBE-course** the requirements are lower than for the GEB-course. Here the mediation of **basic information** is the main aim. Therefore practical work cannot be integrated because of the short period of time. But it is important to train these people to **mediate** the problem of **energy consumption** and **energy use** in their **companies** and to their **clients** trying to make them aware and find out practical solutions.

### *Lifelong learning*

Company's training is one of the most important activity in frame of „lifelong study“ and is the one opportunity for lots of adults who holds their qualifications on the standing position. The Ministry of vocational study (BIBB) have realized the test on behalf of the Ministry of Study and Research with cooperation with the second Europe-wide questioning company of continuing education (CVTS-II). The results of the examination showed that 85% of the meaning company's training is as contribution to lifelong study of the stuff. In the same time people who is responsible in the companies for the continuing study recognize however the worker's problems which comes from the draft „lifelong study“ such as: 85% emphasize repeated problems through the work, the family and through the study, 81% see permanent pressure of the workforce to learn something new, 56% discover increasing employee's insecurity of possibility of self job study development and 54% run out from their private finance when „lifelong study“ is active.

➔ *BIBB: Perspektiven der beruflichen Weiterbildung in Deutschland und Europa*  
[www.bibb.de/publikat/pm/pm01/pm251001.htm](http://www.bibb.de/publikat/pm/pm01/pm251001.htm)

*Services from one hand needs early co-operation with other craft branches, with architects, engineers and planners*

The desire of owners and in addition of users of buildings is more and more to receive all services relating to crafts from one hand and concentrate themselves on their main businesses. Therefore facility management providers have an increasing market position especially for middle and big business clients. Because of straight craft regularities in Germany the offers of facility management services from craft firms are an exceptional case, whereas these offers from planning and engineering bureaus, which take craft firms as subcontractors, are more and more observable.

Therefore it becomes more important for craft firms not to supply only their trade-specific services and executions but to offer entire solutions to customers. An early co-operation with other craft branches, with architects, engineers and planners is mostly inevitable.

*Trade-spreading know-how becomes more important for the individual craftsman* in order to strengthen his position on the labour market and to detect possibly developing risks for himself and his customers in time.

The vocational continuing education for the building industry has been trained in 2000 with cooperation 14 timber companies and planners from the Passivhouse Building Teams with a main area on timber constructions and certified with Passiv-house nationwide. In the moment 17 Bauteams from Germany take part in the course. 10 days of presentation in 5 blocks, and between self-study phases as the whole 14 weeks.

➔ [passivhausschulung.de/seiten/bauteam2002.html](http://passivhausschulung.de/seiten/bauteam2002.html)

### **3.2.4. Czech Republic**

The situation on the demand side can be characterized like this:

Customers are not well informed (e.g. renewable energy: "top technology" is heat pump, solar will never pay back etc.). Not sufficiently (financially) supported by appropriate (state, communal, privat) instruments

Professionals: not forced to educate themselves (e.g. – "the optimal thickness of insulation is known since 20 years, many companies offer this "standard")

The situation on the offer side can be characterized like this:

Schools are very deeply in the "business as usual". Interesting examples were found on the:

*Technical University Prague:*

RUE: There is one specialized professor – trained in Switzerland, did translation of nearly all relevant literature, but – any of his students were never met in seminar in country or abroad.

RES: the same, but there are no translations available

*Technical University Brno:*

RES: The same – club of old professors

RUE: the department develops on basis of 3 postgraduate students who develop the field.

*Energy agency*

Course for energy auditors who obligatory approve the demands for state subsidies.

Training for "elite" experts. You can become an energy auditor only if you did work for three years as an energy auditor

*Fan club for renewables and savings*

The participants educate themselves by means of internet discussions, irregular seminars prepared by NGOs etc. – there is no guaranteed quality control.

Creating auditorium for Tune – up results:

Possible educational institution for offering vocational training

- School for professionals in Breclav  
sensitized by an Czech – Austrian solar project – 80 m<sup>2</sup> facade collector
  - Planned Training for Sustainability Centre Hostetin – training for SMEs
  - Association of young architects, ARCHALL, Brno
  - Companies involved in pilot repairs on block houses in Brno – Liskovec – support for the idea
- Basis information for customers is necessary on renewable energy and efficient use of energy to raise a demand for professionals who are qualified in these fields. European co-operation projects seem to be a good opportunity to develop the educational system.

There exists only a very small group of people who are deeply interested in sustainable energy use (ranging from University people, advanced architects and planners to independent experts). They prepare seminars, meetings and conferences but are not able to reach the majority of relevant educational institutions.

### 3.2.5 Austria

#### *Vocational Institute bfi*

In the vocational institute **bfi Wien** there has been running a successful model course on Sustainable Energies, „Solarschule“. This course was a training for plumbers to qualify them for solar installation. This modular course offer was documented as a “highlight” (e.g. in LOOS, R., Synthesebericht zum CEDEFOP Projekt “Beobachtung von Innovationen in der Berufsbildung”, Thessaloniki 2000) and there were international co-operations in European projects, e.g. the Leonardo da Vinci pilot project “Model for an expanded installation of heat pumps & refrigeration-techniques”. In the meanwhile relevant trainers have left bfi Wien and the “Solarschule” lost a lot of its attractiveness and parts are now implemented in courses for unemployed people. Although there has been a model project, Sustainable Energies is not yet implemented in general in the bfi Wien course offer – this was a result of our interviews with trainers.

#### *Vocational Institute WIFI*

The biggest vocational Institute in Austria, **WIFI Wien** refused to co-operate with *TUNE UP!* in the beginning. There was no interest in a European project that aimed to improve vocational trainings in aspects of Sustainable energy. We also found some problems to identify the responsibility for Sustainable Energy in WIFI. During the ongoing project phases it was possible to have contact with the Austrian umbrella organisation **WIFI Österreich**, where several briefing-contacts could be arranged, and one representative took part in the Transfer workshop. Finally even a co-operation between the *TUNE UP!* project, GDI (Association of insulation material producers) and WIFI could be started, aim is to “tune up” the **initial education for the building master**.

We found no clear requirements for the qualification and life long learning of lecturers of vocational courses. For example some lecturers are not well informed about Climate protection programs (national and international), information about Energy Pass and Eco/Energy Labelling seems to be not on an actual level.

On the other hand we found out some very innovative courses that are dedicated to Sustainable Energies and which were offered by non -typical vocational institutions. These courses are mostly individual approaches - European Cooperation could be found only in special programs.

The following case seems to be very typical: bfi was involved in the EU-LEONARDO heat pump training project “Model for an expanded installation of heat pumps and refrigeration techniques”. The produced CD is presenting attractive, partly interactive training material, but it was neither known nor used in any of the screened courses and not by arsenal research, the provider of the course for certified heat pump fitters (see Good Practice catalogue).

### *Information for Trainer*

Many trainers who are active in courses, which are relevant for Sustainable Energy are not involved in the various (often informal) existing networks on Sustainable Energies. We evaluated this assumption in Austria by our screening question about the Austrian impulse program “sustainable economics – house of tomorrow” (Nachhaltig Wirtschaften – Haus der Zukunft). Most trainers in the vocational institutes do not know this program, although it can be regarded as the most relevant program for sustainable energy in the building sector in Austria. Until now vocational trainers are not yet on the address/mailling lists of this program. So we contacted the program management and informed them about this opportunity. It is now planned to provide trainers and vocational institutions relevant information.

➔ [www.hausderzukunft.at](http://www.hausderzukunft.at)

### *Implementation of Vocational training plans in quality management systems*

Vocational training should be lined out more as an element of quality management. There can be developed a culture of “learning from mistakes” in companies – this can contribute to further education in a very efficient way. A building master reported about his annual jour fixe to discuss what can be learned from last years mistakes on the building sites.

➔ *The 20 Elements of Quality Management (ÖNORM-EN 29 000 ff): 18: Education demand for education is evaluated systematically and the vocational training of employees is ensured. (Bau&Qualität, Merkblatt zur Qualitätssicherung in der Bauausführung nach ISO 9000-9004 (EN 29000-29004, Bundesinnung der Baugewerbe, Wien)*

### *Labour Market Service: Case study Internet Data Bank*

As a case study we identified the latest official web-site of labour market service which promises a complete information on vocational courses in Austria from all course providers. Our search on this web-site did not bring information about Sustainable Energies in courses (key words and attempts documented below, update 17.05.02).

This data bank was announced as the complete overview on vocational courses in Austria. Our test with keywords (renewable, efficient, solar, heat pump, thermal insulation) did not bring satisfying qualified results. This example is featuring the typical situation, if you need information on Sustainable Energy in vocational training on the short run. There is a confusing number of “Bildungsserver” (education server) available via internet in Austria, but none seems to be complete.

„Die Internet - Aus- und Weiterbildungsdatenbank ist ein kostenloses Dienstleistungsangebot des Arbeitsmarktservice, in dem alle österreichische Aus- und Weiterbildungsinstitutionen eingeladen sind ihr Institut sowie ihr Bildungsangebote vorzustellen. Die Datenbank bietet in benutzerfreundliche Form und unentgeltlich für Anbieter und Nachfrager einen vollständigen und aktuellen Überblick über das Spektrum an Aus- und Weiterbildungsinstitutionen und deren Bildungsangebote. Internetadresse: <http://fmserver.braintrust.at/amswb.html>

Unsere Eingabe mit den Stichworten: erneuerbar, effiziente, Solar, Wärmepumpe, Wärmedämmung, ergab keine qualifizierten Treffer, bei der Eingabe "Energie" kamen neben Qi Gong im Grünen, Elektroinstallationstechnik, -betriebstechnik und einigen Kursen betrieblicher Umweltschutz (nähere Infos allerdings nur auf Anfrage). Daraufhin kontaktierten wir den web-master und schrieben unsere Kontaktpersonen aus den Weiterbildungsinstitutionen an, die entsprechenden Informationen zu liefern, damit energierelevante Kurse in dieser AMS web-site gefunden werden können.“

### *General Assessment of existing courses in Austria*

The overall assessment of existing courses in Austria is, that it does not fit with the real needs of the construction economy. Robert Korab discusses some reasons for it:

„Generell werden Informations- und Kommunikationsdefizite als Grund dafür gesehen, dass die Potentiale des Energieeffizientes Bauen nicht ausgeschöpft werden. Auch wenn von den Herstellern Baumaterialien und Komponenten in guter Qualität geliefert werden, so passieren auf der Baustelle viele Fehler in der Bauausführung - sehr oft dort, wo mehrere Gewerke aufeinander abgestimmt werden müssten. Die Folge sind z.B. Wärmebrücken oder mangelnde Winddichtheit. Die bestehenden Lehrgänge zum Thema „Bau“ orientieren sich zumeist zu wenig am konkreten Wissensbedarf des Baugewerbes und sind im Regelfall so lang oder zeitlich ungünstig angesetzt, dass die Unternehmen ihre MitarbeiterInnen dafür nur ungern freistellen.“ (Robert Korab, raum + kommunikation)

On an expert-train-the trainer Seminar in the final session of the project in 2002 it was recommended, that to achieve sustainable effects negotiation of further actions, e.g. identification of a person who will provide information on Sustainable Energies, internet discussion forum, follow up meeting.

The interest of the trainers was big and the discussion was animated. The results give very specific insight in the practical problems, which make it difficult to implement Sustainable Energy. Besides information deficits this seems to be often a matter of frame conditions.

1. The institutional, spatial resources and the possibility of practice work are in bfi Wien on the international comparison very good.
2. The place for implementation „Sustainable Energy“ in training courses are seen restricted: the general conditions are given by AMS and job profile. Only what the job profile contains is evaluated. Example: in education for electrical construction the engineer is tested photovoltaic, the big connection with sensible application to other renewable forms of energy is not a topic. On the other hand the trainee cannot be overloaded.
3. The advisory and communicative competences should be improved for craftsman. They have contacts with customers and they can contribute effectively in the way of giving general information about „Sustainable Energy“ to the population. Experience from Germany should be looked at.
4. There is an increasing demand on quality issues in the building sector: Buildings certificates, guaranteed outputs (for example solar constructions) and measured quality, the system of qualified protection etc. require qualified employees.
5. The call for higher qualified skilled work, wider qualification in sense of long life study is coming, but not all economy is interested. In construction the nonqualified workers are the cheapest. Example: It is difficult to find participants for bfi-courses Thermal Insulation System – although at the same time the City of Vienna is giving lots of subsidies for thermal insulation (THEWOSAN)
6. Completed studies in the way of „Sustainable Energy“ as for example cooling- and climate technology hardly find jobs.
7. The present fee base in vocational institutions is low. So it is difficult, to find well qualified lecturers, who are also active in practice.
8. The trainers should have practice. The reinforced net work with current „Sustainable Energy“ programs, for example climate protection program KliP, should be forced by the bfi.
9. The participation of the bfi in international projects on „Sustainable Energy“ can support the organisation's development.
10. The courses for unemployed people, which were prepared by AMS are for people who have a job too expensive, too long and in the moment not feasible!
11. Due to social considerations the level often cannot be kept as high as it would be necessary, e.g. for Sustainable Energy.
12. As a new target group the developers are seen, who could be informed about new development in the area of „Sustainable Energy“ from product independent side.

## 4. Good practise catalogue

### Training for Energy Counselling

#### Title of Course

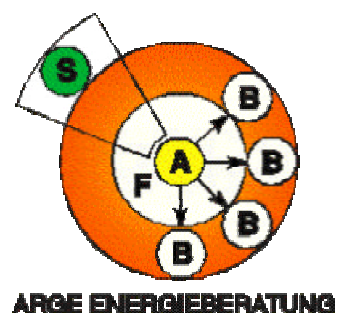
#### EnergieberaterInnen-Ausbildung/Training for Energy Counselling

#### Provider

Working Group ARGE EBA; O.Ö. Energiesparverband and Chamber of Commerce, LandesEnergieVerein Steiermark, Wien Energie, Energie Tirol, ARGE Erneuerbare Energie Kärnten, Land Salzburg

#### Address

- LandesEnergieVerein Steiermark, Burggasse 9/II, A-8010 Graz  
Mag. Gerhard Bittersmann, [gerhardb@lev.at](mailto:gerhardb@lev.at)  
Tel.: +43-316-877-3389
- O.Ö. Energiesparverband, Landstraße 45, A-4020 Linz  
Tel.: +43-732-6584-4380, FAX: +43-732-6584-4383  
Margit Nagelstrasser, [office@esv.or.at](mailto:office@esv.or.at)
- Wien Energie, Mariahilfer Straße 63, A-1060 Wien  
Andreas Hudecek, [andreas.hudecek@wienenergie.at](mailto:andreas.hudecek@wienenergie.at)  
Tel.: +43-1-58 200 – 5801



#### General Description of the course

To introduce a standard for Energy counselling in Austria a working group was established in 1991. Members were experts from energy suppliers, energy agencies, and consultants. One year later a proposal for basis training was presented to institutions dealing with energy in different aspects like federal governments, Chambers, Universities. This “tuning” of education for energy counsellors was also based on the energy report of the Austrian government in 1993.

Modular System: A: basis course, F: advanced, B and S: special courses.

**Course A** provides basics of energy policy, building physics and energy techniques, calculation schemes for heating load of heating systems. Practice by case studies and in communication training units. (50 lessons)

**Course F** is building up on the A course and consists of a seminar, participation in and realisation of energy consulting (guided by experienced energy counsellors), projects in working teams.

Examination by a commission. (120 lessons, partly module system, 80 hours practice)

**Courses S** on special topics.

These courses are also running in Slovakia - EU Energy Centre in Bratislava

**Target group:** Persons from all institutions who are in touch with energy topics: Craftsmen, skilled workers; enterprises, counselling organisations, energy supplying organisations, municipalities, engineers, planners, public administration, schools, ...

**Aim of training:** Additional qualification to recognise potentials for energy efficiency and to solve small problems. Participants can be contact persons for energy matters in their offices and provide contacts to specialists.

**Duration:** A course: 50 hours, F course: 200 hours

**Price:** A course 580 € including training material, F course 1600 € S course 220 – 450 €

**Courses until now:** about 100 courses, more than 1500 participants, courses in Upper Austria, Styria, Carinthia, Vienna, Salzburg, Tyrol, Lower Austria

#### Further Information

[www.lev.at](http://www.lev.at),  
[www.esv.or.at/aktuelles/veranstaltungen-kurse/kurse/akurs.htm](http://www.esv.or.at/aktuelles/veranstaltungen-kurse/kurse/akurs.htm),  
[www.wienenergie.at](http://www.wienenergie.at) <http://www.wienernergie.at/>

## Special quality

Usually, Energy counselling is provided by institutions, which are following different interests (NGO, governmental, energy suppliers). ARGE EBA provides a standard for the education for energy counselling in Austria. As results minimum standards of quality in energy counselling and more objectiveness could be achieved. The Austrian Handbook is used as a practical guideline. So the counselling results from different counselling institutions should be comparable. Energy counselling was also implemented in subsidy systems for buildings (as precondition and service). Now distance learning modules are prepared to make the courses more efficient and attractive.

## Short description of content

### General aspects

Energy production, flow of energy, energy demand, environmental situation, units and definitions

### Technical aspects

*Building Physics – Building techniques:* Building materials, building constructions, Calculation of U-Values ( $\text{W/m}^2\text{K}$ ), insulation material, optimal energy planning

*Energy techniques:* Energy carriers, heating systems, heat production, heat distribution, steering systems, warm water production, simple calculation scheme for heat load, renewable energy systems

*Optional:* Modules B and S: *Energy Pass:* Presentation of calculation schema and software, lighting, cooling etc., (see list of courses)

### Practice

Case studies (active and passive participation in consulting)

Introduction Handbook for Energy Counsellors

Communication Training

### Key qualification

The A course is a basis and provides communication qualification for counselling.

The given information should strengthen the ability to find further information, to contact other experts and to recognise potentials of energy efficiency.

The F course provides more detailed qualification for energy consulting for households.

The qualification of course A and F is often a precondition for counselling within the frame of e.g. energy programs of a federal country, but not sufficient to start a career as an energy consultant on the free market. As additional qualification it is also of interest for enterprises.

## Institutional/organisational advantages for provider

In Austria the providers of these courses are mostly the institutions, which are making use of energy counselling, e.g. calculations for energy pass which is mostly implemented in subsidy systems. Municipal administrations e.g. in Vienna and Linz are making use of these courses to qualify their employees in terms of energy efficiency and renewable energies.

## Additional value for EU and SAVE

This approach could be a model for other European countries. We identified the broad **involvement of stakeholders** in the development phase as success factors. So the main objective – to provide energy counselling, which is more independent – could be achieved. The **modular system** and the available materials make it easy to adopt these courses for other countries and various providers.

Course material is not available for everybody but there is willingness to co-operate on European level.

Author: 17&4 Organisationsberatung

## Building Energy Consultant

### Title of Course

### Gebäudeenergieberater (GEB) / Building Energy Consultant

Centre of Energy, Water and Environmental Technology (ZEWU - Zentrum für Energie Wasser- und Umwelttechnik der Handwerkskammer Hamburg )

### Address

Buxtehuder Straße 76, D-21073 Hamburg  
Tel.: +49-40-359 05-800  
Fax: +49-40-359 05-842

### Contact

Rolf de Vries  
[rdevries@hwk-hamburg.de](mailto:rdevries@hwk-hamburg.de)



### General Description of the course

About a quarter of energy consumption and CO<sub>2</sub> emissions in Germany originate from private households. The largest part results from heating and hot water production. Energy consumption can be drastically reduced by meaningfully planned and optimally executed modernisation measures with existing buildings. For the customer thereby the operating costs are reduced and at the same time the possibility for a personal contribution for the climatic protection is offered - carry out by avoided CO<sub>2</sub>-emission to. Craftsmen from the building sector are in many cases the first partners for customers who want modernisation. The intensified legal regulations, an intensified demand for energy-saving technologies, the use of regenerative energies, ecological building materials and constructions today makes it increasingly necessary to have a "further thinking" even for these skilled trades.

It becomes more important to supply not only a trade-specific optimal execution but to offer entire solutions to customers. An early co-operation with other craft branches and architects and drawer planners is mostly inevitable.

Trade-spreading know-how becomes more important for the individual craftsman in order to strengthen his position and to detect possibly developing risks for himself and his customers in time. Therefore, the idea for the training course "Building Energy Consultant in Handcraft" was developed by the central association of German construction industry and the central association of sanitary, heating and air-conditioning crafts in agreement with the central association of the German electrical crafts. Their designs for nation-wide examinations and appropriate curricula - as the preparation for this further examination – were published by the central association of the German handcraft in 1997.

Since that time more than 50 % of the German chambers of craft – including all chambers which have environmental centres - have passed on this base specifications for the examination of "Building Energy consultants in craft" and offer appropriate training courses.

### Target group:

Master craftsman education (with master craftsman certification) or equivalent engineer or architect education

### Aim of training:

The target of the training course is to put the trainees into position to check buildings under the building design, constructional, build-legal aspect and judge ecological and economic aspects. After successful examination as Building Energy Consultant participants can develop concepts and present them to the customer. These concepts contain action catalogues, by whose conversion the energy balance of a building is improved sustainable and thus the CO<sub>2</sub> emission is reduced for a long-term.

**Duration:** 240 hours (45 min); 6 components 1 week each (40 h)

**Price:** 1 380 EURO, 5,75 EUR/h

**Courses until now:** 3 (1 current)

### Further Information

<http://www.hwk-hamburg.de>



### Special quality

In this course skilled craftsmen from different branches are educated together with building engineers, architects and planners and the subject matters of the education include all the different energy aspects belonging to buildings.

Short description of content	hours
1. Knowledge of building materials	15
2. Knowledge of building construction	20
3. Sound-, thermal and moisture insulation, fire protection	40
4. Building technical equipment and controlling	40
5. Planning of modernisation, computer programmes	70
6. Thermo graphic and blower-door-measurements	10
7. Basics of specific energy laws	5
8. Project work in an existing building	40
<b>Total</b>	<b>240</b>

### Practice

In all of the mentioned groups #1 - #6, practical parts (e.g. the blower-door-measurement) are included, but the main part is #8, the project work. Here the participants investigate an existing building (optimal is a house with energy deficits) and they have to work out a strategy for the energy optimisation, costs and amortisation times.

### Key qualification

Basic qualification in communication and teamwork

### Institutional/organisational advantages

As, supported by the modification of the legal basis, an increasing interest in consultancy belonging to energy and buildings can be obtained, this course generates a lot of interest, in this time e.g. by chimney-sweepers, and can be a stable course for the organisation for quite a long time.

### Added value for EU and SAVE

This course can be a model for other European countries, because the effect of energy saving in buildings (heating and cooling/air-condition, thermal and moistness insulation, optimised technological equipment and more) on the CO<sub>2</sub>-emission and its indispensable reduction is great in all European member states.

Author: 17&4 Organisationsberatung GmbH.

## Consultant for Energy-Saving

### Title of Course

**Initialberater für energetische Gebäudesanierung (IBE)/Initial Consultant for Energy-saving in Existing Houses**

### Provider

Centre of Energy, Water and Environmental  
Technology (ZEWU - Zentrum für Energie-, Wasser-  
und Umwelttechnik der Handwerkskammer Hamburg )

### Address

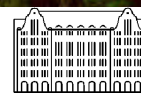
Buxtehuder Straße 76  
D-21073 Hamburg  
Tel.: +49-40-359 05-800  
Fax: +49-40-359 05-842

### Contact

Rolf deVries  
[rdevries@hwk-hamburg.de](mailto:rdevries@hwk-hamburg.de)



Handwerkskammer  
Hamburg · ZEWU



### General Description of the course

The training course "initial consultant for energy-saving in existing houses" was started in order to offer to potential participants from all craft branches around the house an overview of the chances and possibilities of the energetic improvement of buildings.

Particularly for the persons, who are at the present time not interested in long-term educational offers, the basics are shown in an introducing seminar.

It concerns to learn "the first words, in order to arouse the interest in the entire language", and then decide to participate further in resuming training courses and seminars.

**Target group:** craftsman journeyman education or technical worker certification

➔ **Aim of training:** The participants just get an overview about the basics of the energetic improvement of buildings. The aim is to increase their interest in these themes and lead them to the decision to go on with further education as the provider has shown with the Building Energy Consultant (Gebäudeenergieberater - GEB).



**Duration:** 32 hours (45 min), 2 components of 16 h each within 2 days

**Price:** 390 EUR per participant, 9,40 EUR/hour

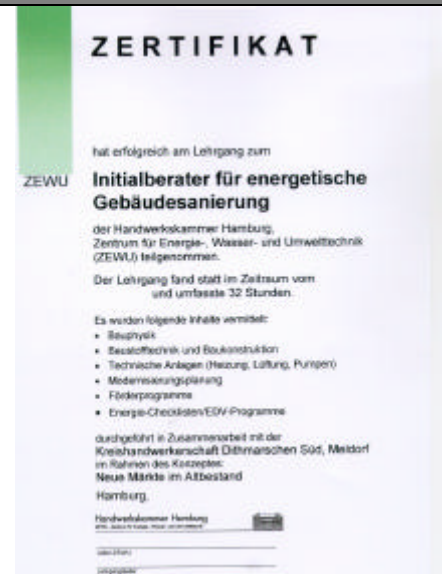
**Courses until now:** 4 (1 current)

### Further Information

<http://www.hwk-hamburg.de>

## Special quality

Learn "the first words, in order to arouse the interest in the entire language"



Short description of content	hours
1. Consulting of clients - basics	2
2. Sound-, thermal and moisture insulation, fire protection	12
3. Basics of specific energy laws	2
4. Building technical equipment and controlling	8
5. Planning of modernisation	8
<b>Total</b>	<b>32</b>

Detailed list of content available

## Practice

The participants cannot, belonging to the short period of time of the course, fulfil own practical work.

## Key qualification

Entrance into the themes of saving energy belonging to buildings

## Institutional/organisational advantages

This course has the described function of an entrance into the themes of saving energy belonging to buildings. If the organisation realises modern and interesting lessons, there will be a big chance that participants want to get more information and book other courses as the building energy consultant in craft.

## Added value for EU and SAVE

As an introducing training course for all themes belonging to the saving of energy in and around the house this course can be a model for other European Countries, especially in organisations, which provide further and far-reaching education.

Author: ZEWU

## Facility Management Expert

**Title of Course**

**Fachwirt Gebäudemanagement /  
Facility Management Expert**

**Provider**

Centre of Energy, Water and Environmental Technology (ZEWU -  
Zentrum für Energie-, Wasser- und Umwelttechnik der  
Handwerkskammer Hamburg )

**Address**

Buxtehuder Straße 76, D-21073 Hamburg, Germany  
Tel.: 0049 40 359 05 - 800  
Fax: 0049 40 359 05 - 842

**Contact**

Dieter Fuhrmann  
[dfuhrmann@hwk-hamburg.de](mailto:dfuhrmann@hwk-hamburg.de)  
[www.hwk-hamburg.de](http://www.hwk-hamburg.de)



**Handwerkskammer  
Hamburg · ZEWU**

**General Description of the course**

The desire of owners and in addition of users of buildings is more and more to receive all services relating to crafts from one hand and concentrate themselves on their main businesses. Therefore facility management providers have an increasing market position especially for middle and big business clients. Because of straight craft regularities in Germany the offers of facility management services from craft firms are an exceptional case, whereas these offers from planning and engineering bureaus, which take craft firms as subcontractors, are more and more observable.

Therefore it becomes more important for craft firms not to supply only their trade-specific services and executions but to offer entire solutions to customers. An early co-operation with other craft branches, with architects, engineers and planners is mostly inevitable. Trade-spreading know-how becomes more important for the individual craftsman in order to strengthen his position on the labour market and to detect possibly developing risks for himself and his customers in time.

Before these backgrounds this training course was planned in the year 1999 and is offered since 2000 with a constant interest from participants - craftsmen, architects, engineers but also from the commercial departments.

**Target group:** Master craftsman certification with vocational experience or equivalent engineer or architect education

➔ **Aim of training:** *The participants receive an overview of the possibilities and the necessities for co-operation relating to crafts. Legal bases and aspects of insurance are likewise educated like technical conditions (building cover, energy criteria, technical equipment, security and more) and services such as catering, messenger, garden and portier services. At least the participants are to be able to plan and execute the management of a building in all aspects*

**Duration:** 250 hours (45 min); 6 modules held on Friday evening and Saturday, the whole duration is one year

**Price:** 2.610 EUR per participant, 10,44 EUR/h

**Courses until now:** 3 courses within 3 years

**Further Information**

[www.hwk-hamburg.de](http://www.hwk-hamburg.de)

### Special quality

- Skilled craftsmen from different branches are educated together with building engineers, architects, planners and economic experts and
- The subject matters of the education include all the aspects of facility management.

Short description of content	hours
1. Definition and advantages of facility management, necessary competence	10
2. Life-cycle of buildings, cost-structures	25
3. Co-operations, liability and insurance aspects, legal basics, marketing	25
4. Kinds of contracts, economic basics, controlling	20
5. Area management, accounting	20
6. CAFM-systems	20
7. Planning of new buildings, modernisation, reconstruction, building demolition	35
8. Technical equipment (heating/cooling, water, wastewater, electrical equipment, controlling and automation systems)	35
9. Management systems, quality insurance	20
10. Infrastructure services (catering, security, cleaning, waste removal, garden services, messenger- and portier-services)	10
11. Project-work-coaching, supervision	30
<b>Total</b>	<b>250</b>

Detailed list of content available

### Practice

Project work, in which the participants have to solve a problem in facility management which includes items as planning, co-operation with other firms, contracting, costs and accounting, marketing.

### Key qualification

Qualifications in communication and teamwork, technical and economical overviews

### Institutional/organisational advantages

An increasing interest in facility management services is obtained and therefore exists a lot of interest from different circles (craft-firms, architects, planners and more). This seminar can be a stable course for the organisation for quite a long time.

### Added value for EU and SAVE

Facility management becomes more and more important for SME's in different countries, so that the frame of this seminar can be transferred into other European member states with specific details on the countries' regularities.

Author: ZEWU

### Training on Energy Management

## Title of Course

### Training on Energy Management

## Provider

Architects' Association of Rome in collaboration with CEFME  
(Training centre for the building sector)

## Address

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Italy  
Tel.: +39-06-44248924  
Fax: +39-06-44265266

## Contact

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[s.giachini@archiworld.it](mailto:s.giachini@archiworld.it)

Ms. Anna Simone, delegate of the Architects' Association of Rome for energy efficiency and renewable energies  
[anna.simone@flashnet.it](mailto:anna.simone@flashnet.it)



## General Description of the course

In Italy architects, planners and technicians are the professional groups that are faced with requests from private persons and public entities on possibilities for energy efficiency measures and renewable energies for territories and buildings.

Many of the above mentioned professionals do not have enough knowledge neither on the topics in general nor on technical solutions that are available on the market. This leads to misinformation of interested groups, might stop interesting initiatives and delay the improvement of energy efficiency in buildings in general.

In order to raise the knowledge on those topics, the Scientific Committee of the Architects' Association of Rome set-up a training course on energy efficiency and renewable energies. The course was organised with the help of CEFME, a vocational training institute specialised on trainings in the building sector. Public funding could be guaranteed by the region of Lazio and therefore the course could be offered free of charge. This fact helped to raise interest among the target group. The course was supported by ENEA (the Italian Agency for Energy and Environment), the National Association of Architects, the local authorities of the Lazio Region and the Province of Rome, the Roman Agency for Energy Savings and Legambiente.

**Target group:** Architects, planners, engineers, technicians, geometer

### Aim of training:

Raise the number of experts on energy efficiency and renewable energies among architects, planners and engineers. Information on: technical background on energy issues for urban and territorial planning as well as for the construction of buildings, different techniques for energy efficiency and renewable energies that are available on the market

Theoretical background on energy and environment politics and sustainable development

**Duration:** 180 hours (every second day for three months, 5 hours a day)

**Price:** 1.500 Euro (free of charge until now as the course was financed by the Lazio Region)

**Courses until now:** 4 (in parallel) with 75 participants

## Further Information

### Special quality

- Participants are mainly senior architects with already some years of working experience
- Teachers are well known experts in the field.
- Due to the length of the course (180 hours) participants get an in-depth knowledge on different fields of energy management, energy efficiency, renewable energies and general knowledge on sustainable development, energy and environment politics.
- Therefore they are well prepared to promote energy efficiency and renewable energies and to implement the knowledge in their day-to-day work. Participants are trained in technical, economic, environmental and planning aspects of the topic.
- The course was accompanied by a comprehensive evaluation.

### Short description of content

#### hours

Principles of environmental politics and its application in regulations and norms for buildings or urban planning	20
Planning of integrated renewable energy systems for local authorities and territories	15
Electronic management of data for an integrated planning with help of G.I.S. (Geographical Information System)	15
Integrated planning on the application of energy efficiency and renewable energies for company management, including heating and cooling systems	25
Economic analysis and financing opportunities for energy efficiency measures and the use of renewable energies	35
Types of innovative techniques for energy efficiency and renewable energies	20
Measurement of energy efficiency in public and private buildings	15
Integrated management of local resources in tourist zones with a high risk of pollution	20
Workshop on a public participation planning process (real case study)	15
<b>Total</b>	<b>180</b>

### Practice

- Each of the above mentioned modules have a practical part with the use of specific software and other planning instruments.
- On top there is a 15 hours workshop on a practical planning case study at the end of the course.

### Key qualification

- Participants get a good overview on the topic and horizontal skills. They are informed about available techniques.
- They participate in a simulated public participation planning process of EASW (the European Awareness Scenario Workshop)

### Institutional/organisational advantages

The course raises the amount of architects, planners and engineers that have knowledge on energy efficiency and renewable energy topics. Therefore the topics become more important in the work of the association of architects in general and raise its image.

After the course a network of participants and other actors was created and is serving as an experience exchange and information pool for participants.

### Added value for EU and SAVE

The course covers a broad range of topics in the interest of energy and environment politics of the European Union: the promotion of the use of Geographic Information Systems, integrated planning in tourist zones, available techniques in the energy efficiency and renewable energy field, integrated energy management for buildings etc.

Participants will promote the application and use of energy efficiency measures and renewable energies. They guarantee the competent information of different types of end-users (private persons, companies, local authorities).

Author: UNICA

## Energetic Design in Architecture on-line

### Title of Course

**Disseny energètic en arquitectura/Energetic Design in Architecture**

### Provider

Josep Lluís Sert School, from the Catalonia Association of Architects (COAC)

### Address

c/ Arcs, 1 -3 4a floor  
Tel.: (34) 93 3067844

### Contact

Gemma Solanellas  
[escolasert@coac.net](mailto:escolasert@coac.net)

### General Description of the course

This course first run in 1998 but it all started back in 1996, when Barcelona's Association of Architects carried out a series of ecology initiatives on its members training schemes and practices. A LIFE project (1996) concerning "the training of technician in environmentally friendly construction" was then developed. It was turned into a long term and very comprehensive course as well as into a book, "Architectural and Environmental Teaching". As a result of this LIFE project and the Barcelona's Council Solar Decree (1999), courses on energy efficiency of installations, one-off courses and lectures on subjects like: "solar components integration into buildings", "renewable energies", etc. and the theme course of this Good Practice were created.

The "Energetic Design in Architecture" Course is based on the passive solar architecture. This bio climatic architecture looks onto the resources architecture has to be energetically efficient. It takes into account surrounding characteristics like climate, location, etc. building technologies in order to minimize the dependency on auxiliary resources. This course is on-line and was designed for architects on any working situation or location.

The course is structured on theoretical foundations, the study of cases and practical exercises. It is divided into 4 modules: Climate and Comfort, The Building, Energetic Control and Dimension Setting.

**Target group:** Architects and other related disciplines professionals

**Aim of training:** to provide professionals with the practical information and method tools that will enable them to incorporate energetic saving criteria and environmental respect into building practices at sufficient comfort levels without abandoning current languages and procedures.

**Duration:** 2 months equivalent to 60 lecturing hours or 90 real hours

**Price:** 209 euros (architects or Architecture students) and 244 euros (others)

**Courses until now:** 4 courses (1 per year), from 1999 to 2002. 60 students have completed the course until now.

### Further information

[www.coac.net/escolasert](http://www.coac.net/escolasert)

### Special quality

- The on-line Course offers easy, comfortable access to the course contents and makes it compatible with professional activity due to its "attendance" flexibility and the absence of travelling to class.
- Modular and interactive approach with a very synthesized explanatory introduction and auxiliary windows (with diagrams, graphics, definition tables, web sites of interest and bibliography).
- Every chapter incorporates practical exercises with examples, calculus tables and resumed references. The case solving, the student's questions and the answers are accessible to all participants. There is also an electronic mail private line between every pupil and the teacher
- The course also offers a very close and personalized Evaluation and tutorial system on-line.

### Short description of content

hours

1. Climate and Comfort. Climate Parameters.

2. Climate and Comfort. Comfort Parameters.



3. The Building. Location	
4. The Building. Architectonic Configuration.	
5. The Building. Building Configuration.	
6. Energetic Control. Solar Control Systems.	
7. Energetic Control. Thermal Solar Use.	
8. Energetic Control. Natural Lighting.	
9. Dimension Setting. The Thermal Balance Method.	
10. Dimension Setting. The LT Method.	
<b>Total</b>	<b>90</b>

### Practice

7-8 practical exercises and about 30 hours. The most relevant aspects are:

- Sun exposure at the EAV (Escola d'Arquitectura del Vallès). Basic information about a university building in a warm area is provided - ideal locations for windows that would minimize the hours of direct radiation and the area of sun exposure (shadow graphic method).
- Lighting Calculation of a sport centre. Calculation of the economic profitability of installing windows in a sport centre (total artificial lighting). (Angular and Flow Method).
- Trade towers Energetic consumption. Verification of energy consumption and CO<sub>2</sub> emissions associated with the central heating, air conditioning, ventilation and lighting. Energetic consumption based on the LT Method.
- Jacobs second residence. Advice to supposed private promoter on whether the location, characteristics and proposed materials for an urban development can be considered bio-climatic.

### Key qualification

- Professional expert on comfort parameters associated with climate parameters, weather conditions and their geographic variations regarding the design and building of constructions.
- Professional Expert capable of carrying out an architectural and building configuration focussed on energetic saving and efficiency.
- Professional expert on passive heating and cooling systems, calculation methods and their application on building practices.

### Institutional/organisational advantages

Within the Catalan Association of Architects, the *Escuela de Práctica Profesional Josep Lluís Sert* works for permanent learning and information for architects all around Catalonia, while facilitates specialisation to architects in new areas, which are generated by a permanent development process of the discipline.

The main objective is to program and to execute courses, technical sessions, conferences and other activities related principally to architects continuing development. However, these are opened to the participation of other professional groups.

Since 1999, on-line learning has been introduced, as well as a reorganization of the learning offer, in order to adjust these to the labour market.

### Added value for EU and SAVE

COAC is an organization sensible to innovations on legislation (and other kinds) coming from the EU within a local and national framework. Such innovations get incorporated into its courses straight away. The "Energetic Design into Architecture" Course is therefore based on the A LIFE project (1996) concerning "the training of technician in environmentally friendly construction". Another example of this predisposition are the training sessions related to the Barcelona Solar Decree (1999) Implementation.

- Currently, The COAC training school is designing a course to promote the master lines of the Building Directive, Energia Solar Térmica, Energia Solar Fotovoltaica, etc.

Author: Ecoinstitut Barcelona

CURSOS online  
www.cncs.net

Diseño energético en arquitectura

I. CLIMA Y CONFORT II. EL EDIFICIO III. CONTROL ENERGÉTICO IV. PRE-DIMENSIONADO V. C

III. CONTROL ENERGÉTICO

OBJETIVOS

2.1. Análisis F&D  
2.2. Iluminación: Politecnico de V&

BIBLIOGRAFÍA

WEB DE INTERÉS

Preguntas y Respuestas

TUTOR

COORDINACIÓN

**EJERCICIO**

El ejercicio plantea la valoración, en términos de asoleo, de la decisión citada, respecto a otro extremo posible: enrasar las ventanas con el plano exterior de la fachada.

Como la fachada de que se trata es la norte, no recibe sol durante los meses de invierno, pero sí durante los de verano.

Para simplificar el cálculo, compararemos únicamente las horas de sol que reciben los cristales en ambos casos y la superficie expuesta al sol: con el cristal en el plano interior (la solución existente) o en el exterior de la fachada, durante un día del mes de junio; obviamente, se considerará más correcta aquella solución que ofrezca mejor protección solar.

El resultado es predecible: el cristal en el interior recibe menos radiación, pero se trata de llegar a conocer realmente cuánta menos radiación recibe en términos de superficie-tiempo.

Situación: calle de Pere Serra, 1-15 Sant Cugat del Valles (Barcelona).



**Procedimiento**

El método de trabajo que parece más adecuado es la utilización del **gráfico de sombras producidas por aleros** (apartado 1.2.2 del Bloque II), pues sin entrar en demasiados detalles, hace muy fácil cuantificar las horas y la superficie asoleada.

**Documentación para hacerse**

PLANTA  
SECCIÓN  
FACHADA

## Thermal Insulation Compound Systems

### Title of Course

**Weiterbildungslehrgang für Wärme-Dämm-Verbundsysteme/  
Further Training for Thermal Insulation Compound Systems**

### Provider

**bfi Wien** – Vocational Training Institute Vienna

### Address

Ausbildungszentrum für Bau- und Holzberufe  
des **bfi Wien**  
Innstraße 27-29  
A – 1200 Vienna  
Tel: +43 1 332 77 30-0, Fax: +43 1 332 77 30-209

### Contact

International Department  
e-mail: [bfi.int@bfi-wien.or.at](mailto:bfi.int@bfi-wien.or.at)



### General Description of the course

Because of energy saving measures there is demand for thermal insulation of facades. That is why the training centre for constructional- and wood-professions of the **bfi Wien** offers the course for thermal/insulation/compound systems.

The course is a well-founded further training for unemployed people. It is an efficient higher qualification in the field of thermal insulation and insulation of facades and enables the participants to reintegrate in the job market after having finished the training.

The training lasts for 5 weeks at 40 lessons each. Most of the lessons (about 75%) are the practical part.

At the end of the training the participants get an assessment of practice and theory. Certificate is only given if the participant took part in at least 75% of the lessons.

**Target group:** unemployed persons who want to be reintegrated in the job market

**Aim of training:** efficient higher qualification in the field of thermal insulation and insulation of facades, reintegration of the participants in the job market

**Duration:** 5 weeks with 40 lessons at 50 minutes each

**Price:** free for participants, funded by the Austrian Labour Market Service

**Courses until now:** about 20 courses

### Further Information

[www.bfi-wien.or.at/sites/english\\_version.html](http://www.bfi-wien.or.at/sites/english_version.html)

### Special quality

- This course is a very practical approach and gives specific qualification for thermal insulation.
- The aims of Kyoto target require improved thermal insulation for new buildings and for the building stock – this new demand is combined with an effective labour market measure.
- The workshops in *bfi Wien* are very well adjusted for the practical exercises.

### Short description of content

Professional theory:

Knowledge about tools and scaffoldings according to ÖNORM

Various ways of sticking and rawl plugging (Verdübelung)

Processing of various ways of coatings and paintings

Getting to know various systems like Silamin-Terramin-Thermosol-Terrasil

Calculation of the U-value

Carrying out of all profiles which are used at fronts

Professional practice:

Division of the front according to the execution plan on scale of 1:50

Fitting of the base profile, production of the glue, sticking, shifting of the profiles, abrading and filling in the netting

Priming of the surfaces with various materials

Various fine plasters with different compositions in colour

Plasters with various grain sizes

Professional calculation:

Basic arithmetical operations like length, planes, circumferences, rectangles, squares and circles.

Calculation of scales. Calculation of material-needs according to the execution plan.

Industrial law:

Working hours, holidays, dismissal, payment

**Practice**

The practical training is an important part – about 75% of the lessons are practical, about 25% theoretical. In practical exercises the participants can show that they have understood the acquired knowledge.

**Key qualification**

Improvement of communication skills and higher qualification for re-integration in the labour market.

**Institutional/organisational advantages**

The funding of this course by the labour market service makes this course attractive for the vocational institute. There are many participants since years.

**Added value for EU and SAVE**

This course is a contribution to a higher qualification level for thermal insulation. The latest standards of energy efficiency should be adopted in this course, for example working with insulation material up to a thickness of 10 to 30 centimetres as it is used for low energy or passive houses. The combination with a measure for the labour market is promising. It seems to be possible to adopt this approach for other countries.

Author: 17&4 Organisationsberatung GmbH.

**Sustainable Building Training-School****Title of Courses**

**Escola-Taller Construcció Sostenible / Instal·lador d'Energia Solar**  
**Sustainable Building Training-School / Solar Energy Technician**

**Provider**

Barcelona Activa S.A.

**Address**

c/Llacuna 163  
 E-08018 Barcelona  
 Tel.: 93 401 95 87

**Contact**

Susana Sanahujes i Bars, Coordinadora Programa Escoles-Taller  
[susana.sanahujes@bacelonactiva.es](mailto:susana.sanahujes@bacelonactiva.es)

**General Description of the course**

The Barcelona Activa “Workshop-School” runs a series of qualifying educational programs for the youth. They are co-financed by the European Social Fund and the Work Department of the Catalunya Generalitat. Different professional profiles are to be achieved within the same “Training-School” although they are all coordinated in order to reach a common project. In the “Training School” Program real construction projects with a social use for the city of Barcelona are given special significance.

The “Solar Energy Technician” training course is framed within the “Sustainable Construction Training School”, a joint project run by Barcelona Activa and the second degree association Futur Sostenible. This entity agglutinates associations involved in research, technical consultancy, communication and awareness of environmental, energy and social issues.

The objective of this coalition project is the rehabilitation of a local authority modernist building with sustainable criteria and its conversion into a centre where the maximum amount of sustainable technological components are visible and therefore shown to be viable and efficient.

Once rehabilitated the “Sun Factory” will become a diffusion, promotion and training tool for the energy and environmental building sector.

For the “Sun Factory” rehabilitation they have support from the local, the autonomic and the state administrations. Support from the European Commission come through projects within the 5<sup>th</sup> Framework program. With this rehabilitation work, issues like selective deconstruction, building residue revaluation, installation of a green covers, solar air-conditioning, etc. will be dealt with.

In accordance to the rehabilitation project contents the “Sustainable Building Training School” welcomes training for 6 different professional profiles: air-conditioning technician, water and electrical technician, carpenter, solar energy technician, bricklayer and façade decorator-restorer. The “solar energy technician” is detailed below.

**Target group:** Unemployed youth under 25

**Aim of training:** The Barcelona Activa “Training-School” Programme involves a comprehensive training process based on 3 basic parameters:

Professional qualifications: learning practical and theoretical aspects of the trade.

Acquisition and/or improvement of working habits and attitudes towards work and training.

Acquisition of resources and skills for job seeking or creating self-employing projects.

The main objective is to form professionals on the principles of “learning to work” and “work while learning”. The “solar energy technician” professional profile is developed under the agreement with the “Professional Certificate” according to the R.D. 2223/1998 “solar energy-plumber”.

**Duration:** The total duration of the course is 2 years. 6 training months and 1,5 years working on site as well as taking theory lessons. This theory training runs for 184 hours (37,5 hours per week) making a total of 3450 hours.

**Price:** free for students

#### Further Information

[www.barcelonactiva.es](http://www.barcelonactiva.es)

#### Special quality

The main differences between this “Training School” Programme and other training offers are:

- The solar energy installations carried out have been developed in 2 projects. Both projects have been co-financed by the EC 5<sup>th</sup> Framework research and development program: DESSHC (solar air-conditioning) and Tea-Pub (photovoltaic installations connected to the grid). The students are therefore enabled to take part in the applying of the latest advances in the renewable energy issues.
- Collaboration between Futur Sostenible partners (also European project partners), the administration and the “Training School” allows us to directly coordinate the contents of the theoretical and practical training with their applications on the real building site.

Short description of content	hours
1. Basic training in Sustainability in the building sector.	40
2. Solar Radiation and energy applications	75
3. Installation reconsidering.	105
4. Solar thermal and photovoltaic collectors, technologies and installation.	400
5. Primary circuit, installation	400
6. Secondary circuit.	400
7. Control, workings and maintenance	400
8. Compensatory training: communication, etc.	200
9. Job seeking training	50
10. Self-employment training	50
11. Practical work	1330
<b>Total</b>	<b>3450</b>

#### Practice

- The practical lessons are on building an installation with thermal solar collectors, the assembly of a simple pipe-in-vacuum installation, the building and fitting up of an air solar collector and a solar dryer and the building of a photovoltaic solar installation (independent and connected to mains installations), as well as the building of various types of solar cookers.
- The practical exercises aim to facilitate the final installation of both the air-conditioning (pipe-in-vacuum) and the photovoltaic systems at the site. The total amount of hours is of 816.

### Key qualification

Qualifications achieved by accomplishing the RD 2223/1998 professional certificate for “solar energy plumber”: Professional qualifications for carrying out solar energy installations and for applying the current technical legislations on health and safety at work.

Training in the “sustainable building” basic aspects. Developing the capacity to integrate and interrelate with professionals within a team with different skills and working together on a specific building site (where all the sustainability aspects are to be found).

### Institutional/organisational advantages

As the main institutional advantage we can highlight that a public organisation like Barcelona Activa S.A. promotes the work-force insertion and training of the youth on innovative professions. Barcelona Activa intends to foresee the job market future necessities by preparing professionals on the environment field in Barcelona and its metropolitan area. Therefore, Barcelona Activa S.A. holds, with an expert advisor panel, an open working line on studies about new job mines within the environmental field. It also looks onto the development of new courses according to tendencies and main necessities of the current moment.

### Added value for EU and SAVE

The Sustainable Building Training School “solar energy installer” course is an example of how Barcelona Activa is willing to collaborate with pioneer experiences that develop at an European level with human and technical resources.

Author: Ecoinstitut Barcelona

## Certified Heat Pump Fitter

### Title of Course

**Ausbildung zum zertifizierten Wärmepumpen-  
Installateur/Anlagenplaner  
Certified heat-pump fitter/facility planner**

### Provider

arsenal research Ltd. in cooperation with LGW (“Leistungsgemeinschaft Wärmepumpe” – the Austrian federal association of heat-pump producers and -fitters)

### Address

arsenal research, Österreichisches Forschungs- und Prüfzentrum Arsenal  
Ges.m.b.H.  
Faradaygasse 3, Objekt 230, A-1030 Wien  
Tel.: +43-1-050550-6299  
Dr. Brigitte Bach  
[Brigitte.bach@arsenal.ac.at](mailto:Brigitte.bach@arsenal.ac.at)



### General Description of the course

An efficient heat-pump facility is not only a matter of the heat-pump. Many heat pump facilities are running with low efficiency. The reputation of the heat pump technology was rather bad. As main deciding factor to improve this situation the qualification of heat pump fitters was identified.

Following this analysis this training was developed in cooperation between the Austria research institute and chamber of commerce.



The training consists of four modules for three days each. Parallel distance learning is offered, so that learning from home is possible. arsenal research is applying as certification institution. A practical and a final theoretical (oral and written) examination on expert level has to be done.

The four modules:

- 1) introduction, renewable energies, ecological basis, basis of heating engineering
- 2) general heat-pump technology
- 3) examples, experiences and problems in the practice, supports and finance, marketing
- 4) practical exercises at arsenal research, examination

**Target group:** Installers and plumbers with degree in the field of gas and water plumbing, refrigerating or plant technology and electricians who are employees of an officially recognized company. The certified company has to be member of LGW.

**Aim of training:** Qualification and certification for heat-pump installers and facility planners.

**Duration:** given lectures: 4 modules for 3 days each, distance learning

**Price:** €1.660,- including training material and VAT

**Courses until now:** 3, 2 running at the moment + 2 planned; 30 participants who finished until now

#### Further Information

[www.arsenal.ac.at/erneuerbare/waermepumpen/installateur.htm](http://www.arsenal.ac.at/erneuerbare/waermepumpen/installateur.htm): Rahmenbedingung für die Zertifizierung, Kurse, zertifizierte Installateure und Betriebe, Kursbesucher und Absolventen

[http://www.arsenal.ac.at/publikationen/pdf/paper\\_zero\\_leakage\\_pdf\\_250402.pdf](http://www.arsenal.ac.at/publikationen/pdf/paper_zero_leakage_pdf_250402.pdf): Quality of heat pump systems through high-quality training schedules

#### Special quality

- Tight cooperation between research institute and chamber of commerce
- High degree of implementation - participant must do practice tasks in his enterprise
- Contract, which makes sure that the participant is working in practice by installing heat-pumps – as a contribution to quality management
- Practical exercises on heat pump testing facility (troubleshooting, find mistakes)
- The qualification of the installers is not only shown in the examination; to reach the certification 3 heat-pump facilities have to be monitored; the data are evaluated by arsenal research;
- Additionally every certified heat pump installer sends basic data of every installed facility to arsenal research each year



Short description of content	hours
Energy, renewable energies, ecological basis	5
basis of heating engineering, sources of heat	9
general heat-pump technology (heat and refrigeration, refrigerant, ways of use, planning of facilities, components of a heat-pump)	21
water law and geological basis	3
examples, experiences and problems in the practice	12
supports and finance, marketing	3
installation and working on heat-pump facilities	15
	68

Detailed list of content available, 1000 pages course material

#### Practice

- Realization of a “facility monitoring” at three plants. For three weeks following facts have to be written down: outdoor and indoor temperature, some physical values, electrical power, working hours. Measuring instruments can be borrowed by arsenal research.
- At the practical examination the skill and knowledge of starting up and troubleshooting of a heat-pump facility has to be shown.

**Key qualification**

The certification contract goes to the company, but the holder of the license is the participant of the course. If this participant leaves the company, it is possible to certify another employee within one year. In this time the company does not lose the designation “certified heat-pump installer”

**Institutional/organisational advantages**

- The research centre is fostering its reputation as partner for enterprises
- Creating of confidence to the economy and business – through that research activities are encouraged and intensified
- It is very important that there is at least one institution per nation which takes up the topic of quality saving. Especially heat-pump facilities are to this effect a very sensitive technology.

**Added value for EU and SAVE**

- This course is providing best available qualification in theory and practice, which is also negotiated in a special contract.
- Important contribution for advanced energy efficiency in heat pump facilities
- This approach could be a model for other European countries. Interest in cooperation of arsenal research makes it easy to adopt this course for other countries.

Author: 17&4 Organisationsberatung GmbH.

**Course on Heating Maintenance****Title of Course**

**Heizkesselwärterkurs/  
Course for Boiler Attendants**

**Provider**

Autonome Provinz Bozen-Südtirol  
Landesberufsschule Meran  
Abteilung Handel, Handwerk und Industrie “Dipl. Ing. Luis Zuegg”

Autonomous province of Bozen-South Tyrol  
Vocational training institute of the Meran province  
Department of trade, craft and industry “Dipl. Ing. Luis Zuegg”

**Address**

Rennstallweg 24  
I-39012 Meran  
Italy

Tel.: +39-0473-274900, Fax: +39-0473-274909

**Contact**

Mr. Edwin Daniel  
[lbs.me-luis-zuegg@schule.suedtirol.it](mailto:lbs.me-luis-zuegg@schule.suedtirol.it)





## General Description of the course

The course was established in reply to the Italian law 615 of 13.7.1966. The law determines that boilers bigger than 232 kWh can only be installed and maintained by people who hold an official licence. The “Landesberufsschule Meran” (the vocational training institute of the province), was asked by the regional government to design and offer a course for heat pump attendants in order to provide participants with the requested licence. The course was therefore established in 1974. Participants are passing an oral exam and receive an official licence as “approved boiler attendant”.

In Italy, the course is the only one offered in German. It is highly recognised by all kind of professions in the building sector, from installers to engineers, from workers in biomass power plants to architects.

In the near future the institute is planning to set-up a network of all participants in order to keep former course attendants up-to-date on new legislations and regulations. Regarding training contents, the institute is planning to implement communication training among building teams.

**Target group:** The course is open to everybody that is older than 18, but is specifically targeted for heat pump installers, engineers and planners

**Aim of training:** Preparation for licence as “heat pump attendant”

**Duration:** 215 hours

**Price:** 155 Euro

**Courses until now:** 30 trainings with more than 600 participants

## Further Information

[http://www.schule.provinz.bz.it/lbs\\_meran-zuegg/kurs\\_heizungstechnik\\_d.htm](http://www.schule.provinz.bz.it/lbs_meran-zuegg/kurs_heizungstechnik_d.htm)

## Special quality

- The training course has a long and successful tradition in the autonomous province of Bozen and is highly recognised by companies and public administration.
- It provides participants (after an exam) with an official certificate as “heat pump attendant” that is valid in whole Italy.
- The training has a good equilibrium between systematic skills, theoretical backgrounds and key qualifications. It offers a wide range of side information on energy efficiency topics and contains communication skills training.
- The comprehensive training material (app. 1500 pages) in four folders gives participants a good directory for practical use after the course.
- Beneath practical training, participants learn about practical applications during several excursions.

Short description of content	hours
Basics in building physics, building ecology, thermal comfort	20
Heating systems (including oil, gas, wood, biomass)	20
Regulations in the different fields of heating systems and related areas (e.g. emissions, security aspects, energy saving law, risk prevention etc.)	40
Basics on acoustics, air pollution and its prevention	10
Correct use of hazardous materials	10
General information on environmental problems and environmental politics (climate change, Kyoto protocol, eco-controlling, renewable energies, energy efficiency, fuel cells, passive houses)	15
Control technologies	10
Pump technologies	15
Cooling systems	10
Basics on fire prevention	10
Firing systems, chimney technique and related topics	10
Protection of drinking water and waste water recycling	15
Corrosion	15
Communication in selling	5
Financing possibilities for renewable energies and energy efficiency	10
<b>Total</b>	<b>215</b>

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## Practice

Practical exercises:

- Installation, running and maintenance of oil and gas heat pumps
- Measuring and monitoring of different heat pump installations
- Diagnosis of problem situations
- Fire extinction exercises

Excursions to:

- Passive houses with demonstration of the Blower Door Test
- Waste burning plants
- Biomass heating plant
- Source and storage of drinking water

Each exercise and each excursion lasts 8 hours.

## Key qualification

- Participants get comprehensive information on the various aspects on heating systems and its environmental implications, as well as on background information on environmental issues and communication skills among customers.
- They are well prepared to offer and communicate environmentally friendly solutions to potential costumers as well as to comply to environmental laws.
- Participants are passing an exam and receive the official certificate as “boiler attendant”.

## Institutional/organisational advantages

- Installers, planners and engineers are qualified to correspond to the law on qualification for installing and controlling heating systems.
- The course is well known and has a high reputation in the region.
- The team that is planning and implementing the training is highly motivated and always interested in further developing methodology and contents of the course.

## Added value for EU and SAVE

- The course helps to implement European energy saving objectives on a local level by training installers and planners in the field. By direct practical application after the course, energy savings could be achieved.
- The course could be transferred to other countries as response to local laws on heating systems' requirements.
- The different types of excursions are of special quality as they give participants a good idea on the broad fields of application of their knowledge.

Author: UNICA

## Solar Energy Planner-Technician



### Title of Course

**Proyectista-Instalador de Energia Solar/  
Solar Energy Planner-Technician**

### Provider

CENSOLAR (Solar Energy Training Center)

### Address

c/ Comercio, 12  
E-41927 Mairena del Aljarafe (prov.Sevilla; SPAIN)  
Tel: (34) 95.418.62.00

### Contact

Francisco Chica  
[progensa@sarenet.es](mailto:progensa@sarenet.es)



Installation carried out by Censolar students  
(Villarobledo Sports Center, Albacete)

## General Description of the course

Censolar is a Center exclusively dedicated to the solar energy technical, thermal and photovoltaic training, through attendance or distance teaching programmes that use methods specially developed (progressive adaptation pedagogic system).

Censolar was the first training center officially authorized to run distant learning courses on solar energy (26-3-82 O.M.). The center holds the ISO 9001 Quality Certificate on design, creation and running of renewable energies courses.

The Solar Energy Planner-Technician Course is a distant-learning course attended by pupils from more than 30 different countries. It was thought out to be totally independent followed by the student and to aim for the professional practice from a basic knowledge level starting point. An internationally recognized "Solar Energy Planner-Technician" Diploma is awarded at completion.

The course is structured in three parts: first preparatory one on Physics and Energy to accomplish the basic level necessary to go on. Part two deals about Solar Energy topics (water heating systems, photovoltaic energy, swimming-pool heating and energy storing systems). The last part is designed to consolidate knowledge on legal rules, contracting, producing estimates and general information on firms and quality guaranteed products on the market. The material support of the course includes 6 manuals with up-to-date information and various software programs for the pupils' sole use. The course is based on a self-learning program. Students get personalized support from a tutor who evaluates the pupils' work individually, avoiding tests and other standardized evaluation systems. A final project is to be produced at the end of the course. Pupils are encouraged to take practice in one of the several collaborating companies that operate on solar energy all over the world, although practical experience is not compulsory to get the diploma.

**Target group:** Students with A levels on technical subjects or an equivalent vocational training.

**Aim of training:** The course objective is to form specialists with a pre BA level on the practical applications of solar, both thermal and photovoltaic, energy.

**Duration:** 700 h (1 year. Although It could run up to 2 years depending on the personal and/or professional needs of the student)

**Price:** 925 euros (paid in one or more payments)

**Courses until now:** + than 20 courses (1 per year)

## Further Information

[www.censolar.es](http://www.censolar.es) (detailed course information)

## Special quality

- Distant-Learning Course. No need to travel to carry out any activities, evaluation or final project presentation.
- Recognized course with years of experience and continuity. Recognized by the Spanish National Work Bureau (INEM) and by numerous Spanish and Foreign entities and companies.
- The course academic requirements are of a very basic knowledge level. A progressive adaptation pedagogic system is implemented to reach the basic knowledge level. Every chapter contains various practical exercises that form the essence of the course.
- The course uses highly comprehensive material with a didactic focus to avoid the need for external bibliography. This material has been elaborated by the course teachers/tutors themselves. Software for the student's exclusive use especially designed to carry out the necessary calculations to solve the courses exercises is also provided.
- Individualized and flexible tutoring to accommodate the student's own working rhythm with coaching and evaluation according to their own personal work (no on-line test or evaluation systems)

## Short description of content

	hours
1. Physics, introduction to electricity, energy and radiant energy	40
2. Solar energy, basics	30
3. Thermal systems, types of solar collector, energy balance, heat exchange, pumps, etc.	60
4. Optimization of thermal solar systems, Regulation and Design, Collecting Area Calculation, Installation Elements Calculation, Economics, Project Presentation and Estimates Producing,	150

Swimming-pool Warming, Heating, Other Solar Energy Applications, Hot Sanitary Water Installation Maintenance	
5. Electric Conversion Systems: Electricity Conversion, The Solar Panel, Photovoltaic Installation, Viability Studying, Project Presentation, Execution and Maintaining of FV Installations.	150
6a. Current Legislation. Technical Regulations, Auxiliary Legislation, Contracts, etc.	10
6b. Thermal and Photovoltaic Solar Energy Commercial Dossier. Companies and Manufacturers Directory, Products, Importing and/or Supplying Companies, Publications	10
<b>Total</b>	<b>700</b>

Detailed list of content available

### Practice

- 5 exercise units, practical cases to be solved and “an end of course”. 300-350h in total.
- Every chapter contains a solved exercise and a practical-case annex as well as proposed practical cases for the students to solve prior moving onto the next chapter.
- Censolar has a list of collaborating companies where the students can do placements. The students are also informed of job offers within their residence area.

### Key qualification

Professional ability to design, carry out calculations, make estimates and run thermal and photovoltaic solar energy installations of small and middle capacity.



### Institutional/organisational advantages

- CENSOLAR is certified with the 9001 ISO and is subject to the RD 2223/1998. Its qualifications are homologated and it enjoys a high international level of recognition.
- CENSOLAR has been running courses for more than 20 years. It has numerous agreements signed with private companies and the public administration. As an example, CENSOLAR trains workers in conjunction with the Spanish National Work Institute (INEM) on placement contracts.
- As a result of its tight collaboration with public and private agencies CENSOLAR is constantly up-dating itself in relation to technical, legal and administrative changes.

### Added value for EU and SAVE

- CENSOLAR is the only training agent that has been regularly offering a course for more than 20 years in Spain.
- CENSOLAR is a center specifically orientated to run training courses on the solar originated renewable energies field. Its potential students come from a great variety of backgrounds although the target group is people who want to work as solar energy installers or planners.
- CENSOLAR is formed by a very active and motivated collective of professionals dedicated to the exchange and diffusion of Profiting Energy Solar Systems with numerous contacts with private companies and public organizations around the world.

Author: Ecoserveis

### Solar Thermal Energy Installer

**Title of Course**

**Instalador d'energia Solar Tèrmica/  
Solar Thermal Energy Installer**

**Provider**

CIFO Sta. Coloma de Gramanet

**Address**

Avgda. Ramón Berenguer s/n  
E-08924 Sta. Coloma de Gramanet (Barcelona)  
Tel.: +34 93 466 58 30

**Contact**

Mr. Felip Belmonte (Head of Innovation)  
[cifoscoloma@correu.gencat.es](mailto:cifoscoloma@correu.gencat.es)

**General Description of the course**

Vocational course (formació professional ocupacional) addressed to unemployed people over 25.

The course has been running for 7 years and there is no plan of ending it.

The contents, structure, nº of hours, requirements, etc. are regulated by Spanish law (RD 223/1998). The course provides official qualifications for: thermal solar energy installer .

This type of course could be in the future part of an European qualifications program for skilled workers.

The educational institution where the course is being given was created and belongs to the public administration "Department de Treball de la Generalitat de Catalunya" (Work Department of the Autonomous Government) and is totally dedicated to vocational training for unemployed people (formació profesional ocupacional). The center is furnished with high quality equipment, that benefits the pupils with access to computers, library, database, publications etc.

The course gives the participants the skills to: Install and to correctly connect solar thermal energy system collectors, primary circuits, control panel and electric connections according to legislation.

The course not only covers technical aspects, it also includes teachings on job seeking skills, security and health at work, Catalan language, computer, environment and a first look into communication skills. The aim of the short modules is to give the pupil the tools to be able to find a job.

**Target group:** unemployed people over 25

**Aim of training:** to prepare skilled workers in the solar thermal installation field market.

**Duration:** 363 hours

**Price:** free (for pupils)

**Courses until now:** 8

**Further Information**

See address and e-mail above.

**Special quality**

- The course provides well skilled professionals for the solar thermal energy market.
- The contents of the course are regulated by law, which implies that the quality of the course is ensured and it follows the government requirements for this type of training.
- The center is totally dedicated to vocational training and provides extra help for job seeking.
- These type of courses addressed to unemployed people are very important in a country with a high level of unemployment, as Spain.
- The on-going nature of the course allows for new issues to be incorporated as well as their improvement in the future (as opposed to other one-off courses)

Short description of content	hours
Solar radiation	25
Adapting project to local characteristics	40
Installation and assembling of solar collectors	60

Primary circuit	60
Secondary circuit	60
Control, operation and maintenance	85
<b>Total</b>	<b>363</b>

Each module is divided into 3 parts: Practice, theory and professional issues (computer, security and health at work, environment, communication skills = 33 hours)

Catalan language and job seeking skills are taught in workshops or self learning

### Practice

Each module dedicates approximately 50% of the hours to practical exercises. Examples of 3 exercises:

- Practice Module 4: Installation of tanks and heat exchangers, recirculation pumps, expansion vessels, counterflow valves, steamers. Measure of flow and pressure (30 hours aprox.)
- Practice Module 5: Examine sanitary water installation drawings, Installation of components (pressure drop valves, counterflow valves, back-up system), Solder steel/copper and copper pipes, Installation of systems: direct compact, forced series-parallel (30 hours aprox. )
- Practice Module 6: Install, connect and tune-up control panels and components (different types of temperature measuring tools). Check ups of electrical and control schemes. Description of components with their characteristics and the solar thermal systems. Write out of maintenance instructions for a standard installation, Drawing of hydraulic and electrical diagrams of an installation. Preparation of technical information and filling out of grant applications (ca. 40 hours)

### Key qualification

General skills: installing of solar thermal energy systems: collector, primary circuit, secondary circuit and control panel connections. Electric connections in accordance to the technical legislation in force and legislation on security and health at work. Units of skills:

- Organizing work, locating the main elements of the installation.
- Assembling solar thermal collectors in the support structure
- Installing and connecting the primary circuit
- Installing the secondary circuit
- Installing control panel and tune-up of installation

### Institutional/organisational advantages

The course is given within the institutional framework of vocational training for unemployed people.

The contents of the course is regulated by law to ensure standards among all vocational teaching institutions that offer these type of courses

The educational center that runs the course is a model center for teachings on water and energy issues. This means that the center can introduce and propose changes and innovations in the curriculum that will be adopted by other related centers.

The course is financed by public administrations and is free of cost for students. The course allows everybody to have access to this training.

The courses provided by the center are well known. People from outside Catalonia come to the center to attend to its courses

### Added value for EU and SAVE

- Training of professionals who will achieve the EU targets on diffusion and usage of renewable energies.
- The educational staff of the center has shown its high interest in the projects outcomes and their willingness to participate in the “train the trainer” workshop and others activities of the project
- This type of course could be part of the European professional qualification scheme.
- Possibilities to exchange experiences with other foreign and local institutions.
- The on-going nature of the course allows the introduction of innovative issues and other aspects in accordance to EU aims into its curriculum

Author: Ecoserveis

### Photovoltaic Technology



**Title of Course****Tecnica fotovoltaica / Photovoltaic Technology****Provider**

Scuola Universitaria Professionale della Svizzera Italiana  
Dipartimento Costruzioni e Territorio  
LEEE (Laboratorio di Energia, Ecologia e Economia)

University of Applied Sciences of Lugano, Switzerland  
Department of construction and territory  
LEEE (Laboratory of Energy, Ecology and Economy)

**Address**

LEEE-TISO  
SUPSI-DCT CP 110  
CH-6952 Canobbio  
Switzerland  
Tel. +41 91 935 13 55, Fax. +41 91 935 13 49

**Contact**

Mr. Sandro Rezzonico  
[sandro.rezzonico@dct.supsi.ch](mailto:sandro.rezzonico@dct.supsi.ch)

**General Description of the course**

In order to raise the production of energy from renewable sources, photovoltaic technology becomes more and more important. Therefore the demand for professional planning and installation of photovoltaic installations is raising steadily.

The Laboratory of Energy, Ecology and Economy (LEEE) of the University of Applied Sciences set up a specific training course on photovoltaic technology in 1999. The course provides comprehensive theoretical and practical knowledge, as well as specific planning software training and practical exercises. It is based on the experience of former training courses in the same field implemented by LEEE since 1991.

The course is divided in four modules. According to individual knowledge, participants can choose to participate in all or in only one, two or three modules.

**Target group:** Architects, planners, consultants, electricians and other interested people in photovoltaic technologies

**Aim of training:** Information on the theoretical background on photovoltaic and on energy policy in general; planning and installation of photovoltaic installations and the simulation of different technical solutions

**Duration:** 32 hours for all modules

**Price:** 820 Euro for all parts; Module 1: 170 Euro, Module 2: 240 Euro, Module 3: 240 Euro, Module 4: 170 Euro. The price does not include the training software nor the expenses for travel etc, if the course is implemented outside Lugano.

**Courses until now:** 3 trainings with 106 participants

**Further Information**

[www.leeedct.supsi.ch](http://www.leeedct.supsi.ch)

**Special quality**

- In Italy and the Italian part of Switzerland the course is unique in its contents and structure.
- The modular system with a clear division of topics guarantees flexibility for participants. The combination of background information on technical and economic solutions, practical planning and installations give participants a good and comprehensive overview on photovoltaic technologies.
- Participants can immediately apply the knowledge into praxis.
- The course can be carried out in different locations.

Short description of content	hours
Part 1: Theoretical introduction Basic technical and economic background in relation to photovoltaic; meteorological basis; presentation of different technologies and various types of plants; environmental and energetic benefits in comparison with other energy sources; economic analysis	8
Part 2: Planning and installation of grid-connected photovoltaic plants Theoretical and practical basics; characteristics; modes of operation and special features of plants connected with the electricity network; norms; analysis on different components and how to choose them; risks; planning on efficient sizes of plants; avoidance of principal mistakes; practical exercises for different types of plants	8
Part 3: Planning and installation of stand-alone photovoltaic plants Theoretical and practical basics; characteristics; modes of operation and special features; analysis on different components and how to choose them; risks; planning on efficient sizes of plants; avoidance of principal mistakes; practical exercises for different types of plants	8
Part 4: Use of the simulation software PVSYST basic exercises; advanced simulations; advanced understanding of photovoltaic plants by using the software	8
<b>Total</b>	<b>32</b>

### Practice

- Part 2 (4 hours): Installation of different types of grid-connected photovoltaic plants  
Testing of the installed plants in operation
- Part 3 (4 hours): Installation of different types of stand-alone photovoltaic plants  
Testing of the installed plants in operation

### Key qualification

- Participants get basic and specific knowledge on the planning and installation of photovoltaic installations. They are informed about funding possibilities in Switzerland.
- They can directly apply the knowledge into praxis and are able to choose the best technical and economic solutions according to given conditions.
- Planners are enabled to supervise and control the installations and installers will understand plans better. Participants are able to make an economic analysis for a photovoltaic installation.

### Institutional/organisational advantages

As the course is implemented in Italian, LEEE has the opportunity to promote it in whole Italy. Interest is shown by the local Italian agencies for energy savings. One example is the local agency of Rome, RomaEnergia, that invited LEEE to carry out a training in Rome in order to promote a local program for the financial support of photovoltaic installations on public and private buildings. Huge interest was shown and more than 50 people attended the course.

### Added value for EU and SAVE

Participants will promote the installation of photovoltaic installations and will help to choose efficient economic and energetic solutions according to given conditions. Therefore they contribute to an increase of photovoltaic installations and the production of solar energy.

Author: UNICA

### Bioheat-Installer

#### Title of Course

**Biowärme Installateur/  
Bioheat Installer**



#### Provider



Austrian Biomass Association, with financial support from the Austrian Federal Ministry for Agriculture, Forestry and Environment

**Address**

Österreichischer Biomasse Verband - Austrian Biomass Association  
Franz Josefs Kai 13, 1010 Wien  
Tel: 01/533 07 97-14, Fax: 01/533 07 97-90

**Contact**

Hermann Pummer  
[pummer@oesfo.at](mailto:pummer@oesfo.at)

**General Description of the course**

There is a trend towards modern and progressive wood-heating-systems – a contribution to CO<sub>2</sub>-reduction and sustainable energies. Especially in rural areas a higher demand on wood-chops- and pellets-heating systems can be found out.

Although there are producers in Austria which developed heating systems of high quality, there was a lack of qualified installers, who could fit these new products well.

The initiative was started by the Austrian Biomass Association who developed a new course.

The training lasts three days. It took place in several cities and towns in Austria (e.g. Vienna, St. Pölten, Linz, Salzburg, Innsbruck and Klagenfurt).

The speakers are recognized specialists from the economy and various chambers, guilds, technical offices and administrations. Additionally to the training, practical knowledge in installation of a biomass-heating-facility has to be proved by the participant.

In the year 2001 two hundred further companies have received the certificate “Biomass-Installer” (registered trademark), which is 80% more than in the year 2000. Typically about 260 companies see a chance in ecological heating systems, made use of the further training and have the certificate. The awarding of the certificate takes place through an event, where also the Minister for Agriculture and Environment is present.

**Target group:** employees from installer and plumber companies can attend the training, the certificate is awarded to the company

**Aim of training:** knowledge in installation of new wood-heating-systems

**Duration:** 3 days + proved practical knowledge

**Price:**

**Courses until now:** series of trainings began 2000; in the year 2001 trainings at 7 various places happened; typically there are about 260 companies with certificate

**Further Information**

[www.regionalenergie.at/bwi](http://www.regionalenergie.at/bwi)

**Special quality**

- This initiative was market driven. The industry, represented by one of their associations, started vocational business and contributes to climate protection policies.
- The training is compact and the number of certificates until now is relevant for the dissemination of bio heating systems.
- As success factors we identified the initiative of the relevant association. So the main objective - provide know how for innovative bio heating systems – could be achieved.
- The certificates were awarded by the minister of agriculture and environment and this was fine for public relations. Articles in several newspapers were a first and strong contribution for marketing.

**Short description of content**

Energy politics, bio fuels, burning techniques, installation of facilities, requirements to the chimney 1<sup>st</sup> day  
and fire prevention

Heating and burning systems, hydraulic integration, promotion and supports, comparisons of costs, 2<sup>nd</sup> day

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arguments of selling

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The theoretical knowledge has been extended by practical instructions at a prestigious producer of 3<sup>rd</sup> day kettles

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### Practice

Only if the participant additionally proves the practical knowledge in installation of a biomass-heating-facility his company is able to get the certificate.

### Key qualification

Skills for argumentation

### Institutional/organisational advantages

There is a trend towards modern and clean wood-heating-systems. Especially in rural areas a higher demand on wood-chops- and pellets-heating systems can be found out. In some Austrian federal countries the subsidy system gives grants for such sustainable energy use.

Installation and plumber companies can profit from this trend if they concentrate on the environment-friendly biomass-heating-technology.

*The award of the certificates by the minister is a welcome PR-support for the company.*



### Added value for EU and SAVE

This approach could be a model for other European countries with large forest areas.

Author: 17&4 Organisationsberatung GmbH.

## Viennese Solar School

### Title of Course

**Erste Wiener Solarschule/  
1<sup>st</sup> Viennese Solar School**

1. WIENER SOLARSCHULE

### Provider

**bfi Wien** – Vocational Training Institute Vienna  
Partners: Wienstrom, AEG, AMS and Solarzentrum Vienna

### Address

1. Wiener Solarschule  
Berufsausbildungszentrum  
des **bfi Wien**  
Engerthstraße 117  
A-1200 Wien  
Tel: +43 1 332 77 30-0, Fax: +43 1 322 77 30-237

### Contact

International Department  
e-mail: [bfi.int@bfi-wien.or.at](mailto:bfi.int@bfi-wien.or.at)



## General Description of the course

The 1<sup>st</sup> Viennese Solar school offers a practice-orientated and complete professional education in the field of solar technology and geothermal since 1994. At this time there was a need of qualifying plumbers for solar facilities.

The teaching concept is based on a good combination of theoretical and practical knowledge in all important fields of solar technology. Several working steps are arranged by a combination of various measuring, installation and lab exercises. The training has three modules: photovoltaic, solar thermal and modules which can be chosen (like EDV, calculation of heat load, economical and ecological building and housing technical services, cooling systems,...). Practical exercises can be done on the Solar facilities in the vocational institute.

The concept is also special because it is interdisciplinary, flexible and participants-friendly. The professional modules are job specific and can be made individual or as a whole package.

At the end the participants have to realize a project and a final examination, and get a certificate as “solarteuer”.

After five successful years there was an interruption because of a change of personnel in the institute. At present parts of the course are implemented in qualification measures for unemployed craftsmen. A relaunch is foreseen in 2003.

**Target group:** installers, plumbers, electrical engineers and skilled workers from similar and constructional engineering professions

**Aim of training:** graduates of the training are plumbers for solar facilities → “solarteuer”

Also could be called: EU-skilled workers for renewable energy techniques, EU-skilled workers for new energy techniques, EU-skilled workers for environmentally-sound energy techniques

**Duration:** 360 hours in intensive day-trainings as well as in evening classes for employed persons

**Courses until now:** about 100 courses, about 1750 participants who finished until now

## Further Information

[www.bfi-wien.or.at/sites/english\\_version.html](http://www.bfi-wien.or.at/sites/english_version.html)

## Special quality

The training offers a practice-orientated and complete professional education in the field of solar technology and geothermal. It is also special because it is interdisciplinary, flexible and participants-friendly. The professional modules are job specific and can be made individual or as a whole package in intensive day-trainings as well as in evening classes for employed persons.

## Short description of content

The training consists of three modules: photovoltaic, solar thermal and modules which can be chosen (like EDV, calculation of heat load, economical and ecological building and housing technical services, cooling systems,...)

Photovoltaic for solar production of electricity

Thermal solar techniques for heating of water, heating, swimming pool and heat-pump facilities

Housing-ventilation systems

Administrative regulations and guidelines for financial supports

## Practice

The teaching concept is based on a good combination of theoretical and practical knowledge in all important fields of solar technology. Several working steps are arranged by a combination of various measuring, installation and lab exercises.

## Key qualification

The occupation of a “solarteuer” contains:

- Optimisation of energy systems by using alternative energy sources
- Planning and installation of energy systems

- Professional consulting
- Communicative basis qualification for counselling

#### **Institutional/organisational advantages**

The Solar School was one of the model projects of the *bfi Wien*, Solar School took part in international projects like the EU-Leonardo project “Model for an expanded installation of heat pumps & refrigeration techniques” and was also described as a case of good practice in a CEDEFOP publication and many more.

#### **Added value for EU and SAVE**

This approach could be a model for other European countries. As success factors we identified the broad involvement of stakeholders in the development phase. So the main objective - provide energy counselling which is more independent – could be achieved. The modular system and the available materials make it easy to adopt this course for other countries.

Author: 17&4 Organisationsberatung GmbH.

### **Renewable Energies and energy-conscious Architecture - Modular course**

#### **Title of Course**

**Energie rinnovabili e architettura energeticamente consapevole – Corso modulare**  
**Renewable Energies and energy-conscious architecture – Modular course**

#### **Provider**

ISES Italia (International Solar Energy Society, section Italy)

#### **Address**

Via Tommaso Grossi 6  
 00184 Roma  
 Italy  
 Tel.: +39-06-770736-10/-11  
 Fax: +39-06-770736-12

#### **Contact**

Arch. Patricia Ferro  
[ferro@isesitalia.it](mailto:ferro@isesitalia.it)



#### **General Description of the course**

Due to a lack of training offers for renewable energies and bio-climatic architecture in buildings, ISES decided to offer a modular training course that are open for everybody being qualified to apply the contents.

In 1998, ISES set up eight one day seminars on different issues for architecture and renewable energies applied to buildings. In 2000 they added a longer specialization course for photovoltaic technology, due to upcoming public tenders to support the installation of photovoltaic roofs. In 2001 they added another specialisation course on solar thermal technology in buildings in collaboration with AmbienteItalia.

The modular course system contains a course package consisting 8 individual one-day seminars that can be attended as a whole or individually, and the two specialization courses on photovoltaic and solar thermal technology.

**Target group:** Professionals, Architects, Engineers, Technicians, Installers

**Aim of training:** To provide participants with knowledge on renewable energies and energy efficiency in buildings; to bring them in contact with the topic of bio-architecture, including contact with the private sector (companies that are offering products in this field).

One-day seminars: to disseminate knowledge on technologies, concepts and tools of the specific topic

Specialisation courses: to provide participants the whole information and different tools necessary to design solar installations

**Duration:** 8 one-day seminars of 8 hours each (1 of them 14 hours in two days)

2 courses of specialisation of 4 days (20 hours) each

**Prize:** One one-day seminar: 80 € (max. 50 participants); Courses of specialization: 310 € for non-ISES participants, 260 € for ISES members (groups from 26 to 40 participants)

**Courses until now:** One-day seminars: Three cycles of the eight one-day seminars (two in Rome and one in Turin), plus one one-day seminar in Lecce

Specialisation courses: 16 courses on photovoltaic technology, two on solar thermal technology

**Participants:** One-day seminars: 720, Specialisation courses: 520

### More Information

[www.isesitalia.it](http://www.isesitalia.it)

### Special quality

- A modular system with a clear division of topics guarantees flexibility for participants:  
In the one-day seminars participants get a good overview on the different topics, with the specialization courses architects and planners learn to plan a photovoltaic or solar thermal installation for buildings.
- The courses provide orientation and raise awareness in the field of renewable energies and energy efficiency.
- The combination of background information on technical and economic solutions and practical planning gives participants a good and comprehensive overview on existing photovoltaic technologies or solar thermal installations.
- Participants can immediately apply the knowledge into praxis.
- The course can be carried out in different locations.

Short description of content	hours
<b>Introduction seminars</b>	
• How to plan for energy-conscious architecture – introductory aspects	8
• How to heat with sun: Use of passive solar systems	7+7
• Natural ventilation and shading systems	8
• Natural illumination in buildings – potential and applications	8
• Air Solar systems integrated in advanced building	8
• Integration of photovoltaic system in buildings	8
• Heating with wood	8
• The active solar thermal systems	• 8
<b>Specialization courses</b>	
Course on Photovoltaic installations	5
Photovoltaic technology – Introduction	5
Stand-alone photovoltaic installations	5
Grid-connected photovoltaic installations	5
Integration of photovoltaic systems in architecture BIPV	5
<b>Course on Solar thermal installations</b>	
Solar thermal technology – Introduction	5
Integration of Solar thermal systems in architecture	5
Course on Solar thermal installations	15

### Practice

Practical Case study planning: exercises for calculating the dimension of an installation

If possible an excursion is organised to realised installations

### Key qualification

Participants get a certificate of participation that is well known in Italy

Participants are enabled to plan photovoltaic or solar thermal installations.

### Institutional/organisational advantages

Creation of a win-win situation for participants and speakers from companies that are selling photovoltaic or solar thermal installations. The courses offer new and immediate contacts for both. In general the courses serve to disseminate the knowledge on the topic and therefore is supporting the overall aims of ISES.

#### Added value for EU and SAVE

The courses of ISES are contributing to the awareness raising for renewable energies and energy efficiencies for buildings in Italy. Additionally it is serving as a kind of market place for presenting existing products in the field in Italy and therefore is creating a market effect. Participants will help to choose efficient economic and energetic solutions according to given conditions. Therefore they contribute to increase the rational use of energy in general and the application of photovoltaic and solar thermal installations widely.

Author: UNICA

### R Vocational training outside the frame of conventional courses

#### Klima:aktiv bauen

#### Low energy and Passive house

##### Title of Course

**Klima:aktiv bauen, Low energy and Passive House**

##### Provider

WIFI Wien (2004) Bauakademie Wien (2005) in cooperation with GDI (Gemeinschaft Dämmstoffindustrie/Thermal Insulation Producer's Association) and 17&4 Organisationsberatung GmbH., supported by BMLFUW (Ministry for environment)

##### Address

Mariahilfer Strasse 89/22  
A 1060 Wien



##### Contact

DI Johannes Fechner  
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#### General Description of the course

Due to a lack of information on the new requirements for the energy standard this course was developed. Austria's biggest vocational institute, WIFI, contacted GDI, Gemeinschaft Dämmstoffindustrie/Thermal Insulation Producer's Association, because they wanted to provide a new course on thermal insulation. GDI then invited some experts and discussed the idea, then Johannes Fechner, 17&4 Organisationsberatung was charged to develop a curriculum. The ministry for environment gave some financial support to produce training material, GDI financed coordination and public relations. A first course was offered in 2003 but there were not enough applicants. This was because of the short period between announcement and start (only two weeks).

The second announcement was successful and in January 2004 the first training started with 25 participants, all professionals in the building sector.

Part of the concept is a certification after one year. The certification will be in the frame of the Austrian climate program klima:aktiv and shall be awarded by a certification institution. The applicants have to present a practice example of one of their projects, low energy or passive house standard.

The first certification is planned for 2005.

WIFI is providing a web community with trainer infos, forum, download ([www.telewifi.at](http://www.telewifi.at))

**Target group:** Building Master, Architects

**Aim of training:** To provide know-how to be able to realise projects in low energy and passive house standard and to learn about the actual subsidy systems (Wohnbauförderung). In Austria there are different systems in all of the federal countries, the focus of the first training was Vienna and Lower Austria.

**Duration:** 6 one-day seminars of 8 hours each

**Prize:** 1800 € (max. 25 participants)

Courses until now: One

Participants: 25

#### More Information

[www.wifiwien.at](http://www.wifiwien.at), [www.gdi.at](http://www.gdi.at)

#### Special quality

- Modular system (3 modules, can be booked separate, but this was not used frequently)
- Top lecturers
- Practice and Certification
- Web community
- Participants will be listed as qualified building professionals on official websites (after certification 2005)

Short description of content	days
Modul Building	2
Housing techniques	2
Optimisation	2

#### Practice

Project must be prepared and presented for certification. Including calculation following the requirements of passive house institute and/or Wohnbauförderung (federal subsidy)

#### Key qualification

Participants get a certificate of participation that is well known in Italy

Participants are enabled to plan photovoltaic or solar thermal installations.

#### Institutional/organisational advantages

In Mai 2004 a Train the Trainer course takes place in Lower Austria. Bauakademie is willing to offer more trainings and therefore more trainers are required.

#### Added value for EU and SAVE

Can be a model for other countries. In EU Cadses project CER2 it is planned to develop trainings based on klima :aktiv in Slovenia, Poland, Slovakia, Czech Republic.

Author: 17&4 Organisationsberatung

#### Vocational education outside the frame of conventional courses

→ *Quality Management for Refurbishment of Hamburg's Building Stock/*

→ *Qualitätssicherung in der energetischen Sanierung des Hamburger Wohngebäudebestands*

Learning in building teams with support of special consultants (e.g. quality management Chamber of Crafts Hamburg, subsidies by City of Hamburg).

The initiative Work and Climate Protection is a common platform for the optimal thermal insulation of Hamburg's building stock. Leadership: Department for environment and health, the platform is integrating building industry, craft, building owners, tenants, real estate managers, architects, engineers, scientists and educational institutions.

Detailed information is available:

[www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de)





### **Passivhouse Building Team 2002/ Passivhaus Bauteam 2002**

Vocational Training for building professionals to become a certificated „Passive House Building Team” in Germany. Until now about 30 companies and their cooperating planners were qualified to be a building team. (10 days presence in 5 blocks, in-between 14 weeks for self learning). In the "field-factory" the participating companies built up a training centre following the Passive House Standard. [philbus 21](http://philbus.21.de), <http://passivhausschulung.de/seiten/bauteam2002.html>



### **Building with SMART/BAUEN NACH SMART**

was developed from the back to the front. In such a way, one learned in the end from mistakes very at the beginning, during clarification of the intentions of the builder-owner/developer, from mistakes on the construction site, from mistakes of planning. To optimize the building course this is the first aim of SMART and it contains lot of information for sustainable building.

<http://www.crb.ch/de/dyn/news/archive/00807-004-tvad-zrh.html#Bauen nach Smart>



### **Distance learning training module on energy efficient building design in urban environment**

A global approach on the energy efficient building design in the urban environment intending to promote the use of energy conservation techniques, solar energy, high efficiency energy systems, improved and adapted thermal and visual comfort standards and appropriate indoor environment quality, through a flexible, interactive and on-going training process.

TUNE UP! partner project:

<http://www.ee.uni-lj.si/SAVE13/>

### **Green Academy**

Online distance learning program for ecological building

[Ökologisches bauen für handwerker/innen - Lehrgang Deutschland](#)

Eco building for craftsmen in Germany and Austria

Target group: apprentices, journeymen and masters in the building sector.

Duration: 6-12 month, examination and certification of the Chamber of Crafts

[Ökologisches bauen für planer/innen](#)

Eco building for planners

[Solares planen und bauen, solararchitektur](#)

Solar planning and building, solar architecture

[www.green-academy.at](http://www.green-academy.at)



## 5. Conclusions and Recommendations

### 6.1 Vocational Training in European Countries

Course Original title/ English	Country	Region	Provider, (website)	Duration	Screening Good Practice available
Environmental Design of Urban Buildings	EU	Distance Learning	NKUA, HOU, CAR, REHVA, J&J, <a href="http://www.rehva.com">www.rehva.com</a> >>Projects >> Distance learning		
<b>Italy/Italian Switzerland</b>					
Eco-Energy-Manager	I	Rome - Centre	Architects' Association in collaboration with CEFME (training centre for the building sector)	22 days	S, GP
Photovoltaic technology <i>Tecnica fotovoltaica</i>	CH	Lugano	LEEE (Laboratory of Energy, Ecology and Economy) Professional school of Lugano, Switzerland	2 days	S, GP
Course for Boiler attendants Heizkesselwärterkurs	I	Meran - North	Vocational training institute of the Meran province Autonomous province of Bozen- South Tyrol	27 days	S, GP
Renewable Energies and energy-conscious architecture - specialisation <i>Energie rinnovabili e architettura energeticamente consapevole</i>	I	Rome - Centre	ISES Italia – International Solar Energy Society	4 days	S, GP
Renewable Energies and energy-conscious architecture – horizontal course <i>Energie rinnovabili e architettura energeticamente consapevole</i>	I	Rome - Centre	ISES Italia – International Solar Energy Society	1 day	S
Block-seminar for low energy houses <i>Blockseminar Niedrigenergiehäuser</i>	I	Neustift - North	Eco-Centre Neustift	3 days	S
Electrician for systems with energy saving and renewable energy <i>Tecnici per impianti elettrici a risparmio energetico e ad energie alternative</i>	I	Gela - South	CNOS – FAP Gela (Centro Nazionale Opere Salesiane Formazione Addestramento Professionale)	225 days	S
Hydraulic for heating systems <i>Conduttore di impianti termici</i>	I	Forlì - Nord	ECAP (Ente Confederale Addestramento Professionale) Forlì	70 days	S
Energy managers	I	Bologna – North	ENEA (Italian National Agency for Energy, Environment	5 days	S
European Master – Sustainable Project of Building <i>Corso Europeo di perfezionamento post-laurea – Progettazione Sostenibile dell'Ambiente Costruito</i>	I	Florence - Centre	ABITA – Centro Universitario per l'Architettura Bioecologica e l'innovazione tecnologica	1 year	S

National course of Bioarchitecture – online module <i>Corso Nazionale di Bioarchitettura – Modulo Online</i>	I	residential	INBAR – Istituto Nazionale Bioarchitettura	not specified	S
Master in Bioarchitecture <i>Laboratorio Progettuale Specializzazione Post-Laurea „Bioarchitettura“</i>	I	Bologna – North	INBAR – Istituto Nazionale Bioarchitettura	app. 200 days	S
National course of Bioarchitecture <i>Corso Nazionale di Bioarchitettura</i>	I	all over Italy	INBAR – Istituto Nazionale Bioarchitettura	6-10 days	S
Energy Experts in the building sector <i>Esperto del risparmio energetico settore edile</i>	I	Udine – North	ENAIIP UDINE	75 days	S
Training course for Energy Optimizing Technicians/Experts	I	Torino - Nord	CNOS-FAP (Centro Nazionale Opere Salesiane Formazione Addestramento Professionale) Torino		S
Bauen im Solaren Zeitalter/ Solares Bauen und Sanieren für Ausführende (ESF)	I	Toblach Dobiacco	Akademie Toblacher Gespräche Kulturzentrum Grand Hotel Toblach <a href="http://www.grandhotel-toblach.com">www.grandhotel-toblach.com</a>	100 h	
<b>Spain</b>					
Instal.lació d'Equips d'Energia solar fotovoltaica – <i>Installation of fotovoltaic equipment</i>	E	Catalonia	Centre Valles, Sabadell	400 hours	S
Instal.lació elèctrica d'edificis i aplicació fotovoltaica – <i>Electrical installation of buildings and fotovoltaical applications</i>	E	Catalonia	Centre Valles, Sabadell	280 hours	
Instal.lació d'energies renovables en edificis – <i>Renewable energy in buildings</i>	E	Catalonia	Comisiones Obreras, Mataró, Hospitalet del Llobregat	280 hours	
Instal.lacions d'electricitat i energia solar – <i>Electrical Installations and solar energy</i>	E	Catalonia	Mon Blau SCP, Barcelona	700 hours	
Curs teòric i pràctic de regulació i control. Estalvi energètic en edificis – <i>Theory and praxis of regulation and control. Energy saving in buildings</i>	E	Barcelona	Escola Tècnica Professional del Clot <a href="http://etpplot.jesuitiescat.edu/">http://etpplot.jesuitiescat.edu/</a>	75 hours	
Instal.lador d'Energia Solar Tèrmica – <i>Installation of termical solar energy</i>	E	Barcelona	Escola Tècnica Professional del Clot <a href="http://etpplot.jesuitiescat.edu/">http://etpplot.jesuitiescat.edu/</a>	380 hours	
Curs teòric i pràctic d'energia solar tèrmica – <i>Theory and praxis of thermal solar energy</i>	E	Barcelona	Escola Tècnica Professional del Clot <a href="http://etpplot.jesuitiescat.edu/">http://etpplot.jesuitiescat.edu/</a>	60 hours	
Auditories energètiques: estalvi i diversificació de l'energia – <i>Energy Auditing: energy saving and diversification</i>	E	Catalonia	Escola Universitària Politècnica de Medi Ambient, Mollet del Vallès	50 hours	

Introducció a les energies renovables – <i>Introduccion: Renewable Energy</i>	E	Illes Balears	Universitat de les Illes Balears <a href="http://www.uib.es">www.uib.es</a>	40 hours	
Màster en Enginyeria i Gestió de les Energies Renovables . <i>Master in Engineering and Management of Renewable Energy</i>	E	Catalonia	Institut Català de Tecnologia <a href="http://formacio.ictonline.es">http://formacio.ictonline.es</a>	300 hours	
Simulació tèrmica d'edificis – <i>Thermal Simulation of Buildings</i>	E	Catalonia	Universitat d'Estiu a Terrassa	2 days	
Aplicació de sistemes energèticament eficients als edificis – <i>Application of Energy Efficient Systems in Buildings</i>	E	Catalonia	Universitat d'Estiu a Terrassa	2 days	
Energia per a un desenvolupament sostenible – <i>Energy for Sustainable Development</i>	E	Catalonia	Càtedra UNESCO a la UPC en Tecnologia, Desenvolupament Sostenible i Canvi Global, Terrassa	180 hours	
Construcció, Arquitectura i Urbanisme Sostenible. Exemples – <i>Sustainable Building, Architecture and Townplanning. Examples</i>	E	Barcelona	Col·legi d'Aparelladors i Arquitectes Tècnics de Barcelona. <a href="http://www.apac.bcn.es">www.apac.bcn.es</a>	18 hours	
European Màster Arquitectura i desenvolupament sostenible	E,I, CH, F	European	Universitat Politècnica de Catalunya, Escola Tècnica Superior d'Arquitectura de Barcelona <a href="http://madd.epfl.ch">http://madd.epfl.ch</a>	10 months	
Bioconstrucción	E	Aragón	GEA – Asociación de Estudios Geobiológicos, Teruel <a href="http://www.gea-es.org">www.gea-es.org</a>		
Energías Renovables – <i>Renewable Energy</i>	E	Aragón	GEA – Asociación de Estudios Geobiológicos, Teruel <a href="http://www.gea-es.org">www.gea-es.org</a>		
Màster en control d'edificis i arquitectura sostenible – <i>Master – Building Control and sustainable Architecture</i>	E	Madrid and Barcelona	La Salle, Barcelona, Madrid <a href="http://www.salleURL.edu/masters">www.salleURL.edu/masters</a>	400 hours	
Màster in Facilities Management	E	Madrid and Barcelona	La Salle, Barcelona, Madrid <a href="http://www.salleURL.edu/masters">www.salleURL.edu/masters</a>	400 hours	
Energia solar en la edificació - <i>Solar energy in building</i>	E	Madrid, Castilian	CIEMAT – Madrid <a href="http://www.ciemat.es">http://www.ciemat.es</a>	30 hours	S
Energia solar fotovoltaica	E	Madrid, Castilian	CIEMAT – Madrid <a href="http://www.ciemat.es">www.ciemat.es</a>	62 hours	
Instal·lador projectista d'energia solar - <i>Solar energy installer</i>	E	Barcelona	Comisiones Obreras (CEPROM), Barcelona	280	S
Solar thermal energy installer	E	Catalonia	CIFO Sta. Coloma		S, G
Aigua calenta i climatització de piscines amb energia solar - <i>Hot water and climatization of swimming pools with solar energy</i>	E	Catalonia	INTIAM RUAI SL, Rubí <a href="http://www.intiam.com">www.intiam.com</a>	54 hours	S
Calefacció amb energia solar <i>Solar energy heating</i>	E	Catalonia	INTIAM RUAI SL, Rubí <a href="http://www.intiam.com">www.intiam.com</a>	29 hours	S
Electrificació autònoma amb energia solar - <i>Solar energy autonomous electrification</i>	E	Catalonia	INTIAM RUAI SL, Rubí <a href="http://www.intiam.com">www.intiam.com</a>	44 hours	S

Instal·lacions solars amb connexió a xarxa	E	Catalonia	INTIAM RUAI SL, Rubí <a href="http://www.intiam.com">www.intiam.com</a>	26 hs	S
Curso de Projectista Instalador de Energía Solar - <i>Solar energy planner-technician</i>	E	Sevilla, distant-learning (Spain and Latinamerica)	Censolar Sevilla <a href="http://www.censolar.es">www.censolar.es</a>	700 hours	S, G
Sustainable building training school/solar energy technician	E	Barcelona	Barcelona Activa S.A.		S, G
Disseny energètic a l'arquitectura - <i>Energetic design in architecture</i>	E	Distant-learning, Spain	Escola Sert, Col·legi d'Arquitectes de Catalunya - Catalunya School of Architects (COAC) <a href="http://www.coac.net/escolasert">www.coac.net/escolasert</a>	90 hours	S, G
Curs LIFE: Formació de tècnics en Medi Ambient-edificació	E	Catalonia	Escola Sert, Col·legi d'Arquitectes de Catalunya - Catalunya School of Architects (COAC) <a href="http://www.coac.net/escolasert">www.coac.net/escolasert</a>	44 hours	
La planificació energètica i la implantació d'energies renovables a l'arquitectura i a les ciutats – <i>Implementation of Renewable Energy in architecture and town planning</i>	E	Catalonia	Escola Sert, Col·legi d'Arquitectes de Catalunya - Catalunya School of Architects (COAC) <a href="http://www.coac.net">www.coac.net</a>	2 days	
Integració dels captadors solars tèrmics als edificis. Productes que ofereix el mercat – <i>Integration of fotovoltaic collectors in building</i>	E	Catalonia	Escola Sert, Col·legi d'Arquitectes de Catalunya - Catalunya School of Architects (COAC) <a href="http://www.coac.net/escolasert">www.coac.net/escolasert</a>	1 day	
Curs sobre energies renovables <i>Renewable Energy-</i>	E	Catalonia	Escola Sert, Col·legi d'Arquitectes de Catalunya - Catalunya School of Architects (COAC) <a href="http://www.coac.net/escolasert">www.coac.net/escolasert</a>	4 days	
Aplicació de criteris de sostenibilitat i eficiència energètica a la promoció privada – <i>Sustainability and efficient use of Energy in private promotions of buildings</i>	E	Catalonia	Escola Sert, Col·legi d'Arquitectes de Catalunya - Catalunya School of Architects (COAC) <a href="http://www.coac.net/escolasert">www.coac.net/escolasert</a>	1 day	
Instalaciones en edificios – <i>installations in buildings</i>	E	Catalonia	Fundació Politècnica de Catalunya, Barcelona <a href="http://www.fpc.upc.es">www.fpc.upc.es</a>	126 hours	
Experto Profesional en Energía Fotovoltaica- <i>Professional in fotovoltaics</i>	E	Madrid, distant-learning	Universidad Nacional de Educación a Distancia, Madrid <a href="http://www.ieec.uned.es">www.ieec.uned.es</a>	250 hours	
Especialista en Arquitectura Bioclimàtica – <i>Expert in Bioarchitecture</i>	E	Navarra	Instituto Superior de las Energias Renovables del Departamento de Educación y Cultura del Gobierno de Navarra. Imarcoain.	90 hours	
Especialista en Instalaciones de Energías Renovables – <i>Expert in renewable energy installation</i>	E	Navarra	Instituto Superior de las Energias Renovables del Departamento de Educación y Cultura del Gobierno de Navarra. Imarcoain.	390 hours	
Especialista en Instalaciones de Energía Solar – <i>Expert in Solar energy installation</i>	E	Navarra	Instituto Superior de las Energias Renovables del Departamento de Educación y Cultura del Gobierno de Navarra Imarcoain	100 hours	

<b>Austria</b>						
Klima:aktiv bauen Niedrigenergie- und Passivhaus – <i>Low energy and passive house</i>	A	Wien	WIFI Wien <a href="http://www.wifiwien.at">www.wifiwien.at</a>	6 days	NEW!	
Solarschule: Solarthermie, Wärmepumpe, Photovoltaik, Kälte- und Klimatechnik – <i>Solar School: Solar thermal, Heat pump, PV, HVAC</i>	A	Wien	Bfi Wien <a href="http://www.bfi-wien.or.at">www.bfi-wien.or.at</a>	360 hours	S	
Wärme-Dämm- Verbundsystem – <i>Application of thermal insulation compound system</i>	A	Wien	Bfi Wien <a href="http://www.bfi-wien.or.at">www.bfi-wien.or.at</a>	25 days	S,G	
Sanierungskurs – <i>Course on Renovation</i>	A	Wien	Bfi Wien <a href="http://www.bfi-wien.or.at">www.bfi-wien.or.at</a>	480 hours	S	
Technisches Facility Management - Facility Management Lehrgang	A	Wien	Bfi Wien <a href="http://www.bfi-wien.or.at">www.bfi-wien.or.at</a>	68 hours		
Überprüfung von Heizungsanlagen mit Abgastest - <i>Inspection of heating systems with exhaust fume test</i>	A	Burgenland	Bfi Burgenland <a href="http://www.bfi-burgenland.at">www.bfi-burgenland.at</a>	40 hours		
Energiesparendes Bauen: Vom Niedrigenergiehaus zum Passivhaus – <i>Energy Efficient Building – from Low Energy House to Passive House</i>	A	Wien	WIFI Wien <a href="http://www.wifiwien.at">www.wifiwien.at</a>	78 hours		
Fachkurs für das Baumeistergewerbe 1,2 – <i>Special course for Master Builder</i>	A	Wien	WIFI Wien <a href="http://www.wifiwien.at">www.wifiwien.at</a>	45 days		
Der Zentralheizungsbauer (Basiskurs, Fachkurs) – <i>The central heating system builder</i>	A	Wien	WIFI Wien <a href="http://www.wifiwien.at">www.wifiwien.at</a>			
Messkurs für Zentralheizungsbauer – <i>Course for measurement in central heating systems</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a> Landesinnung Wien der Sanitär- und Heizungs-Installateure	4 half days		
Der Lüftungsanlagenbauer – <i>The Ventilation System Builder</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	Octobe r –end of Mai		
Dampfkesselwärterkurs – <i>Boiler Attendant</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a> Technischer Überwachungsverein Österreich	5 days		
Messkurs für Rauchfangkehrer - <i>Course for measurements for Chimney sweepers</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a> Landesinnung Wien der Rauchfangkehrer, 1030 Wien			
Vorbereitung Meisterprüfung für Rauchfangkehrer – <i>Preperatory course for master exam for Chimney sweeper</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a> Landesinnung Wien der Rauchfangkehrer			
Grundlagen der Solartechnik – <i>Basics of Solar technique</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	2 days		
Grundlagen der Wärmepumpentechnik - <i>Basics of heat pump technique</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	2 days		
Photovoltaik - <i>Photovoltaic</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	2 days		

Windenergie und Windkraftanlagen – <i>Wind Energy and wind power facilities</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	2 days	
RGR – Franchisesystem für Installateure – <i>Franchise system for plumbers</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	1 days	
Der Bauphysiknachweis – <i>Certification for building physics</i>	A	Wien	WIFI Wien, <a href="http://www.wifiwien.at">www.wifiwien.at</a>	1 day	
Vorbereitung auf die Befähigungs- und Meisterprüfung, Heizung, Klima, Sanitär und Gas – <i>Preparation for master degree in HVAC and Gas</i>	A	Niederösterreich	WIFI Niederösterreich <a href="http://www.noe.wifi.at">www.noe.wifi.at</a>	6 semina rs 840 hours	
ARGE EBA EnergieberaterInnen-Ausbildung Grundlehrgang A – <i>Energy counseling Basic course A</i>	A	Oberösterreich Steiermark Wien	WIFI Oberösterreich <a href="http://www.wifioberoesterreich.at">www.wifioberoesterreich.at</a> Landesenergieverein Steiermark <a href="http://www.le.v.at">www.le.v.at</a> Wien Energie <a href="http://www.wienenergie.at">www.wienenergie.at</a>	56 hours	S,G
ARGE EBA EnergieberaterInnen - Fortbildung F – <i>Energy counseling advanced F</i>	A	Oberösterreich	WIFI Oberösterreich <a href="http://www.wifioberoesterreich.at">www.wifioberoesterreich.at</a> Landesenergieverein Steiermark <a href="http://www.lev.at">www.lev.at</a>	120 hours	S,G
ARGE EBA Elektrische Energie im Haushalt – <i>Electricity in Households</i>	A	Wien	Wien Energie <a href="http://www.wienenergie.at">www.wienenergie.at</a>	2 days	
ARGE EBA-Bauen und Sanieren – <i>Building and retrofitting</i>	A	Wien	Wien Energie <a href="http://www.wienenergie.at">www.wienenergie.at</a>	3 days	
ARGE EBA-Licht und Beleuchtungstechnik - <i>Energy counseling – light and lighting</i>	A	Wien	Wien Energie <a href="http://www.wienenergie.at">www.wienenergie.at</a>	2 days	
ARGE EBA-Solar und Wärmepumpe – <i>Solar and Heat pump</i>	A	Wien	Wien Energie <a href="http://www.wienenergie.at">www.wienenergie.at</a>	2 days	
ARGE EBA-Raumkühlung im Haushalt – <i>Cooling in households</i>	A	Wien	Wien Energie <a href="http://www.wienenergie.at">www.wienenergie.at</a>	2 days	
ARGE EBA-Energie-Kennzahl und Energie-Ausweis – <i>Energy key figures and Energy Pass</i>	A	Oberösterreich	WIFI Oberösterreich <a href="http://www.wifioberoesterreich.at">www.wifioberoesterreich.at</a>	5 hours	
<a href="#">Einregulierung von Rohrnetzen in Wasserheizungs- und Kaltwasseranlagen</a> - <i>Regulation of pipe-systems in water heating and cold water plants</i>	A	Salzburg	WIFI Salzburg <a href="http://www.sbg.wifi.at">www.sbg.wifi.at</a>	11 hours	
			WIFI Kärnten <a href="http://www.wifikaernten.at">www.wifikaernten.at</a>	14 hours	
Klimaanlagen - Aufbauseminar zu Grundlagen der Lüftung und Klimatisierung - <i>Air-conditioning - seminar for basics of the ventilation and of airconditioning</i>	A	Salzburg	WIFI Salzburg <a href="http://www.sbg.wifi.at">www.sbg.wifi.at</a>	15 hours	
Sonnenenergie Thermische Solaranlagen – <i>Solar energy thermal solar facilities</i>	A	Salzburg	WIFI Salzburg <a href="http://www.sbg.wifi.at">www.sbg.wifi.at</a>	32 hours	
Heizungstechnik für Elektroinstallateure –	A	Steiermark	WIFI Steiermark <a href="http://www.stmk.wifi.at">www.stmk.wifi.at</a>	40 hours	

<i>Heating system techniques for electricians</i>						
Architektur ohne Bauschäden: Teil 5: Wärmeschutz - <i>Architecture without building damages: Part 5: Thermal insulation</i>	A	Kärnten	WIFI Kärnten <a href="http://www.wifikaernten.at">www.wifikaernten.at</a>	8 hours		
Heizung-, Sanitär- und Wärmetechnik für Haustechniker - <i>Heating, sanitary and heat engineering</i>	A	Kärnten	WIFI Kärnten <a href="http://www.wifikaernten.at">www.wifikaernten.at</a>	36 hours		
Klima-, Lüftungs- und Kältetechnik für Haustechniker – <i>ventilation, air conditioning and refrigeration technique</i>	A	Kärnten	WIFI Kärnten <a href="http://www.wifikaernten.at">www.wifikaernten.at</a>	44 hours		
Green Academy PlanerInnen – <i>E-learning course for planners</i>	A	Distant Learning Österreich	Österreichisches Institut für Baubiologie <a href="http://www.green-academy.at">www.green-academy.at</a>	Ca 12 days	S	
Green Academy Handwerker - <i>E-learning course for craftsmen</i>	A	Distant Learning Österreich/ Deutschland	Österreichisches Institut für Baubiologie in Kooperation mit ÖkoZentrum NRW <a href="http://www.green-academy.at">www.green-academy.at</a>	Ca 5 days	S	
Facility Management – <i>Post Graduate Masters Program</i>	A	Niederösterreich	Donau Universität Krems <a href="http://www.donau-uni.ac.at/umwelt/zbau">www.donau-uni.ac.at/umwelt/zbau</a>	76 days		
Solararchitektur – <i>Solar architecture</i>	A	Niederösterreich	Donau Universität Krems <a href="http://www.donau-uni.ac.at/umwelt/zbau">www.donau-uni.ac.at/umwelt/zbau</a>	October - May		
Klimaanlage VDI – <i>Ventilation and Airconditioning systems VDI (Association German Engineers)</i>	A	Niederösterreich	Donau Universität Krems <a href="http://www.donau-uni.ac.at/umwelt/zbau">www.donau-uni.ac.at/umwelt/zbau</a>	1 day		
Zertifizierter Wärmepumpen-Installateur – <i>Certified heat pump fitter</i>	A	Wien	Arsenal research <a href="http://www.arsenal.ac.at/erneuerbare/installateur.htm">www.arsenal.ac.at/erneuerbare/installateur.htm</a>	13 days	S,G	
<a href="#">Lehrgang Bauökologie / Baubiologie</a>	A	Vorarlberg	Energie Institut Vorarlberg <a href="http://www.energieinstitut.at">www.energieinstitut.at</a>	15 days		
Biowärme Installateur – <i>Bio heat installer</i>	A	Österreich	Biomasse Verband <a href="http://www.biomasseverband.at">www.biomasseverband.at</a>	3 days	S,G	
Solarschule Pinkafeld – <i>Solar school Pinkafeld</i>	A	Burgenland	ZEBIG Technik Zukunftsorientierte Entwicklungs- Bildungs Innovations-Gesellschaft b.R. <a href="http://www.solarschule.at">www.solarschule.at</a>	Ongoing		
Qualification combine/Qualifizierungsverbund Gemeinsam Lernen, aktives Mitgestalten der Zukunft	A	Tirol	AMS Tirol <a href="http://www.qvb.at/">www.qvb.at/</a>			
<b>Czech Republic</b>						
Evropské trendy a my v oblasti tepelné ochrany budov – nové normové požadavky, nízko-energetická architektura European trends and thermal buildings protection – new norm requirements and low energy architecture	CZ	All country (several towns)	Archall (association of young architects, focused on education. <a href="http://www.archall.cz">www.archall.cz</a>	1day	S,G	
<b>Germany</b>						

#### Overview of the Various Courses in Germany

There is a large variety of courses in different education institutions in Germany.

The courses vary in terms of period (1-day to several weeks), required previous experience, degrees, theoretical and practical elements and different costs.

Therefore the following list can only give an overview of groups of offering institutions.

### Chambers

Skilled Crafts, Commerce, Architecture, Engineers e.g.: Environmental Centres of the Chambers of Skilled Craft:

Environmental Center	Street		City	Fon	Internet
Umweltzentrum Trebsen der Handwerkskammer zu Leipzig	Thomas- Müntzer- Gasse 4b	04687	Trebsen	034383/ 612-0	www.hwk-leipzig.de
Umweltzentrum des Handwerks Thüringen	In der Schremsche 3	07407	Rudolfstadt	03672/ 377- 180	www.umweltzentrum.de
Zentrum für Umweltschutz der Handwerkskammer Hannover	Berliner Allee 10	30175	Hannover	0511/ 34016-0	www.hwk-hannover.de
Zentrum für Umwelt und Energie der Handwerkskammer Düsseldorf	Mühlheimer Str. 6	46049	Oberhausen	0208/ 82055-55	www.hwk-duesseldorf.de/uzh
Institut für Umweltschutz der Handwerkskammer Münster	Echelmeyerstr. 1	48163	Münster	0251/ 705- 1314	www.hwk-muenster.de
Saar- Lor- Lux Umweltzentrum des Handwerks Trier	Loebstr. 18	54292	Trier	0651/ 207-250	www.hwk-trier.de
Zentrum für Umwelt u. Arbeitssicherheit der Handwerkskammer Koblenz	August- Horch- Str. 6	56070	Koblenz	0261/ 8996-237	www.hwk-koblenz.de
Saar- Lor- Lux Umweltzentrum des Handwerks Saarbrücken	Hohenzollernstr. 47- 49	66117	Saarbrücken	0681/ 5809-0	www.saar-lor-lux-umweltzentrum.de
Umweltzentrum für Handwerk und Mittelstand e.V.	Bismarckallee 6	79098	Freiburg	0761/ 21800- 19	www.umweltzentrum-freiburg.de
Zentrum für Energie-, Wasser- und Umwelttechnik	Buxtehuder Str. 76	21073	Hamburg	040/ 35905-0	www.hwk-hamburg.de

### Organisations / Associations / NGO's

- Initiative Arbeit und Klimaschutz, Hamburg ([www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de))
- Bundesinitiative Zukunftsorientierte Gebäudemodernisierung e.V. ([www.initiative-jetzt.de](http://www.initiative-jetzt.de))
  - Solarzentrum, Hamburg ([www.solarzentrum-hamburg.de](http://www.solarzentrum-hamburg.de))

### Private Education / Training Companies

- Volkshochschulen ([www.vhs.de](http://www.vhs.de))
- Deutsche Gesellschaft für Sonnenenergie ([www.dgs-solar.org](http://www.dgs-solar.org))

### Manufactures of Specialised Production

- Bau-Medien-Zentrum GmbH & Co. KG, Düren-Gürzenich ([www.baumedienzentrum.de](http://www.baumedienzentrum.de))

### Energy Agencies

- Deutsche Energie-Agentur ([www.deutsche-energie-agentur.de](http://www.deutsche-energie-agentur.de))
  - Energieagentur NRW, Wuppertal ([www.ea-nrw.de](http://www.ea-nrw.de))

### Government

Federal Government, Federal States  
 Federal Environmental Ministry ([www.bmu.de](http://www.bmu.de))  
 Federal Environmental Agency ([www.umweltbundesamt.de](http://www.umweltbundesamt.de))

### Scientific Institutes

Fraunhofer Gesellschaft ([www.fhg.de](http://www.fhg.de))

### Universities

Actual information about the different courses you will find in the Internet.

Belgium					
Soltherm	B	Institut Wallon ASBL Boulevard Frère	IFPME (Institut de Formation pour les Independents et les PME- Training	28 h + 4	S



		Orban, 4 5000 Namur Belgium	Institute for independent professionals and SMEs) under the control of Wallonian Region <a href="http://www.solartherm.be">www.solartherm.be</a>
<b>Greece (institutions for vocational training)</b>			
Vocational Training programs for Fitters, Thermohydraulics, Stone builders, Insulation, Plumbers, etc.	GR	Alimos	Green manpower Employment Organisation <a href="http://www.oaed.gr">www.oaed.gr</a>
Educational videos, Software for Solar thermal applications		Athens	Technological Education Institute of Athens <a href="http://www.helios.teiath.gr">www.helios.teiath.gr</a>
Training		Athens	Centre for Renewable Energy Sources <a href="http://www.cres.gr">www.cres.gr</a>
Education on renewable energy - NESE Project		Athens	National Technical University of Athens, Dep. Of Water Resources, Hydraulic and Faculty of Civil Engineering <a href="http://www.fluid.mech.ntua.gr/renesunet">www.fluid.mech.ntua.gr/renesunet</a>

## 6.2 Ten Recommendations for successful TUNE UP!

### Before you start gain a picture of vocational education in your country

The awareness and the value of vocational education are very different in European countries. This means, it is not possible to give detailed recommendations or to transfer courses from one country to another, but it is possible to learn from other approaches. Although *TUNE UP!* did not make detailed research on the educational systems in European countries, we found out some characteristic features.

In November 2001, the Commission adopted a Communication on "Making a European Area of **Lifelong Learning** a Reality". While the idea of Lifelong Learning is theoretically accepted in states like Austria, Germany or Switzerland, the practice is different. They often have the conviction, that vocational courses are only directed to unemployed people.

In the building sector **responsibility** for vocational education seems to be wide spread. In Germany traditionally the guilds have taken the initiative and are providing vocational courses, an increasing number of them also cover aspects of Sustainable Energy. In Austria there are two big vocational institutes, WIFI and bfi, providing the greatest part of training courses. In Spain we often found University based training courses and even a decree for the "thermal solar energy installer"! A decree can fix the contents but it makes the courses' duration non flexible (fixed on 300 hours in this case). We found many lot of individual providers we found in Italy, the biggest interest in the field of Sustainable Energy seems to be Photovoltaic. In the Czech Republic some solar companies are the most active in Sustainable Energy, providing training for solar energy use. The problem of such courses can be the level of independency of the information offered. Vocational training often seems to be more based on "learning on the job" than on a comprehensive vocational training.

Many courses do **not** offer **enough practical training**. The methodology is often based on lectures and has little interactive parts and limited use of new media. Communication skills are given importance now e.g. in Germany and Austria, but are little considered in other countries.

Although the systems are very different, we found a general **willingness** of the target group to **co-operate** for the implementation of Sustainable Energy in vocational education. Respect for the special geographic, cultural and community situation in the different country is a precondition for a dialogue.

➔ *Information on vocational education in European countries provided by CEDEFOP:  
<http://www2.trainingvillage.gr/etv/vetsystems/report.asp>*

*For detailed result of the TUNE UP! screening report contact TUNE UP! project partner*

## **Provide a clear message on the need of Sustainable Energy**

Generally spoken, **Sustainable Energy is not yet identified as a matter of vocational training** (except special courses on energy topics). Sometimes you will find persons who are in charge for environmental issues, but this does not mean that Sustainable Energy is included in their awareness!

Terms as renewable energy, rational use of energy, energy savings, energy efficiency, clean energy and environmental benign energy are used. Each one of these terms has got it's own followers or practitioners. Questions like "should we use renewable energy or introduce energy efficiency first?" are posed daily.

## **? Arguments for Sustainable Energy to be used in vocational training**

We need to promote energy savings, because of:

1. **Security of supply:** External energy dependence 70% in 2030 if no measures taken
2. **Environment:** Energy production and use create 94% of CO<sub>2</sub> emissions
3. **Limited influence on supply:** The EU can promote only savings in energy use

The EU committed itself in the Kyoto Protocol to reduce its greenhouse gas emissions by 8% from its 1990 levels by 2008-2012.

### **Rational Use of Energy:**

A savings potential of around 22%<sup>52</sup> can be realised by 2010 for energy used in heating, air-conditioning, hot water and lighting purposes.

- Promoting thermal insulation to a level already attained by some Member States
- 10 million EU residential boilers are older than 20 years. Their replacement would save 5% of the heating energy.
- Air-conditioning will double by 2020. 25% could be saved through air-conditioning equipment minimum efficiency requirements.
- Lighting consumes 14% of total energy in the tertiary sector. 30-50% savings could be achieved with the use of the most efficient components, control systems, integration of daylighting and other technologies

### **Renewable Energy Sources:**

On the longer run only the use of renewable energy sources is possible. The White Paper on Renewable Energy<sup>53</sup> presents the European Action Plan for Renewable Energy Sources by 2010.

- Active and passive solar design and systems, improved daylighting and natural cooling can reduce energy demand by up to 60%
- On-site renewables, cogeneration of heat and power, connection to district heating/cooling

In the North energy efficiency in buildings is generally regarded as a more important topic due to climate conditions, even though the saving potentials are comparable in southern Europe as well. As initial and vocational training is not as strictly organised as in Northern Europe, the information flow is low and the interest is very low there. In Italy for example, more interest in TUNE UP! could be found on architect's and planner's side.

We found greater interest, when we underlined our arguments with the presentation of European developments like the new Buildings Directive. It is convincing that new frame conditions are creating a need for qualification. The state of information is rather poor as far as it concerns developments on

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<sup>52</sup> "Mesures d'Utilisation Rationnelle de l'Energie (MURE)", Database, European Commission, 1998

<sup>53</sup> The White Paper can be downloaded in European languages:  
<http://europa.eu.int/en/comm/dq17/legislat.htm#599final>

European level. The Buildings Directive or the White Paper on Renewable Energy are widely unknown.

**? The responsible persons for the course management are key persons who should be informed continuously about European energy policy.**

### **Put vocational training in an adequate frame and commit the political decision makers**

Many vocational courses are developed based only on the initiative of one training organisation. But the chances to incorporate Sustainable Energy into the group of building professionals are far better, when many relevant decision makers are involved and interested. An analysis of the project environment is recommended to **identify the relevant decision makers**. It should be targeted to create a win-win situation for all partners. Below you find some examples:

The implementation of *TUNE UP!* can start as a commitment between vocational institution and political/administrative body, e.g. **Regional Energy Plan**. Nowadays, Regional Energy Plans enclose measures to raise the rational use of energy and to increase the share of renewable energies. Qualified building professionals can contribute to realise these aims!

- ➔ *The Department for Air and Noise in Bozen/Italy is presenting trained craftsmen within the **KlimaHaus/CasaClima program** (low energy house): [www.klimahaus.info](http://www.klimahaus.info) (>>Adresses)*
- ➔ *The **TUNE UP!** documentation on the [Transfer Workshop](#) in Vienna can give more information and arguments for such an approach (Impuls.Bau.Wien, Aktionsprogramm Weiterbildung Bau) <mailto:office@17und4.at>*

**Impulse Programs** give the opportunity to develop and implement **quality standards, coordinated course programs** and **public awareness**. RAVEL or IP BAU in Switzerland, Impulsprogramme Nordrhein Westfalen und Hessen can be regarded as successful programs.

With the help of an Impulse program also **customers** can indirectly become a **driving force** for an increasing demand for vocational trainings. Certification schemes, training passes can be communicated to the public so that customers can ask for these qualifications (e.g. certified heat pump fitter, bio heat installer, see Good Practice). New services like energy counselling programs in combination with subsidies are relevant for vocational training. The presentations of successful impulse programs in European countries can help to make clear the idea of *TUNE UP!*.

- ➔ *Impulsprogramm Nordrhein Westfalen: [www.ea-nrw.de](http://www.ea-nrw.de)*

The ideas to start Impulse programs could be supported by the European Commission. Impulse Programs give the opportunity to develop and implement: quality standards, coordinated Impulse course programs, a coordinated transfer of EU energy politics to relevant target groups.

**Voluntary energy-standards for buildings** like the Swiss MINERGIE Standard define a high level of the energy performance of a building. The enclosed label (building pass/energy profile) is a contribution for communication of quality. For building companies this can be a driving force to enable their employees further education in Sustainable Energy. Systems like MINERGIE should be supported by other states.

- ➔ [www.minergie.ch](http://www.minergie.ch)

Courses connected with **legal requirements** provide a good option for broad dissemination (e.g. boiler maintaining, Italy). The implementation of innovative legislation (e.g. Barcelona's solar ordinance) promotes the demand and offer of specific qualification.

- ➔ ***TUNE UP!** [Good Practice Catalogue](#)*

The combination of qualification for Sustainable Building with a **labour market** incentive was presented as a successful project on the Johannesburg conference 2002.

- ➔ [www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de)

A **municipal competition** for a Passive house project in Vienna could raise the demand for a special seminar on Passive houses extremely.

- ➔ <http://www.raum-komm.at/>

**Request for special qualifications** can also support vocational training:

- Constructions Rubau S.A. is a building company that operates all over Spain. It has implemented the ISO 14.001, a model of Total Quality (work, health & environment) and also a system for environmental management. Their **training on the job** system is addressed not only to their own staff but also to suppliers. A score system evaluates the environmentally sound **practices of subcontractors**. Rubau recently has edited a Green Building Guide that includes 35 good practices already implemented by different subcontractors.
- In **calls for tender** in the public sector **criteria of qualification** for craftsmen can be implemented (see Austria, similar legislation can be found in other countries).

Bundesvergabegesetz:

§ 29. (4) Der öffentliche Auftraggeber hat in den Ausschreibungsunterlagen oder in der Bekanntmachung **die als erforderlich erachteten Nachweise sowie alle Zuschlagskriterien**, deren Verwendung er vorsieht, grundsätzlich in der Reihenfolge der ihnen zuerkannten Bedeutung anzugeben.

§ 35. (1) Hinsichtlich der Gestaltung der Ausschreibung sind durch Verordnung der Bundesregierung die entsprechenden Bestimmungen der ÖNORM A 2050 „Vergabe von Aufträgen über Leistungen – Ausschreibung, Angebot und Zuschlag – Verfahrensnorm“ vom 1. Jänner 1993 mit der Maßgabe für bindend zu erklären, daß die **Projektierung und Ausschreibung umweltgerechter Leistungen** gegebenenfalls auf für die Planung und Ausschreibung **umweltgerechter Produkte** sowie **umweltgerechter Verfahren** geeignete technische Spezifikationen Bezug zu nehmen und diese zu berücksichtigen hat.

§ 60. (3) Bei Bauaufträgen kann der Nachweis der technischen Leistungsfähigkeit des Unternehmers folgendermaßen erbracht werden:

1. durch **Ausbildungsnachweise** und Bescheinigungen über die berufliche Befähigung des Unternehmers und der Führungskräfte des Unternehmers, insbesondere **der für die Ausführung der Arbeiten verantwortlichen** Personen;

(4) Bei Dienstleistungsaufträgen kann der Nachweis der technischen Leistungsfähigkeit des Unternehmers folgendermaßen erbracht werden:

1. durch **Ausbildungsnachweise** und Bescheinigungen über die berufliche Befähigung des Unternehmers und der Führungskräfte des Unternehmers, insbesondere der für die Erbringung der Dienstleistungen verantwortlichen Personen;

3. durch **Angaben** über die technische Leitung oder die technischen Stellen, unabhängig davon, ob sie dem Unternehmer angeschlossen sind oder nicht, und zwar insbesondere über diejenigen, die mit der **Qualitätskontrolle** beauftragt sind;

6. durch eine **Beschreibung der Maßnahmen des Unternehmers zur Gewährleistung der Qualität** und der Untersuchungs- und Forschungsmöglichkeiten;

- **Life cycle cost**, at least calculation of running costs and energy monitoring for heating and cooling should be requested in calls for tender in the building sector. Companies practicing price dumping and illegal practice should be excluded, because they make it impossible for „honest“ companies to invest in training for their employees.

### **Develop attractive, modular concepts, cooperate with the industry and learn from experiences in other European countries.**

Attractive vocational courses have a clear **scope**, an exactly defined **target group** and provide **practice** relevance and documented **qualification**. You will find participants more easily when they can identify also their **personal** benefit.

Craftsmen/skilled workers usually are not able to attend long courses, many courses are adequate only for unemployed people! In the more northern countries courses and seminars should take place in the winter month when there are less activities on building sites. But workers without higher qualification often are not employed continuously and therefore building companies won't finance any training for them!

**Modular concepts** and compact courses are more attractive for employed workers. Acknowledged modules have more value for the participants and are more transparent on the job market. Modularisation is the answer to the increasingly more complex demands in the profession.

- ➔ An example for a modular concept is the course „Fachwissen für Fachleute – ecobau 24“ (technical know how for experts – eco-building 24), developed by Öko-Zentrum NRW (Eco Center Northrhine Westfalia) [www.ecobau24.de/info-dateien/info.html](http://www.ecobau24.de/info-dateien/info.html)

The praxis relevance and the practical part is poor in many courses. This may be because of a more academic approach, lack of equipment, workshops and training possibilities. The involvement of innovative companies (e.g. producer of building equipment) can be useful to **raise the practical use of courses**. In this case the training design and the trainer must make sure that the given information is as objective as possible.

There are good practice examples showing courses with practical orientation initiated by the **industry** (Biomass installer, solar companies). The co-operations with Associations and/or bodies of interest give a broader approach. To **ensure objectiveness**, cooperation with an independent institution is recommended. This can be a research institute (see Good Practice Catalogue: Certified Heat Pump Fitter, various courses of bio-architecture in Italy, European Master on Sustainable Buildings, renewable energies and energy-conscious architecture)

Craftsmen/skilled workers can be **qualified for counselling** (e.g. Energie-Check, Germany). This additional qualification for craftsmen is of special interest for companies because it can “**open the door**” to new customers. Unfortunately, this option is not available in many other countries.

The desire of owners and users of buildings is more and more to receive **all services “from one hand”**. Therefore it becomes more important for craft firms not to supply only their trade-specific services but to offer entire solutions to customers. Services “from one hand” need **co-operation** of architects, engineers and planners with craft branches from the beginning. Trade-spreading know-how becomes more important for the individual craftsman in order to strengthen his position on the labour market and to detect possibly developing risks for himself in time.

Sustainable Energy and ecological refurbishment offer themselves as a field where **common modules** could be developed on European level. A need for qualification exists in the building sector in all Europe due to the new EU Buildings Directive. Special courses could be developed on an international level as a frame and then regional details could be supplemented.

**? The TUNE UP! project team found interest and demand in Dialogue Forums. These forums should enable coordination of vocational courses on national level, exchange of information, update of European initiatives**

## **Provide qualification in preparation for the new Buildings Directive in time!**

### **Key qualification**

The following key qualifications are essential and should be implemented in all training courses.

- **A basic understanding of the work of other branches** is a precondition for better cooperation and avoidance of mistakes and damages.
- **Motivation for Life Long Learning.** To awake interest in further training, training methods should be built on the state of the art of adult learning, offer attractive qualification, certification and modular concepts.
- **Ability to make critical use of information.** Product information from producers should be used in trainings and trainees should learn to evaluate this information critically by themselves.
- **Client orientation:** Communicative skills enable to enter a dialogue with the client. This starts with simple things like „clean working“ (leaving the building site in a proper condition). Communicative skills should be improved generally, not only for migrants.
- **Counselling qualification:** Craftsmen can be qualified for energy counselling. They are in contact with their clients and have practical know how.

## **Special need for qualification to be prepared for the new Buildings Directive**

The European Directive on the [Energy performance of buildings](#) indicates the main elements, which must be considered in future for the calculation of energy performance of buildings.

### **General framework for the calculation of energy performance of buildings (Article 3)**

1. The methodology of calculation of energy performances of buildings shall include at least the following aspects:

(a) thermal characteristics of the building (shell and internal partitions, etc.). These characteristics may

- also include air-tightness;
- (b) heating installation and hot water supply, including their insulation characteristics;
- (c) air-conditioning installation;
- (d) ventilation;
- (e) built-in lighting installation (mainly the non-residential sector);
- (f) position and orientation of buildings, including outdoor climate;
- (g) passive solar systems and solar protection;
- (h) natural ventilation;
- (i) indoor climatic conditions, including the designed indoor climate.

2. The positive influence of the following aspects shall, where relevant in this calculation, be taken into account:

- (a) active solar systems and other heating and electricity systems based on renewable energy sources;
- (b) electricity produced by CHP;
- (c) district or block heating and cooling systems;
- (d) natural lighting.

→ [http://europa.eu.int/eur-lex/en/dat/2003/l\\_001/l\\_00120030104en00650071.pdf](http://europa.eu.int/eur-lex/en/dat/2003/l_001/l_00120030104en00650071.pdf)

Following these general ideas of this Buildings Directive, we suggest to start now:

- **First information for all kinds of potential applicants** (building owners, building professionals): The Energy Profile should be implemented in existing real estate assessment.
- **Basis course on the energy profile** for all relevant branches. A frame concept should be developed on European level and detailed on national level. Such a course can be the common pre-qualification for more specialised courses. The course concept including training material and trainer information should be offered to all vocational training institutions.
- **Basis courses on Inspection & assessment of boilers/heating and cooling installations** in all European countries. The course on heating maintenance in Meran, Italy, is described in the *TUNE UP!* Good Practice catalogue.
- **Train the Trainer:** Special information is required for trainers in the building sector. It should be ensured that all trainers are familiar with the practical implementation in their country before April 2006.
- **Training for public authorities:** Besides general information, the Life Cycle approach should become a criterion for planning and calls for tender. For the evaluation of the energy performance energy monitoring must be introduced on a broad range. This would be a powerful support for the aims of the intentions of the Buildings Directive.
- **Benchmarking systems, know how pools:** experience on planning and running cost (energy). Facility managers often do have this kind of experience but this is not considered in planning in most cases, because there is no linkage to architects.
- **Energy pass, energy profile, or building pass?** The best name must be introduced like a new label. The benefit has to be communicated to everybody to whom it may concern. So the interest in high quality and energy efficient building construction will increase, because this will reduce running costs for all the following years.

### **Special training offer for site manager, building trade foreman and representative of local construction supervision**

The new challenge of Sustainable Building makes it necessary to provide an update for the mentioned above building professionals. In short training modules (e.g. one day) the focus should be on problems and frequently to be found mistakes – and how to solve these problems: Details in thermal insulation, advanced heat, ventilation and air conditioning (Passive House), wood construction, etc. Such training can also be implemented in quality management on the building site.

### **Special Challenge: Provide sustainable concepts for cooling**

Energy use for air-conditioning will double by 2020. 25% could be saved through air-conditioning equipment minimum efficiency requirements.



**? It is important to inform all kind of decision makers and actors who are in any relation with the building sector about sustainable solutions for cooling. Vocational training institutions can develop new ideas for qualification in the field of ventilation and cooling, including the maintenance of facilities.**

- ➔ *Programs for easy calculation of heat load are available and should be disseminated: Summer Building – A Simulation Tool on Passive Cooling, V. Geros, M. Santamouris, University of Athens, <http://www.ee.uni-lj.si/SAVE13/>*

### **Create vocational training outside the frame of conventional courses**

As vocational training in courses often is regarded as training only for unemployed people new forms of training must be developed. New forms of “learning on the job” are realised in the following projects:

#### **a. Learning in building teams**

Instead of the usual building meetings whose destination is only organizational, building teams are elaborating common solutions – together with the craftsmen. This leads to higher identification with the project, qualitatively better solutions and qualitatively better work. In this way building teams increase quality of projects and are multipliers for know-how when a member brings his experience into the next building team.

The idea of building teams is realised e.g. in Hamburg, Germany with support of special consultants (e.g. quality management HWK Hamburg, subsidies by City of Hamburg). Building teams can also be found in the Netherlands. For these kinds of projects subsidies of public administration are helpful. Detailed information is available:

- ➔ *Leitfaden zur Qualitätssicherung in der energetischen Sanierung des Hamburger Wohngebäudebestands, [www.arbeitundklimaschutz.de](http://www.arbeitundklimaschutz.de)*

#### **b. Qualification combine**

A qualification combine (Qualifizierungsverbund) is a regional merger of enterprises to plan and realise measures of qualification together. This kind of qualification is very close to the specific needs of the enterprises. Qualification combines were established e.g. in Lower- and Upper Austria by 17&4 Organisationsberatung and OekoConsult, funded by ESF. An other example can be found in the Tyrol. The minimum number is three enterprises, more than 50% must be small and medium enterprises.

- ➔ *Aufbau von Qualifizierungsverbünden im Auftrag des AMS Tirol, <http://www.qvb.at/>*

#### **c. Passive House Building Team**

This vocational training for building professionals aims to qualify a certificated „Passive House Building Team” in Germany. Until now about 30 companies and their cooperating planners were qualified. (10 days presence in 5 blocks, in-between 14 weeks for self learning). In the “field-factory” the participating companies built up a training centre following the Passive House Standard. ([philbus 21](http://philbus21.de)).

- ➔ *<http://passivhausschulung.de/seiten/bauteam2002.html>*

#### **d. Build Smart! (Bauen nach Smart)**

The first aim of the SMART guideline is to optimize the building course and it contains lot of information for Sustainable Building. Smart was developed from the end to the beginning. In such a way, one learned in the end from mistakes very at the beginning, during clarification of the intentions of the Bauherrschaft, from mistakes on the construction site, from mistakes of planning.

- ➔ *Schweizerischer Ingenieur- und Architekten Verein SIA, Schweizerischer Baumeisterverband SBV: Bauen nach Smart, Das zukunftsweisende Prinzip des effektiven Planens und Bauens, Birkhäuser Verlag, 1998, ISBN 3-7643-5923-4*

#### **e. Company internal training nets**

These internal training nets correspond to the concept of modularisation: On account of the increasing specialization of the companies, many enterprises are no more able to provide the complete professional qualification to the apprentices. Therefore, innovative companies have built up training nets, which can cover the requirements of a profession together. In the Netherlands, specific associations provide this function, they mediate the apprentices into the respective companies.

- ➔ *[www.quintec.at](http://www.quintec.at)*

## f. Standardized Training material

Standardized training material is the main contribution to improve the quality of vocational training, and to spread the ideas of Sustainable Energy. Useful and attractive material is used also in many presentations and lectures, in energy consulting, etc. Standardized training material should be free!

There has been developed a lot of useful training material on national and European level, which is partly unknown and partly used frequently. Comprehensive training material for Sustainable Energy was developed in the Swiss Impulse programs in a very co-ordinated way, but unfortunately this program has been finished and the material is not up to date in all aspects, especially modern presentation techniques.

A good practice example is the training material for training of architects, edited by the German chamber of architects. The book "Energiegerechtes Bauen und Modernisieren", (Energy sound building and renovation) is providing background information for the trainer, the CD-Rom contains 225 overhead transparencies (pdf). The graphic concept of this training material is very illustrative and vividly.

- ➔ *Fortbildung für Architekten, Bearbeitet vom Wuppertal Institut für Klima · Umwelt · Energie WI-Grafik, Bundesarchitektenkammer mit Förderung des BMU/ UBA. Fortbildung CO2 -Reduktion 1995, available via Energiegerechtes Bauen und Modernisieren, Birkhaeuser, ISBN 3-7643-5362-7*

A special service for lecturers is provided by the energy agency Northrhine Westfalia's Wissensportal Energie, where material for training can be downloaded, e.g. overhead/pdf-transparencies.

- ➔ [www.wissensportal-energie.de](http://www.wissensportal-energie.de)

**? Standardized training material should be provided free within coordinated programs. High quality training material can raise the quality of trainings and contributes that more trainers can implement Sustainable Energy in their trainings.**

## Make use of distance- and E-learning courses or modules!

### a. Distance learning general

The computer-assisted distance-learning, is frequently discussed for the working process but rarely realised. One reason: Many work places are - according to statements of the enterprises - not suitable for e-learning, especially for craftsmen in the technical sector. In companies where e-learning is already introduced, more than 50% is learned via electronic medias at the place of work. In general architects and planners can learn with books and other material more easily than skilled workers and craftsmen.

Distance learning courses must be certified in Germany. Many aspects of this certification are relevant for all kinds of courses in general. *TUNE UP!* recommends to orientate all kinds of distant learning courses on the German scheme of certification.

- ➔ *Checklist for evaluation purposes, see Annex 11 (Das Zulassungsverfahren nach dem Fernunterrichtsschutzgesetz) Staatliche Zentralstelle für Fernunterricht (ZFU), Peter-Welter-Platz 2, D- 50676 Köln, Tel.: 0039 221/92 12 07-0, Fax.: -20, [www.zfu.de](http://www.zfu.de)*
- ➔ *Cedefop's European Training Village (ETV) is introducing new, improved, user-friendly web services in the field of electronic learning. [http://www.trainingvillage.gr/etv/Projects\\_Networks/Elearning/](http://www.trainingvillage.gr/etv/Projects_Networks/Elearning/)*

### b. Distant learning training module on energy efficient building design in urban environment

The purpose of this distant learning module is to present a global approach on the **energy efficient building design in the urban environment** intending to promote the use of energy conservation techniques, solar energy, high efficiency energy systems, improved and adapted thermal and visual comfort standards and appropriate indoor environment quality, through a flexible, interactive and on-going training process.

Also, this educational approach aims to provide to **building designers, engineers and operators** with all the necessary technical, scientific, industrial, legal and marketing information and tools on the appropriate design, evaluation, selection and implementation of energy efficiency techniques in urban



buildings. The educational approach of the present training module is mainly based on the approach of the [Hellenic Open University](http://www.hellenicopenuniversity.gr/) and includes the following educational material:

- **A handbook**, which is the main educational tool of the module and includes information on all aspects related to the energy efficient integrated design of buildings in urban environments, from conceptual design and specific systems (such as passive ones, BEMS, lighting, etc) to more wide approaches (energy and resources management in the urban environment) including useful tools like design and economic ones.
- **Computerized tools**, that can be used to evaluate the heating, cooling, lighting, requirements and indoor air quality, as well as, the global performance of the buildings.
- **Examples of urban buildings**, aiming to describe successful integration of energy efficient techniques in urban buildings. The relevant material includes the basic design parameters together with architectural and engineering drawings as well as data on the performance of the buildings.
- **Industrial libraries**, which include information data on energy efficient products and materials ranging from windows and glazing to daylighting and control systems and from insulation materials to passive and active energy conservation systems.
- **Climatic documentation**, that includes urban climatic data from various European cities that are appropriate to carry out realistic thermal simulations corresponding to urban characteristics.
- **A multimedia tool**, which integrates all the previous mentioned material providing all the essential information about the energy efficient integrated building design in urban environment. This tool gives the possibility to the trainees to have a user-friendly approach to the developed educational material.

→ [www.ee.uni-lj.si/SAVE13](http://www.ee.uni-lj.si/SAVE13)

#### c. „Wissensportal-Energie“

The Energieagentur NRW (energy agency Northrhine Westfalia) was awarded the price for innovative adult education in 2003 for their „Wissensportal-Energie“ (knowledge-portal). This service offers information on Sustainable Energy in the building sector and also a special service for lecturers. Material for training can be downloaded, e.g. overhead/pdf-transparencies.

→ [www.wissensportal-energie.de](http://www.wissensportal-energie.de)

### Improve Transparency of Qualifications and Certification!

The recognition of qualifications is regarded as a key element of successful vocational training. Transparency of qualifications and certification must be fostered on national and European level. Europass vocational education is a project to acknowledge practice in European countries in school-, apprenticeship- und university education. Until now the focus is on schools. Europass documents experiences made in other countries and should help to raise the chances on the job market. The Swiss qualification handbook is another example how qualification can be documented well.

- *"Schweizerisches Qualifikationsprogramm zur Berufslaufbahn" CH-Q: Schweizerisches Qualifikationsbuch und Dossier Kompetenznachweis* [www.ch-q.ch](http://www.ch-q.ch)
- *Documentation of vocational training completed by a person undergoing work-linked training as part of their training in another Member State, complying with a number of quality criteria.* [http://europa.eu.int/comm/education/europass/index\\_en.html](http://europa.eu.int/comm/education/europass/index_en.html)

**? The development of a qualification pass system for crafts in building construction and refurbishment of old buildings on national/European level should be included in a *TUNE UP!* process.**

### European Social Fund ESF and Sustainable Development

Many courses are financed by the ESF. For these courses the main orientation for the course planning are the guidelines of ESF. Often ESF founded courses do not have a focus on Sustainable Energy.

In Austria WIFI and bfi are the biggest vocational institutions. Most of the courses for building professionals in the bfi are funded by the labour market service AMS. The course design of these funded courses is orientated on the requirements of the labour market service. Until now there are no

requirements known, which promote Sustainable Energy. AMS is partly financed by the European Social fund ESF.

**? A *TUNE UP!* recommendation to the European Commission is, to synchronize the European politics of the ESF with the aims of Sustainable Energy. Corresponding criteria should be included in the calls for course offers. Such criteria should among other things contain the qualification of the coaches as well as the correspondence with relevant energy programmes on national and regional level.**

### 6.3 Outlook

Vocational training can be a more powerful support for sustainable development, when promising approaches - mostly developed individually and without over-regional effects - will be adopted in other European countries.

A **joint development of frame curricula** and acknowledged **certificating systems** will support the implementation of the EU Buildings Directive.

For the broad application of integrated buildings energy performance standards on new and existing buildings the **awareness** for Sustainable Energy must be raised generally. Craftsmen will contribute to this in a very concrete way, when they can acquire key qualification in energy consulting, besides the essential update concerning certification schemes for buildings and inspection and assessment of boilers/heating and cooling installations.

Meeting these requirements the vocational training sector can be involved directly and indispensably in the implementation of the Buildings Directive.

The continuation of the already started **dialogue for Sustainable Energy** in training for decision makers in vocational institutions on European level will be the next step.

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[Rolf de Vries](#)  
Courses in environmental education for all target groups and also for various branches  
Hamburger development program "thermal insulation in residential buildings"
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Qualification of Eco-Advisers
- [Ecological Institute Veronica](#) (Czech Union for Nature Conservation)

[Yvonna Gailly](#)

energy counseling for citizens in the city of Brno, independent expert in energy efficiency and energy design of buildings

- [National and Kapodistrian University of Athens](#), Department of Applied Physics, Laboratory of Meteorology [Mat Santamouris](#) Development of a distant-learning training module on energy efficient integrated building design in Urban Environment

## 6. Annex

### European Standards:

Selected standards with relevance for the screened training courses

1. Richtlinie für einfache Druckbehälter 87/404/EWG
2. Bauproduktenrichtlinie 89/106/EWG
3. Richtlinie über die elektromagnetische Verträglichkeit 89/336/EWG
4. Gasgeräte richtlinie 90/396/EWG
5. Wirkungsgradrichtlinie 92/42/EWG
6. Druckgeräte richtlinie 97/23/EG
7. Maschinenrichtlinie 98/37/EG
8. EN 226 Ölzerstäubungsbrenner – Anschlussmaße zwischen Brenner und Wärmeerzeuger.
9. **EN 255 Luftkonditionierer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern Teil 1-4**
10. EN 297 Heizkessel für gasförmige Brennstoffe; Heizkessel der Typen B11 und B11BS mit atmosphärischen Brennern mit einer Nennwärmeleistung kleiner oder gleich 70 kW.
11. EN 303 Heizkessel.
12. EN 304 Heizkessel – Prüfregele für Heizkessel mit Ölzerstäubungsbrenner.
13. **EN 378 Kälteanlagen und Wärmepumpen**
14. EN 442 Radiatoren, Konvektoren.
15. EN 483 Heizkessel für gasförmige Brennstoffe; Heizkessel des Typs C mit einer Nennwärmeleistung gleich oder kleiner als 70 kW.
16. EN 656 Heizkessel für gasförmige Brennstoffe; Heizkessel des Typs B mit einer Nennwärmebelastung größer als 70 kW aber gleich oder kleiner als 300 kW.
17. EN 676 Automatische Brenner mit Gebläse für gasförmige Brennstoffe.
18. EN 677 Heizungskessel für gasförmige Brennstoffe; Besondere Anforderungen an Brennwertkessel mit einer Nennwärmebelastung kleiner als oder gleich 70 kW.
19. **EN 814 Luftkonditionierer und Wärmepumpen mit elektrisch angetriebenen Verdichtern - Kühlen**
20. EN 832 Wärmetechnisches Verhalten von Gebäuden; Berechnung des Heizenergiebedarfs Wohngebäude.
21. EN ISO 6946 Bauteile – Wärmedurchlasswiderstand und Wärmedurchgangskoeffizient Berechnungsverfahren.
22. EN ISO 7730 Gemäßigtes Umgebungsklima – Ermittlung des PMV und des PPD und Beschreibung der Bedingungen für thermische Behaglichkeit.
23. EN ISO 10211-1 Wärmebrücken im Hochbau – Wärmeströme und Oberflächentemperaturen; Allgemeine Berechnungsverfahren.
24. EN ISO 10211-2 Wärmebrücken im Hochbau – Wärmeströme und Oberflächentemperaturen; Berechnungsverfahren für linienförmige Wärmebrücken.
25. EN 12809 Heizkessel für feste Brennstoffe mit Hand- und automatischer Regelung – Nennwärmeleistung bis 50 kW.
26. EN 12828 Heizungssysteme in Gebäuden; Planung und Installation von Warmwasser-Heizungsanlagen.
27. EN 12831 Verfahren zur Berechnung der Norm-Heizlast.
28. **EN 13313**
29. EN ISO 13789 Wärmetechnisches Verhalten von Gebäuden – Spezifische Transmissionswärmeverlustkoeffizienten – Berechnungsverfahren.
30. EN 13829: 2000: Wärmetechnisches Verhalten von Gebäuden – Bestimmung der Luftdurchlässigkeit von Gebäuden; Differenzdruckverfahren.
31. EN 13836 Heizkessel für gasförmige Brennstoffe; Heizkessel des Typs B mit einer Nennwärmebelastung größer als 300 kW aber gleich oder kleiner als 1000 kW.
32. EN 12975-1 Anforderungen an Sonnenkollektoren
33. EN 12975-2 Sonnenkollektoren-Prüfbestimmungen
34. EN 12977-1,2,3 große kundenspezifische Solaranlagen

- 35. EN 1190, Thermal performance of buildings – Heat exchange with the ground – Calculation method
- 36. EN 1752, Ventilation for Buildings – design criteria for the interior environment
- 37. CEN/TC 89/N 422E, Building materials and products – Energy related properties – Tabulated design values
- 38. CEN/TC 89/WG6, N 427E, Calculation of the non steady state thermal behaviour of buildings in summer
- 39. EN ISO 7730
- 40. EN ISO 6946
- 41. EN ISO 10 077
- 42. EN ISO 1190
- 43. EN ISO 13 370 (Thermal performance of buildings – Heat transfer via the ground-Calculation methods)
- 40. ...

EUROPEAN COMMITTEE FOR STANDARDIZATION

Finding European Standards:

<http://www.cenorm.be/>

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