

AVAILABLE TRAINING PROGRAMMES AND NEEDS IN CENTRAL AND EASTERN EUROPEAN COUN- TRIES



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INTENSE

Intelligent energy saving measures for municipal housing in Central and Eastern European countries



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1. Introduction

The implementation of an effective training programme requires knowledge of the framework conditions in the respective target countries. Thus it must be determined what the local structural conditions are, also including staff and qualification requirements. The results of the previous investigations done in frame of other INTENSE work packages (related to legislation, best practice and holistic planning) as well as the international meetings and study visits, are incorporated into the development of the training programme. The goals and desired outcomes at a glance are introduced following.

Goal and outcome for INTENSE

Inquiry of current state of knowledge of involved training institutions:

- Draft of common base knowledge/background knowledge for future continuing education training
- Finding content and topics for Train the Trainers qualification
- Expert exchange and discussion on the topics of the first Train the Trainers event—knowledge profit
- Networking between the training institutions of INTENSE and finding partners involved in other IEE-programs on international and national level
- Essentials for the content and design of the handbook/ guideline
- Presentation of various tools/ materials/ software programs

The INTENSE training programme is meant to provide tools for further dynamic developments at the pan-European level and to promote the know-how transfer between nations in order to achieve the goal of implementing the EU standards at a national level.

Due to that reason there is a need for a training programme having a holistic approach by bringing together different aspects of energy efficient urban planning down to details of construction and finding out how to make energy efficient houses more attractive and desirable for citizens.

Such a training programme should be targeted not only to the immediate decision-makers on municipal level, but also the executing stakeholders, such as architects, engineers or craftsmen who will need to implement specific measures at site. These three target groups are the most important key actors for the implementation of energy efficiency in construction.

For having the common understanding on specific definitions of these three target groups the following characteristics are brought out:

- **Architects**

Architect is a person, who

- engages in the profession of architecture (buildings)
- has an academic degree in profession of architecture
- designs new buildings on a well-defined energy standard

- retrofits buildings on a well-defined energy standard
- makes certain that the construction accords to the legislation

Architects are responsible for the technical, economical, functional and aesthetical design and construction of buildings. Energy efficiency is one aspect of functionalism of modern buildings.

This group is the most important in spite of its responsibility for the holistic view on planning issues – from EU- and national legislation standards as the frame for planning a settlement down to the topics of planning various types of buildings (small/multi-storey/public).

- **Engineers**

An engineer is a person who

- engages in the profession of engineering (buildings/ building services)
- has an academic degree in the profession of engineering
- designs the building service of a (complex) new building
- retrofits building service for modernized (complex) buildings
- makes certain that the design accords to the legislation

Besides the architects the group of engineers is the second, which has nearly the same level of importance. The difference between these two target groups is a question of sphere of action at their place of work.

- **Craftsmen**

A craftsman is a person who

- engages in the profession of carrying out construction and application of technical details
- has an education/ vocational training for his specific topic(s)
- tries to carry out the building and technical details according to a well-defined standard and to the legislation

The training programme having a holistic modular approach will be developed based on already existing materials in target countries and Western Europe. So the aim of the assessment is to find out what currently exists in the countries and what could be utilized for the training programme. The focus will be on further education and not on basic university/vocational school curricula.

The assessment is carried out in the frame of the project “From Estonia till Croatia: Intelligent Energy Saving Measures for Municipal housing in Central and Eastern European Countries” (INTENSE; Nr. IEE/07/832/SI.500392).

The following report shall give an overview about the current situation regarding the available further education programmes in the target countries Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, Czech Republic, Slovenia, Croatia, Romania and Bulgaria and additionally assesses existing training programmes that have been developed in Germany and in frame of IEE funding in Europe.

2. Frame and scope of the assessment

To have the frame for the assessment certain boundaries were agreed before carrying out the survey in target countries.

Firstly, the attention was targeted to further education programmes and not to basic university or vocational school curricula.

Secondly, continuous programs were addressed and one-time events left aside. It is clear that there are one-time trainings, seminars and workshops on relevant energy efficiency topics carried out in each country, but the aim of the project was to see what is offered in target countries on more or less permanent basis.

Thirdly, modules to be searched for were specified in order to have common ground. The modules were selected based on the potential training programme modules to be developed in frame of INTENSE project.

The list of the modules in interest with a short description is listed below:

Legislation (EU-legislation and national legislation)

Legislation topic consists of two levels – European Union level and national level.

The EU-legislation gives the over all frame, which each European Union country has to adapt to their own national legislation. The schedule of this adaptation must be known for coming to a realistic implementation plan.

Additionally there are specific pieces of national legislation that regulate in more detail technical issues which are relevant for our target group when implementing their work.

Settlement planning (ecological/energetic aspects)

This issue is necessary for the evolution of sustainable development in city areas and outskirts. A holistic planning ensures an optimal synergetic effect of all components of a forward-looking settlement planning.

Regional conditions (adaptation to the climate conditions)

The current climate conditions vary between the target countries from north (Estonia) to south (Croatia): it is necessary to consider the country-specific climate situations and changes with their influence on the planning process.

Energy carriers (types of energy resources: fossil/renewable)

The current dependency of the target countries on the energy deliveries from Russia and other post soviet countries as well as the increasing energy price for fossil energy resources impacts the discussion about renewable energy resources, and country specific or regional energy production.

Building physics (building construction, materials, energy efficiency of new buildings)

Before deciding what kind of energy will be used to cover the energy demand – all planning's should be targeted to reduce the energy consumption of buildings (requirement of EU legislation). This topic of building physics including

construction and materials is directly relevant for the quality of a building, its life cycle and energy demand.

Construction elements; solutions (windows, walls, doors)

Construction elements are a part of construction and need to be thought through in order to achieve maximum possible and feasible energy efficiency. An important point to keep in mind is the correct application to achieve the desired result.

System engineering (heating, cooling and ventilation)

The topic has to integrate the whole field of planning a building and focuses then on individual technical solutions for detached buildings or complexes of buildings. Technical solutions must be adapted to the special requirements of each building otherwise the calculated energy saving demands will not be reached.

Retrofitting (insulation of construction, insulation materials, detail planning)

Beside the focus on new buildings, one of the most important fields of energy saving measurements is retrofitting of existing buildings. There is an enormous capability of standardized solutions for energy saving measures in the CEE countries.

Best practice (urban planning, building construction)

For all interested parties „best practice“ solutions give an impression about possible ways of practical solutions that have been tested and implemented in Western Europe and also CEE countries.

Cost benefit assessment (payback calculation, running costs)

One of the most important aspects is the benefit of possible measurements in the short and long run. Solutions must be assessed and designed taking these two viewpoints into consideration.

Methods of awareness raising

Awareness of regular people is very important. People should be aware of different possibilities and options that are available and also what is requested by the national regulations in order to be able to make most feasible decisions.

With a country wise and target group specific questionnaire we aimed to get an overview about the situation of existing further education programmes and their specific topics in target countries. In the Annex II of the report the detailed overview of the available training programmes in target countries can be found.

3. Methodology

As the target groups and scope for the assessment was agreed upon then the time was to design and carry out the survey.

The survey consisted of following steps:

1. Designing the template of the questionnaire
2. Carrying out the country-wise survey
3. Evaluation of the questionnaires

3.1 Designing the template of the questionnaire

The questionnaire had a tabular approach, which from one hand set the modules to be searched for and on the other hand set what kind of information would be relevant to find out about each training program addressing given modules. Modules were based on the potential training programme modules that would be developed in the frame of INTENSE project (Table 1. Potential training modules).

So information concerning following modules was requested:

- Legislation (EU-legislation and national legislation)
- Settlement planning (ecological/energetic aspects)
- Regional conditions (adaptation to the climate conditions)
- Energy carriers (types of energy resources: fossil/ renewable)
- Building physics (building construction, materials, energy efficiency of new buildings)
- Construction elements; solutions (windows, walls, doors)
- System engineering (heating, cooling, ventilation)
- Retrofitting (insulation of construction, insulation materials, detail planning)
- Best practice (urban planning, building construction)
- Cost benefit assessment (payback calculation/ running costs)
- Methods of awareness raising

About each further education programme, tackling relevant modules, following specific information was looked for:

- Addressed target group (architects, engineers, craftsmen)
- Programme title
- Training institution
- Duration (how long has the program been taught)
- Methods (Lectures/ workshops/ practical work)
- Keywords

- Availability in English language
- Materials (handbook/ webpage)
- Free availability (for using the existing material for INTENSE training programme purposes)

The table template is shown in Annex I of the report – The template for survey.

3.2 Carrying out the country-wise survey

The questionnaire was filled in by INTENSE partner countries: Estonia, Latvia, Lithuania, Poland, Hungary, Slovakia, Czech Republic, Slovenia, Croatia, Romania and Bulgaria. Data was searched and presented by the project partners - multiplier organizations (country coordinating partners).

Based on the table questionnaire each of the partners in the target countries carried out the survey to find out available continuous further education training programmes in their country. In different countries different approaches were used for that purpose including contacting different training institutions that carry out trainings on topics of our interest, searching websites of relevant unions/educational institutions etc.

The results of the country wise survey can be found from the Annex II of the report – An overview of the available training programmes in target countries.

3.3 Evaluation of the questionnaires

The filled templates were collected for summarizing the results and carrying out the assessment by addressing each target group, module and taking into account country specific situations.

The results were separated between 2 groups – architects/engineers and craftsmen and are reflected in the following Chapter 4 - Results.

Table 1: Potential training modules

TOPIC / MODULE	1	2	3	4	5	6	7	8	9	10	11
STAKEHOLDER GROUPS	Legislation	Settlement planning	Regional conditions; Adapting to Climate Change.	Energy carriers; RES	Building physics	Construction elements; solutions (windows, walls, doors)	Systems engineering (heating & cooling)	Retro-fitting	Best practice	Cost-benefit assessment	Methods of awareness raising; households
GROUP 1: Already high qualification: Architects, Engineers, University lecturers											
GROUP 2: Practical orientation: Vocational school teachers, craftsmen											

No shade - we assume that this particular group does not need this specific module;
 Light gray- we assume that the training module is needed;
 Dark gray – we assume that more than basic knowledge should be transferred.

4. Results

In this review report we are presenting short assessment and overview – more detailed data can be found from the Annex II - An overview of the available training programmes in target countries.

After assessing the answers received from target countries regarding available training programmes that address given modules it was clear that the results can be separated between 2 target groups: architects/engineers and craftsmen.

4.1 Existing programmes of further education for architects and engineers

Discussion of each module

In the following pages the main points of each module are brought out module by module.

Module title: Legislation

In majority of countries there are existing offers for the Legislation module. Mainly lectures with some consultation part are offered to the participants and topics cover issues related to EU legislation – certification, auditing, etc. Based on the length of the events it can be concluded that participants are mainly in informative way getting basic information about EU required legislation.

The most detailed program is offered in Croatia (non-EU country) having comprehensive topics legal regulations covering building and technical legislation, EU legislation, building licence, basics of physical buildings, and environment conservation. Additionally they have specific training course on fire protection including following - legal regulations of civil measures, protection from fire, architecture, civil engineering, and mechanical engineering.

As the topic legislation seems to be well covered in majority of countries and based on the general aim of INTENSE project in our training program we are concentrating on future developments (i.e. informing about the recast of EPBD etc.) and informing about possible future requirements and possibilities as energy efficiency issue is evolving very quickly. In addition, the focus of INTENSE project is towards the development at municipalities, so the training module on legislation will be adjusted to cover the topics on legal aspects relevant for the local level.

Module title: Settlement planning

Against the background of planning new buildings, settlement planning could give a good frame for a forward-looking, environmental-friendly and holistic view. This topic is a fundamental base of planning and should be integrated in training programmes at all EU-countries.

Settlement planning is tackled in further education programmes in Croatia, Hungary, Czech Republic and Poland as in other target countries it is not.

The topic of settlement planning is offered from different viewpoints in these countries. Some are more holistic; some are more concentrating on the buildings situation. There is no consistent and comparable offer in all target countries. It is a mix of lectures and workshops with practical work.

Based on the information available to us we can conclude that the situation is not very good – there are not many further education courses available on the topic, there is great variety of subtopics and we can see a gap in teaching this issue. Preceding shows that settlement planning would be an important module to concentrate on in the INTENSE training programme by for example discussing orientation, density, mixed land use and introducing different urban planning instruments (i.e. fixation of location for energy supply, urban planning contracts, land sale contracts, support for private initiative, etc.) to the target groups. Settlement planning is also a topic for which input from another INTENSE project work package could be used – Holistic planning of housing for energy optimized municipalities. In frame of the work package a background paper has been compiled – “Holistic Planning For energy Optimised Municipalities”. The paper discusses some basic ideas of urban planning related to energy consumption and shows how classical planning ideas or instruments can be used for energy-optimized municipalities. Also several best practice examples of German municipalities are presented. (von Knorre, et.al., 2009)

Module title: Regional conditions; adapting to climate conditions

The existing differences of the climate conditions between Estonia and Bulgaria are relevant. On one hand the distance is about 2000 km from south to north with its regional conditions, on the other hand the climate change will be relevant for all countries in a different way. This topic is getting more relevant for settlement planning and building construction.

It is a relatively new issue and based on our search it seems that there are not available relevant programmes that we could use for our INTENSE training programme. It clearly shows that currently it has not been realised what kind of impact climate change and its impact on regional conditions can have for future planning of settlements and building constructions.

It would be relevant to tackle the issue of regional conditions and adoption to climate conditions in INTENSE training programme especially from different viewpoints of adaptation of planning as well as best practice options and adaptation of buildings. Also for this topic work done in frame of INTENSE project can be used from work packages related to best practice examples and holistic planning. Two background papers compiled in the frame of INTENSE project – “Holistic Planning For energy Optimised Municipalities” (von Knorre, et.al., 2009) and “Experience and lessons learned from Western Europe and from CEE countries of best practice examples of energy savings in buildings” (Tvrdon, et.al., 2009) – are presenting best practice examples of planning and buildings and also tackle adaptation possibilities. Also in the work package related to best practice options for increasing energy efficiency in buildings an adaptation concept will be elaborated, which can be directly used for the training programme.

Module: Energy carriers, renewable energies

In most of our target countries there is a high capability of renewable energy resources (bio mass/wood), which could and should be used for regional energy production. Renewable energy sources should be also taken into account and used when planning and constructing a building according to low energy, passive or nearly zero emission house standards.

As a further education course this topic is not continuously offered in most of the target countries but it is known to be a really hot topic due to high promotion of using local energy sources in all countries so it might be the situation that it may not be included to further education programmes but is already covered in regular curricula. It is additionally known that already a lot of materials exist on renewable energy sources.

However, in Hungary there is an offer that correlates the question of energy systems with the question of energy demand of buildings. From other perspective Croatian offer integrates a holistic view and also includes the impact of energy systems on the environment.

Based on the information received from different countries and knowing the wider picture it is clear that the module is relevant when talking about energy efficiency and construction. It should be however thought through in which way to tackle the topic in INTENSE training programme. As INTENSE project concentrates on new buildings then we need reference to renewable energy sources and energy carriers when building low energy and passive houses (using renewable energy sources (solar, wind etc) and efficient techniques) but with having an energy efficiency point of view (i.e. use of renewable energy sources to improve overall energy efficiency of a house). Additionally there should be a holistic approach – not concentrating on one source but different – and giving overview from construction point of view. Additionally it can be pointed out that in that field developments are fast so there would be all the time something new to talk about.

Module: Construction elements/ solutions

This topic is the most important from the viewpoint of energy saving measures at buildings. Before discussing the kind of energy supply to be used, the buildings have to be planned and optimised to as low energy demand as possible and feasible.

The search results from target countries show that the topic about construction elements and solutions is well covered by further education courses. Nevertheless the courses tend to concentrate in majority on technical details and are not linked to energy efficiency.

However, a couple of countries have a special view on energy efficiency issues and there is even one progressive offer from Slovenia having a workshop on constructions solutions in planning and building low energy and passive house buildings.

Differently from other topics and modules there are more practical work and workshop offers for construction elements and solutions. The depth of the offers seems to be very different and the spectrum of duration of nationwide programmes lies between 5 hours and 26 hours.

List of topics taught:

- Building elements used: walls, tables, windows, roofs, etc.; implementation plans
- Virtual construction; 3D modelling
- Panel elements
- Static models
- Reinforcement
- Costs
- Deformation
- Basic dimensioning of structure
- Concrete types of structures (steel, wood, aluminium); durability
- Maintenance
- Reliability of machines and fittings, equipment
- Investigation of energy efficiency in buildings and industrial systems
- Constructions solutions in planning and building low energy and passive house buildings
- Energy efficiency of windows
- Insulation methods and materials
- Building management
- Energy saving possibilities

It is clear that this topic cannot be left out from a holistic training programme on energy efficiency and construction. However, in order not to duplicate existing courses already available in the target countries, in INTENSE training programme we would not talk about basic technical details (as based on the assessment we assume this is known by target groups) but concentrate on energy efficiency part. This would for example include showing best practice examples (i.e. triple windows), have discussion on building materials (as there is large variety on market) for example on how to choose best option (i.e. ecomaterials), maybe present newest material characteristics and refer to the recast of the Energy Performance of Buildings Directive (EPBD) from where the energy efficiency requirements are coming from. In INTENSE we also find experience exchange to be an important part of the training programme as it is important to give experts time to change viewpoints on different issues (experience in use of different materials etc.).

Additionally Condetti® method could be introduced in frame of the INTENSE training programme. It is a way of presentation used in seminars, which allows in small working groups linking together construction details with topics of building physics. Working groups are provided a rough sketch with boundary conditions that can produce different solutions. The solutions can be discussed and

changed in an easy way on a working board and verified with the whole plenum (seminar) to inform about the process of finding the solution.



Photo 1. Example of using Condetti® method (photo taken by Wilfried Walter)

Module: building physics

In direct dependency on the topic of construction elements and solutions physical issues are important to be discussed because of possible moisture problems that may occur when insulating the building envelope. This topic is necessary for both types of buildings - for new buildings and also energy optimised retrofitted buildings.

The search results show that some offers overlap directly with the previous topic of construction elements and solutions (for example structures and statics). Even though two offers from target countries focus on humidity and moisture problems in construction, in general it can be observed that building physics is not a common issue for currently available further education programmes. The depth of the offers is ambiguous because of different duration of courses. It can be pointed out that one programme is offered in co-operation between the Chamber of Architects and a commercial company.

It should be noted that even though building physics seems not to be very well covered by the further education courses in target countries, it is known that the topic is covered in the frame of regular curricula.

However, when talking about energy efficiency and construction then definitely air-tightness and thermal bridges should be discussed and for that reason building physics should be definitely part of the INTENSE training programme. Project experts from Germany (EUZ) have long years experience in measurement and

calculation of air-tightness in buildings and that experience can be very well used for the elaboration of the INTENSE training programme. From the viewpoint of energy efficiency the focus in INTENSE should be on consequences that physics and technical solutions have – indoor air quality, mould etc.

Module: System engineering (heating, cooling and ventilation)

System engineering is a typical topic for engineers and planners in differentiation to architects.

The search indicates that system engineering seems to be an important topic in the target countries - it is a topic that has been covered in all target countries by further education programmes. However, each offer has its own specific viewpoint but none of the offers cover all necessary issues under system engineering together. Most of the programmes have their focus on the issues of heating and ventilation with its microclimatic impacts and two programmes tackle also renewable energy sources.

It should be brought out that for this topic - system engineering - high variety of methods of teaching is used including lectures, on the job training (Poland), seminars and workshops.

We can conclude based on the search that basic things are covered in target countries so needed would be the next step to energy efficiency – introducing best practice examples, new solutions, regeneration options, cooling systems in warmer countries, but maybe also for ice halls, combining municipal viewpoint with the one of industrial.

Module: Retrofitting

The previously discussed topics impact the topic of retrofitting as well. Retrofitting can be more problematic because of the predetermined situation of having diversity of for example satellite towns with multi-storey apartment houses up to timbered single houses in historical cities.

Even though retrofitting is not the main focus of INTENSE project it should be emphasised that there are a lot of old soviet time multi-storey apartment houses in Eastern European countries that are in bad energetic conditions and technical solutions for retrofitting are not so much different from technical solutions for new houses. That was also the reason for including initially retrofitting to the potential training programme of INTENSE project.

The information available to us about further education programmes in target countries shows that the topic is not very well covered - only half of the countries could bring out further education courses about retrofitting. From the search results we can see that in some countries soft measures and in some hard measures are tackled. As an interesting point we discovered that Hungarian offer integrates E-learning parts corresponding to the lectures.

As a good example Slovenia of having retrofitting courses including clear energy efficiency aspect can be brought out:

- Passive and low energy retrofitting of buildings
- Energy intelligent retrofitting of non-profit/ social multi-flat apartments

From holistic perspective Polish course on thermo modernisation (including thermo modernisation, cost-benefits, legislation, innovation, market) could be interesting for municipalities – similar approach could be used.

Due to the fact that in the INTENSE project we are not concentrating on retrofitting and taking into account that in general retrofitting topic is still pretty well covered then it would be better not to have a whole separate module about retrofitting in the INTENSE training programme and rather include it partially when relevant to some other modules – i.e. best practice or construction elements - as some aspects are applicable both for old and new buildings.

Module: Best practice

Trainings and education programmes are more effective if learning is not only cognitive and abstract but by also getting pictures and impressions from good examples that have been successfully implemented either in their own country or in other European countries.

The search shows that in some target countries there are separate further education courses about best practice – three of the courses are explicitly orientated at energy saving or energy efficiency issues (one of thee tackles passive house technology). It can be noticed that different methods are used for teaching this topic – not only lectures but also practical work, trainings and study visits.

From a general point of view it can be pointed out that the topic about best practice examples is anyway covered probably to different extent everywhere (it does not have to be separately brought out but best practices are often used as examples) and it will have to be covered also in future. Based on that this is a needed module also in INTENSE training programme where the emphasis could be on holistic approach to best practice examples. Again materials collected and elaborated in another INTENSE work package – Best practice options for increasing energy efficiency in buildings – for instance the background paper about “Experience and lessons learned from Western Europe and from CEE countries on best practice examples of energy savings in buildings” (Tvrdon, et.al., 2009) could be used as an input to the training manual and programme explaining for example concept behind best practice, adaptation and practical examples.

Module: Cost benefit assessment

All investments regarding previously mentioned topics have to be investigated from the viewpoint of ecological, social but also economical aspects. A holistic planning considers the interdependency between these aspects – and its economical effect.

Economic issues are covered in several countries by further education programmes but offered programmes have different orientations: on one hand the focus lies on energetic optimisation (either renovation/retrofitting or new buildings) and on the other hand the focus is on managing the continuous usage of buildings, facility management as well as life cycle strategy. This shows that a lot of issues are covered but not really on a holistic way.

As financing and cost issues are always relevant then this topic has to be included in the training programme of INTENSE project as well. Additionally financing issue could be covered from the legislative point of view, as financial issues are crucial for practical implementation of EU and national requirements. To have a view to future then INTENSE training module would aim more on concentrating on financial issues regarding new buildings rather than refurbishment of old buildings, which is already well addressed and informed about in most of the countries.

Module: Awareness raising

Awareness raising focuses on regular people who should be aware of different possibilities and options that are available related to energy efficiency and buildings and also what is requested by the national regulations in order to be able to make most feasible decisions.

The search shows that only two target countries – Hungary and Croatia - have offers for awareness raising but these are related to environmental psychology, environment conservation (including environmental impact assessment) and protection of architectural heritage. It is also clear that it is related to awareness raising of the target group itself and not teaching how to work with clients/citizens.

Looking from the viewpoint of INTENSE training programme it can be stated that awareness raising of regular people is an important issue but it would be difficult to tackle it in the frame of INTENSE training programme as it is a very diverse and large topic. Additionally can be brought out that in INTENSE project a whole work package is dedicated to awareness raising of regular people – Raising public awareness on energy saving measures for buildings – and it will tackle the issue more deeply and efficiently.

4.2 Existing programmes of further education for craftsmen

Based on the information gathered during the survey in target countries we found out an interesting aspect - most of the countries do not really have continuous offers for the special target group craftsmen - only one programme for further education is offered by a Western European commercial company in Poland.

However, it could be the case that such topical trainings are related to qualification raising of the craftsmen or inner events (for union members) and for that reason not publicly announced.

As for the INTENSE training programme craftsmen are one of the main target groups then it is important to find the way, how to tackle them in the most efficient way. Addressing craftsmen directly would not be very efficient approach so a possibility would be to tackle them indirectly via local training institutions (vocational schools, professional associations). It could mean that in INTENSE training programme we concentrate on vocational school teachers and education specialists of association with the aim that they will transfer their improved knowledge to craftsmen due to having better direct contact to them.

4.3 Summary

The country wise search of available training programmes on potential INTENSE training programme modules in target countries shows that different countries do not offer similar programmes. It is more or less clear that the detailed programmes could not be compared (especially taking into account the content of the lectures and their specifications) as all of the programmes are in national languages and not available in English for comparison.

Further education courses in target countries are offered mainly by universities or polytechnic schools (accredited training institutions). Only for a couple of modules companies are also involved in giving trainings.

Interesting is that we could not find in most of the countries many further education training programmes for craftsmen, majority of the topics (especially technical ones) are addressed to engineers and architects. In couple of countries there are also offers specifically for municipality representatives. Another finding is that programmes are in most of the cases offered for several stakeholder groups at the same time and are not focussing only on one specific target group.

When looking at the coverage of the modules then it can be clearly seen that technical topics (systems engineering, construction elements etc.) in this field are more tackled than soft topics (settlement planning, energy carriers, legislation etc.). The only exemption is the topic of legislation, which is well covered in almost all target countries.

5. Existing training programmes in other IEE projects and in Germany

5.1 Existing training programmes in other IEE projects

Aim of the survey

The development of the new training programme for the INTENSE project should also be based on the experience of existing training programmes in other IEE-projects. Such an assessment could help to identify possible gaps, overlaps and additions in order to reach the maximum advantage in designing the training modules for the INTENSE training programme. The survey should focus on all aspects that are planned to be covered by the projected training programme because each of these aspects could give useful hints regarding the organisational frame of existing training programmes, their structure and methods and last but not least about their topics and contents.

Other EU level programmes focussing on higher and advanced education (not IEE projects):

- **The GRUNDTVIG life long learning programme of the EU**
The programme enables individuals at all stages of their lives to pursue stimulating learning opportunities across Europe.
- **The ERASMUS programme for higher education**
In addition to mobility actions the ERASMUS programme supports higher education institutions to work together through intensive programmes, networks and multilateral projects.

These programmes for developing advanced and higher education programmes could be interesting for the training institutions participating in INTENSE project from the viewpoint of networking.

Methods of Investigation

The following research and its results were focused on the IEE projects.

During the research answers for following questions were searched for:

- Which IEE projects offer training and train the trainers' programmes for the relevant target groups like professors, professionals and staff of regional environmental centres?
- Which IEE projects offer qualification (advanced training) and information to the topics of INTENSE?
- Which network-structures could be used by INTENSE?

The research was based on the Internet platform of the European Union presenting IEE and EACI projects: „<http://ec.europa.eu/intelligentenergy>“. On that web-

site under Projects are presented all IEE financed projects of last years - both finalised and active ones.

The search was carried out based on the following keywords:

- „train-the-trainer“
- „advanced training“
- „architects“
- „engineers“
- „craftsmen“

Results of the Investigation

All research results under the focus of above mentioned keywords show a partial analogy with the target groups and topics of the projected training programme of INTENSE.

Relying on that background the following search results will be introduced focusing on each partial aspect separately in order to find out possible effects of synergy:

Train the Trainer programmes

There were three projects identified using Train the Trainer (TTT) approach although two of them refer to transport we are looking at the principles of the training method:

The project „COMPETENCE“ (Strengthening the knowledge of management agencies in the transport field, 2005-2007) followed a strategy of multiplying know-how that is similar to the INTENSE training programme. As the first step international trainings for inter-mediators were carried out and as a second step their learned knowledge was transferred to national level. The emphasis is on the topic of transport, which is an important element of city planning and urban development. The participating national agencies (from Bulgaria, Lithuania and Slovenia) could function as consultants in frame of the topic „holistic planning“ at the training programme of INTENSE.

The project „STEER SNOWBALL“ (Wide-spread city implementation of integrated transport planning concepts, 2006-2008) offered the same topics using the learned competences of the participating communities to multiply it to other communities. Participating partners from the CEE-countries Poland and Slovakia could use their competences and know-how for the part „settlement planning“ at INTENSE. Over 300 cities will be targeted by further dissemination activities in frame of the project „STEER SNOWBALL“.

The project „EUROCONTRACT“ (Energy Performance Contracting, 2005-2007) offered the TTT-programme about the topic alternative structure of financing systems for the promotion of contracting-system – it was not possible to find out additional aspects which could be useful for INTENSE TTT-programme. Participating partners came from Poland and Slovakia.

Advanced training programmes for planners, architects and engineers

The Annex III shows projects, which offer advanced trainings for planners, architects and engineers. Sometimes the borderline of the offered training programme structures could not be exactly defined. Taking into account this background the following will introduce the programmes, which could be important for the INTENSE training programme in some aspects. The Internet based search under the keyword „advanced training“ offered only 1 IEE-project (ICOSAW) which is offered for the target groups of INTENSE.

The search in the IEE project database to find relevant advanced training programmes was connected to thematic keywords:

- „building“
- „renewable energy“
- „heat production“
- „local capacity building“
- „European networking for local action“
- „sustainable energy communities“
- „financial mechanisms and incentives“
- „energy efficient transport“

The following analysis helps to identify what was offered, what is currently offered and what is missing. Described are (depending on the description of the projects at the internet platform from IEE) the objectives of each project and the special benefit for INTENSE activities.

Thematic focus „Building“

The project „SuRE-FIT“ (Social housing refurbishment for energy efficiency requires major financial resources) covers the topic energetic modernization. Due to the diversified offers of issues overlapping with the topics of INTENSE (e.g. technical aspects and questions of financing), potential synergetic effects between these projects and possibilities of networking (CEE-project partner-countries are Czech Republic, Poland and Slovakia) could be used.

The project „TREES“ (Training for renovated energy efficient social housing) covers the field of energetic modernization and offers advanced training modules for planners, architects and engineers. The content correlates to the specific building construction issues of INTENSE and covers aspects of construction, system engineering and financing. CEE partner country in this project is Hungary.

The project „CEPH“ (Certified European Passive House Designer) is running parallel to INTENSE. It will elaborate on the first intense training course for Passive House Designer on the European level. This training course will enable the par-

ticipants, after the passing of an exam, to obtain the Certificate of European passive house designer. The need for such a certification is analysed by all experts who are stating the rapidly growing interest for passive house design in many European countries, which only can be satisfied through experienced and qualified passive house planners. The outcome and experience of the CEE partner countries Slovakia and Czech Republic could be useful for further national trainings in INTENSE. One option could be to use possible synergy-effect between both projects.

The project "ENSLIC BUILDING" (Energy Saving through promotion of Life Cycle analysis in Building) is ending in March 2010. The goal of the programme is to achieve energy saving in the construction and operation of buildings by promoting the use of life cycle assessment techniques in design for new buildings and for refurbishment. The project aims to draw on the existing information, which is generated from the previous research projects regarding the topics - design for low energy consumption, integrated planning, environmental performance evaluation of buildings, design for sustainability and life cycle analysis techniques applied to buildings. The participating organisations of the CEE partner countries Bulgaria and Hungary could give their expertise to INTENSE activities.

The project "ILITE" (Initiative for Low Energy Training in Europe) has the objective to foster desire and know-how among construction industry professionals. To achieve this, the project follows three priorities:

- setting up initial training on low consumption for architects and engineers
- setting up ongoing training on low consumption to reach industry professionals
- informing the general public and contracting authorities on level A certification.

This project offers tools for training modules and a training portal. The project is finalised. CEE- partner countries were Poland and Romania, which could give their expertise to respective national trainings.

The project "INTEND" (Integrated Energy Design in Public Buildings) has a holistic view on energy efficiency, renewable energy sources and indoor climate which can be achieved if architects, engineers, building owners and investors adopt together an integrated energy design approach. The special view on public buildings could be useful for the mini-projects developed in the frame of the INTENSE project. CEE- partner country in this programme was Poland.

The project "IDES-EDU" (Master and Post Graduate education and training in multidisciplinary teams implementing EPBD and beyond) will educate, train and deliver specialists for the building sector via improved curricula and training programs, exchange between students and professionals, certification and accreditation of the courses at national level. The project also provides frameworks for standardised European certification and has elaborated on a multimedia-teaching portal to make the educational packages available to graduate students and building professionals in Europe. In this programme most of the new member states were involved: the CEE partners from Croatia, Czech Republic, Hungary, Lithuania, Poland and Slovenia could use their expertise for further national ac-

tivities, especially under the focus of national standards. The project ends in April 2010.

The project "EPI-CREM" (Energy performance integration in corporate public real estate management) aims to improve energy efficiency and rational use of energy across public building stock in Europe by embedding energy issues in decision-making processes within Corporate Real Estate Management (CREM) at the strategic level and translating those decisions into tactical and operational levels of building management. In that way the decision-making process surrounding energy saving measures is embedded in the CREM-process and is structured and more cost effective. To reach these goals the project "EPI-CREM" provides a strategy and a set of tools enabling building owners and users to make the energy aspect an integral aspect of Corporate Real Estate Management. No CEE country is participating in this project. The outcome of this program could be useful under the aspect of cost benefit assessment for the municipalities in all INTENSE partner countries.

Thematic focus „Renewable energy“

The projects are mainly focused on dissemination and implementation topics as well as technical topics. The expertise and outcomes could be used for the training programme and national trainings in INTENSE.

The project "BEST RESULT" (Building and Energy Systems and Technologies in Renewable Energy Sources Update and Linked Training) was developed by actors already involved in training and dissemination activities related to renewable energy sources technologies. It aimed to raise awareness and to enhance skills among key actors in the building and energy sector on the supply side (like installers, technicians, professionals, architects, planners, retailers etc.) with regard to renewable energies. CEE partner countries are Poland and Romania.

The project "RESINBUIL" (Introduction of Renewable Energies in Building Sector) encourages the use of small-scale renewable energy appliances in buildings in four provinces of Spain, Italy, Slovenia and Romania. Its main target groups are local authorities, business associations, constructors, professional associations and the general public. The project partners analysed the current development rates and market barriers before implementing a threefold strategy. CEE partner countries were Slovenia and Romania.

The project "NEW4OLD" (New energy for old buildings - Promoting the integration of RES & RUE measures in historic buildings) promotes the integration of renewable energy and energy efficiency technologies into historic buildings and has a goal to create a Europe-wide network of renewable energy houses in the different Member States of the European Union. The project "NEW4OLD" aims to create a network of similar houses within the EU Member States with the objective to create a focal point for renewable energy and energy efficiency measures in these countries and thereby to contribute to overcoming the lack of information about these technologies, which is still one of the prevailing obstacles to their integration into buildings. No CEE partner country was participating in that project.

The project "ICOSAW" (Promotion of the Intelligent Combination of Sun and Wood for Producing Warm Water and Heating for Private Houses) promotes the necessary technologies including concepts for advanced training, marketing, network creation and public relations tested by the project partners in their target regions Trier, Jönköping, Rzeszów, Zvolen and Mainz and which can be adapted to other EU countries as well as countries throughout the European Union. A further result is represented by a number of targeted activities and materials for informing craftsmen, architects, planners, engineers and the general public. CEE partner countries were Poland and Slovakia. The structure of this project could be useful for the INTENSE partner organisations and municipalities.

Thematic focus „Heat production“

The project "ENCROP" (Promoting the production and utilisation of energy crops at European level) promoted the use of energy crops for heat-production. It may be interesting for the CEE countries because of their high potential of biogenic resources. The structure and outcome of the project "ENCROP" could be useful for INTENSE even though it only involved West European countries.

The project "BIOHOUSING" (Sustainable, comfortable and competitive biomass based heating of private houses) covers not directly the aspects of planning and using renewable energy sources for municipal housing but it aims to remove the barriers via designing of standard and commercial technical systems and by producing tools and information materials for sustainable biomass heating. Project encourages energy maintenance service entrepreneurship and trains energy actors in order to increase their professional skills to advice house builders and decision-makers. Use of stoves as auxiliary or main heating system is common in Europe so the topics and targets could be useful for the CEE countries even though any of CEE countries were not involved in this project.

Thematic focus „Local capacity building“

Under the keyword were two projects – "E-ATOMIUM" (Energy Agencies Training on Mobility in Union Member States) and "E-TEAM" (e-learning for training Energy Agencies in mobility management and alternative fuels). Both project are intended to mobility-management and correspond with the module „settlement planning" of INTENSE. CEE partner countries are Poland, Bulgaria and Romania.

Thematic focus „European networking for local action“

The project "BEAM 21" (Capacity building training programs for European municipalities on municipal climate protection and intelligent energy measures) supports communities evolving climate protection aims and processing measurements of energy efficiency and renewable energy sources. In the frame of the project an E-learning platform for the participants was elaborated. The project works self-directed and includes a supervised online-learning and on-site training. The project supports the targets of INTENSE regarding a holistic view in the field of city planning and housing. The partner communities could benefit from networking possibilities with organisations from Lithuania, Latvia, Poland, Romania, Bulgaria and Czech Republic

Thematic focus „Sustainable energy communities“

The projects that are described following will be useful for the adaptation of strategies for holistic planning under the viewpoint of settlement planning (as one topic of INTENSE training programme) and processing issues.

The project “SUSTAINABLE NOW” (Local capacity development for integrated energy management and implementation of local energy action plans) is addressed to municipalities and has a nearly analogue target as the above-mentioned programme. The outcome and experience of the participating organisations could be useful for the training programme of INTENSE project. The participating municipalities are from West European countries and from CEE countries Bulgaria and Hungary.

The project “REGIO ENERGY PROFIT” (Economic growth, competitive advantages and employment incentives in regions through regional energy profit clusters) is a programme about optimised cluster management structures fostering both the implementation of sustainable energy systems and regional economic growth, employment and innovation. To achieve these goals the project assesses the impact of sustainable energy policies and programs on regional economic growth, employment and innovation. Best practice of management structures, policy instruments and joint actions are identified in the partner regions and the regional cluster managements implement the actions. No CEE countries were participating in this project but the tools and process experiences could be useful for synergetic effects on regional and national level in INTENSE.

The project “SEC-TOOLS” (Energy service communities in new Member States - sustainable energy development at local level energy planning & financing) has the highest number of participating CEE countries. It was dedicated to meeting the large need for energy efficiency improvement and further use of renewable energy in communities of new Member States and accession countries. A core part of the action concerned the elaboration of generic tools with a view to encourage qualified sustainable energy thinking and practices. The key target groups were small communities of 3,000 to 30,000 inhabitants in Bulgaria, Czech Republic, Latvia, Lithuania and Poland. Their experience (exchange) could help for future holistic settlement planning topics in INTENSE.

The project “WISE PLANS” (Co-operation between communities for energy action plans) aim was to identify requirements to mitigate the impacts of the production and supply of energy, to reduce emissions of CO₂ from fossil fuels and reduce dependence on external resources. The objective was to create Sustainable Energy Action Plans in each community, taking advantage of cross-referral between all partners in order to derive relevant, common methodologies. No partner in CEE countries took part but the project “WISE PLANS” could be a good additional base to the “SEC-TOOLS” programme.

Thematic focus „Financial mechanisms and incentives“

The project “CF-SEP” (Commercial Finance for Sustainable Energy Projects) finished in 2007 – just before the beginning of worldwide economic crisis. It is ad-

dressed to financing sector (banks) and was qualifying the staff in questions of financing energy efficiency and renewable energy measures. Additionally a manual was prepared for these institutes. The project "CF-SEP" was evolved in co-operation between CEE countries Estonia, Latvia, Lithuania and Slovakia.

The project "EUROCONTRACT" (European platform for the promotion of energy performance contracting) aims to have more energy performance contracting (EPC) projects implemented in Europe by providing project development standards and implementing pilot projects. At the same time know-how and information on EPC is provided and an exchange among market actors is facilitated. In the participating countries where EPC has already been established the model is being further developed linked to other instruments such as Facility Management or is expanded in its scope to include comprehensive refurbishing measures. The financing models of "contracting" like public private partnerships could be a solution for communities without sufficient financing resources.

The project "PROMOSCENE" (Promoting the use of structural funds and cohesion funds for energy investments in new member states and candidate countries) makes managing authorities aware, able, and willing to take into account energy aspects when promoting and managing structural and cohesion funds. During the project period (2007-2009) specific support tools were developed and various information seminars, trainings and conferences were organised. The experience of partners of Czech Republic, Poland and Romania could be used for the national trainings of INTENSE.

Thematic focus: "Energy efficient transport"

The project "PRO.MOTIO" (Creating liveable neighbourhoods while lowering transport energy consumption) creates new markets transferring knowledge to stakeholders, e.g. construction companies, developers, property management companies. It will combine energy saving in housing and in transport. Key market actors are the target group for the national training sessions in 10 countries. The measures are well known: improvement of accessibility, mobility services and connection with different transport modes, creating awareness and ownership through participation in creating mobility solutions and involvement in activities. From CEE partner countries Bulgaria, Hungary, Latvia, Lithuania, Romania, Slovenia are involved in the project.

The project „ADD HOME“ (Mobility Management for housing areas) aims to reduce transport needs and is fostering a modal shift from car-trips to more energy efficient modes especially starting from residential areas. In 4 out of 5 cases the own front door is the place where modal choices are taken. Owning a private car, which is considered as the easiest accessible mode in daily life, often influences the choice. The approach of the project "ADD HOME" includes three levels:

- 1) legal and regulatory settings will be reshaped to enable sustainable mobility before planning new residential areas
- 2) the accessibility of new residential areas and each household will be refocused from the focus on private car parking lots to more energy efficient modes of transport

- 3) mobility patterns and habits will be reorganised by mobility-services that bundle trips, shift trips and substitute them

The cooperation of municipalities and housing companies/neighbourhood administrations will create liveable housing areas that enable residents to freely choose their transport mode. The project will lead to a more ecological, economical and social way of living. From CEE partner countries Bulgaria and Slovenia are involved in the project.

Advanced training of craftsmen

There are two projects especially offered for craftsmen. Other projects „invited“ this target group to trainings, which actually are more focussed on engineers or architects. In most of the CEE countries the grade of organisation of craftsmen is low. Only in countries with strong organisations like chambers of craftsmen took and take part on projects at European level (for example Poland). This situation makes it difficult for INTENSE to reach the target group of craftsmen in building sector directly. Stimulations for qualifications, certifications and quality assurance measurements are useful to generate a positive dynamic for the high quality erection of buildings.

The project “TRAINENERGY” (Pilot qualification for craftsmen in the building sector) is currently running. It prepares and implements a pilot qualification for craftsmen in the building sector. The objective is to contribute to the qualification of the market to make implementation of recent European legislation as effective as possible. The project will involve an on-line training database with institutionalised (nationally approved and validated) training modules and training guides for craftsmen and for trainers including common European elements and national tailored ones. CEE- partner country in that project is Poland.

The project “INSTALL+RES” (Training courses for installers of small-scale renewable energy systems in buildings) establishes institutionalized vocational training courses for the qualification or certification of installers of renewable energy systems (biomass, solar, PV and heat pumps) in buildings in several European countries. This will be done in line with the requirements of the RES Directive 2009/28/EC. The training courses will be based on a well-balanced relationship between theory and practice, the educational principle being “Hands on Learning”. Due to that the training courses mainly take place in demonstration facilities and laboratories where practical work is performed. Participating partners are from CEE countries Bulgaria and Slovenia.

5.2 Existing training programmes in Germany

Rationale for the Selection

In the area of integral planning, Germany has provided innovative solutions to the European urban planning and building community in the past years. The holistic approach includes social, ecological as well as infrastructural aspects. With regard to an individual building or a complex of buildings, the specific requirements for potential savings were considered in structural design as well as in housing technologies through the implementation of efficient technologies in

combination with the implementation of renewable energies. The leading role of Germany in the area of planning structures and building structures can be traced back to the following framework conditions:

- The dedicated research culture of the civil engineering community provides high-quality offerings for advanced training that address current issues.
- The various target groups (planners, architects, engineers, craftsmen) are highly organised in associations and advocacy groups.
- Based on this specialisation, various providers offer their advanced trainings tailored to the specific needs of the target groups.
- The increasing call for legal provisions at the federal level concerning building codes (construction engineering/housing technologies) leads to great pressure to seek customised advanced trainings with an appropriate certification.
- The incentive structure was and is increasingly linked to the meeting of certain quality standards required by law.

Method of Investigation

Due to the confusing and unstructured variety of training offerings for individual target groups we will primarily focus on those German advanced training structures that can serve as an inspiration to the participating INTENSE project partners.

As has already been done at the EU level (IEE projects), a target-group-specific Internet search for the following keywords was performed:

- “train the trainer *bauwesen* [train the trainer building and construction]”
- “*dozentenfortbildung bauwesen* [advanced training for lecturers building and construction]”
- “*dozentenfortbildung ingenieur* [advanced training for lecturers engineer]”
- “*dozentenfortbildung architektur* [advanced training for lecturers architecture]”

Results for Train the Trainers offerings

At www.schluessselkompetenz.eu we found a Train the Trainers programme that does not specifically deal with building issues but with communication aspects. The priority subjects “presentation” and “visualisation” are offered as a part of education programs.

Train the Trainer courses with explicit building content were not found. It is conceivable, however, that those are subsumed under the category “advanced training”. The high-quality advanced training offerings for the target groups of planners, architects, and civil engineers, which present the most up-to-date knowl-

edge and technical developments, allow for the positive mixing of participants with professors and lecturers from civil engineering education facilities.

Results for advanced training offerings

In Germany there is a wide variety of advanced training offerings that incorporate the current state of scientific knowledge. Therefore we only refer to a sample programme here that also serves as a model at the European level.

REN IMPULS programme

The REN IMPULS programme “Building and Energy” started in the 80s in Switzerland and was developed further in the province of North Rhine-Westphalia (NRW) in 1994. Since then the programme has been adopted by various other German provinces that have developed province-specific programs for their professional advanced trainings. Taking into account that background we will discuss the NRW programme in more detail below.

NRW Energy Agency

Purpose

The purpose of the programme is to provide relevant target groups from industry, business, municipalities, service industries, utility companies, trades, construction industry but also private end users of electricity — through an increase in professional advanced training — new energy-efficient approaches to the environment, economy, and employment in North Rhine-Westphalia in order not to only tap into potential energy savings but in particular also into potential cost savings.

Advanced training offerings

The collection of training courses of the NRW IMPULS programme consists of over 60 practice-based training concepts about energy related issues including leader’s manuals and presentation slides, participant materials and marketing tools that are available to all companies, municipalities and advanced training facilities in NRW. In addition three web-based training courses of the NRW Energy Agency are available for teaching for advanced training providers at the knowledge base “Wissensportal-Energie.”

Additional Offerings

In addition to consulting services and advanced energy trainings the NRW Energy Agency offers extensive services in information processing, media relations and public outreach in order to on the one hand provide all energy users with information about a more efficient use of energy and on the other hand stimulate the market for energy efficiency and new energy sources. The Energy Agency is recognized by almost all the media and multipliers as a leading clearing-house for energy information because of its independent status and comprehensive range of information on the Internet (www.ea-nrw.de).

Note about Above Offering

From the above-mentioned range of services offered by the Energy Agency it became clear that the context of today's advanced training offerings must incorporate appropriate accompanying strategies to increase the benefits for the target groups.

Offerings to the Target Group "Craftsmen"

Practical experiences with the new construction of low-energy and passive-house technology in Germany (e.g. quality assurance in buildings at the EXPO-2000 Residential Area in Hannover) show that the key to high-quality construction not only depends on the excellent planning and design (architects and engineers) but also requires matching construction efforts by the craftsmen.

For the Internet search keywords "Weiterbildung [advanced training]" and "Bauhandwerk [building trades]" broad ranges of nationwide advanced training offerings are presented. The range of offerings also reflects the diversity of facilities that offer advanced trainings. Roughly they can be divided into the following groups:

Advanced Training in training seminars

Associations of craftsmen offering (advanced) trainings, seminars and workshops:

- 1) District craftsmen associations
 - Chambers of craftsmen
 - Guilds of craftsmen

- 2) Umbrella Associations
 - Specialised trades (carpenters, electricians, drywall installers, plumbing installers, etc.)

- 3) Independent Educational Institutions/Academies
 - Various offerings for building trades

- 4) Product-based Training Courses (offered by commercial companies)
 - Product training

- 5) E-learning/ Correspondence Courses
 - Various offerings for building trades with appropriate tools

Campaign "Haus sanieren – profitieren [Renovate a Home and Benefit]"

Following a nationwide campaign, which also includes training seminars for craftsmen, is described as a model campaign.

To date, more than 750 trade companies have participated in this campaign in the two pilot regions of the craftsmen chamber districts of Münster and Osnabrück-Emsland. 19 percent of all training participants were from heating instal-

lation companies, 16 percent of the cooperation partners' work in the building trades and about 14 percent are energy advisers. Based on the experience made during the pilot phase, the project team will not conduct any further training seminars but will pass this important task on to trained leaders (train-the-trainer concept). Training providers will be craftsmen chambers or even district craftsmen associations.

Note about advanced training offerings for craftsmen

Comparable education and advanced training offerings are only available in CEE countries and regions in which craftsmen are organized in associations (chamber of craftsmen) such as in Poland. In countries without such strong crafts associations, companies of the construction industry usually offer to conduct product-based training seminars for interested craftsmen.

6. Discussion

6.1 Planners, architects, engineers

Framework Conditions

The above-listed target groups cannot really be separated from each other due to the overlap of the professions. The investigation of available training programmes in target countries and existing IEE-programs shows a concentration on technical issues. Because of that the INTENSE training programme should focus on imparting the newest state of knowledge – not only at the technical level but also at the level of tools for updating this know-how.

Other investigations conducted in the frame of other INTENSE work packages (legal requirements, best practice, holistic planning) focus on the issues of current and future requirements in the building sector. For the next 5-10 years the target groups see an increasing need for the implementation of low-energy and passive house standards. Because of this background the requirements for optimised planning that also considers suburban planning aspects for residential housing developments will increase.

Apart from new construction, especially the energy-efficient renovation of multi-storey residential buildings also plays a crucial role in the CEE countries. The basics of building physics and technical details, however, need to be considered independently of building codes and types of buildings. Since it can be expected that in the next years especially energy-efficient renovation projects in existing multi-storey residential buildings (soviet housing) offer considerable potential—even including the implementation of low-energy housing standards—increasingly higher technical requirements for heating and ventilation solutions will be demanded from planners and engineers in these situations.

Requirements for a Training programme

At the initial stage, the training programme to be developed within the framework of INTENSE project should be as a one part aimed at the professional groups of planners, architects and engineers (other part will be addressing craftsmen). In this process the specialization of topics relevant to their various professional fields of activity need to be considered. Staff members of both planning as well as facility management departments of municipalities are to be addressed. Furthermore, independent architectural and engineering offices involved in the planning and implementation of individual projects also need to be included. This spectrum of requirements is also reflected in the already existing range of offerings from training institutions (universities and colleges), which were identified via country wise search of further education training programmes. The survey of existing training programmes that have been or are currently elaborated in frame of Intelligent Energy Europe funding tool and programmes offered in Germany give an overview what is already existing in Europe in the field related to construction and energy efficiency, where could be connection points and what is still missing.

An effective training programme must be tied into the increasingly dynamic development processes. This includes, on one hand, the development of the European framework legislation and its country-specific adaptations and, on the other hand, as building research and technical innovations continue to evolve in this area, thus providing the foundations for a positive development in reducing greenhouse gases.

6.2 Craftsmen

Framework Conditions

The long experience of the building sector in Western Europe shows that it is important to also include the group of craftsmen in the training and qualification strategies.

As far as the building of the structure and the installation of the housing technologies goes, this group implements the plans of the previously mentioned professionals (architects, engineers, planners) and thereby plays a crucial part in delivering a high-quality project. In most of the CEE countries nationwide standardized training and qualification structures do not exist nor do exist recognized certifications. As a result many craftsmen acquire their competence through “learning by doing” and thus are dependent on the quality of their respective company. For qualifications craftsmen rely on their own initiative to, for example, participate in product training by mostly Western European companies of the building and housing technology sector. Since in these countries—just like in countries of Western Europe—bids for municipal contracts are won by financial considerations (lowest-priced offer), many projects suffer from less careful workmanship, for example, regarding the connection details in the building envelope or installations.

Requirements for a Training programme

Due to the background of the above-described common bidding practice in Western Europe as well as in Central and Eastern Europe the situation is quite similar: even if the contract goes to a qualified company, this is no guarantee by any means that the workmanship or installation would adequately reflect these qualifications. The hiring of low-cost subcontractors with less qualified or unqualified employees increases the risk of poor-quality workmanship.

It is impossible to view the requirements for a training programme in isolation, especially when considering the above-outlined framework conditions. In the future the effectiveness of qualification strategies will also have to be measured by the extent to which craftsmen develop a market of high-quality building practices. As long as high-quality building practices are prevented by low market prices, it will be difficult to motivate craftsmen to participate in advanced qualification training.

On the other hand, even in the CEE countries the pressure is rising to bring their legislation in line with the requirements of the EU directives. This, in turn, also increases the pressure to become more qualified as a craftsman even though adequate compensation is not received for such better-quality work. This dilemma can only be solved when taking the following aspects into consideration.

Key aspects for a successful craftsmen training

- A market for high-quality craftsmanship must be created. That will be necessary for being able to fulfil the requirements from European Union related to energy efficient construction. That will also require training of craftsmen.

- Certain building standards (low-energy and passive house) must be linked to a qualification scheme of craftsmen. From one hand this will make standards more common and from the other hand it will give guarantee to the client.
- Bidding criteria must be based on qualification of craftsmen. That means already in the tendering process the relevant qualification of craftsmen carrying out the works on site will be taken into account.
- Funding support for building projects or technical installations must be linked to verifiable qualification of craftsmen carrying out the practical work.
- Craftsmen training (vocational training, advanced training) must be based on these standards in order to provide sufficient level of knowledge needed for carrying out practical works in a required way to achieve energy efficient standard of construction.

Building blocks for a training programme for craftsmen

The expertise regarding craftsmen trainings available in the CEE countries should be utilized for the development of customized training and advanced training strategies. Craftsmen chambers, energy agencies, vocational schools and other qualified institutes, for instance, should be called here to make use of this expertise. Furthermore, the many good-practice examples from the IEE programs should be used; (see also the IEE program “BEST RESULT”, which also had aimed at collecting effective training concepts about renewable energy sources).

Apprenticeship

The training of young craftsmen should be practice-based learning and theoretical aspects should be integrated into the detailed work at a construction site. Due to the lack of a standardisation in many countries, this is a great opportunity to provide positive tools for the development of effective training modules.

Teaching staff of the field of building and technology

Training a teaching staff for the various trades in building construction and housing technologies would be the first step. Applicants should already have been involved in teaching of craftsmen—or have proven their skills through passing preliminary exams for this occupation. These applicants would be trained for their qualifications through special national training programmes by e.g. craftsmen chambers, energy agencies or vocational schools.

Idea sketches: Learning by Doing

As a result, the teaching staff would be available for training courses that could be taught in practice-based sessions, e.g. as a “construction-site session” in on-site trailers (classrooms) next to or in which trades could be practised. In addition to a high degree of real-life practice, course participants could also be supervised during the actual building to assure quality.

Additionally the communities of the CEE countries involved in the INTENSE project could use the “mini projects” from the work package dealing with holistic planning to establish quality standards and to train young as well as other interested craftsmen in those qualifications as described.

7. Concluding remarks: Key aspects of the INTENSE training programme

Key principles

It can be said that the assessment that was carried out in target countries on available training programmes and needs gives an overview of further education training programmes that are available for target groups of architects, engineers and craftsmen. Even though the situation is diverse it was possible to make suggestions for the INTENSE training programme to be elaborated. The main target groups must be the municipal engineers and architects and – very important – the target group of the craftsmen (different professions), because they carry out and finish the buildings that are planned by the engineers and architects. There seems to be a gap between the different target groups.

The evaluation shows us a very different situation in each target country. To offer a relevant and effective training programme in frame of INTENSE project we must take into account several conditions, which are brought out following:

- For the target group „Municipal engineers and architects“ the topics could not be split in different intensities of know how – trainings.
- The training modules should start at basic know-how and must offer sequences of more specialized knowledge.
- For the target group „craftsmen“ there must be created a special offer, which they really could use at the construction and installation site.
- As craftsmen are a difficult target group to be addressed directly then more effective results could be received by addressing the indirectly – via vocational school teachers, unions, energy agencies etc.

The INTENSE programme is meant to provide tools for further dynamic developments at the Central and Eastern European level and to promote the know-how transfer between nations in order to achieve the goal of implementing the EU standards at a national level.

Professional exchange

The content of the training programme builds on the existing know-how of the professionals from the universities and colleges involved in the INTENSE programme as well as the INTENSE partner country co-ordinating organisations in the CEE countries. Besides establishing an understanding about a common agenda regarding the content of the future training modules, the German experts will introduce the latest developments to the discussion of the issues covered in the INTENSE programme. The subject list covers the entire spectrum that has emerged from investigating the respective target groups in the target countries.

Networking

The training events start off a dynamic exchange among the participating institutions. This process is meant to result in the formation of a network that promotes a high degree of up-to-datedness and potentially helps complement each other's range of educational offerings.

Networking structures are established that can be extended by institutions involved in IEE programs and specialised in the various subject matters. As a result, we will have forums at the international, national as well as regional level that can cross-fertilize each other and that can already be used during the implementation phase of INTENSE, e.g. within the framework of the planned "mini projects".

Preparation of materials

Training materials are jointly discussed and agreed upon, which are compiled based on the results of the Train the Trainers events and which form the basis for the further development of the training programmes at the respective country level. In addition, participants are expected to use the Internet-based platforms developed within the framework of the IEE programme.

8. References

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- ADD HOME - Mobility management for housing areas. <http://www.add-home.eu>
- BEAM 21 - Blended capacity-building on sustainable energy measures & action plans for European municipalities. <http://www.boellbrandenburg.de>
- CF-SEP - Commercial Finance for Sustainable Energy Projects. <http://www.svn.cz/CFSEP>
- PROMOSCENE - Promoting the use of structural funds and cohesion funds for energy investments in new member states and candidate countries. <http://www.promoscene.eu>
- EUROCONTRACT - European platform for the promotion of energy performance contracting. <http://www.eurocontract.net>
- SURE-FIT – Social housing refurbishment for energy efficiency requires major financial resources. www.sure-fit.eu
- TREES – training for renovated energy efficient social housing. www.cep.ensmp.fr/trees
- CEPH – certified European Passive-House Designer. www.passivehousedesigner.eu
- ENSLIC-BUILDING – Energy saving through promotion of life cycle analysis in buildings. www.enslic.eu
- ILITE – Initiative for low energy training in Europe. www.ilite.eu
- INTEND – integrated energy design in public buildings. www.intendesign.com
- IDES-EDU – Master and post graduate education and training in multidisciplinary teams implementing EPBD. www.chri.nl
- TRAINENERGY -Continuous, practice-oriented implementation and dissemination of the EPBD 2002 energy end-use efficiency. IEE/08/536
- EPI-CREM - Energy performance integration in corporate public real estate management. <http://www.epi-crem.org>
- BEST RESULT – Building and energy systems and technology in RES update and linked training. <http://bestresult-iee.com>
- RESINBUIL – Introduction of renewable energies in building sector. www.resinbuil.com
- NEW4OLD – New energy for old buildings – promoting the integration of RES and RUE measures in historic buildings. www.erec.org/144.0.html
- ICOSAW – Promotion of intelligent combination of sun and wood for producing warm water and heating for private houses. www.icosaw.eu
- BIOHOUSING – Sustainable, comfortable and competitive biomass based heating of private houses. www.biohousing.eu.com

ENCROP – Promoting the production and utilisation of energy crops at European level. www.encrop.net

E_ATOMIUM – Energy agencies training on mobility in union member states. www.e-atomium.org

E-TREAM – e-learning for training energy agencies in mobility management and alternative fuels. www.e-tream.eu

SUSTAINABLE NOW - Local capacity development for integrated energy management and implementation of local energy action plans. <http://www.sustainablenow.eu>

REGIO ENERGY PROFIT Clusters – Economic growth, competitive advantages and employment incentives in regions through regional energy profit clusters. <http://www.regioenergyprofit.eu>

SEC-TOOL - Energy service communities in new member states - sustainable energy development at local level energy planning & financing. <http://www.sec-tools.net>

WISE-PLANS - Co-operation between communities for Energy Action Plans. <http://www.wiseplans.eu>

PRO.MOTIO - Creating liveable neighbourhoods while lowering transport energy consumption. <http://www.ieepromotion.eu>

STEER SNOWBALL - Demonstration, take up and further dissemination of sustainable integrated planning methods in European cities. <http://www.steersnowball.info>

COMPETENCE - Strengthening the knowledge of local management agencies in the transport field. <http://www.transportlearning.net>

"Haus sanieren - profitieren" - German campaign including trainings for craftsmen. <http://www.sanieren-profitieren.de/>

REN IMPULSE programme "Building and Energy". <http://www.schornsteinfegermoenchengladbach.de/Ren-impils.html>

North-Rhine Westphalia Energy Agency. <http://www.ea-nrv.de>

Annex I - Template for survey

(On the following page)

Annex II - An overview of the available training programmes in target countries

Latvia

Training institutions:

- Technical University, Professional continuing education centre, Riga
- Ltd. „Ekodoma“, registered by Ministry of Education and Science

Evaluation

Comment on the training programs:

In Latvia there are two training institutions which offer further education programs: On one hand the Technical University, on the other hand the independent engineering consulting company “Ekodoma”, a private company. In the frame of legislation (module) both institutes are more technical orientated. Their topics are overlapping in the modules “legislation”, “construction elements; solutions” and “system engineering”. The module “retrofitting” is only offered by the Technical University of Riga. Target groups are building engineers, designers, employees of state and local authority institutions

No offers for trainings on the topics:

- Settlement planning
- Building physics
- Best practice
- Methods of awareness raising

Target groups

There is no special offer for craftsmen

Programme offers – special features

The training program of “Ekodoma” is a qualification for specialists, who want to be certified as energy auditors. The courses are offered twice a week; they last between 16 and 84 hours of lectures and practical work on new buildings.

Methods

Lectures and practical works are offered, but not assigned to the modules.

Available programmes/ language

It is unclear, whether the programmes could be used for INTENSE, as they are not available in English language.

Training programmes

Target groups short cut:	M:	Municipalities
	P:	Planners
	Ph:	Physician
	A:	Architects
	E:	Engineers
	C:	Craftsmen
	PU:	Public unions
	I:	Investors
	EM:	Energy manager
	BM:	Building manager
	EC:	Energy consultants
	D:	Designers

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Expert specialization in buildings: Buildings and structures operation and management	Technical University of Riga 26 h Lecture	E, D	Building management
Legislation: Regulation	-		
Settlement planning: Organization of buildings	-		
Regional conditions: adapting to CC	-		
Energy carriers, REC	-		
Building physics:	-		
Construction elements solutions (windows, walls, doors):	26 h Lecture	E,D,	Building management
System engineering (heating & ventilation):	26 h Lecture	E,D,	Building management
Retrofitting:	26 h Lecture	E,D,	Building management
Best practice:	-		
Cost- benefit assessment:	26 h Lecture	E,D,	Building management
Methods of awareness raising: households:	-		

Estonia

Training institution:

- Tallinn Technical University
- The Credit and Export Guarantee Fund KredEx
- Tallinn University of Applied Sciences
- Information Centre for Sustainable Renovation

Evaluation

Comment on the training programmes:

Continuous offers:

In Estonia there are 3 levels of qualification - I, II, III from which I is the lowest (applies for 5 years) and III highest. II and III are in general without expiration deadline.

To get the qualification level there are certain rules (i.e. you have to have the diploma from a vocational school or at least 2 year work experience) and you have to take an exam (calls for exams are twice a year).

Qualification programmes are also offered for different kinds of craftsmen (construction - finishers, carpenters, masons, locksmiths, whitesmiths, builders of concrete constructions, roof layers) – I-III levels can be applied, only III level for construction managers.

The main training institution in Estonia is the Tallinn Technical University. It offers most of all further training programmes (topics: Legislation, energy carriers, RES, building physics, construction elements and system engineering).

Especially for house managers and apartment unions there are offers of the Credit and Export Guarantee Fund KredEx, topics are: National legislation, financing, energy certificates and auditing.

Not continuous offers:

Tallinn University of Applied Sciences is carrying out further education trainings for construction managers, specialists – these include technical stuff (building physics, renovation etc) but also legislation part, financing, and management. The trainings are carried out when ordered.

The Information Centre for Sustainable Renovation offers the topic “retrofitting”, which is an offer for everyone but not a continuous training programme.

No offers:

There is no continuous offer for the topics

- Retrofitting
- best practice
- cost –benefit assessment
- methods of awareness raising for households

Programme offers – special features

The Tallinn Technical University offers its training programmes for municipal architects and engineers decentralized in different regions of Estonia.

Methods

Most of the offers are lectures, the Information Centre for Sustainable Renovation use practical workshops.

Available programmes/ language

Not all programmes can be used by INTENSE, they are only available in Estonian language.

Training programmes

Target groups short cut:

M: Municipalities
P: Planners
Ph: Physician
A: Architects
E: Engineers
C: Craftsmen
PU: Public unions
I: Investors
EM: Energy manager
BM: Building manager
EC: Energy consultants
EA: Energy auditors
ECO: Engineering companies
D: Designers
SM: Salesmen

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Legislation: Training to improve the administrative capacity regarding energy efficiency	Lectures 3 training days: 1 day legislation 1 day auditing in different regions	M, A, E	European and national legislation, energy certificate, auditing
Legislation: Different titles	Presentations 3 years - around 3 training days per year	BM, EM	National legislation, (which reflects EU legislation) financing, energy certificates, auditing

Legislation: Training of building energy auditors	Lectures 10 days out of which one day – legislation, energy certificate, energy auditing	Specialists with technical higher education	National and EU legislation, energy certificates, auditing
		See note 1 and 2	
Settlement planning:	-		
Regional conditions: adapting to CC	-		
Energy carriers, RES: Training of energy auditors	Lectures 10 days out of which one day electricity need and supply, local boiler houses and gas supply	Specialists with technical higher education	Electricity need and supply, local boiler houses and gas supply
Building physics: Training to improve the administrative capacity regarding energy efficiency	Lectures 3 training days from which 1 day about construction March-May 2009, different regions	A, E	Insulation, energy consumption
Building physics: Training of building energy auditors	Lectures 10 days out of which on one day – construction physics	Specialists with technical higher education	Construction physics, heating need, degree days
	See note 2		
Construction elements solutions (windows, walls, doors): Training to improve the administrative capacity regarding energy efficiency	Lectures 3 training days from which 1 day about construction, March-May 2009, different regions	A, E	Energy saving possibilities
	See note 2		

<p>System engineering (heating & ventilation):</p> <p>Training to improve the administrative capacity regarding energy efficiency</p>	<p>Lectures</p> <p>3 training days from which 1 day about construction,</p> <p>March-May 2009, different regions</p> <p>See note 1 and 2</p>	<p>A, E</p>	<p>Building technology systems</p>
<p>System engineering: (heating & ventilation):</p> <p>Training of building energy auditors</p>	<p>Lectures</p> <p>10 days out of which on one day heating, one day ventilation</p>	<p>Specialists with technical higher education</p>	<p>Heating, ventilation and cooling, air treatment process and inner climate</p>
<p>Retrofitting:</p>	<p>See note 2 and 3</p>		
<p>Best practice:</p>	<p>-</p>		
<p>Cost- benefit assessment:</p>	<p>?</p>		
<p>Methods of awareness raising:</p>	<p>-</p>		

Lithuania

Training institutions:

- 1) Quality management centre, Vilnius Gediminas Technical University
- 2) Technical University, Kaunas
- 3) Lithuanian Civil Engineers Union

Evaluation

Comment about the training programmes:

Continuous offers

Three training institutions offer corresponding (additional) modules. Most of the modules are offered for “professionals in building sector”, but on offers for craftsmen. The modules last between 4-40 hours, especially building physics.

No offers

The following topics are not offered:

- Settlement planning
- Regional conditions adapting to CC
- Energy carriers, RES
- Methods of awareness rising:

Target groups

There is no special offer for craftsmen

Programme offers – special features

The offers are additional to each other

Methods

Lectures, consultations

Available programs/ language

The materials can be used, but they are not available in English language.

Training programmes

Target groups short cut:

M:	Municipalities
P:	Planners
Ph:	Physician
A:	Architects
E:	Engineers

C: Craftsmen
 PU: Public unions
 I: Investors
 EM: Energy manager
 BM: Building manager
 EC: Energy consultants
 EA: Energy auditors
 D: Designers

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Legislation: Energy certification of buildings	1); 4 h Lectures Consultations	A, E, EA, EC, P, Ph, EM, BM	Energy performance of a building; Heat losses; Energy performance certificate; legal preconditions for certification
Settlement planning:	-		
Regional conditions: adapting to CC	-		
Energy carriers, RES electricity	-		
Building physics: Modern building technologies and management	2); 40 h Lectures Consultations	A, E, P, Ph, EM, EC, EA	Modern technologies of building structure; movement of heat and moisture in building structure; insulation of building facade; characteristics of concrete floor; building costs
Construction elements solutions (windows, walls, doors): Insulation systems of buildings	1); 5 h Lectures Analyses of best practice Consultations	A, E, P, Ph, EM, EC, EA	Insulation methods and materials; technical-economical indexes
System engineering (heating & ventilation): Heat supply and heating systems in buildings	1); 8 h Lectures Analyses of best practice Consultations	A, E, P, Ph, EM, EC, EA	Requirements for heating systems; available technologies, accounting of heating
System engineering (heating & ventilation): Ventilation and air conditioning systems	1); 8 h Lectures Analyses of best practice Consultations	A, E, P, Ph, EM, EC, EA	Requirements for ventilation systems; air quality, noise characteristics; fire protection

Retrofitting: Use of renewable energy sources to meet the energy demands of the building	3); 8 h Analyses of best practice and recommendations	PU	Alternative energy
Best practice:	-		
Cost- benefit assessment: Energy efficiency during dwelling renovation. Economical effect of renovation	1); 8 h Lectures Analyses of best practice Consultations	A, E, P, Ph, EM, EC, EA	Energy performance of a building; diagnosis of technical and thermal features; energy efficiency during renovation; energy audit; economical benefit from renovation
Methods of awareness raising:	-		

Hungary

Training institution:

- 1) University of Technical Science, Institute of Continuing Engineering Education
- 2) Chamber of Hungarian Architect
- 3) Chamber of Budapest Architect

Evaluation

Comment about the training programmes:

In Hungary there are two types of training institutions (university and chamber of architects), which offer training programmes on searched topics. All requested topics are covered.

Continuous offers

Some modules are offered as „one time events“ up to perennial training programmes.

Not offered topics

In Hungary all requested topics are offered.

Target groups:

There is no special offer for craftsmen.

Programme offers – special features

There is a co-operation between Chamber of Architects and a commercial company (Lindab Ltd). It seems to be a special offer of static structure topics and not especially of the topic of energy saving measures. E-learning- modules are additionally offered.

Additionally there is an offer for engineers, architects and designers about psychological aspects of environmental education.

Methods

Lectures and professional field trips are offered. As a specific thing E-learning modules are provided also.

Available programmes/ language

Some material is for free, not (yet) available in English language.

Training programmes

Target groups short cut:

M:	Municipalities
P:	Planners
Ph:	Physician
A:	Architects

E: Engineers
 C: Craftsmen
 PU: Public unions
 I: Investors
 EM: Energy manager
 BM: Building manager
 EC: Energy consultants
 EA: Energy auditors
 D: Designers

Programme title, Module title	Institution, duration Type of course Number of courses	Target group	Topics
Legislation: The mystery of law	2); 3 occasions, 3 Lectures	A,E	Legislation regulations
Settlement planning: Facility management	1); 2008 - 2009 Lectures	P,A,E,EC, EA,D	Facility management, project management, real estate development, sustainable development, settlement and regional development
Regional conditions; adapting to CC: Introduction of the energy alternative resources usage in the building construction	2) ; 8 occasions, Lectures	E,PH,P	Sustainable development, alternative energy resources, the usage of the hydrogen cell
Energy carriers, RES Preparation for the building energy system regulation and auditing	1); Duration: One month Lectures	E,A,P,PH, EC;EA	Building energy systems, energy efficiency, energy planning
Building physics: The usage of steel structures in the building constructions – presented by the Lindab Ltd	2); Lectures, Field trip (best practice)	A,E,P,PH	Steel structures, statics
Construction elements solutions (windows, walls, doors): Reliability of machines and fittings, equipment	1); 3 occasions Lectures	E,A,EA,P	Professional trainings, mechanical engineering, maintenance etc.
System engineering (heating & ventilation): Applying the renewable energy systems in the building construction	2) ; 4x 90 minutes Lectures	E, A	Renewable energy, solar thermal systems
Retrofitting: Training for technical controller	1); 100 hours lectures, 60 hours e-learning	E	Training for technical controllers

Best practice: Field trip to the famous and recent architectural investments	3); App. 15 occasions per year Professional filed trip	E,A,P,M,E M	Training in groups, filed trips
Cost- benefit assessment: Facility management I-II	1); duration: 4 months Lectures	E, A, P, PH, M, EM, BM	Building energy efficiency, information about standards, norms, IT-technologies
Methods of awareness raising: Environment- psychology	2) ; 28 occasions Lectures	E,A,D	Introduction in the psychology, social and physical environmental education

Poland

Training institutions:

- 1) Polskie Zrzeszenie Inzynierow in Technikow Sanitarnych
- 2) Fundacja Posznowania Energii
- 3) Polish – Japanese Centre for Energy Efficiency
- 4) Institute of Building Technology
- 5) West-Pomeranian Chamber of Construction Engineers
- 6) Niezlezn i Eksperci Majatkowi
- 7) Viessmann Academy

Evaluation

Comment about the training programmes

In relation to the other target countries you find a lot of different training institutions, which offer training programmes on there own specific topics.

These institutions are split in

- (Poli-)technic universities (architects/ engineers) with professional master study programmes for all types of technical specialties
- State and private (vocational) schools, for example founded by private companies (Viesmann Academy) with special topics for professionals (planners, engineers, craftsmen).
- Chambers, associations and agencies of different professional target groups.

The above named institutions offer further training programmes. The survey shows us that each of them offers its own specific topics (see below).

Continuous offers

The modules are offered as „one off events“ up to perennial training programmes.

No offers

- Some of the topics asked for are not especially offered as further training programmes:
- Regional conditions; Adapting to CC
- Energy carriers, RES
- Building physics
- Construction elements, solutions (windows, walls, doors)
- Methods of awareness raising, households

Target groups:

There is only special offer for craftsmen by the Viessmann Academy (commercial)

Programme offers – special features

Several programmes are offered for the first time in 2009: The „Fundacja Posznowania Energii“ will start a program for settlement planning. The topics „retrofitting“, „best practice“ and „cost-benefit assessment“ will be integrated in training programmes of different training institutions. Therefore these offers will overlap with the INTENSE-program.

The only one training institution, which offers trainings also for craftsmen (installers) is an academy, founded by a private, profit-oriented company (heating systems).

Methods

Most of the offers are lectures; workshops and on-the-job trainings are offered for the topic system engineering.

Available programmes/ language

The material is not for free, only the topic best practice is available in German language, all others in Polish language.

Training programmes

Target groups short cut:

M: Municipalities
P: Planners
Ph: Physician
A: Architects
E: Engineers
C: Craftsmen
PU: Public unions
I: Investors
EM: Energy manager
BM: Building manager
EC: Energy consultants
EA: Energy auditors
ECO: Engineering companies
D: Designers
SM: Salesmen

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Legislation: EU law; Polish law; energy efficiency; energy certificate	1); One-off event Lecture	E, EA	EU law; Polish law; energy efficiency; energy certificate
Settlement planning: Free pro-innovation services in energy consulting	2); 4 years Start: September 2009 Type of course not specified yet	M, P,A,E	Free pro-innovation services in energy consulting
Regional conditions: adapting to CC	-		

Energy carriers, RES	-		
Building physics:	-		
Construction elements solutions (windows, walls, doors):	-		
System engineering (heating & ventilation): Many programmes related to all kinds of system engineering, with corresponding titles	3); Since 2005	M,E,ECO,	Many programmes related to all kinds of system engineering, with corresponding titles
System engineering:(heating & ventilation): Design, fitting and trading in energy-efficient heating systems	7); Several short courses Lectures Workshops	D, E, SM	Engineering heating systems; energy efficiency; trading installing
System engineering: (heating & ventilation): Graduate programme in state-of-the-art heating technologies	7); Lectures Workshops On-the-job training	E, P, Ph	Engineering heating systems; energy efficiency
Retrofitting: Thermo modernization	4); Since 2009 Lectures	A, E, P, Ph, EC	Thermo modernization; costs; benefits; law; innovation; market
Best practice: Energy efficiency in construction – German thermo insulation technologies	5); 5 days study trip in Germany Lectures Field visits	A, E, P, Ph	Best practices; thermo insulation; energy efficiency
Cost- benefit assessment: Energy efficiency in buildings - costs and benefits	6); Since 2009 Lectures	M, A, E, P, Ph, EC, PU,EM,BM, EC,EA	Thermo modernization; technical solutions; law; costs and opportunities
Methods of awareness raising:	-		

Slovakia

Training institution:

- Slovak Chamber of Civil Engineers

Evaluation

Comment about the training programmes:

Continuous offers

A further training programme is offered by a Chamber, not by universities or private companies. Target groups are architects and civil engineers. For these groups there are specific offers of the topics "construction elements; solutions" and "system engineering" for new buildings.

It is not specified, whether the topic "building physics" is part of the module "construction elements; solutions" or not. The training lasts five days for all topics with lectures and workshops.

No offers

Not offered are the topics

- Legislation
- Settlement planning
- Regional conditions: adapting to CC
- Energy carriers, RES
- Building physics
- Retrofitting
- Best practice
- Cost- benefit assessment
- Methods of awareness raising

Target groups

There is no special offer for craftsmen

Programme offers – special features

The trainings are located in three different regions of Slovakia.

Methods

Lectures and workshops are offered, but not assigned to the modules.

Available programmes/ language

The materials can be used, but they are not available in English language.

Training programs

Target groups short cut:	M:	Municipalities
	P:	Planners
	Ph:	Physician
	A:	Architects
	E:	Engineers
	C:	Craftsmen
	PU:	Public unions
	I:	Investors
	EM:	Energy manager
	BM:	Building manager
	EC:	Energy consultants
	EA:	Energy auditors
	D:	Designers

Program title, Module title	Duration Type of course Number of courses	Target group	Topics
Energy efficiency in buildings, seminar for authorization exam	5 days seminar	A, E, EA, P, Ph	
Legislation:	-		
Settlement planning:	-		
Regional conditions: adapting to CC	-		
Energy carriers, RES	-		
Building physics:	-		
Construction elements solutions (windows, walls, doors):	s.a.	A, E, EA, P, Ph	Insulation and constructions
System engineering (heating & ventilation): Heating and hot water production	s.a.	A, E, EA, P, Ph	Heating systems and hot water production
System engineering: Electricity installations and lightning systems	s.a.	A, E, EA, P, Ph	Electricity installations and lightning systems
Retrofitting:	-		
Best practice:	-		
Cost- benefit assessment:	-		
Methods of awareness raising:	-		

Czech republic

Training institutions:

- Czech Chamber of authorized engineers and technicians
- National building Center, Ltd.
- Society of environmental engineering
- Gradua-CEGOS, Ltd.
- Viessmann, Ltd.

Evaluation

Comment about the training programs:

There are several training institutions offering advanced education programs. Interesting is that there is no offer from (technical) universities, but 3 professional commercial companies beside independent organisations. All organisations have their own specific training modules and topics without overlapping.

No offers for trainings on the topics:

- Settlement planning
- Regional conditions; Adapting to CC
- Building physics
- Construction elements
- Retrofitting
- Best practice
- Methods of awareness raising

Target groups

Target groups are building engineers, designers, employees of state and local authority institutions. There is no special offer for craftsmen.

Programme offers – special features

There is an offer about cost benefit assessment especially for mid- and top-level management.

Methods

Workshops and conferences are offered.

Available programmes/ language

It is unclear, whether the programs could be used for INTENSE as they are not available in English language.

Training programs

Target groups short cut:

M: Municipalities
 P: Planners
 Ph: Physician
 A: Architects
 E: Engineers
 C: Craftsmen
 PU: Public unions
 I: Investors
 EM: Energy manager
 BM: Building manager
 EC: Energy consultants
 D: Designers

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Legislation: Regulation	Workshop 1 day	I, A, E, P	Building act
Settlement planning: Organiza- tion of buildings	Workshop 2 days (1 day for settlement plan- ning)	M, P, A, BM	Building legislation, building act, spa- tial planning, settlement planning
Regional conditions: adapting to CC	-	-	-
Energy carriers, REC	Workshop 1 day	A, E	Designing, RES, solar systems, heat pumps, heating
Building physics:	-	-	-
Construction elements solutions (windows, walls, doors):	-	-	-
System engineering (heating & ventilation):	Conference 2 days	D, E P	RES, heating units, AC regulation, ven- tilation, heating
Retrofitting:	-	-	-
Best practice:	-	-	-
Cost- benefit assessment:	Workshop 2 days	EM, BM	Calculation, budgeting, management education, cost assessment, building economy, strategic planning
Methods of awareness raising: households:	-	-	-

Slovenia

Training institution:

- Gradbeni institut ZRMK (Building and Civil Engineering Institute ZRMK)

Evaluation

Comment about the training programmes:

Continuous offers

The above named institution is the only one in Slovenia to train the specific topics of the INTENSE program. The further education programmes of the ZRMK are offered for all relevant target groups except craftsmen. For craftsmen the "Chamber of Crafts" offers a special program to reach the title of excellence – mojster (master).

Each of the modules lasts approximately one day (8 h) including lectures and workshops. For some of the topics the short time for each module seemed to be short to handle it with the required intensity.

No offers

There is no offer on the topics

- Settlement planning
- Regional conditions; Adapting to CC
- Energy carriers, RES
- Methods of awareness rising

Target groups

There is no special offer for craftsmen

Programme offers – special features

The topics of the offered modules seemed to convey the state of the art in planning and construct a building and its technology. The focus lies on low energy and passive house technology and retrofitting with there specific technologies.

Methods

Lectures are offered for the topics legislation, building physics, workshops are offered for the topics construction elements, system engineering, retrofitting, best practice, cost benefit assessment.

Available programmes/ language

All materials are for free; availability in English language is unclear.

Training programmes

Target groups short cut:

M: Municipalities
P: Planners

Ph: Physician
 A: Architects
 E: Engineers
 C: Craftsmen
 PU: Public unions
 I: Investors
 EM: Energy manager
 BM: Building manager
 EC: Energy consultants
 D: Designers

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Legislation: Slovenia and EU requirements on EE of buildings and environmental impacts of buildings	8 h Lecture	M, P, A, E	European and national legislation auditing
Legislation: Energy certificate of a building	8 h Lecture	M, P, A, E	Energy certificate
Settlement planning	-		
Regional conditions: adapting to CC	-		
Energy carriers, REC	-		
Building physics: The problem of moisture in buildings	8 h Lecture	P, A, E	The problem of moisture in buildings
Building physics: Thermal insulation – development in the field, Thermography, thermal bridges	8 h Lecture	P,A,E	Thermal insulation – development in the field, Thermography, thermal bridges
Construction elements solutions (windows, walls, doors): Construction solutions in planning and building of low energy and passive house buildings	8 h Workshop	Ph, A, E	Construction solutions in planning and building of low energy and passive house buildings
Construction elements solutions (windows, walls, doors): Energy efficiency of windows	8 h Workshop	A, I, BM	Energy efficiency of windows

System engineering (heating & ventilation): Integral concept of heating and cooling of multi-flat apartments	8 h Workshop	A, I, BM, EC	Heating, ventilation
Retrofitting: Passive and low energy retrofitting of buildings	8 h Workshop	A, I, D, EC, EM, BM	Passive house construction and technology
Retrofitting: Energy intelligent retrofitting of non profit/ social multi-flat apartments	8 h Workshop	A, I, BM, M, EC	Energy intelligent retrofitting of non profit/ social multi-flat apartments
Best practice: Presentation of good practice of energy retrofitting of the kinder garden in G. Radgona according to passive house standard	8 h Workshop	M, EC, EM	Passive house technology
Cost- benefit assessment: Training on energy auditing of buildings	8 h Workshop	E, A, BM, M, EC, EM	Energy auditing
Cost- benefit assessment: Financial and technical support for EE of buildings	8 h Workshop	A, BM, M, EC, EM	Financial and technical support for EE of buildings
Cost- benefit assessment: Energy auditing and EE in schools and other public buildings in relation to local energy concepts	8 h Workshop	A, I, BM, M, EC	Energy efficiency at schools
Cost- benefit assessment: Energy, economy and environmental effects of EE retrofitting of buildings	8 h Workshop	A, BM, M, EC	Energy, economy and environmental effects of EE retrofitting of buildings
Methods of awareness raising: households	-		

Croatia

Training institution:

- 1) Faculty of Civil engineering and Civil Engineering Institute of Croatia
- 2) Polytechnic University in Zagreb, Civil engineering department and Electrical engineering department
- 3) Faculty of Agriculture, Zagreb
- 4) Algebra College

Evaluation

Comment about the training programs

Continuous offers

The Civil Engineering Institute of Croatia is a consulting firm, which offers 54 courses from ten areas of profession. Each course contains between six and twenty hours of lectures.

Several training institutions offer most of the listed modules. All institutions serve their offers to architects, engineers and staff of government or private companies, there is no offer for craftsmen. The modules last between 10 hours (system engineering) up to 112 hours (construction elements; solutions) of lectures, workshops or practical work.

A special feature is offered by the Faculty of Agriculture in Zagreb: "Advanced GIS modelling" for settlement planning.

No offer

There is no offer for following topics:

- Regional conditions adapting to CC
- Building physics
- Retrofitting
- Best practice
- Cost-benefit assessment

Target groups

There is no offer for craftsmen

Program offers – special features

The offers of the Polytechnic University in Zagreb, Civil engineering department and Electrical engineering department, the Faculty of Agriculture, Zagreb and the Algebra College add to each other.

Methods

The training methods includes lectures, workshops and practical work

Available programs/ language

The materials can be used, but they are not available in English language.

Training programmes

Target groups short cut:

M: Municipalities
P: Planners
Ph: Physician
A: Architects
E: Engineers
C: Craftsmen
PU: Public unions
I: Investors
EM: Energy manager
BM: Building manager
EC: Energy consultants
D: Designers

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Expert specialization in buildings	1); Programme contains 54 courses from ten areas of profession; each course contains between 6 and 20 hours of lecture	P, Ph, A, E, EC	(see below)
Legislation: Regulation	1); 60 h Lecture	"	Building and technical legislation, EU legislation, building license, basic of physical building, environment conservation
Legislation: Legislation fire protection	2); Module is part of a five years training programme Lectures, workshops	A	Legal regulation of civil measures, protection from fire; architecture, civil engineering, mechanical engineering
Settlement planning: Organization of buildings	1); 88 h Lecture	"	Planning and control of building project conduction building machinery building preservation
Settlement planning: Advanced GIS modelling	3); 60 h Lecture Workshops and Practical work	St, M, P, PU	Work in GIS packages, processing satellite shots, information and modelling process in GIS

Regional conditions: adapting to CC		"	
Energy carriers, RES: Training programme "Use of alternative sources of energy for heating and new technical requirements for heat protection"	2); Module is part of a five years training program Lectures, workshops	A, E	Energy efficiency, energy consumption, the impact on the environment, operating costs and maintenance
Building physics:			
Construction elements solutions (windows, walls, doors):	4); 16 h Lecture Practical work	A	Virtual construction, building elements used in the real world: Teh walls, tables, windows, roofs etc.; Implementation plans, 3D modeling
Construction elements solutions (windows, walls, doors): Modern processes budget constructions	2); Module is part of a five years training program Lectures, workshops	A, E	Panel elements, static model, budget, reinforcement, stress, deformation
Construction elements solutions (windows, walls, doors): Constructions	1); 112 h Lecture	"	Basic dimensioning of structure concrete types of structures (steel, wood, aluminium) durability an maintenance
System engineering (heating & ventilation): Introduction to air conditioning systems	2); Module is part of a five years training program Lectures, workshops	A,E	Installation systems, microclimatic conditions
System engineering (heating & ventilation): Materials: sub-module: Thermal and acoustic insulation of buildings	1); 10 h Lecture	"	Energy efficiency of buildings EU an Croatian national standards (thermal an sound protection)
Retrofitting:	-		
Best practice:	-		
Cost- benefit assessment:	-		
Methods of awareness raising: households: Environment conservation	1); 8 h Lecture	"	Environment impact assessment, EU and Croatian legislation
Methods of awareness raising: Methodology of conservation and reconstruction cultural goods	2); Module is part of a five years training program Lectures, workshops	A,E	Protection of architectural heritage, prevent deterioration, the structure of the architectural heritage

Romania

Training institution:

- Bucharest Technical University

Evaluation

Comment about the training programmes

Continuous offers

In Romania only the Technical University Bucharest offers a programme for municipal architects and engineers. It seems to be a short program for each topic.

No offer

There is no offer for following topics:

- Settlement planning
- Retrofitting
- Best practice
- Methods of awareness raising

Target groups:

There is no special offer for craftsmen

Program offers – special features

No comment

Methods

Lectures

Available programs/ language

The materials can be used, but they are not available in English language.

Training programmes

Target groups short cut:

M: Municipalities
P: Planners
Ph: Physician
A: Architects
E: Engineers
C: Craftsmen
PU: Public unions
I: Investors
EM: Energy manager

BM: Building manager
 EC: Energy consultants
 D: Designers

Program title, Module title	Institution Duration Type of course Number of courses	Target group	Topics
Legislation: Training to improve the administrative capacity regarding energy efficiency	2 training days from which 1 day (8 hours)- legislation and one day about auditing March-May 2009 Lecture	A, E	European and national legislation, energy certificate, auditing
Settlement planning:	-		
Regional conditions: adapting to CC	Lecture 1 day		
Energy carriers, RES Training programme: Use of alternative sources of energy for heating and new technical requirements for heat protection	Lecture 2 days		
Building physics:	Lecture 2 days		
Construction elements solutions (windows, walls, doors):	Lecture 1 day		
System engineering (heating & ventilation): Introduction to air conditioning systems	Lecture 1 day		
Retrofitting:	-		
Best practice:	-		
Cost- benefit assessment:	Lectures 1 day		
Methods of awareness raising: households:	-		

Bulgaria

Training institution:

- Technical University, Sofia

Evaluation

Comment about the training programmes:

Continuous offers

The offers are limited and focused on technical topics of new buildings. It is not specified, whether the topic "building physics" is part of the topic "construction elements; solutions" or not.

No offers

Following topics are not explicit offered:

- Legislation
- Settlement planning
- Regional conditions, adapting to CC
- Energy carriers; RES
- Building physics
- Retrofitting
- Methods of awareness raising

Target groups

There is no special offer for craftsmen

Programme offers – special features

The trainings are offered only for engineers (constructional, electrical, heat energy). Each of the modules lasts one month (period) with different duration between 6 up to 20 hours.

Methods

All trainings are be composed with theoretical and practical parts.

Available programmes/ language

The training programmes cannot be used for INTENSE and are not available in English language.

Training programmes

Target groups short cut:

M:	Municipalities
P:	Planners
Ph:	Physician
A:	Architects
E:	Engineers

C: Craftsmen
 PU: Public unions
 I: Investors
 EM: Energy manager
 BM: Building manager
 EC: Energy consultants
 EA: Energy auditors
 D: Designers

Programme title, Module title	Duration Type of course Number of courses	Target group	Topics
Legislation:	-		
Settlement planning:	-		
Regional conditions: adapting to CC	-		
Energy carriers, RES	-		
Building physics:	-		
Construction elements solutions (windows, walls, doors): Investigation of energy efficiency, in building and industrial systems	One month 8 h Lectures 7 h Practical work	E, A, P	Energy efficiency; investigation
System engineering (heating & ventilation): Investigation of energy efficiency, in building and industrial systems	One month 12 h Lectures 8 h Practical work	E, A, P	Energy efficiency; investigation
Retrofitting:	-		
Best practice: Investigation of energy efficiency, in building and industrial systems	One month 6 h Lectures 3 h Practical work	E, A, P	Energy efficiency; investigation

Cost- benefit assessment:	One month 4 h Lectures 2 h Practical work	E, A, P	Energy efficiency; investigation
Methods of awareness raising:	-		

Annex III - IEE projects relevant for INTENSE training programme

(On the following pages)

Internet- Research with following keywords: further education / training / energy efficiency

Short cuts:

T target group: P/A/E = planners/ architects/ engineers
C = skilled craftsmen

- | | | |
|-----------------------------------|--|--|
| 1. further education | 6. renewables | 11. awareness rising |
| 2. Qualification | 7. quality assurance | 12. number of participating CEE-partners |
| 3. construction/ building physics | 8. cost-benefit assessment | |
| 4. retrofitting | 9. planning (settlement/ sustainability) | |
| 5. system engineering | 10. legislation | |

Marked actions:



= Train the Trainer



= Further education programmes

Key action	Title	T	1	2	3	4	5	6	7	8	9	10	11	12	Website / Contract No.
Energy-efficient transport	ADD HOME - Mobility management for housing areas	P A E	x	x							x		x	2	http://www.add-home.eu
European networking for local action	BEAM 21 - Blended capacity-building on sustainable energy measures & action plans for European municipalities	E	x								x			6	http://www.boell-brandenburg.de
Financial mechanisms and incentives	GF-SEP Commercial Finance for Sustainable Energy Projects	P	x							x				4	http://www.svn.cz/GF-SEP
Financial mechanisms and incentives	PROMOSGENE - Promoting the use of structural funds and cohesion funds for energy investments in new member states and candidate countries	P	x							x			x	2	http://www.promoscene.eu
Financial mechanism and incentives	EUROCONTRACT - European platform for the promotion of energy performance contracting		x							x			x	-	http://www.eurocontract.net

Buildings	SuRE-FIT – Social housing refurbishment for energy efficiency requires major financial resources	A E	x			x					x						3	www.sure-fit.eu
Buildings	TREES – training for renovated energy efficient social housing	A E	x			x											1	www.cep.ensmp.fr/trees
Buildings	GEPH – certified European Passive-House Designer	A E	x		x		x	x									2	www.passivehousedesigner.eu
Buildings	ENSLIC-BUILDING – Energy saving through promotion of life cycle analysis in buildings	A E	x		x		x				x						2	www.enslic.eu
Buildings	ILITE – Initiative for low energy training in Europe	A E	x		x	x		x	x	x							2	www.ilite.eu
Buildings	INTEND – integrated energy design in public buildings	A E	x		x		x	x									1	www.intendesign.com
Buildings	IDES-EDU – Master and post graduate education and training in multidisciplinary teams implementing EPBD	A E	x		x	x	x	x	x	x	x	x	x	x	x	x	6	www.chri.nl
Buildings	TRAINENERGY -Continuous, practice-oriented implementation and dissemination of the EPBD 2002 energy end-use efficiency	P E C	x	x	x												1	IEE/08/536
Buildings	EPI-GREM - Energy performance integration in corporate public real estate management	P A E	x										x		x		-	http://www.epi-crem.org
Buildings (RES)	BEST RESULT – Building and energy systems and technology in RES update and linked training	A E C	x					x							x		2	http://bestresult-iee.com
Small-scale applications (RES)	RESINBUIL – Introduction of renewable energies in building sector	A E	x					x	x						x		2	www.resinbuil.com
Small-scale applications (RES)	NEW4OLD – New energy for old buildings – promoting the integration of RES and RUE measures in historic buildings	A E	x	x				x	x						x		-	www.erec.org/144.0.html
Small-scale applications (RES)	ICOSAW – Promotion of intelligent combination of sun and wood for producing warm water and heating for private houses	A E C	x					x							x		2	www.icosaw.eu
Small-scale applications (RES)	BIOHOUSING – Sustainable, comfortable and competitive biomass based heating of private houses	A E	x					x	x						x		-	www.biohousing.eu.com

