

## Report

<b>Event</b>	<b>International test trainings</b>
<b>Project</b>	<b>"From Estonia till Croatia: Intelligent Energy saving measures for municipal housing in Central and Eastern European Countries"(INTENSE)</b>
<b>Time and place</b>	November 23 - 24, 2010, Bucharest, Romania November 30 – December 1, 2010, Ostrava, Czech Republic December 6 – 8, 2010, Sigulda, Latvia
<b>Reporter</b>	Sandra Oisalu (Baltic Environmental Forum Estonia)

---

This report equals to Deliverable 5.6.

### Background and objectives

The international test trainings were organized in the frame of the project "From Estonia till Croatia: Intelligent Energy Saving Measures for Municipal housing in Central and Eastern European Countries (INTENSE)", which is financed by Intelligent Energy – Europe program. 28 partners - multiplier organizations, municipalities and project experts - carry out the project in 11 Central and Easter European countries and in Germany. The main objective of the project is to influence building developments at legislative, technical, planning and consumer behavior level.

The trainings were implemented as a part of the INTENSE work package – Stakeholders' Training Program. The goal of the work package is to train those stakeholder groups who are responsible for implementing the concept or parts of it developed in INTENSE work package related to holistic planning of housing for energy optimized municipalities. This does not only involve 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.

In frame of the work package a training program for stakeholders was elaborated. Objective of the training program is to find out and present to the target groups specific issues about new buildings and refurbishment under the focus of current and prospective standards of the EU and national requirements in an holistic way. Main target groups of the training program are engineers, architects and craftsmen.

The training program includes following modules:

1. Legislation
2. Quality control
3. Settlement planning and design principles
4. Energy carriers and renewable energy sources
5. Ecological materials
6. Cost-benefit assessment
7. Building physics
  - a. Avoiding mould
  - b. Thermal bridges
  - c. Vapour transfer
  - d. Airtightness
  - e. Inside insulation

8. Construction of elements
9. Systems engineering
  - a. Heating and domestic hot water
  - b. Cooling
  - c. Ventilation

As a first step in the way to familiarize future national trainers – subcontracted training institutions (for technical modules) and country coordinating organizations (for “soft” modules) from target countries - with the INTENSE training program modules two Train the Trainers events were carried out in order to discuss topics to be addressed with the training program.

As a second step 3 international test trainings were organized in 3 locations – Romania for southern INTENSE countries, Czech Republic for central INTENSE countries and Latvia for northern/Baltic INTENSE countries. The set up of each international test training was similar – presentations were made by future trainers, each country had half a day (2 modules per country), audience consisted of other presenters and partner municipality representatives.

Objective of the international test trainings was to test the training manual by future trainers and to get feedback to the training manual/materials in order to improve the final product.

This report will give a short overview of each international test training (location, participants, modules) and the main part will concentrate on the feedback received from the presenters and listeners to the topics presented.

## **Proceedings**

### **1<sup>st</sup> international test training**

1<sup>st</sup> international test training was organized on November 23-24, 2010 in Bucharest, Romania by Regional Environmental Center Romania with support of Baltic Environmental Forum Estonia. There were 24 participants from Romania, Slovenia, Croatia and Bulgaria from multiplier organizations, universities and partner municipalities. The resource person from project side was Wilfried Walther from e.u.z., Germany.

In the 1<sup>st</sup> international test training following 7 modules were addressed:

- Legislation
- Quality control
- Settlement planning
- Building physics
  - Heat and moisture transport
  - Thermal bridges
  - Inside insulation
- Energy carriers and renewable energy sources
- Systems engineering
- Construction of elements

Additionally the 1<sup>st</sup> international test training included a visit to passive house in Politehnique University in Bucharest organized by the University of Architecture and Urban Planning “Ion Mincu”.



*Photo. Passive house in Politechnique University in Bucharest (photo by Radu Andone)*

### **2<sup>nd</sup> international test training**

2<sup>nd</sup> international test training was organized on November 31 – December 1, 2010 in Ostrava, Czech Republic by Regional Environmental Center Czech Republic with support of Baltic Environmental Forum Estonia. There were 13 participants from Czech Republic, Slovakia, Hungary and Poland from multiplier organizations, universities and partner municipalities. The resource person from project side was Christiane von Knorre from architecture bureau Auraplan, Germany.

In the 2<sup>nd</sup> international test training following 7 modules were addressed:

- Legislation
- Settlement planning
- Building physics
- Energy carriers and renewable energy sources
- Systems engineering
  - Ventilation
  - Cooling
- Quality control
- Construction of elements

### **3<sup>rd</sup> international test training**

3<sup>rd</sup> international test training was organized on December 6-8, 2010 in Sigulda, Latvia by Baltic Environmental Forum Latvia with support of Baltic Environmental Forum Estonia. There were 30 participants from Estonia, Latvia, Lithuania and Russia from multiplier organizations, universities, municipalities and companies. The resource person from project side was Dirk Schröder-Brandt from e.u.z., Germany.

In the 3<sup>rd</sup> international test training following 4 modules were addressed:

- Energy carriers and renewable energy sources
  - Biomass and bioenergy
  - Photovoltaic power generation in the buildings
- Systems engineering
  - Heating and domestic hot water
  - Cooling and ventilation
- Building physics
  - Insulation of buildings
  - How to ensure appropriate indoor comfort level
- Ecological materials

### **Feedback**

The main aim of the international test trainings was to test the usability of the training manual and in order to do that future trainers were asked to prepare and present their selected modules of INTENSE training program. During each international test training feedback and suggestions were collected on one hand from the presenters (future trainers) about preparation of the presentation and on the other hand from listeners about understandability of the presentations.

### **Legislation**

#### Presenters

The presenters of Legislation module assessed the provided material to be very useful. It was pointed out that the electronic manual covers in a very comprehensive and structured way the content and logic of the European Union policy and regulations in the area of energy efficiency and renewable energy sources. European Union strategies and directives are well described, as the main elements affecting the possible actions at local level are underlined. All suggestions for presenting the topic were assessed as reasonable and practical. While preparing the presentation a lot of material was used from the manual, all suggestions were taken into account, as well as some slides and pictures. Nothing essential was missing from the training material, however it was suggested that for such an unexciting topic some case study would be nice too, like model building. Additionally it was said that in order to attract attention, it would be wise to start with some historical facts and drivers for development of the European Union policy and hence – regulation in the area.

#### Listeners

In general legislation presentations got a very positive feedback both from content and presenting point of view. The presentations were organized and clear, well structured and well presented. Nevertheless the listeners gave some useful suggestions for improvements. It was pointed out that for municipality the local rules are always much more important than the European Union directives - they do not concentrate on European Union directives because they do not influence them. It was also stressed that there should be maybe more good or bad examples with the emphasis on the importance of legislation implementation. Additionally more emphasis should be on practical aspects of national legislation.

Taking into account one of the comments stating that it was not so clear why we deal so much with EPBD (Energy Performance of Buildings Directive) recast, it should be kept in mind to more clearly explain during the national events the background and aim of the INTENSE training program and how EPBD recast is influencing municipalities.

## **Quality control**

### Presenters

Quality control was presented in two international test trainings, in one case by professional (university) and in the other case non-professional (multiplier organization) presenter. That gave two different viewpoints for the training manual usability.

In case of having professional background in construction field the training materials were assessed to be very useful and usable. It was commented that the manual is very useful for guidelines of presentation and important things that can then be filled in with national information.

On the other hand in case of having non-professional background it was pointed out that as a not professional it is needed to study more than is included in the modules. Just reading the module is not enough to be able to prepare the national version of the presentation on quality control. It was emphasized that there is a need to more define and extend some slides.

### Listeners

Presentations on quality control were considered to be interesting and useful. It was commented that quality control is a very important part of energy efficiency. However, it is not an easy issue to persuade officials on the usefulness of quality control but showing "bad" examples could be a good idea with showing numbers in money - although these numbers and cases should be checked very well.

For quality control the main suggestion was to add more practical examples both good and bad, preferably local examples and with photos. There are two levels of quality control – quality control of design phase and quality control of finished building and for the second one thermography could be also used as one tool of quality control.

Additionally suggestion of a good contract could be added – this would be especially useful for a municipality.

## **Settlement planning**

### Presenters

Similarly to Legislation module the presenters of Settlement planning and design principles assessed the provided training material to be very useful as background information. It was pointed out that there was much useful information in the background materials but it did not cover the whole problematic. Presenters also missed complete provided electronic training materials on this topic but they were very useful additions as basic "key slides" to develop more complex and detailed presentation.

The initial Settlement planning and design principles module was built up on the group work exercise. The exercise was practiced during the 2<sup>nd</sup> Train the Trainers event but the international test trainings have proved that the module needs a bit of rethinking and refocusing as the exercise might not be feasible during the national trainings.

### Listeners

The presentations were interesting and well structured with lots of information. This is the topic that is very important for urban planners but it should be also presented to politicians and private investors in municipally. However, at some point the presentations were too basic and should in national trainings be more detailed with settlement planning problematic on examples. It was also suggested that the final presentations should be formed according to profiles of participants on national trainings.

In general the module Settlement planning and design principles is very useful and this could be used for municipal trainings very well as it gives basic useful knowledge on several important issues.

## **Energy carriers and renewable energy sources**

### Presenters

The module Energy carriers and renewable energy sources was tackled in each international test training. In presenting 2 different approaches were used:

- Addressing the whole topic
- Concentrating on one specific issue

Arising from the different approaches also feedback differed for the preparation. The INTENSE module has a more general approach so in case of concentrating on one specific issue the material was rather limited and due to that fact training material was not so usable for preparing the presentation.

Presenters of whole topic assessed the training material to be very useful. However, the presenter with professional background (university) concentrated more on his own existing materials while making the presentation as he was familiar with the field and had his own principles. On the other hand the presenter with non-professional background (multiplier organization) commented that it was very useful blueprint, especially that the topic was outside of his educational background so learning a template was very helpful. He pointed out that he added several links but kept the original structure.

It was brought out that examples of good practical and some techniques / sources were missing as well as overall measuring of sustainability like ecological footprints or LCA (life cycle analysis) or material flow analysis. Additionally it was pointed out that the handbook material lacked some information about local situation but this is understandable as national information will be added by national organizations while preparing for the national trainings.

### Listeners

#### *Presentations addressing the whole topic*

On the whole the presentations were considered to be helpful, interesting and containing a lot of information. It was commented that this topic is very useful also for municipal officials, maybe even for politicians; it should make them think and hopefully act.

From improvement point of view the presentations were considered a bit too general and extensive but on the other hand some technologies and principles were missing. There could be also more practical examples that could be used in each country, for example possibilities of the use of renewable energy sources in each country. Practical examples should be also thought more through in the sense of being relevant from municipalities.

#### *Presentations concentrating on one specific issue*

The participants of 3<sup>rd</sup> international test training had a possibility to get a deeper insight to biomass/bioenergy and photovoltaic power generation.

The presentations on specific issues were assessed to be very specific and with a lot of information but still being very useful and interesting. However, the listeners commented that the presentations were too long for presenting this single topic and it was not understandable to whom this content was directed to. There should be more focus on municipal level – both on depth of the information provided to them and also relevance of the material, pros and cons for municipality - what are the real benefits versus costs.

It was also suggested that maybe legislative background should be more opened and more positive and negative examples presented. From the presentation point of view too many figures and too much text was used, instead of that more pictures and examples could be interesting for the audience.

### **Ecological materials**

The module Ecological materials was added to the INTENSE training program at a late stage and due to that fact it was not tackled during the train the trainers events. However, the 3<sup>rd</sup> international test training had a possibility to concentrate more on the topic Ecological materials and there Dr. Dipl. Ing Hans Löfflad from Ingenieurbüro für Baubiologie, Germany first presented the module.

#### Listeners

The listeners considered the presentation on ecological materials to be very exhaustive with perfect visual materials and technical information. There was a lot of information but it was presented in an easily understandable way. The listeners also appreciated that Dr. Löfflad presented examples of the materials so there were concrete materials what participants could touch. It was commented that presented were a wide range of insulation materials from out of which some were unknown and innovational materials and also methods for the audience.

As a suggestion for national trainings is was brought out that it would be relevant to find out who is offering what in the country of presented ecological materials.

It was also pointed out that there should be created connections to legislation. Useful would be bringing out or exchanging audience to think how to contribute into energy efficiency by using gained knowledge from presentation, so each presentation should keep in mind more than one aspect and create connections.

### **Building physics**

Building physics is a module that consists of 5 subtopics. Mainly 3 subtopics were selected by future trainers to be tested during the international test trainings. Even though sometimes borders between these subtopics are very thin it is in general possible to point out thermal bridges, mass transfer and inside insulation.

#### Presenters

In general the materials for module Building physics were appreciated highly by the future trainers. One of the presenters commented that the electronic training manual was very useful with ideas for software and with useful information for practical implementation. Part of the presentation was connected with their experience but more than 70% was connected with the handbook materials. It was also pointed out that it depends on education of the audience - the provided information is very useful for technical level – i.e. engineers.

Some of the presenters still used mainly their own materials as they have been teaching the topic for years but still having in mind the mode idea of the training manual.

The pictures and good examples were valued, however in some cases own pictures of real buildings were used. That is also highly supported by the elaborators of the training program, as one of the aims of the training program is to be country specific.

Additionally some suggestions were given for the improvement of the material – some aspects should be described in more detail- It was also pointed out that there is no clear and short definition of thermal bridge and airtightness which could be easily understandable for simple users.

## Listeners

### *Thermal bridges*

The topic concentrating on thermal bridges was considered by the listeners to be a very important and interesting but also very specific and technical topic. Due to being very technical it is very important to be aware of the knowledge level of the audience. It was several times stressed that municipal experts are not really dealing with these issues in such depth and our lecturers presented the topic much more higher level as local government people can use.

Another possible trap with such technical is that it is quite easy to present in classroom lecture way (equations, dry text, not much pictures). A really good way for avoiding that was suggested by one of the listeners – involving the audience, for example letting participants to calculate something themselves.

### *Mass transfer*

During one of the international test trainings another subtopic of Building physics module was tackled - heat and moisture transport. In general the building physics topic was assessed to be one of the most technical modules of the INTENSE training program and the same applied for mass transfer.

This topic was considered very important for architects and experts for heating, cooling and ventilation. However, in such technical topics it is important to all the time keep in mind who is in the audience. It is very easy to present a lot of equations but for practitioners (these are our municipal experts working with these issues every day) it is more relevant to get to know how they can apply this information in real life situations.

### *Inside insulation*

The subtopic of Inside insulation was presented in two international test trainings. Even though the presenters used slightly different approaches the audience appreciated the presentations – they both were assessed to be well-structured and understandable.

As already before under the Building physics topic the issue of the knowledge level of audience was brought up. But differently from thermal bridges and mass transfer subtopics that were maybe too technical, inside insulation was rather considered as being directed more to non-specialists. It was commented that inside insulation was clear lecture to non-specialists with practical examples and recommendations. From that perspective the listeners really liked the bad examples (what can go wrong) in case of inside insulation.

Even though the presentations were considered understandable some small things had possibility for improvement for national trainings. That included more attention to passive house targets/values, presenting more applications / solutions and pictures with more information / examples "what is what" in the examples. More should be also said about solving details from condensation point of view and how to solve thermal bridges problems in case of inside insulation. It was also several times pointed out that for this topic pictures are very important.

### *Indoor comfort level*

During one of the international test trainings indoor comfort level was addressed separately. Indoor comfort level is considered to be one of the most important issues of both public and private buildings. It is again very easy to get too technical with this topic and the knowledge level of the audience should be understood beforehand in order to make the topic understandable for the target group.

Some of the suggestions for improvement included giving more attention to practical issues (solutions), appreciated was the suggestion for ventilation in houses but too complicated calculations

and missing link to practical applications should be thought through. It was also suggested that there should be more promotion of opportunities how to ensure complete indoor climate.

## **Construction of elements**

### Presenters

The module Construction of elements was presented in two different international test trainings and two really different presenters used different approaches. It should be brought out that initially the module Construction of elements mostly concentrated on the practical exercise using Condetti method. The reality showed that even though this exercise was highly appreciated by the future trainers and assessed to be interesting and useful, it most probably will not be executable in national trainings due to being quite time consuming and needing special materials.

One of the presenters rated the provided material much higher than the other but the reason for that is that for one of the lecturers it was everyday topic and thus known very well. However, the guidelines for presentation were appreciated but comments for some of the pictures were lacking from the training manual.

For improvements additionally clean "target" should be set and duplicity with airtightness and thermal bridges should be thought through.

### Listeners

The presentations about Construction of elements were considered to be very interesting, overall very detailed and complex. However, once again was raised the issue of target group - the technical topics may be too complex if we consider municipality representatives as the target audience, especially where pictures were not inserted. It was stressed that only a professional can handle this topic. As some of the participants had been present at the Train the Trainers events then the exercise would have been considered to be the best way to tackle this topic.

Some of the suggestions for national trainings were also given by the listeners. Firstly it was pointed out that in general nothing was told about materials – under this topic also some of the participants would have liked to have received information about insulation, natural materials versus concrete, oil-based materials. Secondly it was mentioned that this module needs to be clearly distinguished from the Building physics module. And as a final remark it was brought up that this module – Construction of elements - is necessary to be an integrated one for all modules' presentations. The final comment

## **Systems engineering**

### Presenters

Systems engineering was the module that was addressed in all of the three international test trainings. Once again different presenters tackled the topic in a different way and in different amount the training materials provided by the INTENSE team were used. However, in general the materials were assessed by the presenters to be useful and usable and all the presenters at least partly (some more, some less) used the provided materials.

It might happen that if some people have been working with this topic for years then there might be some differences in opinions towards the approach to the topic but all the presenters accepted the concept provided by the training manual and added their own materials according to that (i.e. national examples, legislation requirements).

It was still brought out that the approach should be a little bit closer to target group, i.e. to people outside Germany. While one of the presenters used a lot of material not included in the Handbook as he missed all pictures, examples not included in the Handbook. But it was stressed that in general

for supportive information it was good and he got imagination what should be presented, i.e. what is the aim.

### Listeners

The module Systems engineering was presented in different ways – one of the presenters tackled all the subtopic during the presentation but others concentrated on one subtopic – either heating and domestic hot water, ventilation or cooling.

#### *Systems engineering on whole*

The presentation was considered to be very useful and understandable. It was appreciated that the presentation was short and thus concentrated on only important things but still giving detailed and interesting information. However, it was suggested that more stress should be on low-energy concepts / technologies.

#### *Heating and domestic hot water*

The presentation about Heating and domestic hot water was assessed by the listeners to have been in general with understandable theory and good examples. Some of the participants still pointed out that it might have been a bit too general and that for specialists more interesting is to listen about some new and innovative things in this field and get to know more practical solutions and economical demand. Additionally a link to "near zero energy building" could have been tackled.

It is also important to create connections to legislation, bring out or exchange audience to think how to contribute into energy efficiency by using gained knowledge from presentation, so each presentation should keep in mind more than one aspect and create connections to other topics if possible.

#### *Ventilation and cooling*

Ventilation and cooling were more specifically addressed in two international test trainings. Even though the presentations were considered to be interesting and good it was pointed out that in one case the approach was too technical and in the other case too general.

#### *Technical approach*

The presentations were useful and beneficial, it was pointed out that the speaker covered the whole problematic of the topics, the presentations were well structured with examples, pointing to practical problems, advantages and disadvantages of the different solutions, presenting practical examples. The approach might have been too technical but on the other hand it was practical as it showed different possibilities and pointed to problems - it makes municipal officials think and that is important. Once again the target group should be thought through while preparing for national trainings – for non-professional there was too much detailed information and some of the technologies could have been more extensively explained. Additionally the presentations a bit missed the specifics of energy efficiency.

#### *General approach*

The presentation was in general found to be good and informative but again the target group issue came up as for specialists the provided information was mostly general but for non-specialists was given a good overview on topic. However, it was considered to be a bit problematic that there was only theory without real examples and recommendations which are most relevant for practitioners. With such practical topics practical examples/solutions should be presented and it was suggested that it would be better to talk about house and its different parts (heat, insulation) in economically aspect as economical issues are one of the top priorities for the municipalities. Additionally the passive house aspects should not be forgotten.

### **Discussion results**

During the last international test training additionally to written feedback the participants were asked to give general suggestions for the future national trainings:

- Main overview of topic should be given
- environmental aspect should be tackled
- not too many details, room should be left for discussion
- orientation to target group (engaging them) not so much on content
- clarify purpose, learning goals
- adapt needs of municipalities (non-technicians)
- specify the target groups (municipal general people versus real municipal technical experts)
- think of interactive approach
- aspects of low-energy/passive house ----- keeping in mind the new EPBD recast
- show importance of design
- use of software (i.e. PHPP which is holistic)
- procurement issues - especially important for municipalities
- municipality as one player in the market (if there are no good specialists then they do not know what to ask for)
- work with EU funds
- develop guidelines for old "same type" high rise buildings (what should be taken into account etc.)
- how to choose /talk to subcontractor (non-technical municipality specialist does not need so detailed info rather more general)
- combining together technical knowledge & decision making level & financing (money)
- to keep in mind that specialists (architects, engineers) are existing in municipalities (at least in bigger ones)
- practical applications - help for municipalities for making decision
- to carry out a preparatory meeting before the national trainings for discussing approach, modules, target group (multiplier organization/university/municipality)
- context of municipality
- cooperation on national level
- keep in mind the goal of the training all the time
- performance list
- content - theory & practical at the end
- 3 levels – architect, engineer, craftsmen – might not be the best approach – rather design and implementation level
- best practice should be each time presented if possible

### **Summary of the international test trainings**

In frame of the INTENSE project a training program was elaborated. One of the steps in finalizing the training program was carrying out international test trainings where future trainers tested the training manual by preparing presentations on INTENSE modules and giving feedback.

3 international test trainings were carried out in 3 locations – Romania for southern INTENSE countries, Czech Republic for central INTENSE countries and Latvia for northern INTENSE countries. Most of the modules were tackled during these events and a lot of feedback was gathered both from presenters and listeners.

There are 3 main conclusions that can be drawn from the discussions held during these test trainings:

1. On one hand municipalities are our main target group and they want to know best practice and how to avoid mistakes. On the other hand our donor – Intelligent Energy Europe – aims at innovation. So in order to satisfy these both needs – best practice and innovation - we will

try to **focus the training program to low energy/passive house standard** => how to come and to go further (if possible then also introducing near zero houses), mainly in case of large houses (not so much individual).

2. During the international test training discussions it came clear that instead of 3 target groups - architects, engineers and craftsmen – it would be more reasonable and applicable to work with 2 levels:
  - Design level
  - Implementation level

In that case former 3 target groups can be defined and divided according to the concrete country situation.

3. When preparing for the national trainings it is most important to be aware of the target group and their knowledge level in order to be able to provide the best quality information to them.

The report incorporates 2 annexes:

- Annex 1. Agenda of 1<sup>st</sup> international test training
- Annex 2. Agenda of 2<sup>nd</sup> international test training
- Annex 3. Agenda of 3<sup>rd</sup> international test training