Development and implementation of advanced education for "Certified European Passive House Designer"

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Abstract

The project "CEPH - Certified European Passive House Designer" aims at spreading the knowledge for building high quality Passive Houses. In many Passive House projects it has been shown that energy efficiency can be successfully implemented even in economic terms. A growing number of environmentally aware cities and communities are now acting responsibly by taking advantages of opportunities to require the Passive House Standard for new buildings and the modernization with Passive House components for old buildings. But there is still a lack of trained architects and engineers for the planning and implementation of the Passive House Standard and a lack of trainers for offering this education. In order to provide highly skilled architects, engineers and trainers the European Commission launched the project Certified Passive House Designer "CEPH" in September 2008.

The main objectives of the project are the development of teaching material and the implementation in a 10 days course for Passive House Designers as preparation for the exam given by the Passive House Institute Darmstadt (PHI) and the two-day course for the new trainers.

1 Passive Houses – building affordably for the future today, playing an active role in climate protection

Passive Houses represent an implementation of nearly zero-energy buildings and therefore the education of designers and the certification scheme as "Certified Passive House Designer" developed by PHI will give a strong contribution to fulfill the requirements of the Article 9 of the recast of the EPBD [1], which states that by 31th of December 2020 all new buildings required to be nearly zero-energy buildings. Indeed, the Passive House concept is defined by physical laws and economic feasibility as required by the EPBD recast. All knowledge for building Passive Houses as taught in CEPH courses and assured in implementation of a real Passive House is inevitably relevant for the future national implementation of nearly zero energy-building as well.

A number of European and international projects in compliance with the Passive House standard demonstrate that the concept works well and prove its affordability. Passive Houses are increasingly being built not only as residential buildings, but also as non-residential ones.

A growing number of private and public builders demand the Passive House standard. Some municipalities have even made the Passive House standard a requirement for all of its new buildings

and also use Passive House components in renovations e.g. Frankfurt since 2007 [2], Leipzig since 2008 [3], Nürnberg since 2009 [4]. The result is enormous growth potential for the building sector.

But why do things not look so bright in practice?

New challenges arise, though the main obstacles on the path towards a quick, inexpensive, high-quality implementation of the Passive House standard are:

- Poor information about the Passive House standard
- If a decision to comply with the Passive House standard is made in a very late planning phase, new plans often lead to unnecessary price hikes, which are then attributed to the standard.
- In practice, feasibility comparisons are often based on calculations unsuitable for investments in energy efficiency. The results then lead to the wrong investment decisions.
- A lack of familiarity with the standard among the planners and builders involved.

Conclusion: As long as architects, engineers, and other stakeholder in construction do not know exactly how the Passive House standard can be complied with affordably, they will try to convince their own customers who want Passive Houses to change their minds.

2 Development of a certification process for Passive House Designers

The requirements in local and European construction policies mentioned above are putting more pressure on architects, planners, and construction firms to offer high-quality services and products for Passive Houses.

But what do architects and engineers need to implement the Passive House concept affordably and with high quality?

2.1 German course to certify Passive House Designer launched in May 2007

In May 2007, eza! launched the first course for certification as a Passive House Designer developed in cooperation with the Passive House Institute. The course has been running ever since, and demand is great. In 2008, Passivhaus Dienstleistung GmbH (PHD) launched its own course. While eza! offered an 85-hour course with a final exam from the Passive House Institute either as a full-time seminar or in blocks for those currently employed, PHD came up with a modular course system. Each module can be booked on its own flexibly and irrespective of the other modules.

Other organizations, including such renowned further education providers as Hanover's Target or the Energy Institute of Vorarlberg, have included the course in their program since 2008, and additional educational institutes offer similar courses to prepare for the exam given by PHI.

Participants were especially pleased with the practicality of the courses.

2.2 Implementation of the concept in Europe within the EU-funded project "CEPH - Certified European Passive House Designer"

In a very short time, a lot of highly skilled architects and engineers will be needed if the Passive House resolutions passed by a number of communities and the implementation of nearly zero-energy buildings are to be enforced with high quality in Europe.

Building owners and investors need to know that their architects and engineers have the expertise needed for planning, construction, and operation. Before CEPH, there was no standardized, high-quality textbook for Passive House training classes. Everyone who offered such courses came up with individual materials, creating and updating these materials was very time-consuming. Demand for a high-quality set of training materials and experienced, skilled teachers was growing in Germany, Austria, Europe and around the globe.

Already, there is a supply shortfall. The lack of both planners and instructors hampers the quick, successful implementation of the Passive House Standard. A wide range of practical experience teaches us that the requirements for planning and implementation must be high if this concept is to be successfully realized.

3 Project description "CEPH" [5]

Funded by the EU as part of Intelligent Energy Europe IEE, the CEPH (Certified European Passive House) Designer project was launched in September 2008 and will run until February 2011.

3.1 Project goals

The CEPH teaching materials compile a unified standard for the basic skills needed in planning and construction of passive houses, based on cooperation between leading providers of advanced training. To promote this education concept, which has already proven very successful in Germany, a standardized, updated, high-quality set of slides is being created based on European standards for a European audience. All material is then translated to the languages of most of the partner countries. The partners will work on local specificities, too

Recently developed training sessions for teachers will greatly enlarge the pool of competent instructors for such courses. These newly trained instructors will spread expertise across language barriers. Already, other course providers have expressed their interest in these advanced education materials and courses. In this way, synergetic effects will be produced to speed up the successful implementation of the Passive House standard.

3.2 Project partners

The project team has twelve members from a total of nine EU member states. Most of the participants have a lot of experience with both Passive Houses and advanced education courses. In addition, the partners have been involved in various other projects sponsored by the EU. Synergetic effects can thus be utilized very effectively.

Further development of course content, documents, and training methods; teaching and evaluation of pilot courses, development and offering of trainer education seminars:

- eza! energie- und umweltzentrum allgäu, Germany
- Passivhaus Dienstleistung GmbH, Germany
- Energieinstitut Vorarlberg, Austria

Testing and certification body, list of certified designers, English translation, quality assurance:

- Passive House Institute, Dr. Wolfgang Feist, D-Darmstadt:

Translation of course material, teaching of courses for planners locally with previously qualified trainers:

- La Maison Passive, France
- TBZ GmbH South Tyrol (Bolzano-Bozen), Italy
- ECN – Energieonderzoek Centrum Nederland, Netherlands
- Passivhus.dk ApS, Denmark
- Aarhus School of Architecture, Denmark
- Centrum pasivniho domu, Czech Republic
- IEPD – Institut pre energeticky pasivne domy, Slovakia
- University of Strathclyde, UK

Project coordination:

- WIP – Renewable Energies, Germany

3.3 Project content

The core group worked out the material for a ten-day course. The set of slides is based on the catalogue of learning targets developed by the Passive House Institute for certified Passive House designers (for further information, see www.passivhausplaner.eu). Other partners are handling translations of these course documents into seven European languages.

During the project, a total of 19 planner courses, each with some 20 participants, are being conducted. At the end of the courses, participants take the Passive House Institute's exam for certification as a "Certified Passive House Designer". New trainers take part in the courses, too and in a special course for trainers developed within this project. In this two-day workshop, didactic skills are taught, too.

To establish the concept on the market for advanced education courses, a business plan is being drawn up to help other providers to implement the concept. In addition to other instruments, this approach promotes the long-term effectiveness of the project.

Various communication and marketing work (including public relations, a website, flyers, brochures, a database, presentations, and presence at tradeshows) are developed and employed for the further dissemination of the concept.

4 Review and current status – what has already been accomplished?

Until June 2010, most of the project's main focal points have been completed: the compilation of materials for a 10-day course, the translation to most of the languages and the teaching of these courses in most of the partner countries is running. The education for new trainers is running, too.

4.1 Compiling training material, course concepts, translations, and pilot courses [6]

First, the training materials were compiled based on a catalogue of learning targets. The individual chapters in the training materials cover all of the fields that are important for designing and building Passive Houses: the basics and principles of the Passive House concept; building envelope design; air-tight interstices without thermal bridges; building service concepts for generation and distribution of ventilation, hot water, and heat; economic feasibility; practical implementation of planning; quality assurance, and energy balancing with the Passive House Planning Package (PHPP).

Within this project, two different course concepts have been evaluated. Every course provider has the possibility to choose between the open and the closed course concept:

Open course concept

The modular open concept consists of 10 course days, with a particular topic handled on each day. Participants can therefore book individual days or take part in the entire 10-day course over a longer time frame depending on their professional flexibility and current knowledge. As a result, the particular group of participants can be a bit different each day of the course. This flexibility is quite popular among the participants, who make great use of these options; in return, the organization is more time consuming.

Practical handling of the Passive House Planning Package (PHPP), the primary design tool used to create energy balances for Passive Houses, is taught in a two-day workshop. In other parts of the course, the various course topics are discussed in relation to the PHPP.

Closed course concept

In the closed-concept, the participants are the same the whole time. Experience has shown that the participants get in contact with each other more intensively.

There is also less organization required in this concept. Individual content sections can be shifted around within the course, such as if a speaker gets sick.

On almost every day of this course, small exercises are conducted to show how to work with the PHPP. The participants therefore need a laptop every day and enough space to work. At the end of the course, there is a one-day workshop, in which the main tables in the PHPP are dealt with in detail.

Conclusion: Both concepts have been successfully tested in pilot courses. The party offering the further training sessions can therefore decide which concept to offer based on local demand, staff and classroom situations.

4.2 Pilot courses, quality assurance and English translation

In three pilot courses from the beginning of May to July 2009 in Dornbirn, Kempten, and Darmstadt, the materials were used for the first time. All of the courses were completely full booked and the participants were satisfied despite some initial difficulties.

After these pilot courses, documents were revised. Then, the documents went through external quality assurance and were translated into English. The Passive House Institute handled both of these tasks. In November 2009, the new training materials were used in the first three pilot courses in English held in Scotland, Denmark, and Austria with international participants.

Feedback from participants and teachers in the pilot courses helped to make the training concept far better known internationally.

4.3 National material and courses for Passive House Designers

Once the training materials were available in English and German, the other partners could begin further translations and adaptations to local specificities. Slide layouts for national specialities are already provided in CEPH-materials to show how the Passive House can be realized in different regions. They might also be used to link the basic knowledge of the CEPH-course with national definition of nearly zero energy buildings.

At the beginning of 2010, the first courses were offered in other languages. By the end of the project in February 2011, at least one course with an exam is to be offered in each partner country in the local language.

The dates for the courses are published at www.passivehousedesigner.eu, including links to the respective course organizers.

4.4 PHTC – Passive House Trainer Courses

The first course for trainers took place in Dornbirn in January 2010. This course is intended especially for new trainers. Already experienced Passive House lecturers are able to learn new skills for their future work, too. Energieinstitut Vorarlberg developed the concept for the two-day workshop. In addition to an overview of the content and documentation of training materials, various ways of sharing knowledge and teaching methods are shown and used in practical exercises. Energieinstitut Vorarlberg and Passivhaus Dienstleistung GmbH also offer the courses in German and English for speakers outside of the EU project CEPH.

4.5 Project homepage

The project's homepage www.passivehousedesigner.eu is a central platform for communication and information about the project.

In addition to a detailed description of the project the website presents information about the Passive House concept in general, the certification of designers, all activities and project results. The website links to the learning targets, examination regulations, the database of all Certified Passive House Designers and other important websites dealing with the Passive House concept.

The project partners are presented with a brief description and with a link to their respective homepage. The partners are able to advertise the courses given in their country: Those interested in taking a course can find all of the latest information. Potential course providers can also take advantage of the information on the course concept provided on the website.

Outlook

Interest in courses for designers was great after the project was presented at different conferences and fairs. Even though the project is not finished yet great interest has been shown from third parties to use the course materials. The material is available in English and German language. Rights of use can be granted to qualified course providers. The Passive House Institute is in charge of passing-on the course materials as well as their further improvement.

The soon-to-be-published brochure "Certified Passive House Designer" will include a wealth of information about the availability of training materials, the possible structure of courses and their content, and the organization of designer and trainer courses. The brochure will give those interested in offering Passive House Designer Courses a lot of advice.

It is already clear that both public and private customers are familiar with the Certified Passive House Designer label and explicitly ask for it as a proof of competence. Nearly 220 participants of the CEPH courses passed the exam already.

Until June 2010, some courses with CEPH material have already even been offered by parties who are not part of the project consortium and there is a growing interest from other institutions all over the world to use the CEPH material in courses, to translate and adapt it to national needs.

This project successfully set the cornerstone for unified Passive House international training. The knowledge for building Passive Houses is inevitably relevant for future national implementations of nearly zero energy buildings as well.

References

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[6] Bähr (2010) in conference proceedings of the 14th international Passive House Conference in Dresden 2010, Passive House Institute Darmstadt