

An Interactive Vocational Training Tool for the Energy Performance Buildings Directive

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ABSTRACT

The building sector constitutes approximately the 40% of the total energy consumption in EU. The Directive 2002/91/EC provides a precise legislative framework for improving the energy performance of the built environment. [1]

It was adopted on December 2002 and entered into force in January 2003. According to the article 15 of this Directive all member states have a time period of three years (till January 2006) to implement the Directive in their own countries. Till today all member states have already or will, in the near future, bring into force relative laws, regulations and administrative provisions necessary to comply with this Directive.

In this paper an innovative tool concerning the training of European citizens in the implementation of the Directive 2002/91/EC (Energy Performance of Buildings Directive - EPBD), that targets to reduce the buildings' energy consumption and its efficient use in relation with the protection of the environment is presented. Additionally, certain features of this tool that depend on the existing legislation and restrictions in each country and certain characteristics of the trainees (e.g. profession, scientific background) that influence in a great or in a small extent the training procedure in each case are analyzed.

KEYWORDS

Energy Efficiency in Buildings, Interactive Vocational Training, Energy Performance Buildings Directive

DEVELOPMENT OF THE TRAINING TOOL

Surveys carried out in previous projects revealed that significant amount of energy has been wasted in buildings due to poor design, commissioning, maintenance and operation. Besides the economic barriers, this situation is more likely to carry on

since building designers; managers and operators do not have sufficient technical competence.

Based on the above the proposed Electronic Energy Buildings Directive (EEBD) vocational training tool has been created to:

- Assist the implementation of the EPBD in whole Europe.
- Have both a global and a regional approach in all the articles of the Directive for every interested European citizen.
- Develop a dynamic vocational training tool in order to assist engineers to comply with the Directive 2002/91/EC.

Additionally, the necessity to form this vocational training tool was forced by the following:

- The needs of combined forces of different target groups: Building designers and architects, Civil Engineers, Mechanical Engineers, Electrical and Electronic Engineers, Building Experts, Building Services Engineers, Building Managers and Planners;
- The various countries and target groups have different priorities based to regional/local characteristics;
- The availability of much related information, tools and calculations in the existing bibliography that could assist anyone, interested to implement the Directive.

The design of the general structure of the tool was started based on the existing information concerning the Directive, its implementation in each European country and the results of a questionnaire that was distributed to an adequate sample of different groups of interested parts in as many European Countries as possible. The results of this questionnaire indicated that there exists an extreme interest of all interested parts to learn more about the Directive (see Figure 1) and especially for the following subjects: (i) Calculation methods and software; (ii) Certification procedure; (iii) Training and general information. **[2], [3]**

Also, the analysis of the results showed that:

- In all professional categories and countries, general information, concerning the Directive 2002/91/EC, appeared to be needed.
- The training tool should answer to this demand with information concerning the modality of Directive's set up and specificities of the different countries.
- There was registered a lot of interest for more information concerning regional differences in regulations and energy performance in existing buildings.
- The tool needed to cover all European regions for general Directive's information and to respond from general information's demand to specific demand by area of expertise and by country.
- There was a lot of specific information demanded, depending on the potential end users' profile.

These results initiated a valuable feedback habit for training content and the regular update of end user needs in order to keep the future dynamic training tool up to date. Also, certain properties for the final result were determined as: the levels of the final tool, the target areas of the information to be included in the final modules, the specific information for each region and the integration of the collected material in html format for linkage to the dynamic part of the tool. **[4]**

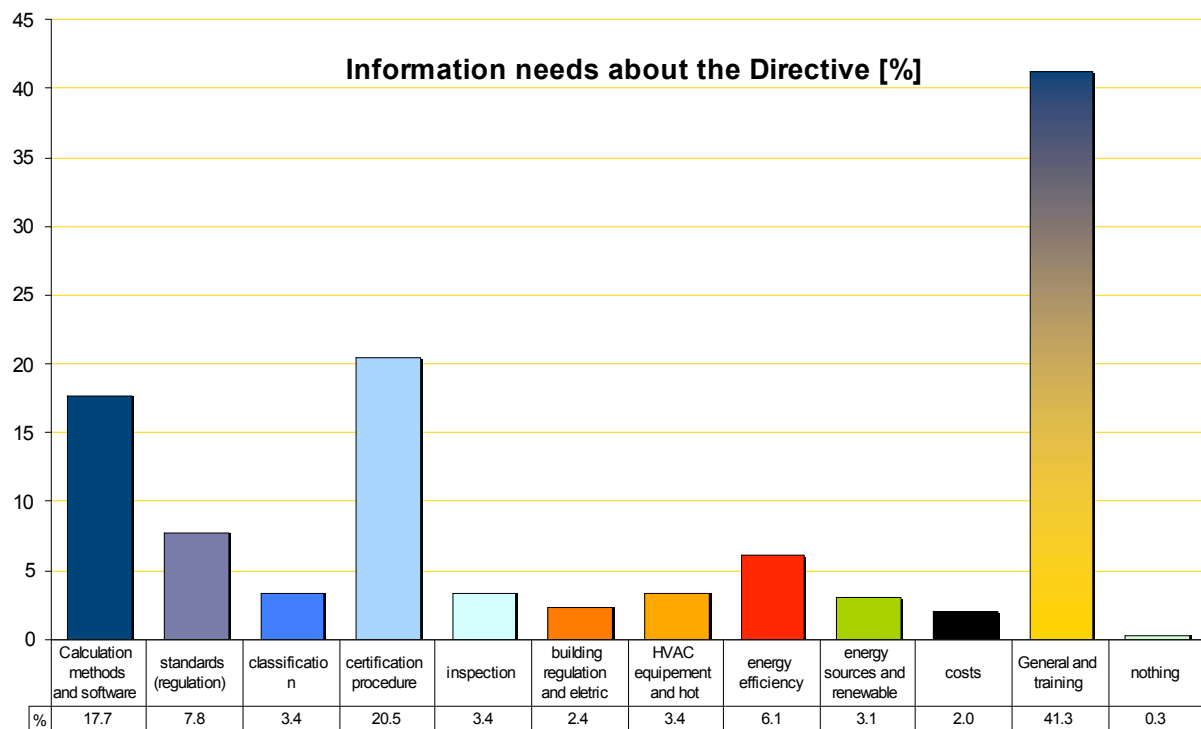


Figure 1: Training needs for the EPBD

SYLLABUS AND TRAINING METHODOLOGY

Main characteristic of the syllabus of the tool is its global and regional approach. In the following figure is presented the graphical general diagram of the tool. [5]

According to this diagram the material is offered on three levels: (i) Global information for all member states; (ii) General information for each member state; (iii) Specific information on each article for each member state that in this phase will be covered only for the countries participating in the Consortium.

Concerning its structure it has been based on the articles of the EPBD. The training material presented is representative of each article. Also, main intention of the training material was to support take-up of the directive and to cover certain issues namely:

- Introduction to the topics in a general informative manner.
- Provide specific details to assist and permit application through heightened awareness.

In the first two levels of the general background and supportive information are presented certain issues concerning: policies, energy consumption in buildings, standards, databases, publications, CEN standards, national contact points and info. In the local approach for each member-state (second level) there are also found answers to certain subjects as:

- National changes in building codes and construction practice
- What are the accepted methods to calculate the energy consumption?

- What is the role of CEN standards in relation the national building codes?
- In what way the energy consumption is been calculated and how the certificates are been given?
- How the parameters of indoor climate are expressed in the certificate?
- From where can someone find information on the possible measures for energy improvement applicable to certain conditions / building?
- How the inspections are been performed – which are the certain guidelines?
- Who does the inspections?
- Where can someone find a reliable certified inspector?
- How can someone become a certified inspector?
- What happens to other Member States?

In the third level of the tool are presented more specific information for each article of the Directive and its implementation in each country. Indicatively the information that is included for Article 3 is presented in Figure 2.

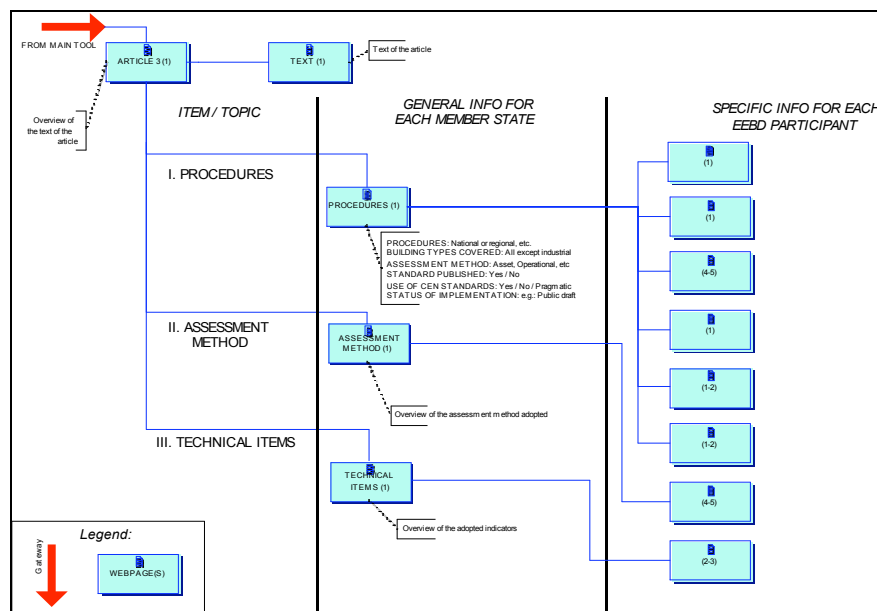


Figure 2: Definitions and paths inside the tool for Article 3 of the Directive

For each article there initially exists general info for each member state and in the next level more specific info for each EEED participant.

Finally, concerning the European countries that do not participate in the project, they were divided in four regions. For each of these regions were collected necessary data concerning the implementation of the directive and are included in the tool to the extend this was possible to be achieved (In many cases this information is not permitted to be widely known because the local authorities have not finalized till today in what way the Directive will implemented. Furthermore, there exist cases where the gathered data is not official but came from general assumptions or the most possible scenarios concerning the way that the Directive will be implemented). However, the countries that do not participate in the project will have the opportunity in the future, in case they are interested, to access the tool and write down more specific info concerning their own countries.

FORMATION AND IMPLEMENTATION OF THE TOOL - DYNAMIC PART

The overall tool has been developed using Lotus Learning Management System (LMS). The training material has been organized in a user-friendly “villages” approach. A village is an interactive platform, a web site, for all people involved in an ad-hoc thematic area. The site provides up-to-date information, forums for dialogue and collaborative working, library and databases, search engines, other on-line applications’ tools, as well as a help-desk for other countries to include data of their own countries.

Registration of the trainees and information is required (name, profession and origin). The visitors can navigate some pages (i.e. global) without registration. The trainee knows his/her exact position by the colour around the text (article) and by a flag on the top right position of the web page. Also, each trainee has the option to select another country to see information for the relative article if he wants to.

Each page is rated with a single question and/or “add comments”. In the login page, there is a “Suggested Reading” pane. This pane includes the top rated content pages according to the following sections: (i) The “Overall Top Rated” section and (ii) The “Profession’s Area Top Rated” one.

The final tool has a tree structure with certain ways to navigate in it. The dynamic aspect that has already begun to be developed and designed will contain only the data from the static form, namely only the boxes without the links between them or there will exist only small groups of linked boxes referring to the different groups of interest (case studies for each group). [6]

The innovative part of the described vocational training tool is its approach to the potential trainees. The dynamic part, which at this time is in its evolution stage, involves the administration and self-adaptation of the e-learning vocational tool to the users’ comments and requirements. The objective of the dynamic part is to automatically adapt the structure of the modules offered to specific group of users, i.e. mechanical engineers, civil engineers, etc.

In the following figure (Figure 3) is presented a general view of the tool template that has already been designed for the tool.

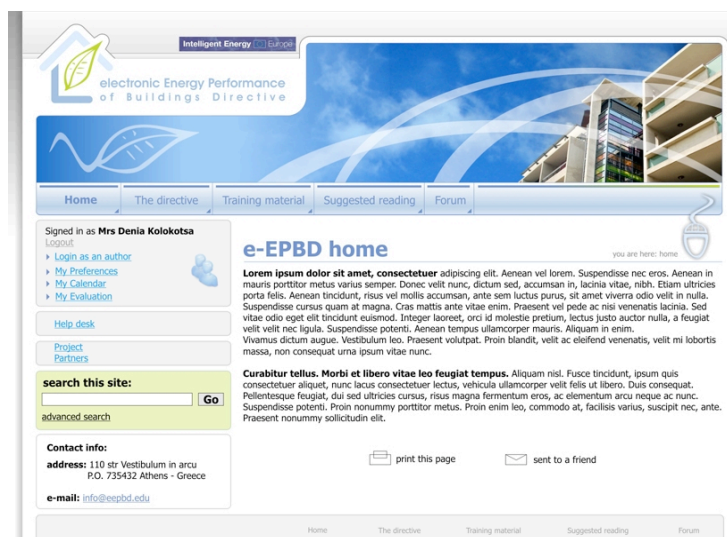


Figure 3: EEED tool template

FUTURE ACTIONS

The whole project will be completed by August 2007. At this time the main tasks being performed are the final formulation of the dynamic and the static part of the tool. Also, it has been started the evaluation of the tool and of the training material it offers. The evaluation will be assisted by the virtual classrooms that are scheduled to be realized in the near future. The aim of the evaluation at this stage is to suggest improvements during the experimental application of the tool in selected trainees and experts and offer as much as possible necessary information for the successive completion of the tool.

All the work presented in this paper has been performed in the framework of an EU program in the Intelligent Energy – Europe 2003-2006. The title of the project is “Development of an interactive vocational Web training tool for the take-off of the buildings DIRECTIVE 2002/91/EC – EEBD”. Duration 32 months (1/1/05 – 31/8/07).

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