ENEA E-LEARN PLATFORM FOR DEVELOPMENT AND SUSTAINABILITY WITH INTERNATIONAL RENEWABLE ENERGIES NETWORK

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ABSTRACT

The UNESCO office in Venice (the Regional Bureau for Science and Culture in Europe) has promoted, in collaboration with the Italian Agency for New Technologies, Energy, and the Environment (ENEA), an e-learning project on renewable energy: the DESIRE-net project (Development and Sustainability with International Renewable Energies network). The project's aim is to share the best available knowledge on renewable energies among all the countries that have joined the project and exploit this knowledge at every level. Currently the project involves 30 Eastern European and Southern Mediterranean countries as well as Australia, Indonesia, and China.

Key words: E-learning, Renewable energies, Sustainable development, ICT, Courses

1 INTRODUCTION

The UNESCO Regional Bureau for Science and Culture in Europe in Venice has promoted, in collaboration with ENEA, the Italian Agency for New Technologies, Energy, and the Environment, an e-learning project on renewable energy: DESIRE-net project (Development and Sustainability with International Renewable Energies network). The project's aim is to share the best available knowledge on renewable energies among all the countries that have joined the project and exploit this knowledge at every level. Currently the project involves forty Eastern European and Southern Mediterranean countries as well as Australia, Indonesia, and China.

The Desire-net project is based on the ENEA experience in the fields of renewable energies and sustainable development as well as on the ENEA e-learning methodology and platform. ENEA is an Italian public undertaking operating in the fields of energy, the environment, and new technologies to support competitiveness and sustainable development. ENEA also develops research activities in the following fields:

- Renewable and clean energies,
- Higher energy efficiency,
- New fuels.

2 THE DESIRE-NET PROJECT

ENEA has started to develop an e-learning platform with courses in scientific subjects in order to overcome the difficulty of technology transfer. Our experience began with a pilot project of 250 workers in four Italian regions. In the last 6 years, more than 25,000 users have followed one or more of the 70 free on line courses. The first group of courses was related to quality, energy, and safety matters; now the courses offered cover more specific subjects such as photovoltaic energy, biotechnology, e-commerce for textile industries, and so on. The interface is very user friendly and has been developed in the ENEA Usability Laboratory.

Figure 1 shows the home page of ENEA's e-learning platform (http://odl.casaccia.enea.it).

Figure 1. Home page

The ENEA e-learning platform offers the following services:

- a guest book that allow guests to leave messages related to the services,
- the contact address,
- browser tests that enable the users to set up all the tools needed for a good view of the courses,
- statistical data about the users themselves, collected from the results of the customer satisfaction questionnaires,
- a glossary, divided into subjects, to explain the meaning of the different terms used in different fields,
- the ability to download a series of documents related to the course subjects or to e-learning and ICT (information and Communication Technology) in general,
- a user manual that explains how to use the training material and services,
- a customer satisfaction questionnaire for users when they reach the end of a course,
- auto-evaluation tests for the courses,
- WEB DB, a data-base based on the web, which provides the opportunity to have a short description related to a particular subject: a church, a plant, etc.,
- a FAQ (Frequently Asked Questions) section to answer commonly asked questions.

We have compiled statistics about our user profiles through the customer satisfaction questionnaires. Many agreements with schools, universities, and private and public training organizations are under way to improve the dissemination of the scientific knowledge and to build up an open data base of scientific learning objects that anyone can use (Moreno & Grande, 2005).

The DESIRE-net project aims to promote renewable energies on at least three different professional skill levels:

- the decision makers or technical officers belonging to public administration who make policy plans and promote renewable energy in their countries,
- the designers who need to design the best renewable energy plants for their particular locations,
- the operators who need to know how to operate and, above all, how to maintain the renewable energy plants.

The DESIRE-net e-learning courses are both in synchronous and in asynchronous modality, and they are structured as multimedia courses divided into modules, subjects, lessons enriched with hyperlinks, videos, and images. The courses are suitable for different targets thanks to the modular approach used. In this way different targets can follow only the modules or the subjects they are interested in. A self evaluation test is added at the end of each module in order to help the users in their knowledge acquisition. Interaction with the experts is made through the traditional e-mail system.

3 THE DESIRE-NET WEB SITE

The DESIRE-net Project web site (www.desire-net.enea.it) has a homepage layout designed to access all the information sections by means of two menus. The first menu introduces the project, the calendar of the synchronous courses, the list of the contacts, the participants of the e-learning program, and a photo gallery about the most relevant events of the project. The other menu is linked to the following modules of the web site:

- ***NetLesson***: manages the synchronous lessons in regard to teachers, real time video lessons, and presentations in power-point format. The module allows synchronization of the videos with the slides and modification of the size of the video. Moreover, a full screen presentation, with the video always on top, to improve the quality of the images has been implemented.
- ***E-learning***: the ENEA Matrix Platform integrated to manage the asynchronous courses. All courses have a specific card (Minimum Data St, MDS). The main aspects of the Matrix platform are: web site, course catalogue with user registration and tracking (LMS), learning content management system (LCMS), authoring tool (SI.A.), video lesson management system (VMS), video content management system (VCMS), and multimedia database (Fontana & Moscarini, 2004).
- ***Multimedia***: manages the multimedia collection (interviews, spots, trailers, etc.).
- ***News***: manages the news of the project (text and images).
- ***Newsletter***: an electronic magazine (cover, articles, photos, and multimedia) that disseminates the project information among Desire-net users. The module sends the newsletter to the users by e-mail through the Sender System.
- ***Services***: a special module to assist the users in terms of: downloading software, plug-ins, public documentation, help desk, etc.

Figure 2 shows the home page of the desire-net project (www.desire-net.enea.it).

Figure 2. Desire-Net homepage

Currently, there are nine DESIRE-net E-learning courses. Their contents deal with general and specific energy themes (Figure 2).

The general themes are:

- Need for energy, quantity, and distribution of the sources,
- The Kyoto protocol and the environmental impact of the energy sources,
- Environmental impact of the different sectors: transport, industry, and buildings,
- The green house effect,
- Renewable energy resources,
- Introduction to energy new technologies and future applications in the energy field,
- Energy scenarios.

The specific themes are: photovoltaic energy, thermo-solar energy, geothermal energy, biomass energy, energy efficiency for buildings, wind energy, hydrogen energy and fuel cells, and small-hydro power.

Figure 3 shows the web page of the E-learning courses.

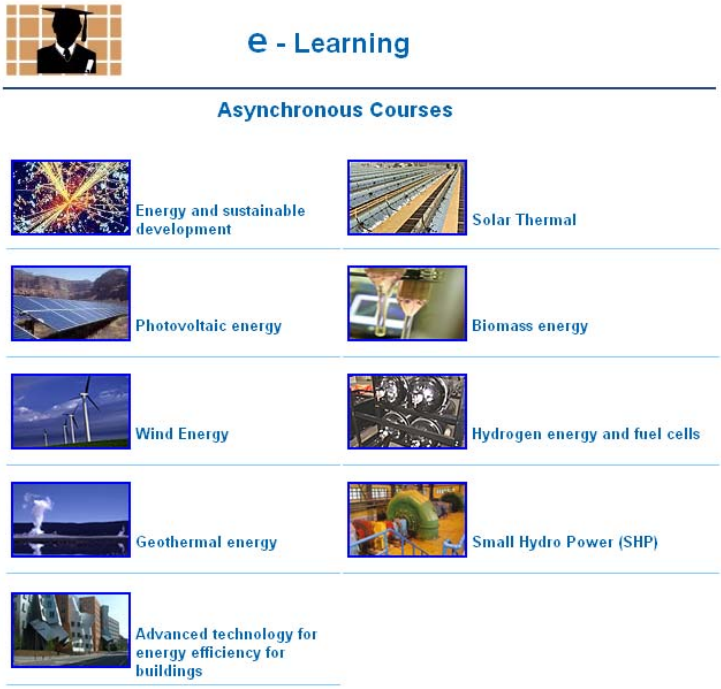

Figure 3. DESIRE-net e-learning courses

4 DESIRE-NET E-LEARNING METHODOLOGY

DESIRE-net e-learning courses are structured as multimedia courses divided into modules, subjects, lessons enriched with hyperlinks, videos, and images. The courses are suitable for different targets thanks to the modular approach. In this approach, different users can follow only the modules or the subjects they are interested in. A self evaluation test can be added at the end of each module in order to help the users in their knowledge acquisition. Interaction with experts can be made through traditional e-mail. The content can be continuously updated. An example of courses can be found at the following address http://odl.casaccia.enea.it (Figure 4).

Figure 4. an example of a ENEA structured e-learning course

The course is transmitted via Internet in a synchronous modality. The screen appears divided into four parts: the first part shows the speaker, the second part shows the slides being illustrated, the third part consists of navigation and services buttons to see the slides full screen or to download them, and the fourth part is a chat line with the speaker that can be used only during the transmission.

Examples of these web lessons can be seen at the following web address but only after a free compulsory "user registration" http://192.107.71.126/alfa_netseminar/ (figure 5).

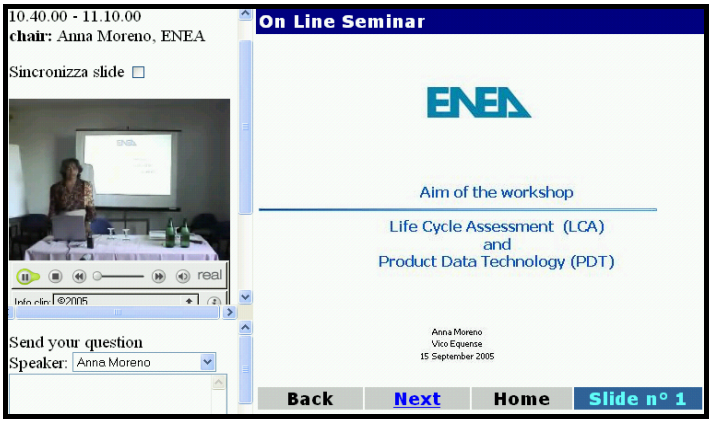

Figure 5. an example of a ENEA web seminar

The asynchronous net-lessons modality works as the previous one except for the chat line, which is inactive. The asynchronous courses are available on the web in English. Countries will have the opportunity to translate the courses into their own languages, so that the users can follow the courses whenever and wherever they like. One or more e-learning points in each participating country will be implemented in order to facilitate the users' learning process. The number of hours for Internet e-learning asynchronous courses is only provisional because of the differing technical and cultural backgrounds of the users. Each course includes a Minimum Data Set (MDS) describing the renewable energy theme of the course. Training materials for managers will be implemented with specific learning materials, which the local experts can use to train their operators. In order to promote a sustainable development in the target countries, besides the training of the "managers," it is also necessary to train the renewable resources operators/technicians.

The advantage of the e-learning platform is that the e-learning courses, with a simple subscription to the ENEA web site, are available to everyone in any country. Currently the courses are open only to the countries that have undertaken an agreement with the UNESCO office in Venice. In the future, the plan is to have them available to the entire world.

5 CONCLUSION

The United Nations Environment Program (UNEP) defines sustainable development as "development which improves people's quality of life, within the carrying capacity of earth's life support systems" (United Nations Environmental Programme, 2006). The Johannesburg Plan of Implementation (JPOI), adopted at the World Summit on Sustainable Development in 2002, addresses energy in the context of sustainable development (United Nations Division for Sustainable Development, 2002)

The JPOI calls are aimed:

- To improve access to reliable, affordable, economically viable, socially acceptable, and environmentally sound energy services,
- To recognize that energy services have positive impacts on poverty eradication and the improvement of standards of living,
- To develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energy and, with a sense of urgency, substantially increase the global share of renewable energy sources,
- To diversify energy supply by developing advanced, cleaner, more efficient and cost-effective energy technologies,
- To combine a range of energy technologies, including advanced and cleaner fossil fuel technologies, to meet the growing need for energy services,
- To accelerate the development, dissemination, and deployment of affordable and cleaner energy efficiency and energy conservation technologies,
- To take action, where needed, to phase out subsidies in this area that inhibit sustainable development.

In accordance with the JPOI goals, the desire-net project aims to disseminate scientific knowledge in the sustainable development field to as many people as possible.

Figure 6 shows 3020 DESIRE-net users in the 32 countries involved in the project.

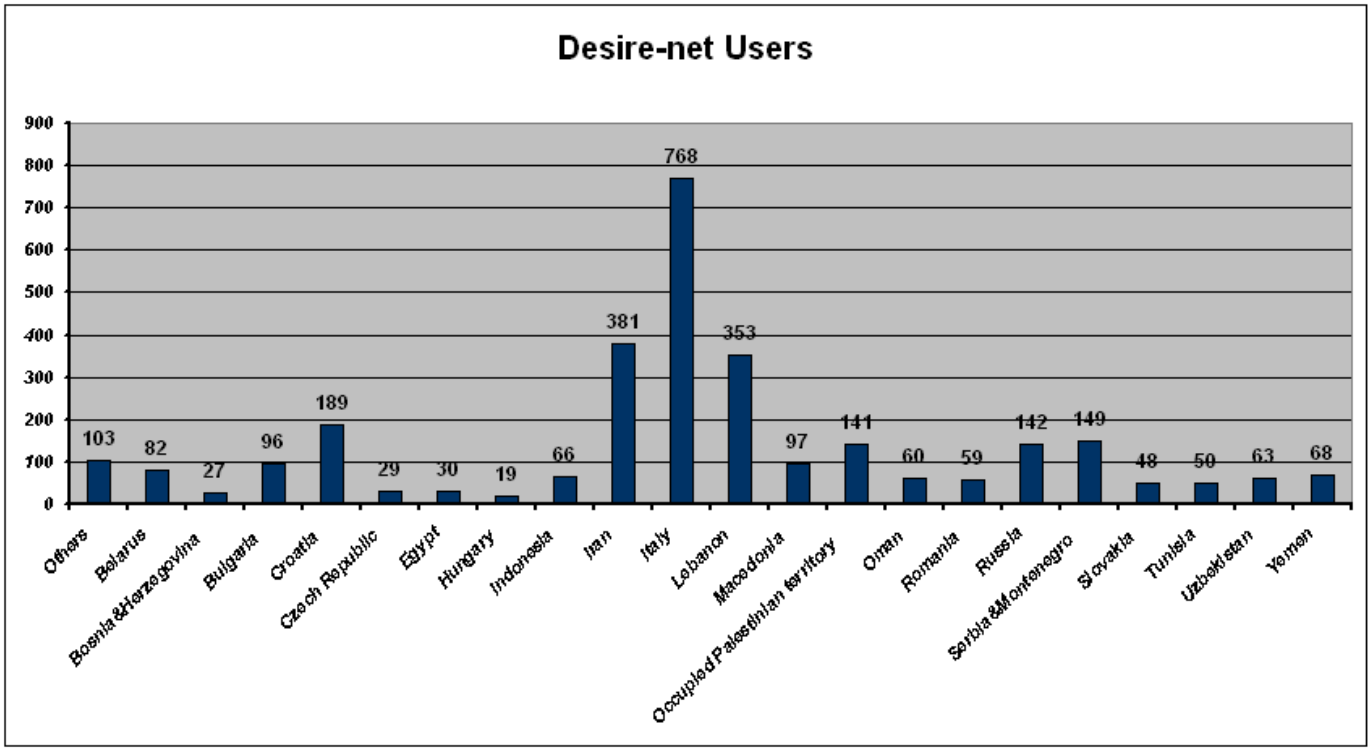

Figure 6. DESIRE-net users

We think that knowledge is a public resource and that the diffusion of scientific knowledge to as many people as possible is more important than earning money, therefore our courses and services are free. ICT can play a relevant role in the dissemination of scientific knowledge, and our e-learning platform can be the instrument to reach the entire world, especially developing countries.

At the moment we have only private sponsorship, but we need other funding to improve DESIRE-net services and courses in the near future.

6 REFERENCES

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