# The need for coordinated training of shallow geothermal designers and drillers in Europe, and how Geotrainet is trying to respond to this need

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**Keywords:** Shallow Geothermal, Training, Certification, Coordination.

## ABSTRACT

Further success of Shallow Geothermal energy systems relies on adequate ground coupling installations, designed and constructed with good knowledge and workmanship. Opportunities for the necessary education, training, and eventually certification of persons for both the design and the construction (drilling, installation) of the ground side for shallow geothermal systems in the past only existed in a few countries. These countries are those with an early and strong ground source heat pump (GSHP) market. The same skills and technologies for ground coupling are required for underground thermal energy storage (UTES). In the most recent years, several independent training activities have been started in a number of countries, reacting either to quality concerns of industry or authorities, or to EU-Directive 2009/28/EU. Some coordination and harmonisation is needed, as well as providing training opportunities for countries without existing schemes.

The work started out with a project named Geotrainet (full name: "Geo-Education for a sustainable geothermal heating and cooling market"), supported 2008-2011 by the EU in the frame of the Intelligent Energy for Europe (IEE) program. The aim of the project was to develop training of professionals involved in GSHP or UTES projects, while focussing on two target groups:

- designers (who undertake feasibility studies and planning, including geology)
- drillers (who make the boreholes and insert the tubes).

In October 2011 a workshop was held to start the real-life existence of the Geotrainet program subsequent to the EU-funded project which provided the basis. The decision was made to first create the European Training Board, consisting of delegates from national associations, platforms, authorities, or other, either existing or to be established in countries where interest in shallow geothermal education exists. The board started with some interested countries and will be open for enlargement; it has been installed in February 2012, with groups from 15 EU-countries interested.

Meanwhile, the creation of an independent organisation to host the European components of the structure was decided. This new organisation, to be sustained by EGEC and EFG, as well as national partners, will hopefully be operational early in 2013.

The paper will shortly review the history of Geotrainet, the rational behind its inception, present the structure, and give up-to-date information of the status achieved by the time of the EGC 2013 in Pisa in June 2013.

## 1. INTRODUCTION

The first Geotrainet course had been held in Uppsala, Sweden (figure 1). Meanwhile the project has ended with the final course in Brussels, Belgium, in January 2011 (figure 2). The curricula and didactic material do exist (see http://geotrainet.eu ), and have been tested with the various courses during the project. Now the necessary steps have been started to transfer the results from the Geotrainet project into a permanent program, by creating a European Education Board and its infrastructure.

## 2. TRAINING AND CERTIFICATION NEEDS

As to § 14, 3 of Directive 2009/28/EC, the EU member states are obliged to provide certification or qualification for installers of those renewable energy technologies that already have a consumer market. The relevant text reads:

*"Member States shall ensure that certification schemes or equivalent qualification schemes become or are available by 31 December 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps. Those schemes may take into account existing schemes and structures as appropriate, and shall be based on the criteria laid down in Annex IV. Each Member State shall recognise certification awarded by other Member States in accordance with those criteria."*

**Figure 1: Geotrainet course in Uppsala, 10.-12.6.2009 (course participants outside the Swedish Geological Survey, SGI, left; explanation during excursion to IKEA BTES, right).**

**Figure 2: Geotrainet course and final conference in Brussels, 24.-28.1.2011 (reception in the Royal Academy of Science)**

For shallow geothermal installation, Annex IV of the directive does not provide much information. However, the curricula from the Geotrainet project can serve as a reference here.

Also the relevant industry as well as national authorities are asking for training and certification of shallow geothermal designers and drillers, in order to guarantee the quality of planning, drilling and installation work, and to guarantee protection of soil and groundwater.

### 3. SHORT SUMMARY OF GEOTRAINET-PROJECT 2008-2011

The aim of the project Geotrainet (full name: "Geo-Education for a sustainable geothermal heating and cooling market") was to develop the training of professionals involved in Ground Source Heat Pump installations (GSHP); in practise this included the related activities in UTES.

The project was coordinated by EFG, in cooperation with EGEC; partners were Associations, Research Centers, and Universities (fig. 3). A good geographical coverage of the EU was achieved, and a network of further contacts from Portugal to Estonia and from Norway to Greece filled in the gaps. The project included the creation of an EU-wide certification scheme for both planners and installers of GSHP.


**Figure 3: Geotrainet project partners (2008-2011) and their locations.**

From the different groups of professionals involved in a GSHP or UTES project, Geotrainet is focused on two target groups:

- designers (who undertake feasibility studies including geology)
- drillers (who make the boreholes and insert the tubes).

The following tasks were completed during the lifetime of the project; documentation can be found on the website http://geotrainet.eu under the document numbers stated in the list below:

- Research into data currently useful for GSHP installers
- Evaluate skills required to design, drill and install GSHP
- Create curricula for installers, designers and drillers (D3, D7)
- Create training tools, test and optimization of the products (training courses, e-learning)
- Suggest standards and codes to create a European market (D13)
- Propose a European certification framework (D11)

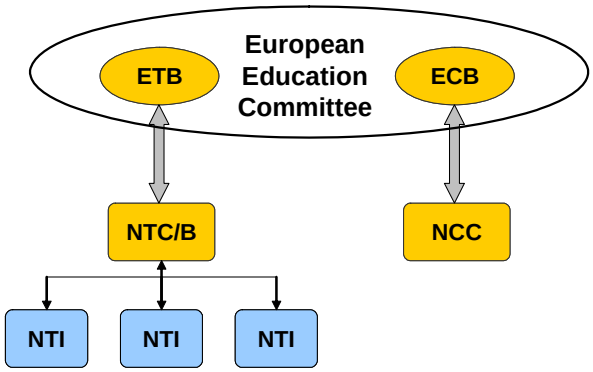
The actual work was done mainly in 2 expert panels (drillers, designers). A total of 8 courses were held during the lifetime of the project. The courses were complemented and supported by an e-learning platform. Two course textbooks ("manuals") have been written by a number of authors within the project (McCorry & Jones, 2011; Andersson & Sanner, 2011); the covers are presented in figure 4, and pdf-versions are for download from the project website http://geotrainet.eu under "didactic material".


**Figure 4: Cover pages of Geotrainet drillers manual (left) and designers manual (right).**

## 4. TRAINING AND CERTIFICATION FRAMEWORK

Within the past project, a framework for both training and certification was established, mainly by the Austrian Institute of Technology (AIT) in cooperation with EGEC. This theoretical framework now has to be brought to life. The framework consists of three levels (figure 5):

- the European roof organisation (Geotrainet EEC – ETB/ECB),
- national coordinators / committees (Geotrainet NTC/NCC)
- training institutions on national or regional level (Geotrainet NTI)




ETB European Training Board
ECB European Certification Board
NTC National Training Coordinator/Committee
NCC National Certification Coordinator
NTI National Training Institute

**Figure 4: Overall schematic of the Geotrainet structure.**

The Geotrainet European Education Committee (EEC) will be the main governing body of the whole program. It consists of two subgroups, the European Training Board (ETB), responsible for education and training, and the European Certification Board (ECB), responsible for certification. It should be mentioned here that a decision was taken both during the project and at the first follow-up meetings to limit Geotrainet certification to persons, and not companies. Certification of companies by other institutions might, however, use Geotrainet as a proof of skilled persons inside a company.

In a first step, the training side of the framework can be set up, with the certification following at a subsequent stage. This allows for having the first round of trainings completed before offering certification to successful participants. This paper hence has a focus on the training side. In Figure 6, the structure of the Geotrainet training framework is shown in more detail, with the three levels already mentioned. The main tasks of the different levels of the training framework are summarised in table 1.

With the commitment to the Geotrainet training standards (trainer guidelines) the national coordinator and the training institutes gets the permission to

- Use printed manuals and further training documents of Geotrainet
- Advertise the Geotrainet programme
- Carry out Geotrainet courses

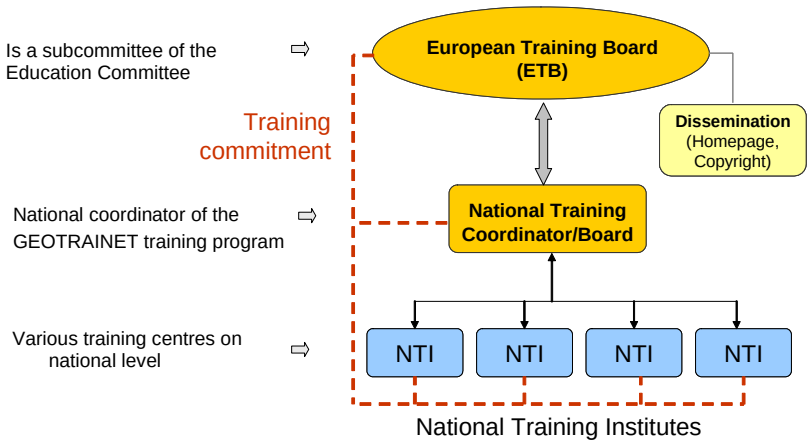



**Figure 4: Schematic of the Geotrainet training structure.**

**Table 1: Main tasks of the different levels of the Geotrainet training framework.**

| | |
|---|---|
| **European Training Board (ETB)** | - Maintenance of the training commitment including the mission statement, training targets, training standards, records<br>- Updating and refinement of established training standards<br>- Transfer and exchange of know-how at European level<br>- Templates of documents for trans-national co-operations<br>- Continuing information exchange<br>- Monitoring of quality of national training schemes<br>- Coordination of national training schemes<br>- Promotion of label |
| Keeping the quality standards on international level, maintenance of all Geotrainet documents | |
| **National Training Coordinator or Committee (NTC)** | - Implementation of the international training standard and definition of specific adaptations needed at national scale<br>- Report to international education committee considering required amendments and adaptations of training standard<br>- Notification of any changes of training system to national training institutes<br>- Dissemination of training program at national level<br>- Communication to national training institutes |
| Keeping the quality standards on national level, national versions of Geotrainet documents | |
| **National Training Institute(s) (NTI)** | - Carry out the training courses<br>- Evaluation of courses<br>- Responsibility for the implementation and maintenance of the training programme<br>- Dissemination on local level<br>- Sub-contracting to trainers<br>- Reporting to the national coordinator |
| Put training system into action | |

The idea is that trainees should apply for the Geotrainet certification only with the positive examination of the training program.

The Certification side of Geotrainet is not yet under concrete preparation, but should be based upon a similar structure and integrated as shown in figure 4. The EU-project Qualicert has prepared a manual on certification for all sectors mentioned in § 14, 3 of Directive 2009/28/EC; for more information on certification as such, we refer to the outcomes of this project, available for download at: http://www.qualicert-project.eu/ .

## 5. STEPS TAKEN FOR GEOTRAINET SINCE 2011

On 14th October 2011, a workshop was held to start the real-life existence of the Geotrainet program subsequent to the EU-funded project which provided the basis. The decision was made to first create the European Training Board, consisting of delegates from national associations, platforms, authorities, or other, either existing or to be established in countries where interest in shallow geothermal education exists. The board should start with some interested countries and will be open for enlargement. Invitations were sent to numerous contacts at the end of 2011, followed by explanations of the procedures for the next steps.

For this next step, delegates from 15 EU countries convened in the Renewable Energy House in Brussels on 15th February 2012, for a first meeting of what is intended to become the European Training Board (ETB) of the Geotrainet program. The response and the number of countries was much larger than anticipated

There were more participants in the Brussels meeting than the 15 delegates, and so more than 15 associations were represented, as in some countries several organisations are interested in cooperating within Geotrainet. Luckily, in most cases (like for instance in Germany and the UK) several national associations have discussed their participation beforehand and had agreed on a joint delegation. The countries represented are listed in table 2.

The preliminary Geotrainet ETB as established on 15.2.2012 installed several working groups, among them two groups for reviewing the existing curricula (curriculum for designers and curriculum for drillers, respectively), as a basis for amendments and final decision to adopt the curricula as the basis for the future training. Another group is working on statutes and bylaws for the Geotrainet ETB.

**Table 2: Countries represented at the first meeting for the ongoing Geotrainet, 15.2.2012.**

| | | |
|---|---|---|
| Austria (AT) | Spain (ES) | Lithuania (LT) |
| Belgium (BE) | France (FR) | Portugal (PT) |
| Bulgaria (BG) | Hungary (HU) | Romania (RO) |
| Germany (DE) | Ireland (IE) | Sweden (SE) |
| Estonia (EE) | Italy (IT) | United Kingdom (UK) |

After several further meetings held for preparation, it became obvious that an independent legal entity needs to be created and supported by several national associations together with the coordinators of the Geotrainet project, EFG and EGEC. This will serve as the Geotrainet secretariat and hold the responsibilities for copyright, updating, communication, etc., and host the infrastructure for the whole Geotrainet European Educational Committee (ETB and ECB). The final decision to set up the Geotrainet aisbl (international non-profit organisation under Belgian law) was taken at a meeting in Offenburg, Germany, on 28 February 2013 in Offenburg, Germany. The process is ongoing and might not have been finalised by the time of EGC 2013.

After 3 years of preparation and testing within the EU-project Geotrainet (first reported in Sanner et al., 2009), and some 2 years of work in getting the right actors in the individual countries together and to set up permanent structures, we now hope to see the first courses run with the new Geotrainet label for shallow geothermal training soon.

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**Acknowledgements**

The Geotrainet-project was supported from October 2008 to February 2011 by the European Agency for Competitiveness and Innovation (EACI) within the Intelligent Energy Program, under no IEE/07/581. The responsibility for the project results is with the project consortium, and the responsibility for the text of this paper is with the authors only.