

Geotrainer: European Scheme for Training and Education of Designers and Drillers for GSHP and UTES to take effect

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1. Introduction

Underground Thermal Energy Storage (UTES) 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 UTES 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, as GSHP use the same technologies for ground coupling than UTES plants. 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 a EU-Directive from 2009 (see below). Some coordination and harmonisation is needed, as well as providing training opportunities for countries without existing schemes.

At the last IEA Energy Storage Conference, Effstock 2009 in Stockholm, the Geotrainer project was presented (Sanner et al., 2009). Just prior to this presentation, the first Geotrainer course had been held in Uppsala, Sweden (figure 1). Meanwhile the project has ended with the final course in Brussels, Belgium, in January 2011. The curricula and didactic material do exist (see <http://geotrainer.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 Geotrainer project into a permanent program, by creating a European Education Board and its infrastructure.



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

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.

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

Also the relevant industry as well as national authorities 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 Geotrained-project 2008-2011

The aim of the project Geotrained (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. From the different groups of professionals involved in a GSHP or UTES project, the Geotrained project is focused on two target groups:

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

The project includes the creation of an EU-wide certification scheme for both planners and installers of GSHP. The project was coordinated by EFG, in cooperation with EGEC; partners were Associations, Research Centers, and Universities (fig. 2). 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.



Figure 2: Geotrained project partners (2008-2011) and their locations

The following tasks were completed during the lifetime of the project; documentation can be found on the website <http://geotraining.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) (D xxxxx)
- 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 (table 1). 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 3, and pdf-versions are for download from the project website <http://geotraining.eu> under “didactic material”.

Table 1: Training courses held in the Geotraining project2008-2011

Course date	Course location	Target group(s)
June 2009	Uppsala, SE	Trainer (Designer/Driller)
Sept. 2009	Dublin, IE	Driller
March 2010	Peine, DE	Trainer (Designer/Driller)
April 2010	Orleans, FR	Driller
April 2010	Newcastle, UK	Designer
July 2010	Valencia, ES	Designer
Oct. 2010	Bucharest, RO	Designer/Driller
Jan. 2011	Brussels, BE	Designer/Driller

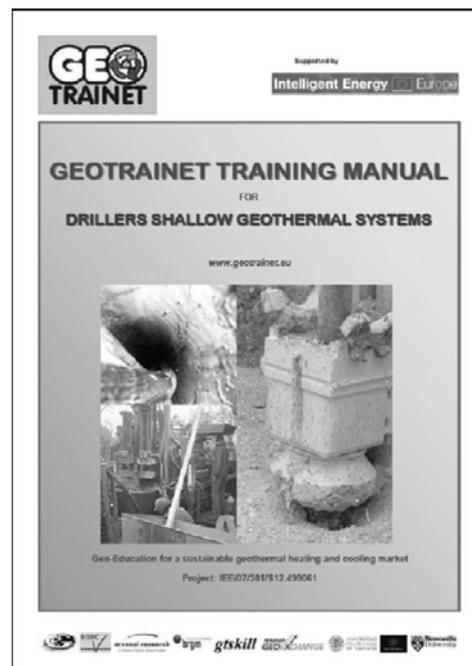
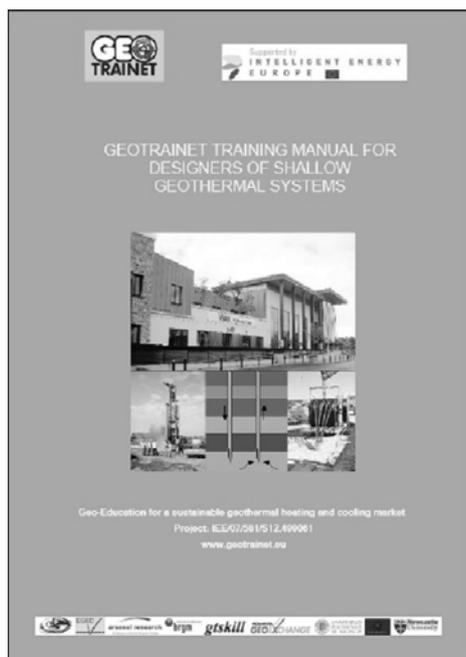


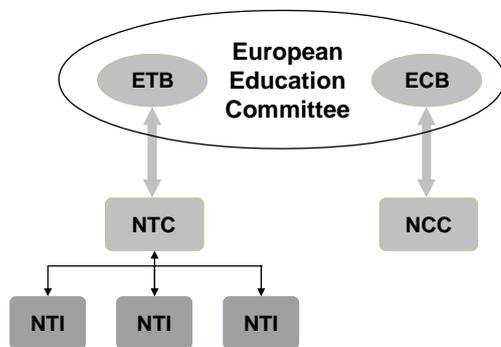
Figure 3: Cover pages of Geotraining designers manual (left) and drillers manual (right)

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 4):

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

The Geotrinet 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 Geotrinet certification to persons, and not companies. Certification of companies by other institutions might, however, use Geotrinet as a proof of skilled persons inside a company.



Abbreviations:

- 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 Geotrinet structure

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 will have a focus on the training side. In Figure 5, the structure of the Geotrinet training framework is shown in more detail, with the three levels already mentioned.

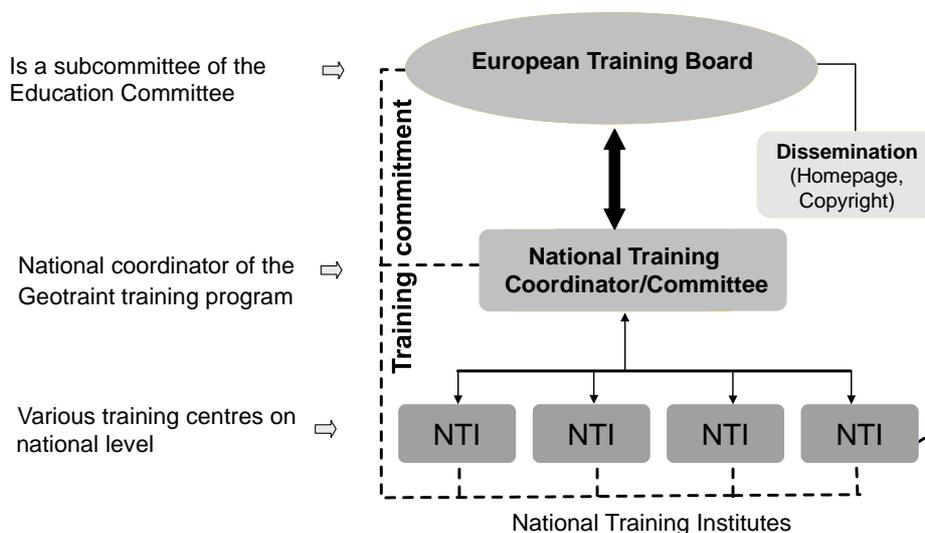


Figure 5: Schematic of the Geotrinet training structure

The main tasks of the different levels of the training framework are the following:

- European Training Board (ETB)**
- Maintenance of the training commitment including the mission statement, training targets, training standards, records
 - Updating and refinement of established training standards
 - Transfer and exchange of know-how at European level
 - Templates of documents for trans-national co-operations
 - Continuing information exchange
 - Monitoring of quality of national training schemes
 - Coordination of national training schemes
 - Promotion of label

Keeping the quality standards on international level, maintenance of all Geotrained documents

- National Training Coordinator or Committee (NTC)**
- Implementation of the international training standard and definition of specific adaptations needed at national scale
 - Report to international education committee considering required amendments and adaptations of training standard
 - Notification of any changes of training system to national training institutes
 - Dissemination of training program at national level
 - Communication to national training institutes

Keeping the quality standards on national level, national versions of Geotrained documents

- National Training Institute (NTI)**
- Carry out the training courses
 - Evaluation of courses
 - Responsibility for the implementation and maintenance of the training programme
 - Dissemination on local level
 - Sub-contracting to trainers
 - Reporting to the national coordinator

Put training system into action

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

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

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

Certification is an independent confirmation of qualities. Wikipedia defines certification in the following way:

Certification refers to the confirmation of certain characteristics of an object, person, or organization. This confirmation is often, but not always, provided by some form of external review, education, assessment, or audit

The glossary of the Qualicert-project says the following:

Certification: Procedure by which a third party gives written assurance that a product, process or service conforms to specified requirements.

Qualicert has prepared a manual on certification for all sectors mentioned in § 14, 3 of Directive 2009/28/EC (cf. chapter 2). For more information on certification as such, we refer to the outcomes of this project, available for download at <http://www.qualicert-project.eu/>.

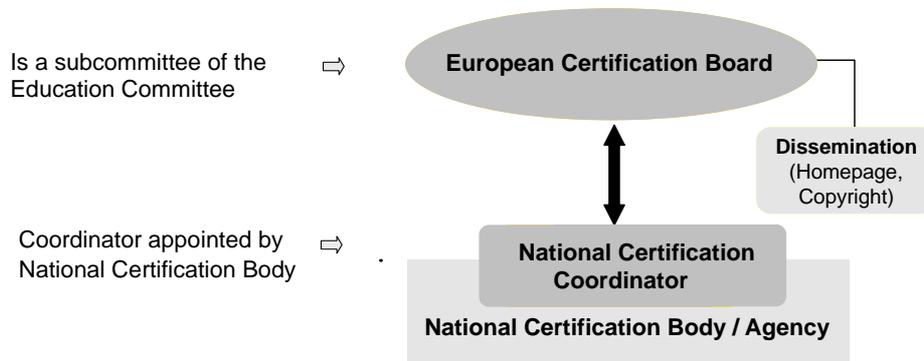


Figure 6: Schematic of the Geotrained certification structure

The main tasks of the different levels of the education framework are the following:

European Certification Board (ECB)

- Support of the training commitment including the mission statement, training targets, training standards, records
- Updating and refinement of certification commitments, certification system, quality management, records
- Updating and refinement of certification scheme & procedure
- Transfer and exchange of know-how at European level
- Templates of documents for transnational dissemination and documentation for evaluation of data concerning the certification scheme
- Dissemination and publication of the certification scheme at European level
- Promotion of label

National Certification Coordinator (NCC)

- Implementation of the international certification scheme and definition of specific adaptations needed at national scale
- Report to European Certification Board (required amendments, adaptations of certification scheme, etc)
- Notification of any changes of scheme to National Certification Coordinator/Board
- Templates of translated documents
- Dissemination of certification scheme at national level

5. Next steps for Geotrained training and certification

On 14th October 2011, a workshop was held to start the real-life existence of the Geotrained 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 Geotrained 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 Geotrained. 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 comprise:

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

The preliminary Geotrained 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 Geotrained ETB.

The coordinators of the Geotrained project, EFG and EGEC, jointly will establish a legal entity in Brussels to serve as the Geotrained secretariat and to hold the responsibilities for copyright, updating, communication, etc., and to host the infrastructure for the whole Geotrained European Educational Committee (ETB and ECB). Another European association active in ground source heat pumps is likely to join in, at the time of writing this still needs to be confirmed. It is hoped that by the time of the INNOSTOCK conference in May 2012 the European Training Board will be operational.

The meeting of 15.2.2012 marks a big step forward in keeping shallow geothermal design, drilling and installation on a high professional level, performed by persons with skills and knowledge all over Europe. The schedule of the program is ambitious, planning to have the first actual courses (after those in the preparatory project 2008-2011) running in autumn of this year.

6. References

- Andersson, O. & Sanner, B. (eds) (2011): Geotrained Training Manual for Drillers of Shallow Geothermal Systems. - 130 pp, Geotrained, European Geothermal Energy Council, Brussels
- McCorry, M. & Jones, G.LI. (eds) (2011): Geotrained Training Manual for Designers of Shallow Geothermal Systems - 192 pp, Geotrained, European Federation of Geologists, Brussels
- Sanner, B., Dumas, P., Fernandez, I. & Regueiro, M. (2009): GEOTRAINET – a new European initiative for training and education of planners, drillers and installers of geothermal heat pumps. - Proc. EFFSTOCK 2009, paper #164, p., Stockholm
- Qualicert (2011): Qualicert Manual - a common approach for certification or equivalent qualification of installers of small-scale renewable energy systems in buildings. – 64 p., for download at: <http://www.qualicert-project.eu/>

7. Acknowledgements

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