

REGEOCITIES

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Report on Italy

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Italian regulative framework



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Definition of Shallow Geothermal Energy¹

A first and partial national definition of Shallow Geothermal Energy (SGE), introduced by the **Legislative Decree 11st February 2010 n. 22**, considers geothermal energy with low temperature. The decree categorizes geothermal energy in:

- high heat content → geothermal fluid has a temperature higher than 150°C
- medium heat content → geothermal fluid has a temperature between 90°C and 150°C
- low heat content → geothermal fluid has a temperature lower than 90°C

The decree establishes that geothermal resources can be:

- *of national interest*: geothermal resources have a high heat content and produce at least 20 MWt
- *of local interest*: geothermal resources have a medium/low heat content and produces lower than 20 MWt
- *small local utilizations*: (see description below)

This decree considers **small local utilizations of geothermal heat** when:

- a) these utilizations allow to carry out installations with capacity lower than 2MWt from geothermal fluid with a wastes' temperature of 15°C.
- b) these utilizations were achieved by shallow wells (≤400m depth) in order to search for geothermal fluids or hot waters (included also waters coming from sources with thermal capacity not higher than 2000 kWt).
- c) there are installations with geothermal exchangers which do not extract and re-inject hot water or geothermal fluid.

The small local utilizations are within Regions or other delegate local authorities. The small local utilizations a) and b) are authorized by Regions according to **Royal Decree 11st December 1933 n. 1775** which regulates the use of water.

The small local utilizations c) are subjected to regional regulations with possible simplified procedures. In particular, installations with capacity lower than 1 MW from geothermal fluid with a wastes' temperature of 15°C and utilizations through geothermal exchangers are excluded by regional procedure of environmental screening².

1 Introduction

1.1 Current situation in your country

Designers are predominantly	X National	<input type="radio"/> Foreign
Installers are predominantly	X National	<input type="radio"/> Foreign
Technology providers are predominantly	X National	<input type="radio"/> Foreign

¹ Shallow Geothermal Energy is usually considered as from surface to approximately 400 m depth

² Procedure of environmental screening is carried out in order to decide if installation has to be subjected to environmental impact assessment.

Designers are predominantly independent from installers Yes No

If no, specify: (see description below)

Designers' market is predominantly Local Regional National

Installers' market is predominantly Local Regional National

Market associated with SGE systems for heating and cooling applications is increasing in the period 2006-2011. This increase was fostered by large applications in retailing chains, e.g. IKEA carried out GHP installations in all Italian dealers, and in public buildings, e.g. headquarters in Lombardy Region.

Unfortunately, it very difficult to quantify the number of firms working in SGE applications, because there is not an official database collecting them. Consequently, it is possible to analyse firms belonging to NACE code 35.30³, because these firms use and develop technologies close to SGE applications (except for geothermal exchanger). We excluded firms working on cold chain from NACE code 35.30. The analysis shows that the number of firms increases because of the entrance of new players. New players are not very structured private firms.

There are firms which are service providers for large SGE applications such as district heating. These firms can be public and private. Public firms are larger and less cost-effective than private firms. On the other hand, private firms are cost-effective but they have constraints to growth. Then, there are firms which are technology providers for SGE application in residential sector. The analysis confirms the growth of sector, but there are not information about geologists and engineers because they are not included in the NACE code 35.30.

The analysis of actors' market associated with SGE applications shows that the majority of actors are national. *Designers* are predominantly national because detailed geo-hydrological information about underground geothermal resources are not publicly available and hardly achievable. Therefore, foreign designers can find obstacles in order to collect information for their projects. Designers work predominantly in the local market because it is important the knowledge of local areas.

Installers are predominantly national. They rarely focus their activity on SGE applications because they diversify their business, but it is increasing the number of specialized installers. These specialized installers are involved in an active promotion of SGE applications. Specialized installers are used to work with designers, whereas less specialized installers are not and use to work with different designers time by time. Installers work in the national market.

Technology providers are predominantly national for heat pumps mainly installed in new buildings for in residential destination. Typical ranges of temperatures in heat pump cycle are 0-35°C for heating and cooling and 50-60°C for hot water production. There are also large applications (district heating) which use binary systems based on heat pumps working

³ NACE 35.30 – Steam and air conditioning supply

until medium temperature (80-90°C). These technologies are provided by foreign firms. Exchangers, valves and hoses are provided by Italian firms.

Typical procedures for drilling a typical hole into the underground (well/borehole/vertical heat exchanger installation):

The **Legislative Decree 3rd March 2011 n. 28** (art. 7) establishes that Ministry of Economic Development, Ministry of Environment and Ministry of Infrastructure and Transports have to define prescriptions for installation of geothermal exchangers and identify cases for simplified administrative procedures⁴. So far, Ministries do not define these prescriptions.

Regulations define procedure for the following SGE systems:

Installations with geothermal exchangers and/or capacity low than 1 MW

For any new development, property developers or another qualified people are expected to present to the Municipality (hardcopy or digital) a technical declaration (i.e. start working notice called *Segnalazione Certificata di Inizio Attività - SCIA*) sent to municipalities concerning compliance between the project and land use, environmental, security, health regulations at least within 30 days before works begin. In case of non-compliance municipality notifies the order to stop works to person concerned within 30 days. Otherwise, works can begin after 30 days from the submission of declaration. Mechanical plant works must be finalized within 3 years. At the end, designers or qualified technicians have to issue a certificate for plant's testing and deliver to municipality.

Before works begin (any kind of work not only installations with geothermal exchangers), owner's installation has to deliver to municipality where installation is located the following documents:

- owner's personal data
- chorography with site's location
- cadastral data
- general description
- date of the beginning of works

Horizontal geothermal exchangers

These installations do not need for any authorization but for above mentioned declaration. Before works begin owner's building has to register his/her installation to Province.

Vertical geothermal exchangers (VGE)

Same procedure cited above (Installations etc.) applies to VGE.

⁴ These simplified procedures are described by art. 6 of the Legislative Decree 3rd March 2011 n. 28.

Special administrative, technical and common sense constraints can persuade not to carry out a VGE. For instance GSHPs (ground source heat pump system i.e. open loop system) using groundwater abstraction boreholes cannot be realised within drinking water protection zones, according to national regulation. Such regulations doesn't apply to GCHPS (ground coupled heat pump system i.e. closed loop system) made by boreholes with no groundwater abstraction. A likely interference between different ground coupled heat exchange systems must be taken into account not to affect negatively HC efficiency.

Boreholes must respect distances among each other to optimize the heat exchange and respect distances from property border established by law (i.e. in Lombardy at least 4 metres) and by Civil Code (all over Italy 2 meters for any kind of buried new construction). Location of drillings and exchangers has to consider any other buried manifolds.

The size of installation is decided taking into account the thermal performance of underground.

Moreover, owners have to declare themselves to be committed to respect obligations and provide all information related to installations. If owner's installation does not coincide with owner's land, it is necessary that owner's land has to give consent.

Province and municipality (where installation is located) can monitor the carrying out of installation.

At the moment, there is a lack of a clear and definitive (national or regional) regulatory framework in order to solve issues regarding the installation of SGE systems in residential and non residential sector.

1.2 Barriers

The development of SGE systems in Italy is mainly hindered by information barriers. These information barriers influence urban planners and in general potential clients. Urban planners do not usually consider SGE systems during their planning activity, because they ignore benefits associated with SGE applications.

Consequently, the installation of SGE systems becomes more complicated. Potential clients are confused because they cannot understand the advantages of using low temperature geothermal resources and recognize "good" practitioners, e.g. designers and installers, among several actors' market. Sometimes, potential clients have to face high costs to carry out feasibility study.

The analysis of Ground Reach project identified also administrative barriers in 2007. In particular, this study highlights the delayed in the realization of GCHP systems caused by the complexity of procedures and related costs.

2 Review of existing documents (or in progress)/Tools to support SGE development

2.1 National level

- **Dedicated Web sites and GIS (general public)** Yes **X No**

The development of SGE systems is not supported by a Geographical Information System and “official” web sites at national level. There are several “unofficial” national web sites which promote the adoption of SGE applications, but it is difficult to verify the accuracy of information.

- **Support tools (publicly available tools)**

Geothermal operations inventories Yes **X No**

Underground operations inventories Yes **X No**

Geothermal resources evaluation Yes **X No**

Geothermal resources management Yes **X No**

Water resources management Yes **X No**

Moreover, there are not support tools (e.g. geothermal operations inventories, underground operations inventories, geothermal resources evaluation, geothermal resources management and water resources management) for SGE systems at national level. In particular, the appraisal of water resources management is carried out by local authorities such as Provinces.

- **Best practice (or technical) Guideline documentation** **X Yes** No

RSE Spa has recently published a guideline on SGE installations in order to support public authorities⁵.

- **Training activities dedicated to SGE** **Yes** **No**

There are training activities on SGE systems but are very often developed within European projects. Some training activities are arranged by professional associations such as geologists associations. Moreover, the **Legislative Decree 3rd March 2011 n. 28**, which implements Directive 2009/28/EC on the promotion of the use of energy from renewable sources, establishes that Regions and Provinces have to activate or promote training activities for installers of RES within 31st December 2012.

- **certification for professionals** **Yes** **No**
- **certification for organizations** **Yes** **No**

The **Legislative Decree 3rd March 2011 n. 28** establishes standards for the vocational qualification of heat pumps' installers, but SGE systems are not sustained by a certification scheme for professionals and organizations.

- **Codes/Regulations (Standards:UNI)** **Yes** **No**

There are technical standards (UNI TS 11300) in order to measure energy performance in buildings. UNI TS 11300 - 4 is a standard in order to measure energy performance in buildings which integrate renewable energy sources for heating and cooling.

Italian technical committee (*Comitato Termotecnico Italiano*) has been prepared specific technical standards (UNI regulations) for geothermal heat pumps:

- project E0206C020: requirements for sizing and design of geothermal systems with heat pump.
- project E0206C030: requirements for installation
- project E0206C170: environmental requirements

All mentioned standards are not mandatory. Therefore, they can be cited by national/regional regulations as guidelines.

⁵ Guidelines are downloadable at: http://www.rse-web.it/notizie/Pompe-di-calore-geotermiche-una-guida-di-RSE.page?rseListEls=documenti&docType_1=yes&typeDesc=Rapporti&resultList=yes

2.2 Local/Regional level

Lombardy Region

- **Dedicated Web sites for information about SGE)** **X Yes** No

Lombardy Region has an official web site⁶ which provides information about regulations and procedures for the installations of SGE systems. Moreover, this web site contains the official regional register of SGE installations which are subjected to a simplified procedure (see the Regulations of 15th February 2010 n. 7). This register is not publicly available.

- **Support tools**

Geothermal operations inventories **X Yes** No

Underground operations inventories **X Yes** No

Geothermal resources evaluation **X Yes** No

The official regional geothermal map “*carta geo-energetica regionale*” gives technical information in order to project and define SGE installation in order to preserve geothermal resources in Lombardy Region, but it not publicly available.

Geothermal resources management Yes **X No**

Water resources management Yes **X No**

The appraisal of water resources management is carried out by local authorities (municipalities, utilities, ATO) but for general studies carried out by academic and research centres.

⁶ <http://geotermia.cestec.eu/home>

- **Best practice (or technical) Guideline documentation** Yes **X No**

- **Training activities dedicated to SGE** Yes **X No**

There are not training activities dedicated to SGE systems at regional level.

- **certification for professionals** Yes **X No**

- **certification for organizations** Yes **X No**

There is not a specific certification for professionals and organizations. Professionals (particularly geologists) are expected to train themselves through training courses organised by their organisations. The assessment of professionals and organizations employs ISO and UNI rules related to this sector (art. 15, **Regulations of 15th February 2010 n. 7**).

- **Codes/regulations** **X Yes** No

The **Regulations of 15th February 2010 n. 7** establishes that the size of installations has to be decided according to standards ISO and UNI. At the moment, Italian technical committee is developing these specific standards.

The **Regional Law 29th June 2009 n. 10** and then **Regulations of 15th February 2010 n. 7** promote a simplified procedure for SGE installations with closed systems.

Tuscany Region

- **Dedicated Web sites for information about Shallow Geothermal Energy** **X Yes** No

Tuscany Region has a section of official web site⁷ with regulations and general information about geothermal energy. Moreover, COSVIG (Consortium of Tuscan municipalities with a strong background in geothermal energy) has a web site⁸ with information about SGE systems and some applications.

The **Regional Law 24th February 2005 n. 39**, then partially modified by the **Regional Law 23rd November 2009 n. 71**, has established a regional informative system of heating and cooling installations, but this system does not work properly, because municipalities do not transfer information about installations.

- **Support tools**

<i>Geothermal operations inventories</i>	<input type="radio"/> Yes	X No
<i>Underground operations inventories</i>	<input type="radio"/> Yes	X No
<i>Geothermal resources evaluation</i>	X Yes	<input type="radio"/> No

Geothermal resource evaluations were recently carried out by research institutions at local level, but it can be hard to access to related information.

<i>Geothermal resources management</i>	<input type="radio"/> Yes	X No
<i>Water resources management</i>	<input type="radio"/> Yes	X No

The appraisal of water resources management is carried out by local authorities.

⁷ http://www.regione.toscana.it/-/fonti-rinnovabili?redirect=http%3A%2F%2Fwww.regione.toscana.it%2Fcittadini%2Fambiente%2Fenergia%3Fp_p_id%3D101_INSTANCE_eonjZadAbVH6%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-3%26p_p_col_pos%3D2%26p_p_col_count%3D3#geotermia

⁸ <http://www.distrettoenergieinnovabili.it/der/cosvig>

- **Best practice (or technical) Guideline documentation** Yes **X No**
- **Training activities dedicated to SGE** Yes **X No**
- **Certification for professionals** Yes **X No**
- **Certification for organizations** Yes **X No**
- **Codes/regulations** Yes **X No**

The **Regional Law 24th February 2005 n. 39**, then partially modified by the **Regional Law 23rd November 2009 n. 71**, foresees a simplified procedures for the installation of SGE systems.

Emilia Romagna Region (Province of Ferrara)

- **Dedicated Web sites for information about Shallow Geothermal Energy** **X Yes** No

Emilia Romagna Region has a section of official web site⁹ with regulations and general information about geothermal energy.

- **Support tools**

Geothermal operations inventories Yes **X No**

Underground operations inventories Yes **X No**

Geothermal resources evaluation Yes **X No**

Emilia Romagna Region has planned a geothermal resource evaluation in order to foster the adoption of SGE systems in this area.

⁹ <http://ambiente.regione.emilia-romagna.it/geologia/temi/geotermia/uso-acque-sotterranee-e-sottosuolo-impianti-climatizzazione-e-scambio-calore>

Geothermal resources management

Yes No

Water resources management

Yes No

- **Best practice (or technical) Guideline documentation** Yes No

If yes, do they include information about energy performances? Yes No

If yes, do they include information about economic performances? Yes No

From Emilia Romagna Region's web site it is possible download some case studies which can be considered a sort of best practice guidelines about SGE applications closed and open loop¹⁰.

- **Training activities dedicated to SGE** Yes No

Certification for professionals Yes No

- **Certification for organizations** Yes No

- **Codes/regulations** Yes No

3 Subsidies /Financial Incentives available

3.1 National level

The Italian government fosters the development of renewable energies and energy efficiency improvements where are included measures for the promotion of SGE applications. The **Legislative Decree 3rd March 2011 n. 28** foresaw the introduction of national incentives for renewable energies for heating and cooling

¹⁰ http://ambiente.regione.emilia-romagna.it/geologia/archivio_pdf/geotermia/01_caso_studio.pdf
http://ambiente.regione.emilia-romagna.it/geologia/archivio_pdf/geotermia/02_caso_studio.pdf
http://ambiente.regione.emilia-romagna.it/geologia/archivio_pdf/geotermia/03_spunti_riflessione.pdf

Since January 2013 the “Conto Energia Termica” allows to receive incentives for thermal retrofitting of buildings using geothermal heat pumps in 2 years (if $P < 35$ kWth) or 5 years (if $P > 35$ kWth) up to 10% of the predicted cost.

We also describe other more general subsidies and financial incentives.

In 2012 the Italian government has activated the Kyoto Fund¹¹ which finances measures for the reduction of CO₂ emissions. Kyoto Fund has an overall budget of 600 millions of Euros for three years. This fund can also finance several measures and in particular SGE installations with a capacity up to 1 MWt in order to improve energy performance from demand side. Beneficiaries are firms, ESCOs, public administrations, natural people, private legal people and apartment buildings. Beneficiaries are financed according to favourable credit terms.

In 2013 any mentioned legal entity may deduct 50% (until 31st December 2012 it was 55%) of the investment costs of their any energy efficiency investment including SGE costs from their tax bill, spread over ten years of 50% in residential buildings

Italian government has established white certificates for heat pumps with a high energy saving potential. This measure is addressed to ESCOs or subjects owning several installations

3.2 City or regional level

Lombardy Region

In 2011 public administrations were fostered to carry out SGE installations in their buildings because they received grants from Lombardy Region. This initiative was funded by Regional Operative Plan ERDF 2007-2013.

Piedmont Region

Piedmont Region has set the Energy Action Plan 2012-2013 which establishes funds (POR FESR 2007/2013) for energy efficient measures and adoption of renewable sources in enterprises and public administrations. In particular, these funds also foster the development of geothermal heat pumps.

¹¹ <http://portalecdp.cassaddpp.it/cdp/Areagenerale/FondoKyoto/index.htm>

Tuscany Region

Municipalities were financed by regional fund (POR Creo 2007-2013) in order to promote measures for the promotion of renewable energies and energy efficiency improvements in 2009.

Emilia Romagna Region

Emilia Romagna Region provides grants for projects (carried out in 2012) within his regional energy plan in order to promote energy efficiency and renewable energies in public authorities. In 2008 small and medium enterprises were financed by regional funds (POR FESR 2007/2013) for energy efficient measures and adoption of renewable sources.

4 Insurance systems

There are not insurance policies specifically dedicated to SGE applications. At the moment, insurance companies provide general insurance policies for environmental liability towards third-party.

5 Existing action plan

5.1 Elements of the NREAP applying to the SGE (heating & cooling)

Italian NREAP distinguishes between the share of thermal energy from direct uses and deep geothermal applications and from SGE systems with heat pumps. In particular, the NREAP suggests a likely exponential growth of SGE systems (geothermal heat pump) from 40 ktoe in 2010 to 552 ktoe in 2020.

The NREAP has foreseen the following measures that can support SGE systems:

- Tax relief: Italian legal entities and citizens, may deduct 50% of the investment costs of any other energy efficiency improvement investment for residential buildings from their tax bill, spread over ten years.
- Quantitative target for new buildings and major renovations: 50% of sanitary hot water must be produced by renewable energy sources, such as geothermal heat pumps.
- “Conto Energia Termica”: since January 2013 allows to receive incentives for thermal retrofitting of buildings using geothermal heat pumps in 2 years (if $P < 35$ kWth) or 5 years (if $P > 35$ kWth) up to 10% of the predicted cost.

- White certificates for heat pumps: these certificates are also assigned to ESCOs which adopt heat pumps with a high energy saving potential.

5.2 Committed or endorsed cities or regions

Legal obligation

Yes

No

The **Decree of the Ministry of Economic Development 15th March 2012** quantifies mandatory targets for Italian regions in order to achieve national target for renewable energies by 2020. Therefore, all regions have to contribute to increase the use of renewable energies including SGE systems and to identify a strategy in order to achieve their targets.

Lombardy Region

Legal obligation

Yes

No

Volunteer

Yes **No**

Some cities of the Covenant of Mayors have promoted the use of heat pumps for their buildings and introduce the obligation of the use of renewable energy sources in their building codes. For instance, The Municipality of Milan has established the obligation to provide at least 20% of heating energy need by means of renewable resources.

Tuscany Region

Legal obligation

Yes **No**

Volunteer

Yes **No**

Some cities of the Covenant of Mayors have promoted the use of heat pumps for their buildings and introduce the obligation of the use of renewable energy sources in their building codes.

Emilia Romagna Region (Province of Ferrara)

Legal obligation

Yes **No**

Volunteer

Yes **No**

Some cities of the Covenant of Mayors have promoted the use of heat pumps for their buildings and introduce the obligation of the use of renewable energy sources in their building codes.

6 Legal framework and Cities Planning

6.1 Current legislation and permit procedures in relation to SGE

Ground-Reach project¹² summarizes Italian regulations on geothermal energy until 2008. Italian regulation on geothermal energy started with the **Royal Decree 29th July 1927, n. 1443 (Mine Law)**. Then, the **Law 9th December 1986, n. 896** regulates the industrial production of geothermal fluids for energy purposes considering the geothermal resources nationally relevant and local small-scale applications.

The **Legislative Decree 11st February 2010 n. 22** reorganizes Italian regulations on geothermal energy and for the first time introduces the concept of SGE in the Italian regulations and repeals the **Law 9th December 1986, n. 896**. According to this new regulatory framework SGE applications are not subjected to mining regulations and are within Regions or other delegate local authorities. Regions have to regulate SGE applications and may adopt simplified procedures. The **Legislative Decree 11st February 2010 n. 22** establishes that in case of lack of regional regulations about SGE applications, it is valid national regulation without simplified procedures. In fact, the **Decree 19th July 2011** foresees minimum requirements for interventions to reduce energy consumption for end-uses and in particular for SGE applications. Then, the **Legislative Decree 3rd April 2006 n. 152** disciplines the use of water in the open loop systems.

These requirements are valid unless there are stricter regional regulations. At the moment, there is a partial lack in the regional and national regulatory frameworks concerning issues related to the installation of SGE systems in residential and non residential sector. For this reason we analyse three different examples of regional regulations: Lombardy, Tuscany and Emilia Romagna. Most of other Italian regions have not adopted yet regulation on SGE systems.

Lombardy Region

The **Regional Law 11th December 2006 n. 24** foresees the promotion of SGE systems. Then, the **Regional Law 29th June 2009 n. 10** establishes the adoption of simplified administrative procedures for the installation and maintenance of SGE systems (geothermal exchangers). The **Regional Regulations 15th February 2010 n. 7** defines the administrative procedure needed to install SGE systems and distinguishes two different procedures for geothermal exchangers:

- ≤ 150 m depth or horizontal
- > 150 m depth

¹² <http://groundreach.fiz-karlsruhe.de/script/tool/forg/doc822/D9%20Inventory%20EU%20legislation%20GCHPs.pdf>

The beginning of installation of geothermal exchangers less than and equal to 150 m deep or horizontal has to be registered in the official regional register of SGE installations. Then, the owner has to communicate the completion of installation within one year.

Installation of geothermal exchangers over 150 m deep has to be authorized by Provinces within 60 days. After the authorization installations have to be registered in the official regional register of SGE installations. Then, the owner has to communicate the completion of installation within one year. Moreover, installations with the capacity higher than 50 kWt have to provide information achieved by Ground Response Test:

- average soil thermal conductivity
- average undisturbed soil temperature
- thermal resistance of geothermal exchanger

Tuscany Region

The **Regional Law 24th February 2005 n. 39**, then modified by the **Regional Law 23rd November 2009 n. 71**, defines procedures for the installation of geothermal heat pumps. Provinces authorize the realisation of shallow wells less than 400 m deep in order to search, extract and use hot waters, included also waters coming from sources with thermal capacity not higher than 2000 kWt, and related installations for heating and power. Moreover, this law foresees that the installations of SGE systems (without extraction of geothermal fluid) for heating and cooling in buildings are subjected just to start working notice (*Segnalazione Certificata di Inizio Attività - SCIA*) sent to municipalities. Therefore, it is possible to carry out the installation after 30 days after SCIA communication.

Emilia Romagna Region

The **Regional Law 23rd December 2004 n. 26** regulates planning activities and interventions on energy using renewable energies at regional and local level. Moreover, this law defines planning activity for the carrying out of renewable energies installations.

In particular, regulations consider two SGE systems:

- open loop
- closed loop

In Emilia Romagna Region open loop systems are regulated by the **Legislative Decree 3rd April 2006 n. 152** and by the **Regional Regulations 20th November 2001 n. 41**. These installations are subjected both to drilling and using permits. If installations put water back into original aquifer, it is needed to receive permission by a public inquiry involving local Authorities (Conference of services).

SGE installations closed loop was regulated by the **Regional Regulations 20th November 2001 n. 41** (art. 17) and the **Decree of Ministry of Infrastructures 14th January 2008**. Therefore, these installations are authorized by Region, Municipality or both and have to follow prescriptions on water resources.

6.2 (Underground) Space planning

Is there a will in your country to link urban planning closer with renewable energy plans?

X Yes No

Regions integrate regional urban plans and regional energy plans taking into account also SGE systems. Moreover, there are other local planning instruments which try to integrate urban planning and energy plans.

Are there specific considerations of renewable energy integration (i.e geothermal energy) into construction licences?

X Yes No

Italian building regulations begin to consider the use of renewable energy sources both for electricity and heating and cooling for new buildings and even major renovations. There is a different level of commitment among regions. Some regions are frontrunners in different way, such as Province of Bolzano, Province of Trento, Lombardy, Emilia Romagna, Piedmont and Liguria. For instance, Emilia Romagna has established a mandatory quantitative target for the use of renewable energies for hot sanitary water and thermal energy in order to obtain the construction licence.

Recently, some Municipalities have introduced in their building code the obligation of use of renewable energies to produce hot sanitary water and heating and cooling mainly for new buildings and major renovations.

Is there a regulation concerning interactions between thermal uses of the underground and other utilisations (such as constructions, use of water, ...)?

X Yes No

In Italy the use of water is managed by local authorities (Regions and Provinces). Therefore, Ground Water Heat Pump Systems have to be authorized by local departments. If installations use the give back water to the aquifer or to superficial water bodies, technical and administrative procedures are subjected to permitting according to specific regulations in force in each region.

Building regulations foresee constraints for using underground for infrastructures/facilities (e.g. gas pipelines, power devices and equipments, etc.). These constraints are not specific to underground thermal uses.

- Is there a national/regional/local database of wells? Yes **X No**

If yes, who is responsible body, what does it contain (data fields) and what is the general quality of the data, is it public available, does it cost, who is obligated to report in data?

Regions and Provinces are responsible for collating data on wells. Data fields can vary pretty a lot from each administration, and the quality of database themselves. They can be publicly available from the websites or as hardcopies upon demand, and corresponding their cost.

Are there public databases concerning all the uses of the underground? Yes No

6.3 Integration of H&C systems in buildings

The **Legislative Decree 3rd March 2011 n. 28** introduces quantitative targets for integration of H&C systems with renewable energy concerning new buildings and major renovation of buildings. The decree does not consider specifically SGE systems. These targets consist of:

- 20% of energy for H&C from renewable energy sources (from 31st May 2012 to 31st December 2013).
- 35% of energy for H&C from renewable energy sources (from 1st January 2014 to 31st December 2016).
- 50% of energy for H&C from renewable energy sources (from 1st January 2017)

Do you have specific targets for integration of H&C systems (in parallel to development of renewable energy) concerning renovation/refurbishment of buildings?

Yes No (see description above)

Do you have a specific regulation on H&C systems concerning new constructions?

Yes No (see description above)

What are the intentions in the regulations and specific targets and how does it fit with geothermal energy development?

Regulations foster the use of renewable sources, mainly thermal solar energy, and sometimes specifically promote the use of geothermal heat pumps as substitutes of thermal solar energy. Therefore, we can conclude that geothermal energy is considered one of options but not main one. In practice many designers, developers, construction companies etc. understand that thermal solar can produce just hot water and not even cooling, which is

nowadays considered a standard both when provided as natural cooling or as a proper air conditioning system.

Are existing plants subject to periodic monitoring/report? **X Yes** No

Lombardy Region has established that local authorities (Provinces) have to monitor SGE installations.

Are existing plants subject to mandatory maintenance? **X Yes** No

Are operational performances (e.g. energy efficiency) guaranteed? **X Yes** No

If yes, specify (in average) how many years, designer/installer/technology provider, single component/whole system

Some companies use to give a warranty on energy produced by the geothermal plant installed (3 years, contractor, whole system).

7 Additional Table

For Ground Water Heat Pump		Comments
Are there temperature thresholds?	Yes	Some Italian Provinces (Milan, Mantova, Bolzano, Treviso, Venezia) have set a threshold on maximum delta temperature (usually + or – 5°C for open loop systems) and 20°C as top temperature of water discharged back to aquifer) in their guidelines. Discharge temperatures to superficial water bodies are regulated by law.
If yes:		
Please report the specific values	Technical thresholds	
	Relative values	
	(limit for heating/cooling)	Heating: +5°C / Cooling: – 5°C
	Absolute values	
	(maximum/minimum temperature)	Maximum: 20° or 25° C
	Technical thresholds	
	Relative values	
	(limit for heating/cooling)	
	(maximum/minimum temperature)	
Are the thresholds legally binding?	Yes/No; Level (state, city, etc.)	No, but strongly suggested

Which are the relevant laws/ordinances?	Title, year	Several guidelines at local level and D. Lgs. 152/2006
What is the basis for these values?	Rule of thumb	Some local authorities have established precautionary thresholds using the rule of thumb.
	Scientific studies	
	Something else	
If no:		
Is there a particular reason?		
Are any regulations planned for the future?		
Are there regulations referring to minimum distances?	No (for simplified procedures)	In case of installations without simplified procedures, one installation must not influence other near installations according to mining regulations. Usually, designers adopt a precautionary approach by establishing an appropriate distance between installation and boundary.
If yes:		
Which are the relevant laws/ordinances?	Title, year, name of the law/ordinance	
What is the basis for these values?	Rule of thumb	
	Result of research	
	Something else	
If no:		
Is there a particular reason?	Yes	There is a lack of scientific data.
Are any regulations planned for the future?	Yes	Some regions (Valle d'Aosta, Piedmont, Lombardy, Veneto, Friuli V.G.,) are

		working on regulations.
Does your country have any other laws, ordinances or regulations concerning thermal groundwater use?	Yes	
If yes, which are the relevant laws or ordinances?	Title, year, comments	Legislative Decree 3 rd April 2006 n. 152 Law n. 323/2000 Italian legislation on thermal groundwater foresees the qualitative and quantitative protection water resource.

For vertical heat exchangers		Comments
Are there distance thresholds? Minimum distance between 2 systems Minimum between two vertical heat exchangers	No No	There is a discussion about the type of threshold: minimum distance or temperature
If yes:		
Please report the specific values	Technical thresholds	
	Relative values (limit for heating/cooling)	
	Absolute values (maximum/minimum temperature)	
Are the thresholds legally binding?	No	
Which are the relevant laws/ordinances?	Title, year	
What is the basis for these values?	Rule of thumb	

	Scientific studies	
	Something else	
If no:		
Is there a particular reason?	Yes/No; Explanation	
Are any regulations planed for the future?	Yes	Public authorities are working on specific regulations
Are there regulations referring to minimum distances?	No	

Appendix

National regulations

Decree of Ministry of Economic Development 15th March 2012 “Definition and qualification of regional targets for renewable sources and definition of procedure to manage the lack of achievement of targets from regions and autonomous provinces (Burden Sharing)”, see: <http://www.gazzettaufficiale.biz/atti/2012/20120078/12A03600.htm>

Decree 19th July 2011 “Modification and integration of annexes for decree 25th November 2008 about regulation of the Kyoto Fund”, see: http://portalecdp.cassaddpp.it/content/groups/public/documents/ace_documenti/011332.pdf

Legislative Decree 3rd March 2011 n. 28 “Implementation of Directive 2009/28/EC on the promotion of the use of energy from renewable sources”, see: <http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2011;028>

Legislative Decree 11st February 2010 n. 22 “Reorganization of regulations on search and management or geothermal resources”, see: <http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2010;022>

Decree of Ministry of Infrastructures 14th January 2008 “ New technical regulations about constructions” see: http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaStrutturaRegionale/PIR_AssInfras trutturaMobilita/PIR_InfrastruttureMobilitaTrasporti/PIR_GenioCivileMessina/PIR_Normativadiriferimento/DM_14_01_2008.pdf

Legislative Decree 3rd April 2006 n. 152 “Regulations on environmental issues”, see: <http://www.camera.it/parlam/leggi/deleghe/06152dl.htm>

Law 9th December 1986, n. 896 “Regulations of exploration and exploitation of geothermal resources”, see: <http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:1986-12-09;896>

Royal Decree 11st December 1933 n. 1775 “Regulations of water and electrical systems” see: http://94.86.40.85/export/sites/default/archivio/normativa/R.D._11-12-1933_n._1775.pdf

Royal Decree 29th July 1927, n. 1443 “Regulations about exploration and exploitation of mines in kingdom”, see: http://www.federcave.it/index.php?option=com_content&view=article&id=142:regio-decreto-29-luglio-1927-n-1443&catid=70:regio-decreto-29-luglio-1927-n-1443&Itemid=37

Regional regulations

Tuscany Region

Regional Law 23rd November 2009 n. 71 “Modifications to Regional Law 24th February 2005 n. 39”, see:
http://www.regione.toscana.it/regione/multimedia/RT/documents/2009/12/11/7ce1f7e365b54558b1cc8fc9c4e38e4e_leggeregionale23novembre2009n71.pdf

Regional Law 24th February 2005 n. 39 “Regulations about energy”, see:
<http://www.ambientediritto.it/Legislazione/Energia/2005/toscana%20lr2005n39.htm>

Emilia Romagna Region

Region Law 23rd December 2004 n. 26 “Regulation on Energy Territorial Planning and other regulations on energy”, see:
http://www.arpa.emr.it/cms3/documenti/energia/normativa/lr_er_2004_26.pdf

Regional Regulations 20th November 2001 n. 41 “Regulations about public water’s concession”, see :
http://ambiente.regione.emilia-romagna.it/acque/informazioni/normativa/Regolamento%20Regionale%20n%2041_2001.pdf/view

Lombardy Region

Regional Regulations of 15th February 2010 n. 7 “Regulations about installation of geothermal exchangers closed loop”, see:
http://geotermia.cestec.eu/c/document_library/get_file?p_l_id=1554609&folderId=2448894&name=DLFE-8624.pdf

Regional Law 29th June 2009 n. 10 “Regulations about environment and economic services” see:
http://geotermia.cestec.eu/c/document_library/get_file?p_l_id=1554609&folderId=2448894&name=DLFE-6807.pdf

Regional Law 11th December 2006 n. 24 “Regulations about prevention and reduction of emissions for health and environmental protection”, see:
http://geotermia.cestec.eu/c/document_library/get_file?p_l_id=1554609&folderId=2448894&name=DLFE-6808.pdf