

REGEOCITIES

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2nd Edition, May 2014

Analysis of Market for Shallow Geothermal Energy



Co-funded by the Intelligent Energy Europe
Programme of the European Union

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This second edition of the annual monitoring report within project Regeocities is designed to review the available sources for statistical data, to assess the quality and accuracy of the market information given, and to evaluate the development since the first report in 2013.

The quality of the statistics for the shallow geothermal sector still varies greatly, from country to country. In addition, any data published in the past by Eurostat need to be taken very cautiously, as Eurostat can only compile and report national information. Up to now, the least ambiguous item in the statistics used to be the number of heat pumps sold annually, with those suitable for geothermal use (water-water, brine-water, water-air, brine-air, or ground-coupled direct expansion units) counted separately. A distinction between water-water/water-air heat pumps using groundwater (“geothermal” according to Directive 2009/28/EC) and surface water (“hydrothermal” according to said directive) could not be made, however, as the number of heat pumps systems using surface water is very small, this issue can be neglected for the moment.

Possible sources for data are the national statistical offices, national and European associations for heat pumps and for geothermal energy, and large conferences like the World Geothermal Congress WGC 2010 or the European Geothermal Congress EGC 2013, where country update reports are delivered, also covering shallow geothermal energy. For this second edition of the report, data from EGC 2013 could be used for calibrating some development.

There is also a project supported by IEE for compiling renewable energy statistics, EurObserv’ER. A biannual review on ground source heat pump market is published under the name “Heat Pump Barometer” by this project. In figure 1, the numbers of new ground source heat pumps installed in the Regeocities partner countries are shown for the years 2007-2012, based on data from different editions of the Heat Pump Barometer. Already at first glance, the strong (and continuing) decrease of new installations in Germany, France and Ireland can be seen in that graph.

While EurObserv’ER is a valuable source, combining data from various sources throughout Europe, it is not (and cannot be) fully consistent. In particular for the smaller markets, data is only given for certain years. In addition, not all heat pumps are considered, as an upper limit of 50 kW heating capacity is observed. When calculating the total number of geothermal heat pumps installed from the annual sales numbers, assumptions for heat pumps scrapped and for units replacing older heat pumps (an issue in particular in Sweden!) have to be made. The discrepancies in different statistics can be highlighted by comparing the development in the mature markets in Germany and Sweden using statistics created by EGEC from different sources (mainly WGC 2010 / EGC 2013, national associations, EHPA, etc.) and using those from EurObserv’ER (figure 2).

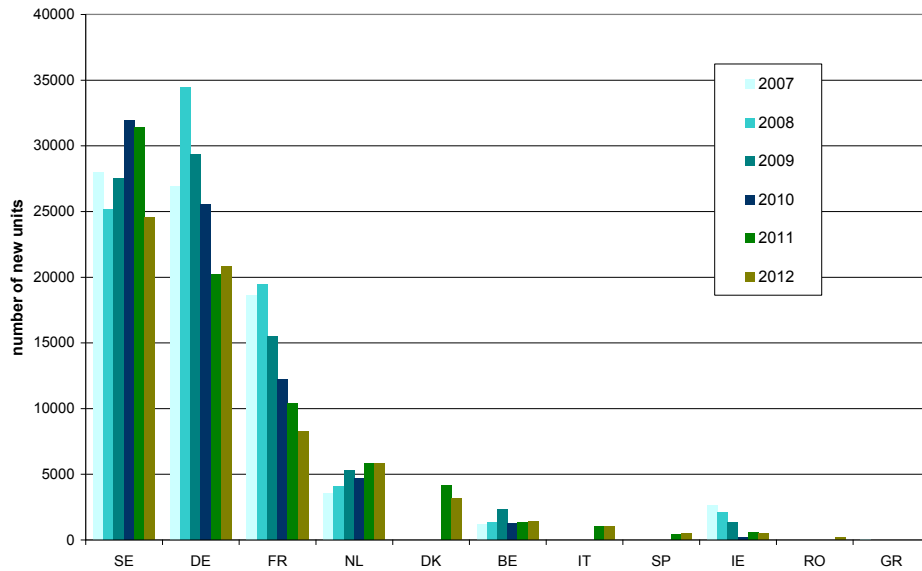


Fig. 1: New installations of geothermal heat pumps in the Regeocities project countries for the years 2007-2012, after EurObser'ER Heat Pump Barometer

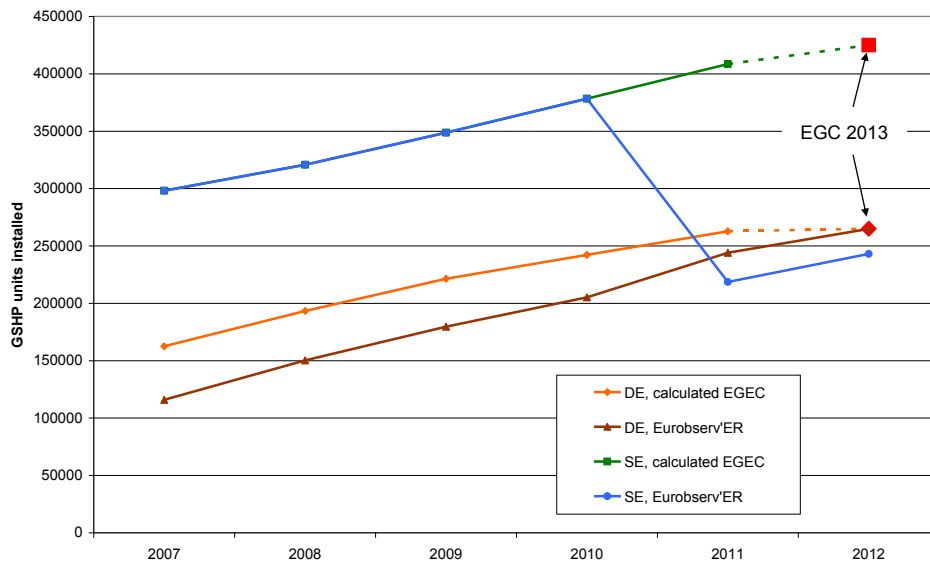


Fig. 2: Total installed geothermal heat pumps in Germany and Sweden, for the years 2007-2012, after own calculations (see Monitoring Report 2013) and data from EGC 2013 (for 2012), and from different issues of the EurObser'ER Heat Pump Barometer

For Germany, the curves follow basically the same pattern, with the EGEC curve higher than that from EurObserv'ER. This can be explained by the issue mentioned above, and in addition, the difference is decreasing over time. For Sweden, the situation is rather different. While the data up to 2010 shown an almost perfect match, the 2011 value from EurObserv'ER is substantially lower than those of the years before. This could be because a new approach has been taken, but no further details are given in the Heat Pump Barometers. Hence, a comparison of installation data from EurObserv'ER over time (as shown in figure 3, for total number of units existing) should be taken with caution. A strong reduction in numbers can be seen in Sweden and France, and a smaller reduction can be seen in Italy, Belgium and Ireland – it does not seem likely that about 42% of all geothermal heat pumps in these countries were removed from 2010 to 2011!

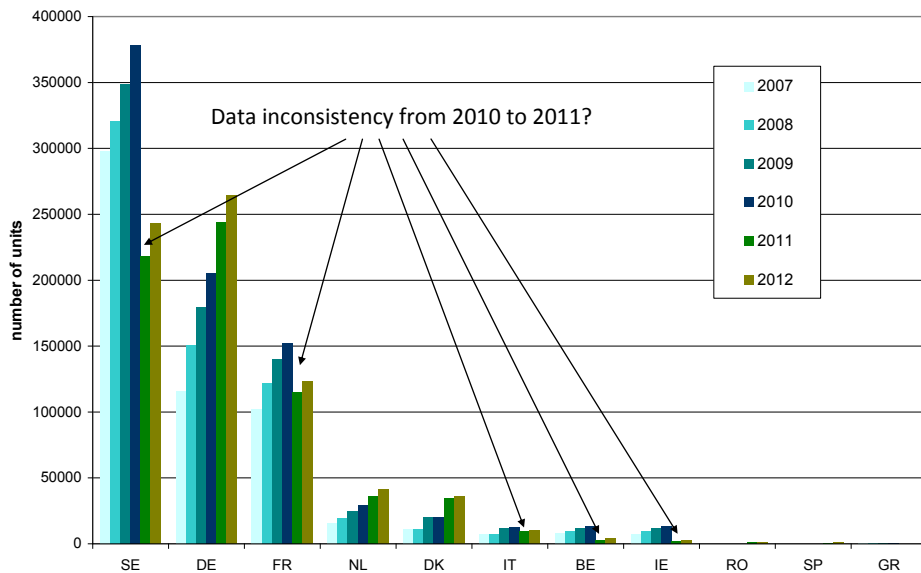


Fig. 3: Number of existing geothermal heat pumps in the Regeocities project countries for the years 2007-2012, after different issues of the EurObserv'ER Heat Pump Barometer

The direct comparison of data for 2012 from EurObserv'ER and from EGC 2013 is shown in figure 4, for the Regeocities project countries. While some consistency can be seen in the number of new units, in particular for Sweden, Germany, Belgium, Spain (EurObserv'ER does not give values for all Regeocities project countries), big discrepancies exist in the (partly estimated?) number of existing units for Sweden, Italy, Belgium and Ireland, and to a lesser extent for France and others.

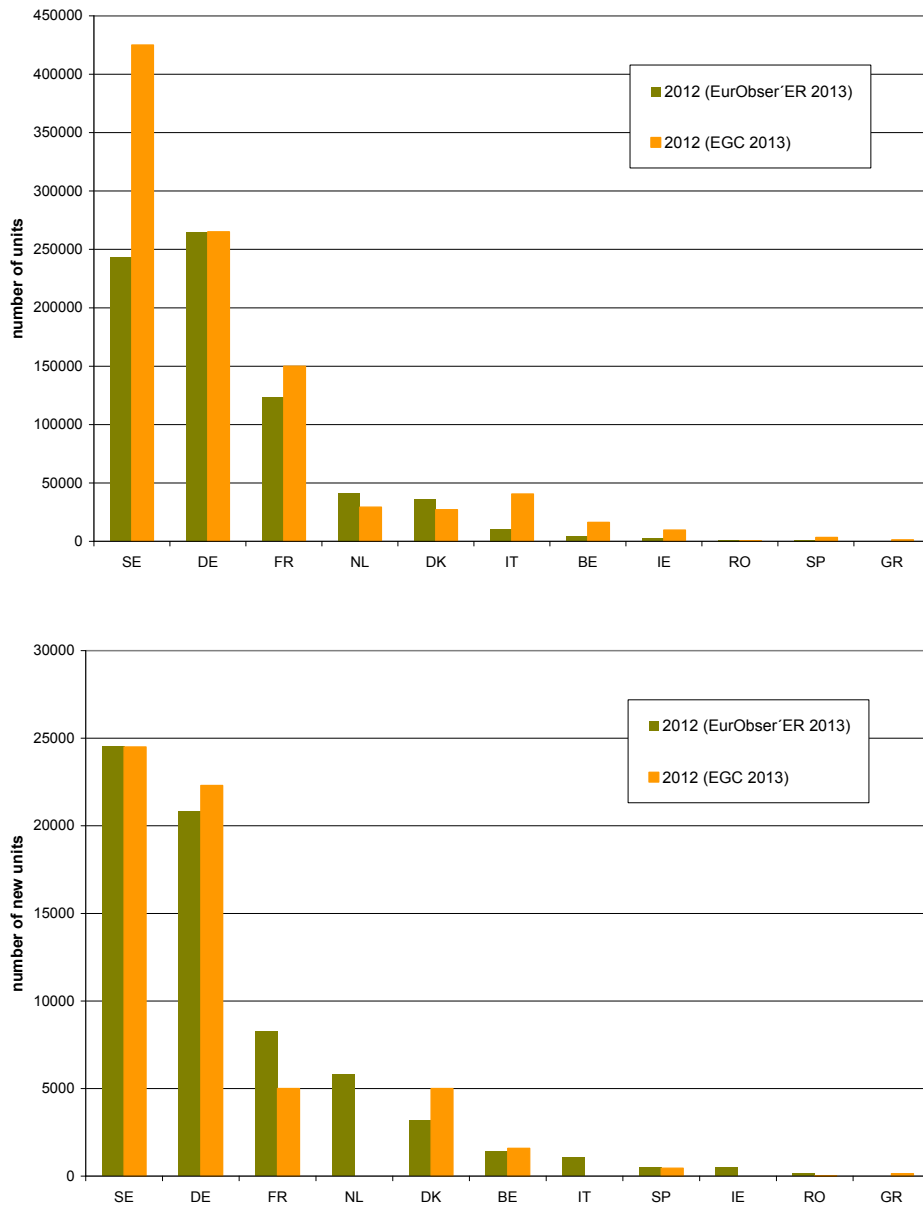


Fig. 4: Comparison of data for 2012, as stated in EurObserv'ER Heat Pump Barometer and in EGC 2013 country update reports; number of existing geothermal heat pumps on top, number of new installations in 2012 below

Figure 5 shows values for 2009-2012 of the produced heat from geothermal heat pumps in the Regeocities countries as given by EurObserv'ER, as an example. However, when talking about installed capacity and heat delivered, it was not clear in all statistics what was actually meant: the heat produced by the heat pump, or the geothermal energy (renewable) taken from the ground, and how the values were determined. In the meantime, the Directive 2009/28/EC (the "Renewable Energy Directive") has given clear rules on how to calculate the renewable share, as explained in the first issue of this report from May 2013.

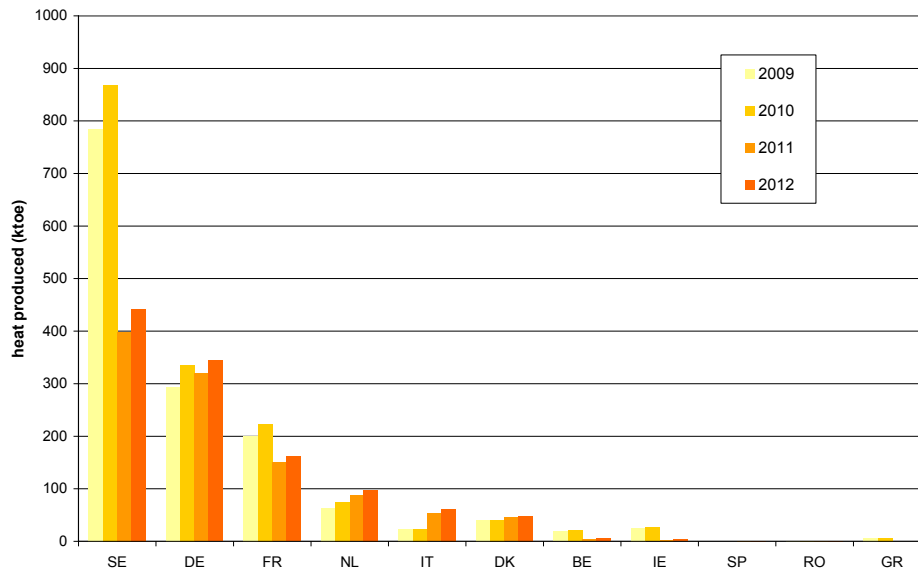


Fig. 5: Heat produced by the existing geothermal heat pumps in the Regeocities project countries for the years 2009-2012, after different issues of the EurObserver Heat Pump Barometer (the same inconsistencies for SE and FR as in figure 3 can be seen)

In general, it can be expected that statistics will become more consistent and meaningful in the coming years, as a result of the obligations Directive 2009/28/EC has imposed upon the EU member state administrations. The conclusion in the first issue of the report is still valid: **For the purpose of monitoring the common performance indicators for the Regeocities project, for the moment only the bare number of new ground source heat pump installations can be used**, as for all other data the rules and boundary conditions are in a period of change, and the published data might not be comparable with the years before or after.

As a result of the market review, the following points can be stated:

- Ground Source Heat Pumps have seen a tremendous market development in some European countries until about 2009. Sweden and Switzerland have been leading since the beginning in the 1980s, however, some other countries with a more difficult start in the same period, like Germany, now have caught up. In France, the development started later, but the opportunities for a widespread, successful use of GSHP are very good. In Sweden a kind of saturation can be seen, with areas in population centres filled with geothermal heat pump installations (fig. 6). In such circumstances, the replacement of older heat pumps becomes the driving market force, with more efficient technologies allowing energy savings, but also challenging the existing ground installations.

- Also in 2012 the trend in most mature markets continued, with the annual number of new installations decreasing over the past few years. The suspected reasons are of economic nature (general crises, unfavourable relation of prices for electricity and other energy in some countries, etc.), and due to alleged overregulation resulting in increased costs and time.
- There are several countries with a satisfactory development, among them some smaller players like Ireland and the Netherlands. The opportunities described in previous studies (e.g. in the shallow geothermal section of the EGEC Market Report 2013-14) are still there, but better boundary conditions and appropriate regulation is needed in order for them to take shape!

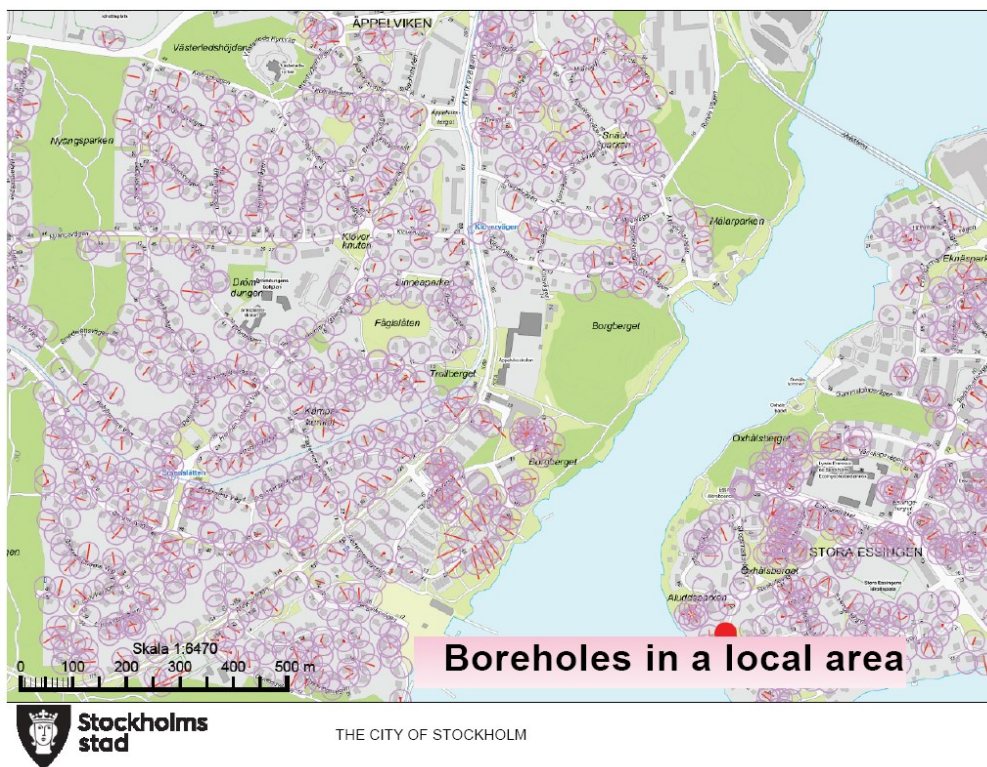


Fig. 6: Map showing geothermal heat pump installations with borehole heat exchangers (BHE) in Western suburbs of Stockholm, with circles of 20 m radius around each BHE location in order to avoid interaction; from a presentation at the Regeocities Workshop Brussels 2014, by Pia Winbladh Högfors, for download at: http://regeocities.eu/wp-content/uploads/2014/05/3-GSHP-Bryssel-23-maj_midsommar-rev.pdf

The eleven Regeocities partner countries indeed cover a major part of the geothermal heat pump market in the EU, and thus are a valid representation of the overall market, as can be seen in figure 7. Alas, the decrease of the market since the high in 2008 can also be seen in that graph. As a consequence, the main goal of Regeocities might have to be readjusted,

from a substantial increase of the market, to stopping the decrease and turning it into a growth again.

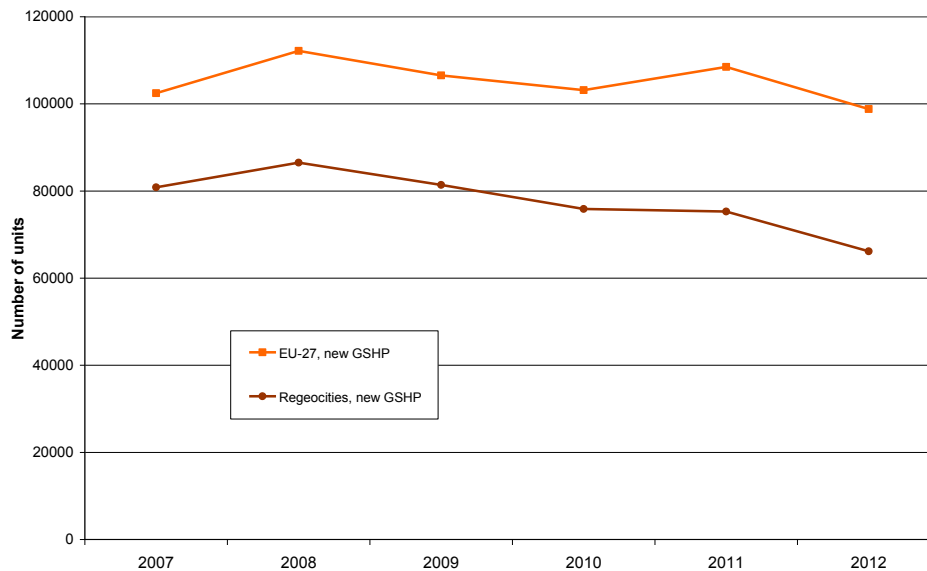


Fig. 7: Development of total number of new geothermal heat pumps in EU-27 and in the Regeocities project countries for the years 2007-2012, after different issues of the EurObser'ER Heat Pump Barometer

Finally, for the purpose of monitoring the common performance indicators for the Regeocities project, at the time of writing (May 2014) the number of new units installed was available only until end of 2012. **Therefore, an impact of the project (started in 2012) in terms of triggered investments, renewable energy production, primary energy savings, and greenhouse gas emissions reduction cannot be seen in the statistics, and the analysis will have to wait further to future versions of this report.** As stated above, a stopping of the market decrease could be considered a success already under the current circumstances.

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