N° 3 | November 2010

European Heat Pump NEWS

ehpa european heat pump association

editorial

The need for data: OUTLOOK 2010 – European Heat Pump Statistics

Karl Ochsner (President)

This fall is a season of reports on energy! The EU has published an update on its energy strategy, a new efficiency regulation is underway and EHPA has just now published one of its major reports: The Outlook 2010 - European Heat Pump Statistics. In the effort to implement the major Regulations and Directives passed recently, a solid database will become more and more important. EHPA is contributing to this challenge!

Market Figures

The 2010 Outlook provides data on the heat pump units sold, the impact on the use of renewables as well as on greenhouse gas emissions and does also provide an in-depth analysis of national markets. The report shows remarkable progress in covering the European markets for heat pumps: On top of the traditional nine countries with a reliable data set (Austria, Finland, France, Germany, Italy, Norway, Sweden, Switzerland and the UK), the 2010 report covers an additional eight newcomers (Belgium, Czech Republic, Estonia, Hungary, Ireland, Lithuania, Netherlands and Slovakia). This makes the reporting much more complete and means a further step towards collecting a consistent set of data for industry and decision makers in Europe. The data presented can also be used to calculate the energy demand in European buildings, an information that is rarely available in other statistics. In fact EHPA has suggested a basic procedure on the collection of data on heat pump contribution to energy demand in buildings, an important part for the evaluation of renewable energy share in buildings to be collected and published by Eurostat.

An increasing market share requires quality!

When we look at the development of the shares of the different heat sources we will notice that the number of air source heat pumps is growing significantly. Air as a renewable ambient heat source is available practically anywhere and inexpensive to use compared to ground sources. Due to the strong impact of reliable and efficient heat pump units on operating cost (especially in cold climates) the need for quality becomes more obvious. The EHPA members are working hard towards further developing both the

- quality of installer education via its EUCERT training and certification scheme, and
- quality of the product via the EHPA Heat Pump Quality label.

Both labels are gaining recognition in the market place. Their requirements are an important and reliable quality guide for the end user and fulfill the requirements as set in the RES Directive on promoting heat pumps and on the need for certification programs for installers.

When applied in combination, these approaches help to ensure high system quality. While the Quality Label includes product and service requirements (third party tests acc. to EN 14511), the EUCERT program aims at educating the installer on all parts of the value chain of a heat pump installation.

A small first step toward system evaluation

The Ecodesign directive will ask for seasonal performance data and the consideration of several basic system configuration inputs. The calculation of the requested ETA (a primary energy efficiency value that allows for the comparison of all heat generators) will basically be based on EN 14825 standard. EHPA opts for keeping third party tests with a family approach obligatory to ensure a reliable data on the Energy Label.

Another benefit of heat pumps

We have achieved a lot so far but there are many new upcoming challenges: As heat pumps use electricity as auxiliary energy to provide renewable heat, the energy sources used for electricity production do become an issue for heat pumps. EHPA thus gladly notes, that according to the EU update on energy trends till 2030, renewables will account for almost one third of total power generation at that time. Wind energy and PV will play a major role. The heat pump, wind and photovoltaik industry associations are already today working together to use this powerful mix to the fullest: Heat pumps with smart controls can serve as a buffer for intermittent electricity thus contributing to a more balanced electricity supply with a high share of renewables to be employed in energy efficient smart cities and regions alike.

Karl Ochsner | President EHPA

content

The European Heat pump market 2009 and outlook for 2010

The most current version of the EHPA European Heat Pump outlook is now available. It shows the picture of a market that is stabilizing after two years of very demanding economic times. The outlook for 2010 is slightly positive.

The global economic crisis has not left the heat pump market untouched. It has led to more cost conscious buying decisions (often unfortunately governed by a very short time horizon) and a reduced rate of building construction. This has substantially influenced the sales of heat pumps in the new building segment, a segment that still dominates the heat pumpmarket in many European countries.

Lower prices for fossil fuels lead many home owners and project developers to postpone a decision towards replacing an existing heating system in general and towards selecting a heat pump based system in particular. In some countries this effect was further pronounced by a reduction or phasing out of existing financial support systems for heat pumps. In combination, these developments have lead to a significant reduction in heat pump sales in all markets but Switzerland.

The EHPA statistics – with data for the UK added in 2009 – now provides longitudinal data for 9 countries since 2005. This part of the European market fell by roughly 9,9 % to 526 263 units compared to 2008 data (see figure 1). The full statistics 2009 covers a total of 17 European countries in which 592 322 heat pump units were sold. Despite the overall market decline, it is worth mentioning that the heat pump industry has in many cases been more fortunate than other industries and even renewable energy sectors. In addition, the figure provided is a very conservative estimate, as national markets on the rise like Denmark, Ireland, and the Netherlands are not included in the presented data.

The outlook for 2010 shows that the market decline was stopped and that approx. the same sales figure as in 2009 is expected to be reached in 2010.

Some national developments are noteworthy to explain the drop: the French heat pump market is a good example for the combined effect of a reduced subsidy scheme at the same time as the crisis: 2009 sales of air/water heat pumps – the type providing the majority of sales in France – dropped by 26 500 units, whereas brine/water heat pumps stayed at the same level as the previous year. This drop alone constitutes for 4,5 % of the European sales reduction.

Whilst most European markets are dealing with the first generation of heat pump customers, some of the more mature markets are experiencing a growing replacement market for old heat pumps. Sweden is such a market, where sales figures dropped by 9 % in 2009, but overall, the heat pump industry strengthened its position on the heating market and is now estimated to stand for more than 80 % in the sector of new single-family houses. Sales are stabilized in part by a growing replacement market for heat pumps. In Sweden, this segment has been estimated at 8% in a recent market study performed by the Swedish Heat Pump Association, SVEP.

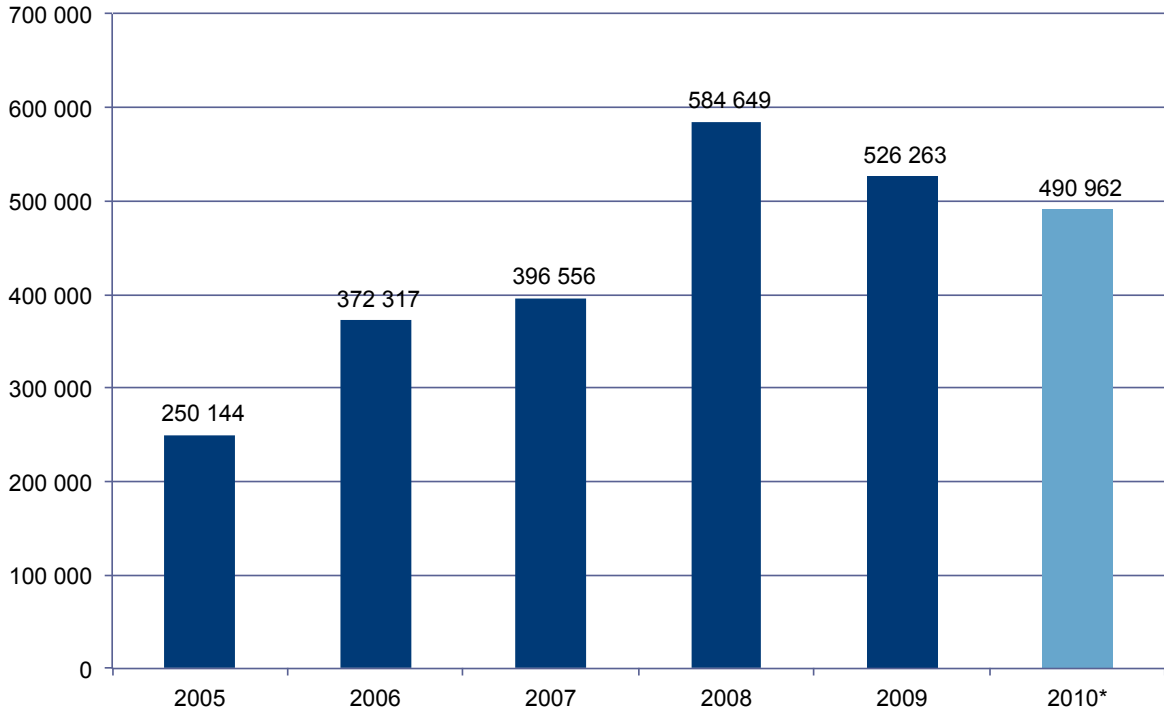


Figure 1: European heat pump sales 2005–2009 covering Austria, Finland, France, Germany, Italy, Norway, Sweden, Switzerlandand the UK.

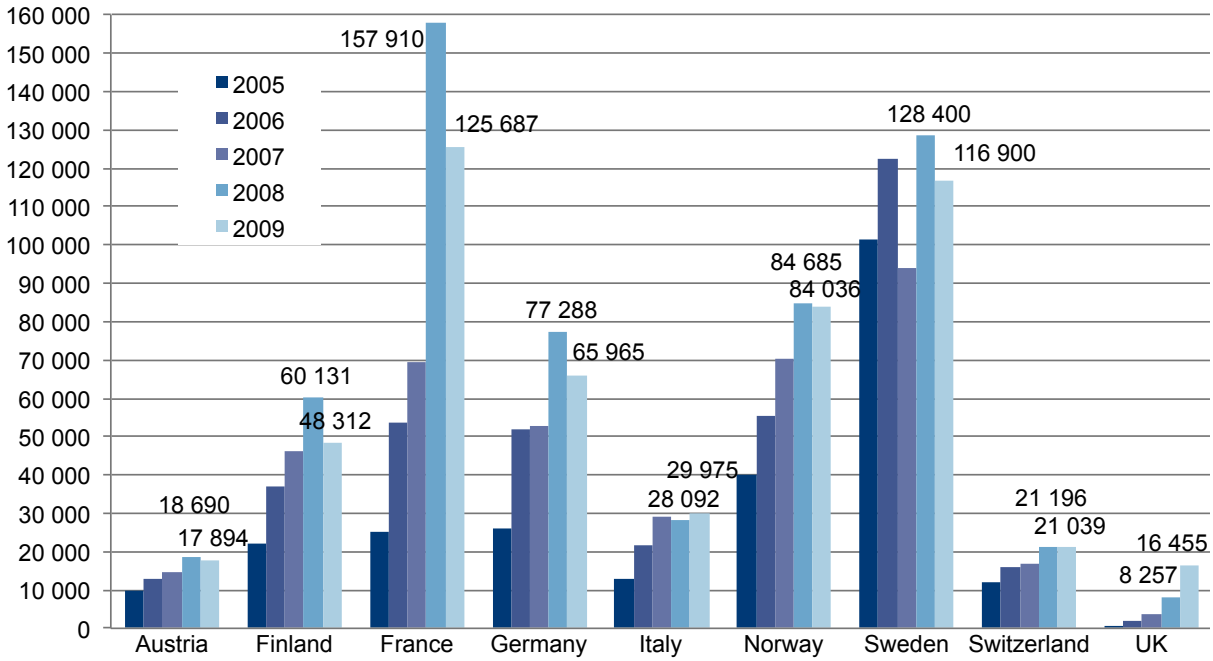


*Figure 2: Heat pump units sold 2005–2009 per country (*including air/air heat pumps).*

Renewable energy provided by heat pumps

The implementation of the RES Directive in the Member States (due later this year) gives special attention to the contribution of heat pumps to the use of renewable energy sources. The significant impact already being made by heat pumps is often underestimated. Based on EHPA statistics, a total of 2129929 heat pump units were sold from 2005–2009 in the EU-9 area. These heat pumps are annually contributing a total of 25,96TWh of renewable energy to the overall energy consumption in the heating sector and have saved a similar amount of final energy. As the pool of operating units is even larger, the total savings will be, too (see figure 3).

The full report "Outlook 2010 – European Heat Pump Statistics" has 116 full color pages and is available now. It is distributed for free to the members of the association.

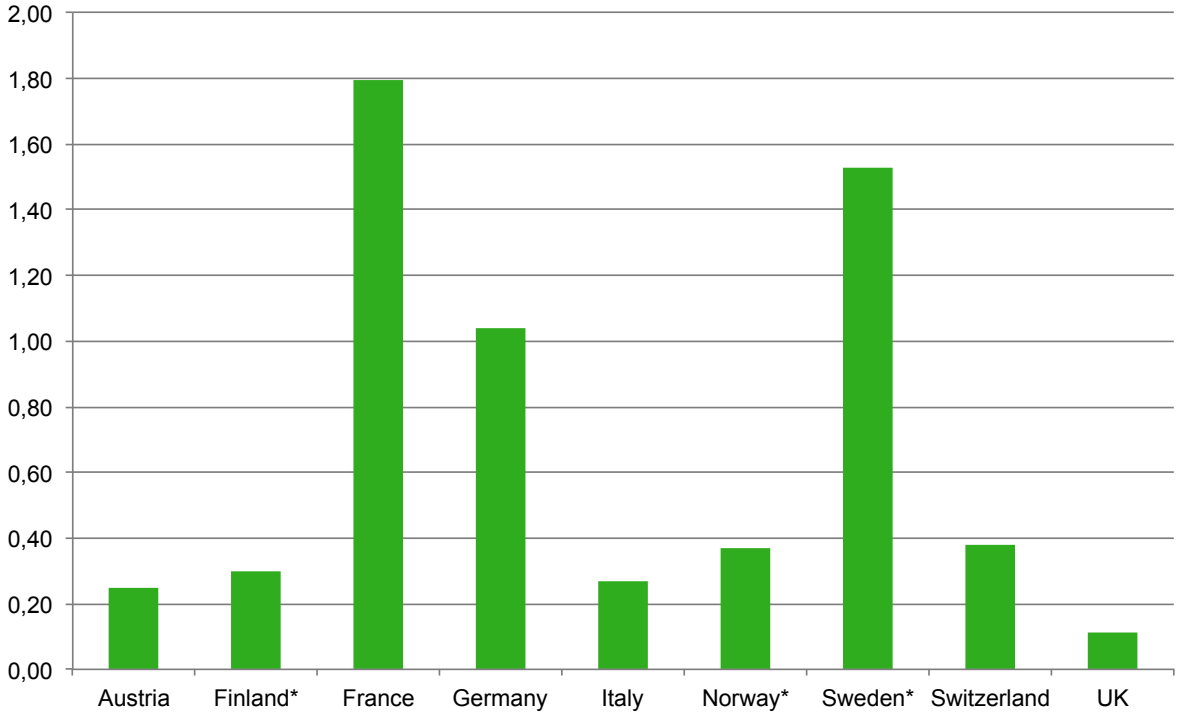


*Figure 3: Renewable energy from heat pumps installed from 2005– 2009 (in TWh / *including air/air heat pumps).*

SEPEMO build
Field test sites in Europe

In the SEPEMO-Build project, a total number of approximately 45 field sites will be monitored for a calendar year, using the methodology developed in the project. In addition, a number of other projects around Europe have started to use the system boundaries developed, and Fraunhofer ISE plan to include measured results from some of their field measurements in the evaluation process, using the methodology. This paper presents an overview of the field sites chosen for monitoring in Sweden.

In Sweden, the market for heat pumps in the domestic sector mainly consists of four different product categories, Ground Source heat pumps (GSHP), Air source heat pumps with hydronic heating systems (ASHP), Air source heat pumps with air distribution (reversible split units) (A2A), and Exhaust air heat pumps (FVP).

The three first categories have a large market potential in Europe, and are also stated in the RES-directive as products supplying renewable heat to the end user. Therefore the field measurements in Sweden will capture the efficiency of these types of units. The sites to be measured are therefore 3 A2A, 2 ASHP, and 3 SGHP, of which one of the GSHP is a hybrid system with solar thermal panels contributing to the useful energy delivered (cf. figure 4). The renewable energy contribution from exhaust air heat pumps is not so easy to describe, and therefore we choose to exclude this type in the SEPEMO project. This product category could however have a large market potential, since they utilize exhaust air that should otherwise have been vented and thereby constitute a large heat loss from the building. There is of course also the possibility to use a heat exchanger to heat incoming ventilation air.

For practical reasons, since we want to have close access to the sites, all field sites are located in western Sweden. This makes it easy to quickly go to the sites and make corrections in case of problems with the measurement equipment.

All field sites chosen in Sweden represent the retrofit market. Some have made adjustments to the heat distribution system by incorporating underfloor heating systems, but most sites have the original radiator in place. This will be an important factor in the evaluation of the field sites, since this could be said to represent a "lower bound" of what could be expected in terms of efficiency for heat pump systems. (New built houses have better insulation levels, and are often designed with low temperature heating, which improves the working conditions for heat pumps).

All installations of the measurement equipment and all electrical works have been made by qualified installers under supervision of SP, and SP have implemented a wireless measuring system. This system connects the sensors to a base station.

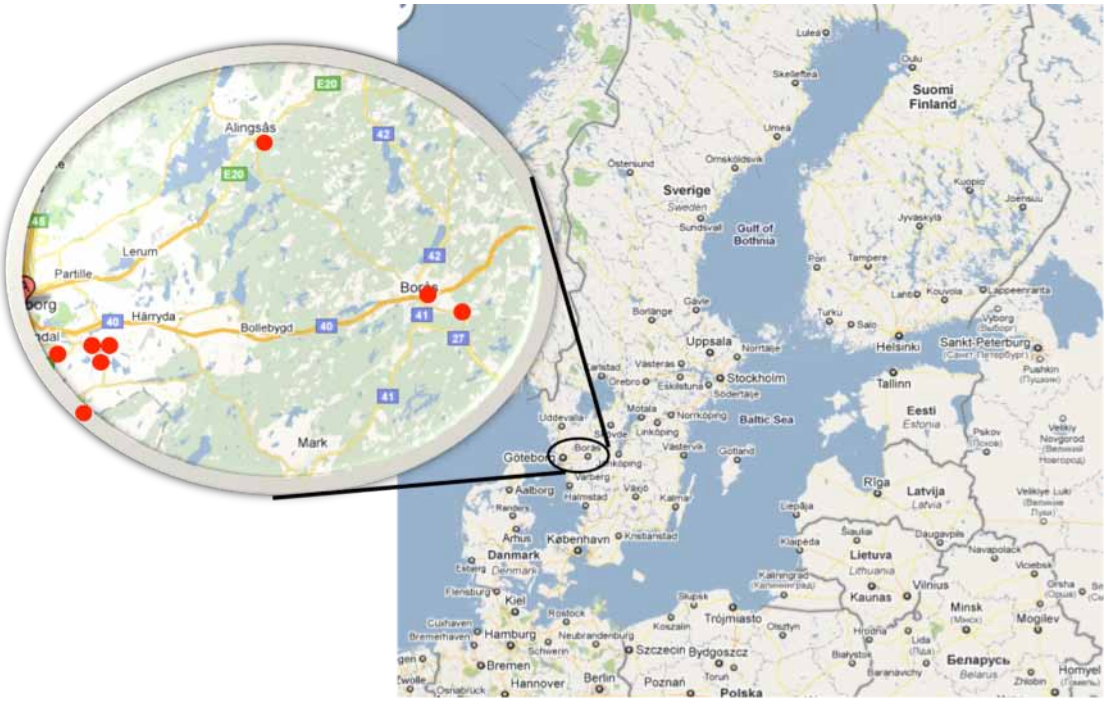


Figure 4: Heat pump measurement sites in Sweden.

The table below summarizes the field measured sites in Sweden.

Site #	Building year	Building heated area [m²]	Building location	Heat pump type
1	1974	155	Mölnlycke	A2A
2	1991	280	Onsala	ASHP
3	1963	200	Mölndal	ASHP
4	~1980	140	Alingsås	A2A
5	1946	170	Borås	GSHP
6	1982	~150	Mölnlycke	GSHP
7	1977	147	Dalsjöfors	A2A
8	1961	~200	Mölnlycke	GSHP

It is especially noteworthy, that the buildings measured and evaluated included those equipped with A2A systems. As no standardized way to perform the measurements in this category exists, SP will use a methodology developed in-house, and compare it with other methodologies used for field measurements, and with a lab method. The results will therefore also give some guidance to further field method developments for this heat pump type.

The installation of the measurement equipment is complete W49, and from that week, trimming of the measurement equipment will proceed for a week or two before the measurements start. All measured data is sent by email to SP on a daily basis for check of consistency, and evaluation of the performance will be made on a monthly basis.

Roger Nordmann, SP, Project Coordinator

SEPEMO measurements in Greece

Installation sites in Greece with measurements ready to proceed

Field measurement sites in Greece are only using geothermal units. They are quite diverse ranging from single family buildings to office buildings to a large luxury hotel. The measurements are expected to support the claim that heat pumps are available for (nearly) all fields of application.

Test site no. 1: Hotel "Amalia", Nea Tirintha

Hotel "Amalia" with a total area of 8.979,07 m2 is located in "Kaminia", Nea Tirintha near Nauplio in Peloponese, Greece. The building was entirely renovated during the years 2007-2008 and is heated and cooled by an open loop geothermal heat pump system. The main components of the system are two subsaline groundwater supplying wells (60m depth each one) and two reinjection wells (60m depth each one), two titanium heat exchangers, two electrical water source heat pumps (both use R407C as refrigerant) placed in cascade and fan coils units (floor standing type). In addition, hot water is supplied to the building by an oil boiler. The build ing heating and cooling loads are 704 kWth and 566 kWc respectively. After two years (2008-2009) the adopted technological choices in the Hotel "Amalia" have allowed significant energy and financial savings.

Figure 5: View of the Hotel "Amalia".

Figure 7: T he central building and the geothermal energy hub.

Test site no. 2: Office building, Keratea

The central building and the geothermal energy hub (with a total area of 150 m2) of the Park of Energy Awareness (PENA), which was developed by CRES, is located in Keratea, in Attiki Region, Greece. The buildings are heated and cooled by a closed loop geothermal heat pump system. The main components of the system are five borehole heat exchangers (25m depth each one) and a heat pump (uses R407C as refrigerant and has 16,9 kWth nominal capacity). The heating/cooling distribution system consists of four (4) fan-coil units (floor standing type).

Figure 6: Office building of Centre for Renewable Energy Sources (CRES).

Test site no. 3: Office building of CRES, Athens

The bioclimatic and low-energy consuming office building (total area 428 m2 with two (2) storeys and a basement) of CRES is situated in Pikermi, in east area of Athens. The building was designed and constructed (during the years 1999-2001) as a demonstration building which applies various RES technologies and energy saving techniques. Among RES technologies used in the building, the geothermal water-to-water heat pump (with R22 as refrigerant) operates in bivalent mode and covers about 21 % of heating and 15 % of cooling loads of the building. The unit uses the thermal energy content of the stored water of the existing well which is 80m deep, located 10 m north of the building. After use the water is reinjected into the production borehole. The heating/cooling distribution system into the building consists of fan-coil units (FCU). The heating and cooling capacity of the aforementioned system is Pth=17.5 kW and Pc=16 kW respectively.

Test site no. 4: One family house, Pikermi

The Residence (total area 180m2) is located in the Center of Pikermi, Attiki. The Residence is heated and cooled by a geothermal heat pump system. The main components of the system are one groundwater supplying well (92m depth) and one reinjection well (94m depth), one electrical water source heat pump (of 8,7 kWth/6,8kWc nominal capacity and uses R407C as refrigerant) in serial connection with the under-floor system of the house. In addition, there is a direct expansion small electrical heat pump attached to a 300lt hot water tank, producing sanitary hot water by using as a source the return pipe of the floor system, extracting energy from the circulating water. The building heating and cooling loads are 8,7 kWth and 6,8 kWc respectively.

Figure 8: View of the family house.

Plans for the measurements

The monitoring of the three sites will start on the 1st of December 2010. The heat pumps will operate in the heating mode from the 1st of December 2010 till the 31st of March 2011 and in the cooling mode from the 1st of April 2011 till the 15th of October 2011. The operating points for heating are 40°C (with an internal temperature of 22°C) and for cooling are 7°C (with an internal temperature of 26°C) in the first three sites. In the fourth site the operating points for heating are 35°C and for cooling are 14°C.

Olympia Polizou, CRES

SEPEMO measurements in France

Monitoring of two geothermal heat pumps in a double single family house in France

The European Sepemo project (IEE) aims at developing harmonized methods for monitoring and evaluation of performances as well as quality assurance guidelines of heat pump systems. Besides these developments, the Sepemo project includes several real monitoring projects in order to a) allow to test the methodologies and b) gather more monitoring data. Among other monitoring projects, the monitoring of two attached single family houses is currently under preparation and will start by the end of 2010.

The test sites described in this article will be monitored with three main objectives:

- Apply and test the monitoring methodology from Sepemo
- Demonstrate the feasibility of a monitoring kit with low costs
- Use the monitoring data in order to validate a new dynamic laboratory testing approach allowing to measure annual performances of heat pump systems in reduced time

Description of the monitoring sites

Both monitoring sites are located in a semi detached house in the north of France. Both parts of the house are identical in terms of construction and conception of the heating system.
The systems are conceived for heating only; emitters are floor heating systems in both houses. The heat pumps on the other hand are different, but both have a nominal output of about 6 kW heating.

The heated area of each house is 98 m². The installation was completed in June 2010. The system is operated without backup heating and is connected to the heat distribution system without buffer storage. The specific heat load of the building is 75 W/m². The system has been sized for a max. supply temperature of 35 °C (with a 30 °C return temperature) and the houses are heated by a floor heating system.
The source side consists of a geothermal borehole exchanger for each house with a depth of 95 m. The nominal COPs of the electrical heat pumps (scroll compressor) are 4.3 and 4.6 respectively for 0 °C / 35 °C. The refrigerant is R410A.

Developed of a cost efficient monitoring kit

A new monitoring kit has been specially developed for the Sepemo project and a French project on the monitoring of heat pumps in the frame of the "Fonds chaleur", funded by Ademe, the French energy agency. The main objectives of the kit are:

- Reduce cost level while matching the accuracy specified in the Sepemo methodology
- Measure data in a short time interval and send compiled data every minute to a data base
- Display monitored data online on a web-site (actualised every minute)

All measurements are based on commercial products guaranteeing the necessary. The heart of the monitoring kit is a micro PC, communicating with the measurement equipment via a bus network (Modbus) and sending data on a server. The PC allows any intermediary calculation since the monitoring is carried out using the simulation program TRNSYS (or TRNSYS executable), allowing in a second step to combine monitoring, fault detection and online optimisation.

Measured values of the kit are as shown in figure 3. Room and external temperatures are measured by wireless sensors. The cost for this type of monitoring kit is 2500 € excluding internet connection, for a single family house, and is thus very attractive compared to classic monitoring kits using data. These costs can still be reduced when only SPF values are needed.

Figure 9: Monitoring sites in northern France.

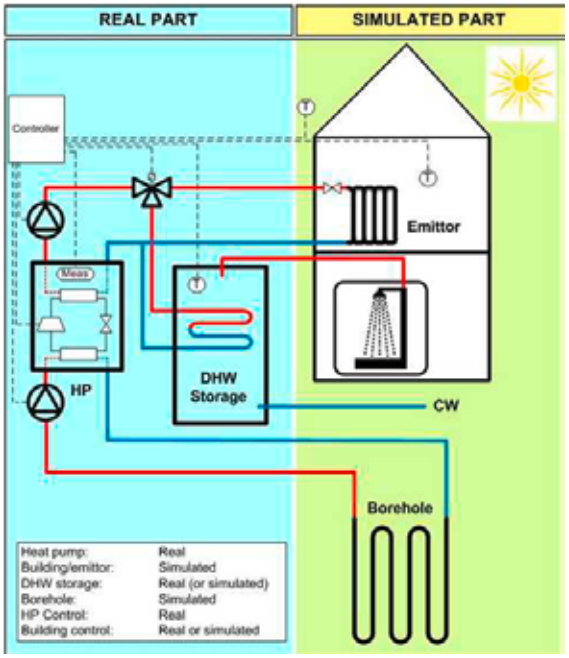


Figure 10 (left): Monitored heat pump in one of the two sites.

Figure 11 (right): Layout of a semi-virtual test configuration.

Dynamic laboratory testing

The two described French monitoring projects are used in order to validate a new testing approach for heat pump systems. This testing approach allows the evaluation of global, annual performance of heat pump systems in only some days, with a high accuracy. The testing approach is based on a semi-virtual platform, PEPSY (Platform for the Evaluation of Performances of dynamic SYstems) at CSTB. Therefore, parts of the system to be tested (heat pump, storage tank, pumps, regulation, etc.) are actually installed in the laboratory, while the building or the house (with its distribution and heat emission system, occupants, equipment, climate) and ground heat exchangers are simulated numerically.
In this test, the heat pump outlet temperatures and flows (on evaporator and condenser side) are measured and sent to the virtual environment at each time step of the test (every 5-30 seconds). In return, the virtual environment calculates the conditions of fluid to be controlled at the inlet of the heat pump (realised using a hydronic test bench). Temperature sensors (e.g. zone or external temperature) are replaced by variable resistance exactly reproducing the temperatures of the virtual system, so that the heat pump and the regulation act as they would do in a real building.

The boundary between the "real" and "virtual" parts can be freely determined as a function of the product to be tested ... (cf. Figure 11).

Unlike conventional tests, performances are annual or seasonal rather than nominal and consider also the real control of the system, which is not the case with standard tests or calculation methods.
The result is an analysis and a global performance calculation including all relevant parameters i.e. equipment, climate, typology, building use, etc.
This new testing approach will be validated in the frame of a French research project and the Sepemo project.

First public monitoring results are expected in spring 2011.

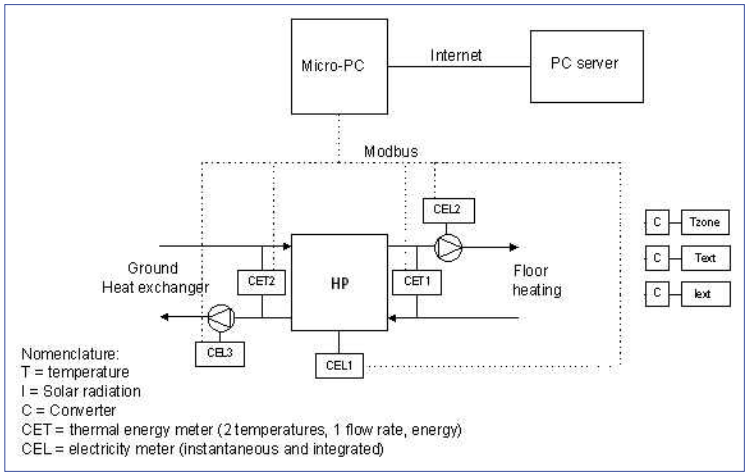


Figure 12 (left): Layout of the monitoring kit for a basic system configuration.

Figure 13 (below): Picture of a prototype of the monitoring kit for the basic system configuration.

Country in focus:

Changes in the heat pump association landscape in the Netherlands

In the Netherlands a tendency can be observed of establishing an increasing number of organisations, associations and foundations, in all fields of life. E.g. in politics, during the elections for the House of Commons last June, 18 political parties were in the race. The elections resulted in a new parliament, consisting of 10 parties, the largest of which only having 31 seats of the total of 150 seats. The reader may have heard that composing an administration based on a majority in the house of parliament has not been a sinecure (and in fact appeared to be impossible).

In the Netherlands, it would be wise if an obligation would exist to cancel at least one organisation before another one is allowed to be established.

In this context the Netherlands has made a significant step forwards in the field of heat pumps. The Stichting Warmtepompen and the Smart Hybrid Foundation (SHF) have joined their efforts and will continue their activities under the name Dutch Heat Pump Association.

The former Stichting Warmtepompen was established approx. 20 years ago and has mainly been focused on new buildings in which water-to-water and brine-to-water heat pumps were installed. In the first period of heat pump implementations, this was quite reasonable: Heat pumps require low temperature heating systems and houses with a low heating demand; New houses represent a market segment where these conditions could be realised relatively easily.

After three decades of heat pump system development in the Netherlands, resulting in heat pump technology being considered more or less state of the art as application of renewable energy in the built environment, a general need was felt to enter a larger part of the housing market. In the Netherlands, only 30 – 50.000 houses are constructed yearly, while there is a housing stock of over 7.000.000 dwellings. With an expected lifetime of, say, 20 years for an individual heating source this housing stock represents replacement market of roughly 400.000 systems/ year. For practical reasons, the (hybrid) air-to water heat pump is a promising candidate for this market. Air is an easily accessible heat source in existing houses and bivalent "hybridising" (i.e. bivalent with gas fired auxiliary heating) is a good approach to solve a double problem in the existing market:

1. The combination of a not very low temperature heating system with air as a heat source may cause capacity- and COP-problems for a heat pump.

Figure 14: Member Logos of the new Dutch Heat Pump Association.

2. In areas with existing houses, the electricity grid is not dimensioned for delivery of power for space heating, while the natural gas grid is.

In this context, the Smart Hybrid Foundation was established in early 2009. In the nearly two years of its existence, it has been acting quite enthusiastically, the main feat of arms being the inclusion of hybrid air-to-water heat pumps into the new Dutch standard for "Energy Performance of Buildings" NEN 7120.

In the beginning of 2010, the 6 manufacturers and suppliers that are both member of Stichting Warmtepompen and Smart Hybrid Foundation created an important stimulus for both organisations to combine their efforts, which will be effective from 1 January 2011 under the name Dutch Heat Pump Association (DHPA).

In our inaugural meeting, we have defined a number of priorities for the period 2011–2012, a.o:

1. Positioning of DHPA.
   The DHPA will have to build up networks on policy both nationally and internationally through EHPA and build up a national network in the market chain, thereby being a reliable partner in the sustainability chain, a.o. by:
   a. Discussion with the Dutch government in order to establish a Memorandum of Understanding about the role of heat pumps in CO_2-emission reduction targets.
2. The DHPA will set up and invest in a strong technical department in order to:
   a. Achieve that the heat pump is taken up in the right way in instruments and tools used by designers for heating systems as well as government for decision making and monitoring.
   b. Actively monitor the legislation and legal instruments and as a logical partner for this to be asked to develop these.
   c. Represent Dutch interests (on small / compact and gas driven heat pumps) at European level.
   d. Achieve certification system guarantees.
   e. Be a help desk and information centre.
   f. Provide training and education.
   g. Bring the quality label as used in the Netherlands in line with European approval.
   h. Lay the foundations of product and system quality through objective monitoring.
3. The DHPA will work on knowledge transfer and promotion, through:
   a. Increased awareness.
   b. Newsletter.
4. The DHPA will develop knowledge as part of building system concepts.
5. The DHPA will be independent of government subsidies and focus on ways to create an autonomously developing market by:
   a. A project to launch towards other tariff structures.
   b. Quality and certification as a basis for further deployment of DHPA, a system quality label.

Peter Oostendorp
(Smart Hybrid Foundation/Dutch Heat Pump Association)

Energy 2020: A strategy for competitive, sustainable and secure energy supply

On 10 November 2010, Energy Commissioner Günther Oettinger outlined the medium-term priorities of the EU energy strategy for 2020. A new strategy is necessary, as the European Commission has come to the conclusion, that current developments put achieving the 20-20-20 targets on the use of RES, the reduction of greenhouse gas emissions and the improvements in energy efficiency at risk. Current strategy does not only fails for the medium targets, but is also "wholly inadequate to the longer term challenges": cutting GHG emissions by 80–95% by 2050!
In parallel the Communication stresses the insufficient quality of different National Energy Efficiency Action Plans and calls for Member States, regional and local authorities to intensify their work to implement adequate policies. As for renewables, the EU is broadly on track to meet the 20 % target: renewables represented 10 % of the EU's gross final energy consumption in 2008 (in 2009, 62 % of newly installed electricity generation capacity in the EU was from renewable sources, mainly wind and solar). However, the use of renewables in heating and cooling is still underrepresented – both in policy measures and in the market place.

The new energy strategy focuses on five priorities:

1. Achieving an energy efficient Europe;
2. Building a truly pan-European integrated energy market;
3. Safe, secure and affordable energy through active consumers;
4. Extending Europe's leadership in energy technology and innovation;
5. 27 States, one voice on energy in the world

Achieving an energy efficient Europe

The European Commission first promotes energy efficiency and mainstreaming into all relevant policy areas, including education and training, and into all spheres, including the allocation of public funds. Two areas have the biggest energy saving potential: the existing building stock and the transport sector.

To speed up building refurbishment using energy-efficient products and technologies, the Commission will:

- issue a new Energy Efficiency Plan in February 2011, followed by "concrete regulatory proposals", such as a Directive on energy efficiency and savings in the 3rd quarter of 2011, and possibly the revision of the energy taxation Directive (forecast for December 2010),
- propose investment incentives and innovative financial instruments by mid-2011 – notably addressing the division of investment incentives between owners and tenants with regard to investments in energy efficiency and RES-using technologies and energy labeling of buildings (certificates used in the real estate market and public support policies);
- widen the scope of Ecodesign requirements for energy and resource-intensive products, complementing them by "system level requirements where relevant";
- introduce more extensive energy labeling for a more comprehensive comparison between products;
- analyze the potential effect of voluntary agreements with energy and resource-intensive industry branches;
- encourage energy-management scheme implementation (effective compliance monitoring, adequate market surveillance, widespread usage of energy services and audits / plans / energy managers), as well as material efficiency and recycling, in industry and the services sector – with dedicated support mechanisms for SMEs;
- encourage – and even "require" – distribution and supply companies (retailers) to secure documented energy savings among their customers, e.g. through third party energy services, 'white certificates', public benefit charges and 'smart meters';
- use EU financial programs to target energy savings projects (such as the 'smart cities' initiative in the SET plan) and make energy efficiency a strong condition for allocating financial support, while encouraging the public sector to take energy efficiency into consideration for their purchases.

Pan-European integrated energy market with infrastructures

The Commission targets 2015 for completing the internal energy market with actions needed in 4 main areas:

- infrastructure with investments "of around 1 trillion Euro needed by 2020" – through a new European Energy Infrastructure Package issued on 17 November 2010 – also aimed at preparing the grid for the changes from energy and transport policies, such as electro mobility and an increase in decentralized as well as large scale renewable power generation;
- "forceful" competition policy with a consolidated regulatory framework (e.g. network codes), complemented by other actions such as market coupling, target model development and a robust framework for traded markets – with a Communication on Transparency and integrity of traded energy markets expected on 8 December 2010;
- use of existing mechanisms to further integrate the energy market with simplified and shorter building permits;
- a review in 2011 on how to include renewable energy into the market, with a blueprint of European electricity and gas grids for 2020-2030, followed by a longer-term vision and a legislative proposal to support the implementation of Smart Grids by the end of 2011.

Safe, secure and affordable energy through active consumers
The Commission will develop guidance document on switching electricity and gas suppliers, encourage utilities to issue clear and transparent bills, complaint handling, and alternative dispute resolution schemes. A price comparison tool based on a methodology to be developed by energy regulators and other competent bodies should also be available to all consumers, and all suppliers should provide updated information on their tariffs and offers.

Europe's leadership in energy technology and innovation

Four new large-scale European projects will be launched: new technologies for intelligent networks / smart grids and electricity storage, research on sustainable second-generation biofuels and the 'smart cities' partnership to promote energy savings in urban areas. The Commission will also propose a € 1 billion initiative "to support the frontier research needed to deliver science necessary for low-carbon energy breakthroughs". Additional support will be given to the Technology Roadmaps of the European Industrial Initiatives for 2010-2020, with the promotion of strategic energy research infrastructures in Europe as well as "other great potential avenues" – such as renewable heating and cooling.

27 States, one voice on energy in the world

For the Commission, the EU should coordinate its energy policy vis-à-vis third countries, especially in its relation with key partners: through an extended and deepened Energy Community Treaty within the neighborhood policy; through a "major cooperation with Africa" aiming at providing them with sustainable energy.

A limited impact on the heat pump sector

The "Energy 2020" Strategy focuses on energy efficiency but focuses again mainly on electricity and gas supply. Even here, concrete ideas, specific timelines and binding targets for energy savings are missing. One critique often heard is the compliance of this strategy with the requirements previously voiced by large integrated energy companies.

From the perspective of the heat pump industry it is surprising that a technology, that is

- ready to market,
- reliable and secure,
- affordable today,
- energy efficient,
- using renewable sources,
- applicable to nearly all application fields in the heating sector is not getting more attention.

If the heating sector is supposed to change quickly, Europe can benefit from using heat pumps' full contribution potential immediately. While the technology will certainly benefit from technology improvements, it will work, even without immediate success of RD&D projects. A quick implementation of this technology requires political will: European market development should be supported by a true level playing field among countries, basically relying on one set of quality requirements to be used for incentives and subsidies, one approach towards administrating application procedures and the recognition of the importance of independent quality tests and qualified personnel.

The tools are there – we now need political will to put them to work!

The set of documents adressing the strategy can be found at http://ec.europa.eu/energy/strategies/2010/2020_en.htm

next meetings

EHPA EVENTS

Quality Label Committee meeting
14–15.12.2010 | Brussels, BE

Norms & Standards Committee meeting
16.12.2010 | Brussels, BE

Executive Committee meeting
13.01.2010 | Düsseldorf, DE

Executive Committee meeting
23.03.2011 | Brussels, BE

Executive Committee meeting
04.05.2011 | Budapest, HU (tbc)

PROJECT MEETINGS

SEPEMO project meeting
02–03.12.2010 | Vienna, AT

Ground-Med Partner assembly
24–25.02.2011 | Coimbra, PT

QualiCert meeting
28–29.03.2011 | Brussels, BE (tbc)

OTHER EVENTS

GeoPower Europe 2010
08–09.12.2010 | Paris, FR

SSB'2010 8th International Conference on System Simulation in Buildings
13–15.12.2010 | Liège, BE

GEOTHERMA France
20–21.01.2011 | Paris, FR

GEOTRAINET Training course for designers and drillers
24–26.01.2011, Brussels, BE

GEOTRAINET Final Conference
27.01.2011 | Brussels, BE (registration by 15.12.2010)

European Summit of Heads of States and Governments on energy
04.02.2011 | Brussels, BE

CEP® CLEAN ENERGY & PASSIVEHOUSE 2011
10–12.02.2011 | Stuttgart, DE

ENERVIDA '11
10–13.02.2011 | Viseu, PT

Eurexpo 2011
15–18.02.2011 | Lyon, FR

EUSEW 2011
11–15.04.2011

2nd Annual Conference of the RHC Platform
05–06.05.2011 | Budapest, HU

10th IEA Heat Pump Conference 2011
16–19.05.2011 | Tokyo, JP

Imprint

European Heat Pump Association (EHPA)
Editor: Thomas Nowak
Renewable Energy House
Rue d'Arlon 63-67
B-1040 Brussels
phone +32 24 00 1017
fax +32 24 00 1018

The opinions expressed in the articles are those of the authors and not necessarily those of the EHPA.

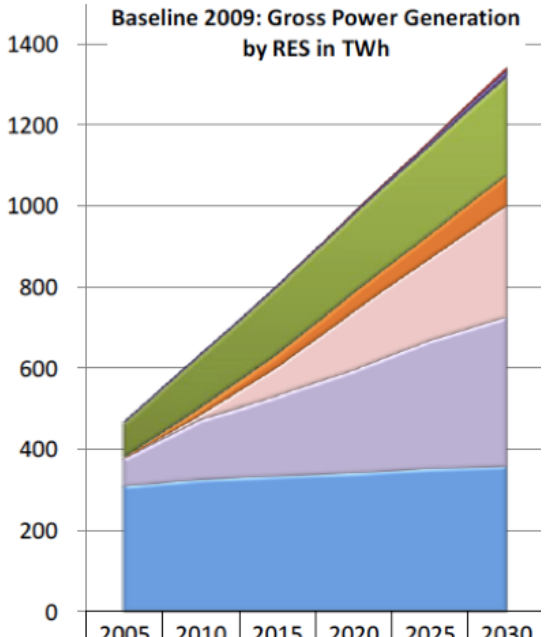
More electricity, more renewables, more energy efficieny.

EU energy trends to 2030: 2009 update

In mid-September 2010, the European Commission published an update of EU energy trends up to 2030 [Source: DG Energy: http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf]. The new '2009 Baseline' scenario includes the following technology portfolio:

- End-use energy efficiency (thermal integrity of buildings, lighting, electric appliances, motor drives, heat pumps, etc.)
- Renewable energy in centralized and decentralized power generation, in direct heating and cooling applications, as well as for blending with gasoline or diesel oil,
- Supercritical coal plants, advanced gas combined cycle plants and CHP,
- CO_2 carbon capture and storage (CCS),
- Nuclear energy (generation III and III+),
- Advanced transmission and distribution grids and smart metering,
- Plug-in hybrid and electric vehicles, both for passenger and freight road transportation,
- Improvements in conventional engines in transport.

The 2009 Baseline takes into account the economic crisis that led to lower energy demand and prices due to a drop in production and thus demand from energy-intensive industries, and also includes effects from legislation policies and measures adopted/implemented in the Member States before April 2009.



	2005	2010	2015	2020	2025	2030
Tidal, etc.	0	0	1	3	6	9
Geothermal	5	6	6	7	11	19
Biomass/waste	84	127	164	191	218	241
Solar	1	17	32	46	60	75
Wind offshore	2	14	72	146	204	276
Wind onshore	68	147	197	253	316	368
Hydro	307	323	332	339	349	355

Figure 15: Structure of RES power in the 2009 scenariao.

An ambitious scenario for the penetration of RES

According to the report, renewables will account for almost one third of total power generation in 2030 (27% in 2020). The deployment of wind onshore and the rising investment in offshore wind will help wind dominate the renewables market (already in 2020), followed by hydro power and biomass/waste. A large development of photovoltaics is also noticed. Geothermal is projected to grow steadily and increase its share of RES power from 1,07% in 2005 to 1,4% in 2030.

Wind and the other RES are facilitated by assumed expansion of grids and new equipment for controlling grid operation, which entail additional costs that show up in the electricity prices.

As a result, fossil fuel generation looses ground significantly: the market share for gas decreases to 21,9%, while coal and In mid-September 2010, the European Commission published an update of EU energy trends up to 2030 [Source: DG Energy: http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf]. The new '2009 Baseline' scenario includes the following technology portfolio:

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Wind and the other RES are facilitated by assumed expansion of grids and new equipment for controlling grid operation, which entail additional costs that show up in the electricity prices.

As a result, fossil fuel generation looses ground significantly: the market share for gas decreases to 21,9 %, while coal and fossil fuels decrease to 6,6 % of total electricity generation in 2030. Gas is nevertheless expected to play "a crucial role for balancing purposes", as more intermittent RES power is produced (the share of intermittent RES electricity rising significantly from 5,6 % in 2010 to 18,5 % of net electricity generation in 2030).

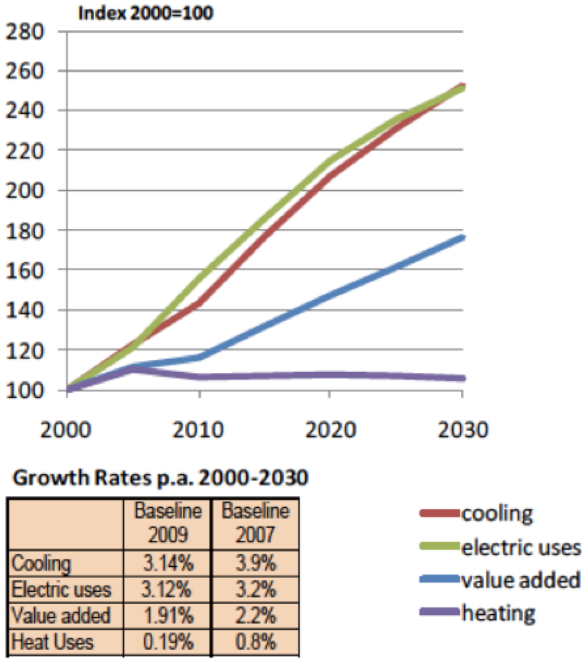
The share of nuclear power falls considerably, but its production volumes are set to remain at current levels as some Member States build new plants while others decommission them, either due to ageing or a phase-out.

A very slight increase in energy demand by 2030

The economic crisis has noticeably affected primary energy in the short run: less economic activity and consumption, hence lower energy consumption, but also a slower pace in investment and capital turnover, which has slowed energy efficiency progress. The slowdown in equipment renewal has implied a slowdown in energy efficiency progress up to 2010.

Beyond 2010, economic recovery implies a faster pace in equipment renewing, hence acceleration of energy efficiency progress. But since important new legislation aiming at higher energy efficiency is implemented, notably for energy in buildings as well as for cars, lighting and electric appliances, the energy efficiency improvement process further accelerates during the economic recovery period. So, energy efficiency progress (owing to new policies implemented) will offset the effects of GDP growth on energy demand and thus primary energy requirements stabilize.

As a result, European total final energy demand is projected to increase slightly by 5 % from 2005 to 2030. In particular, energy demand growth for buildings (households and services) is smaller than for industry and transport. Policies for buildings, appliances and lighting accelerate progress of energy efficiency in houses and buildings implying larger effects in terms of energy savings for heating and cooling uses. However, for appliances and lighting, the changes are rather small as energy efficiency improvements from Ecodesign measures are somewhat masked by stronger increase of population living in more households.



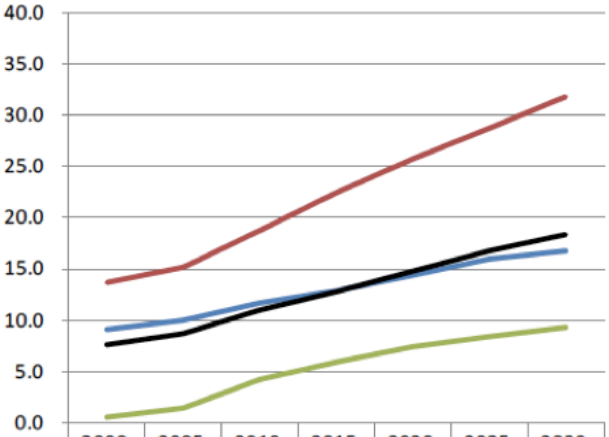
Growth Rates p.a. 2000-2030

	Baseline 2009	Baseline 2007
Cooling	3.14%	3.9%
Electric uses	3.12%	3.2%
Value added	1.91%	2.2%
Heat Uses	0.19%	0.8%

Figure 16: Useful energy in the services sector.

In the Baseline 2009 scenario, for the residential and the services sector, there is a general improvement in the energy efficiency of energy using equipment across the EU. This can be linked to the implementation of the Ecodesign and Labeling Directives applied in all Member States. In the services sector, the energy efficiency improvements are however not sufficient to counteract the increase in absolute terms of useful energy demand, which continues rising.

The share of RES in gross final energy demand is expected to increase over time to reach 14,8 % in 2020 and 18,4 % in 2030 (up from 8,6% in 2005). This just takes stock of the effects of already implemented policies. These shares remain however well below the EU targets as the 2009 Baseline only takes stock of the effects of already implemented policies.



	2000	2005	2010	2015	2020	2025	2030
RES-Heating and Cooling	9.0	10.0	11.7	12.8	14.3	15.9	16.8
RES-Electricity	13.7	15.2	18.8	22.4	25.8	28.8	31.9
RES-Transport	0.5	1.4	4.2	5.9	7.4	8.4	9.3
RES % Gross Final Demand	7.6	8.6	10.9	12.8	14.8	16.7	18.4

RES Indicators

The above changes in the fuel mix of power generation and the penetration of carbon free sources, implementation of European policies in the Member States, and also the economic crisis, imply a continuous decline in energy-related CO_2 emissions until 2030: reduction of 8,4% in 2020 from 1990 levels and 21,8% in 2030. A steady decrease in carbon intensity of power generation is also projected, with the average emission of CO_2 per MWh produced halving in 2030 compared to 2005. This will multiply the contribution of heat pumps to emission savings and to the use of renewable energy sources in Europe.

Due to the contribution potential of heat pumps to the provision of energy for heating and cooling in Europe, EHPA will work towards an integration of this technology into the next scenario update.

Figure 17: RES indicators from 2000 to 2030.

Ground-Med Info Day, 26 October 2010

Advanced ground source heat pump systems for heating and cooling in Mediterranean climate

On 26.10.2010, the Ground-Med consortium held a dissemination meeting in Brussels to present interim results to an audience of policy makers and industry specialists.

Thomas Nowak first gave an overview on how the Ground-Med project improves the contribution potential of heat pumps towards the EU's energy savings, the use of RES and climate protection targets. The Ground-Med project will improve heat pump technology through R&D on HP & Component, Measurement setup and method, improvement and measurement. Ground-Med results are expected to influence existing products, lead to new component / products / systems and enhance the market for heat pumps into new segments and new geographic regions.

Dimitrios Mendrinos, Coordinator of Ground-Med, Centre for Renewable Energy Sources and Savings (CRES), detailed how this 5-year project (Jan. 2009 – Dec. 2013) is composed (9 Work Packages – WP) and implemented by a consortium of 24 organizations across Europe in charge of developing, constructing and demonstrating 8 buildings, as well as monitoring the next generation of ground source heat pump systems for heating and cooling with SPF higher than 5. Ground-Med technology development focuses on both heating and cooling, advanced system control and integrated ground source heat pump systems. A successful Ground-Med project will result in improved competitiveness and widen market opportunities for geothermal heat pumps, especially for cooling in South Europe.

Eric Auzenet, Thermodynamic Systems Laboratory Manager at the Research and Innovation Centre of CIAT Group, showed the results of the WP2 large capacity heat pumps and system components (Jan. 2009 – Oct. 2010). The WP2 aims at developing new advanced large capacity heat pumps with higher energy efficiency. Three prototypes will be installed in demo sites in Portugal, Spain and France. An additional focus of this WP is put on improving the buildings heating and cooling system by updating the efficiency of thermal storage, fan coils and air handing units.

Davide del Col, from the Dipartimento di Fisica Tecnica, University of Padova, presented the WP3 low/medium capacity heat pumps, their results and next steps. Firstly, the WP3 contributed to further improve heat pumps efficiency by reporting on methods for improving heat pumps COP (SEER>5 using PrEN 14825:2009, and SCOP>5 using PrEN 14825:2009), in compliance with Eurovent class A specification. The WP3 has then developed new advanced heat pumps in terms of energy efficiency (SPF>5 for H&C) of medium capacity (20–80 kWth – in progress) and low capacity (10–30 kWth – almost completed).

Donal Finn, from the School of Electrical, Electronic and Mechanical Engineering, University College Dublin, reported on the mid-term review of the WP4 integrated system control aiming at developing a generalized dynamic control model (completed), testing and evaluating this model (validation completed), developing integrated building/heat pump control strategies and a suite of control algorithms (completed), developing a data collection management system (ongoing), and developing a system microprocessor control board (in progress).

Jose M. Corberan, from the Institute for Energy Engineering, Universidad Politecnica de Valencia, presented the WP5 integrated system engineering design, which will evaluate year-round thermal loads for each demo site and size the system for each building, design the ground source heat exchanger to maximize system efficiency at reasonable cost and the integrated ground source heating and cooling system of each demonstration building.

Thomas Nowak then emphasized the link between the Ground-Med project and other Heat pump research, such as SEPEMO and QualiCert. The SEPEMO-Build results will help to develop a common methodology for field measurement of HP system SPF for all types of heat pumps and heat distribution systems in residential buildings, thereby providing robust data on the conditions "in real installations" influencing reliability and seasonal efficiency in Europe. SEPEMO therefore supports the RES Directive (Dir. 2009/28/EC) for both the implementation of Annex IV on the certification of installers and Annex VII to establish how Member States are to estimate the values of Qusable and SPF.
Another link was made with the QualiCert project that analyzes existing certification and accreditation systems for installers of small-scale renewable energy systems (July 2009 – Dec. 2011). Its results are expected to help EU Members States to better implement the RES Directive as it aims at developing a European approach for accreditation / certification of small RES installers.

Isabel M Fernández Fuentes, European Federation of Geologists (EFG) Office Director and Geotrainet Coordinator, described the link between Ground-Med and Geotrainet: "Geo-Education for a sustainable geothermal heating and cooling market". This heat pump research project (Sept. 2008 - Feb. 2011), financed by the IEE program, is designed to develop a European Education program to go towards the certification of geothermal heating and cooling installations targeting both designers and drillers. The Geotrainet final conference will be held in Brussels on 27 January 2011 and the training courses for designers and drillers will take place on 24-26 January.

Burkhard Sanner, EGEC and Coordinator of the European Technology Platform on Renewable Heating & Cooling, presented the RHC platform and the links with the Ground-Med project. The RHC platform's main objectives are the creation of a Common Vision, Strategic Research Agendas for the sectors, and a common one for renewable Heating and Cooling, a Technology Roadmap for RHC and European Industrial Initiatives. From the Common Vision draft, R&D for heat pumps will have to focus on performance improvement and the ecological and economic aspects, both looking at the individual heat pump unit ("next generation heat pumps") and the intelligent integration of heat pump technology into heating and cooling systems.

more: www.ground-med.eu