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European Heat Pump NEWS

ehpa
european
heat pump association

editorial

A broadening View in the Family of Renewables

We will have to use all available renewable energy sources to meet the challenges of the future in respect to energy supply and climate control. Therefore the EHPA welcomes the initiatives to investigate the benefit of system combinations.

At our last Dinner Debate in the European Parliament in April 2010, we could welcome a significant number of participants – also from other key renewable players – and we enjoyed acceptance and recognition.

EHPA today is an established representative of Ambient Heat and Heat Pump Technology. With our contacts and continuous information upon the capability of our products and systems we were able to influence the draft of the upcoming European directive on EuP Lot 1, heat generators, which is without doubt the most important issue at the present time.

Joining forces with Eurostat we took the lead in implementing a European-wide network for the calculation of ambient heat delivered by heat pumps.

And together with our members we do have to monitor the implementation of national sectoral targets of the RES-directive in respect to our technologies contribution to renewable heat.

The implementation of the final rules for calculation and classification of EuPs is another challenge and we are prepared to constructively look after the relevant standards like the pr. EN 14825 and its implementation.

Especially in economically difficult and uncertain times it is essential to protect our interests on the spots where future decisions are made. We have to defend our positions within RES and have to maintain the high quality standards of our products for the benefits of our customers.

Karl Ochsner, Chairman

content

Sao Paolo Skyline. Source: Wikipedia

What is a hybrid system for heating and cooling? Possible combinations.

Heat pump based hybrid systems

Heat pump technology is by now established in the major European markets as a reliable solution to provide heating, cooling and domestic hot water. Appropriately employed, heat pumps do save primary and final energy as well as greenhouse gas emissions, in particular by making use of renewable energy from (air) aerothermal, water (hydrothermal) and ground (geothermal) sources.

Heat pumps can be employed in residential and non-residential buildings as well as for industrial applications. Currently, a developed market exists for installations in new residential buildings, closely followed by an increasing market segment for the renovation market. The more optimized the building envelope (in particular small heat losses and the use of low temperature heat distribution system), the more efficient the installation of heat pump technology. In such new or renovated buildings, heat pump technology can easily provide 100 % of the buildings energy demand for heating/cooling/hot water. Unfortunately, the construction rate for new buildings and the renovation rate for old ones is small compared to the large number of existing buildings (See figure 1).

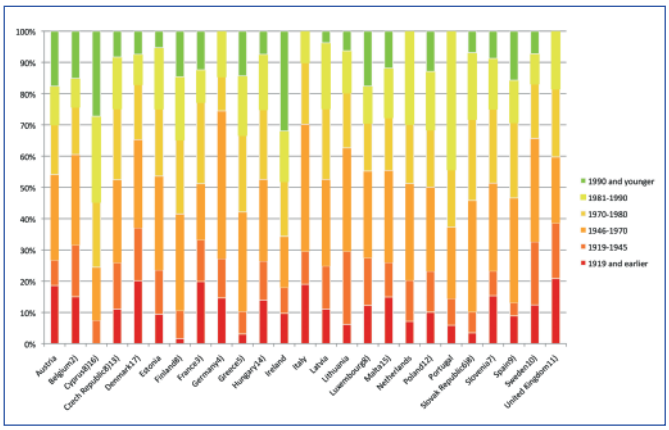


Figure 1: Age distribution of the EU building stock.
Source: Housing statistics in the European Union 2004, graphics: own.

The combination of more than one energy source into hybrid systems to cover such buildings energy demand is gaining interest by policy makers and in the market place. As such a combination makes systems more complicated, it is commonly agreed, that more research and development activities are necessary to optimize their efficiency and economics.

Such hybrid systems combine two or more (renewable) energy sources or energy conversion technologies to cover 100 % of a buildings energy demand in smaller and larger, residential and industrial applications. They address limitations connected to single source/single technology approaches. Typical benefits assigned to hybrid systems are:

- energy source flexibility,
- higher share of renewable sources (up to 100 %),
- energy use efficiency,
- reliability,
- reduced emissions, and (or)
- better economics.

While these aspects support the overall EU energy strategies goal of a larger share of renewables as well as an affordable and reliable building energy supply, they still bear disadvantages in a way that an advantage in one of the mentioned points is often connected to a disadvantage in another (ie: higher share of renewables comes at lower cost efficiency).

To make full use of hybrid systems, it can be appropriate to extend the system boundary beyond the building. Such an enlarged perspective does include:

- recognition of their specific requirements from the (regional) planning, architectural and systems design perspective,
- the integration of green electricity, possibly even from the same buildings roof,
- the use of smart electric grids, and
- the connection to small scale heating grids (a special form of district heating) on a local and a building level. Such grids can also (and are already) be used inside larger buildings where they bridge differences in supply and demand for heating and cooling. The are a form of thermal storage for the whole system.

Thermal storage is a general necessity for almost all heating and hot water systems to overcome differences in time and location of energy supply and demand.

Figure 2 visualizes the relation between the different renewable energy sources and aspects influencing their efficient employment. While it does not explicitly show non-renewable sources – it should be noted that for an interim period the combination of non renewable with renewable sources constitutes a hybrid system, too. Such installations can be considered bridging products to ease the conversion between today's largely fossil fuel based energy supply and tomorrows highly renewable version. The speed of change will likely depend strongly on the energy price developments and on the possible reduction in investment.

While many combinations of the different factors shown here are possible, the following combinations are deemed to have a larger market potential.

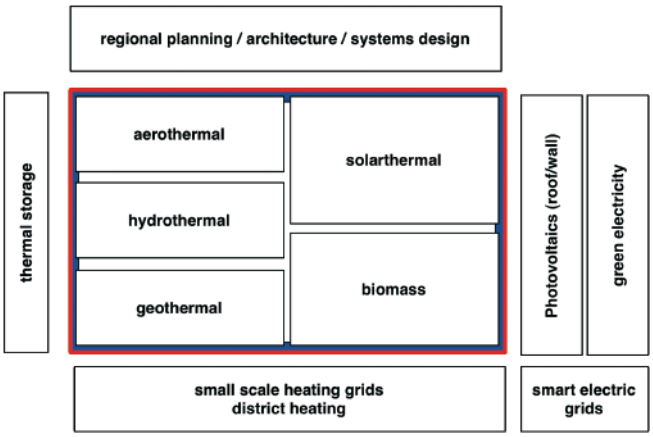


Figure 2: Hybrid systems for 100% renewable heating

1. The simplest example of a hybrid system is a heat pump using air/water/ground as energy sources with an electric back up heater. If electricity comes from renewable sources, such a system is completely emission free. This combination allows for a more cost-efficient set-up, as the heat pumps capacity is designed to fully cover 90 – 95 % of the energy demand and leave the rest to the back up.
2. Increasingly popular is the combination of heat pump technology and solar thermal collectors in new buildings as well as the combination of heat pumps for hot water or solar thermal collectors with existing fossil fuel boilers.
3. The integration of heat pumps with so called "cold source" small scale heating grids is under development. In such combinations, the thermal grid serves as a storage and source of energy. It is used as energy source for a multitude of heat pumps that profit from the stable source temperature and the option to discharge excess heat when used in cooling mode. Such heating grids can also be connected to other energy sources: biomass and solar thermal.

Any of the options one to three can be extended by photovoltaics from the roof of the building in question – a solution that, when grid connected, may even cover the electricity demand of the system .

In combinations of solar thermal energy and biomass, solar thermal is usually used to cover the energy demand for hot water and Stakeholders from the related industries are convinced of the growing potential of hybrid systems, but also acknowledge the need for additional research and development activities. Possible projects would have to include the optimization of the whole system, the development of plug&play applications/systems, optimized controls (taking into account spatial and temporal differences in energy supply and demand) and improved skills of planners/designers/architects/installers. All approaches should acknowledge climate variations and national peculiarities in construction and legislation.

While the systems perspective is most promising to improve the overall efficiency of heat pump based hybrid systems, the individual heat pump unit should not be neglected, as it offers improvement potential as a result of additional R&D. Topics to be covered for electrical driven heat pumps are

a) the aim for decreased losses resulting in higher unit efficiencies (COP improvement),
b) the optimization of the technologies total environmental warming potential by smaller refrigerant loads, higher efficiency (see point a) and the elaboration of the potential of climate friendly working pairs,
c) the development of optimized components for heat pumps and their integration on the systems level.

For thermally driven heat pumps, development needs to aim at a) higher COP's, b) smaller size, lower weight, and lower price and also c) lower driving temperatures.

In addition, research is required on other components such as heat rejection units (hybrid systems, wet cooling towers etc.). The need for such R&D is currently integrated in the EHPA technology roadmap for heat pumps, a document foreseen to be published later this year.

In parallel, hybrid systems are currently explored in a joint Annex/Task of the IEA with the working title heatpumps + solar thermal (www.) – it focuses on the combination of solar thermal and heat pumps. A wider approach is taken in the European technology platform on renewable heating and cooling (www.rhc-platform.eu). Platform stakeholders are convinced that 100 % of renewable energy in heating and cooling (+ hot water) are possible even today. Hybrid systems are given special attention in the platforms cross-cutting technologies' panel. Participants of both groups acknowledge the need for simpler, more cost-efficient and energetically optimized solutions to provide solutions for most if not all application fields in buildings.

This newsletter provides examples of market ready, available heat pump based hybrid systems – as package products or as custom installations. Systaic provides an "energy roof" that uses the waste heat from cooling the PV panels as energy source for the heat pumps. Schüco offers a similar combination, however includes a solar thermal collector on top of it. A second product by Schüco is geared towards the renovation segment by integrating an air-water heat pump, a solar thermal collector and a gas boiler. Sonnenkraft offers a solution that is based on 100% renewable energy and makes better use of the energy taken from solar thermal collectors by making it direcly available to the heat pump.

Rainer Jakobs outlines the options of individually tailored combinations of heat pump technology with existing boilers in older houses, a solution that improves the energy efficiency at very limited cost.

Thomas Nowak, EHPA

Solution for renovation and newbuild

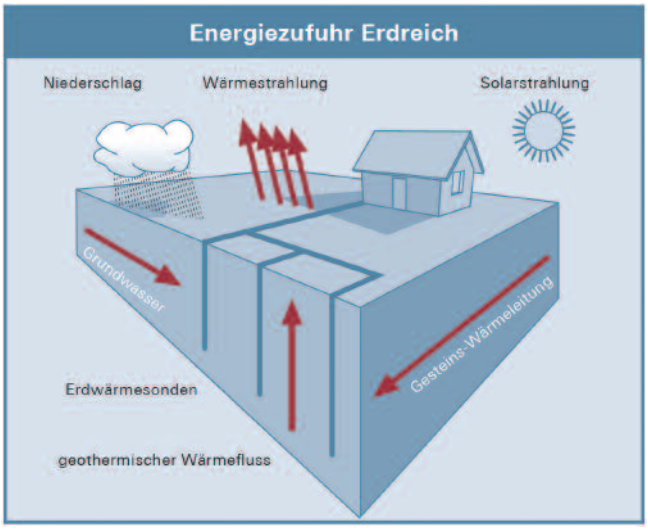
Hybrid system based on heat pump and solar from Schüco International KG

Currently, heat pumps are installed in newbuild projects as a monovalent heating system and are generally accepted as being an efficient technology. However, increasingly, academic institutions and also industrial enterprises are studying the combination of solar thermal with heat pumps.

The fundamental reasoning is the increase in energy efficiency of the complete system achieved by integrating solar energy in the form of direct emissions of the sun's rays. This means that previous modes of operation of heat pumps in utilising environmental energy in the form of solar energy stored in the air or the ground will be substantially extended.

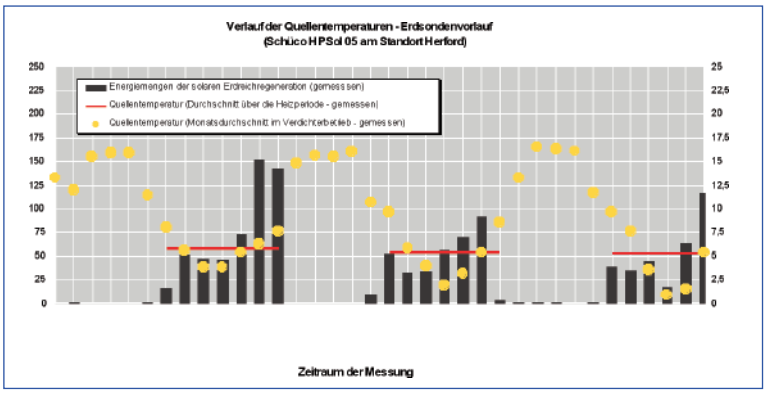
In particular, the increasing relative proportion of hot water supply is of significant importance. But also the resulting opportunities for mutual optimisation of both technologies on the heat source side of the heat pumps might lead to new fields of activity.

Schüco already offers compatible systems for use both in renovation and in newbuild. The striking feature of these is an intelligent system that has been developed on the basis of components already known and tested in the market.



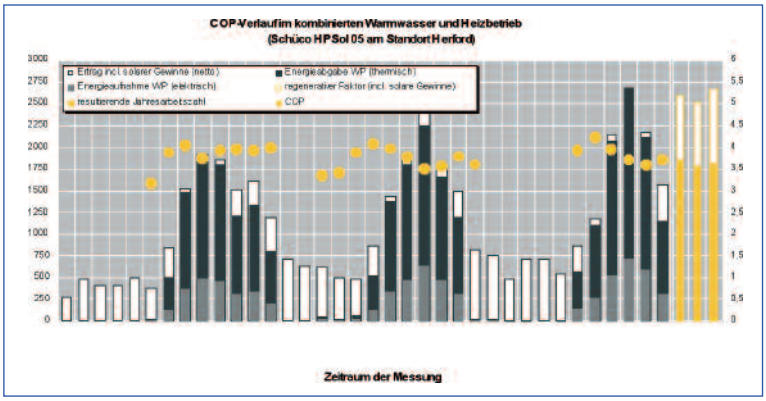
Combining solar thermal energy, heat pumps and photovoltaics: The Zero Energy House

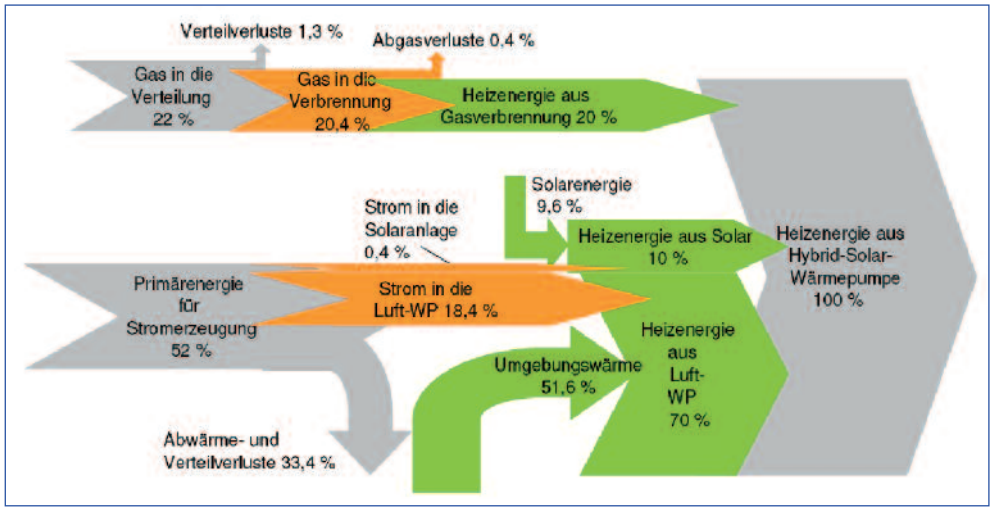
Combining a brine heat pump with a solar thermal installation opens up new options for the exploitation of solar thermal energy generation. In addition to the traditional direct utilisation of solar energy for producing hot water and auxiliary heating, minimal outputs from solar radiation, which are insufficient for direct use, can be used to supplement the heat pump and to actively regenerate the ground source probes. Overall energy balancing, including from ambient heat and solar gains produces a high solar COP (coefficient of performance).



The solar regeneration of the geothermal probes ensures a high temperature level in the ground, so that the heat pump can be operated in the long term at an optimum COP.

Results of a 3 year long field trial are an impressive confirmation of the high solar COP of over 5, and of a stable ground source temperature above previous operating periods.

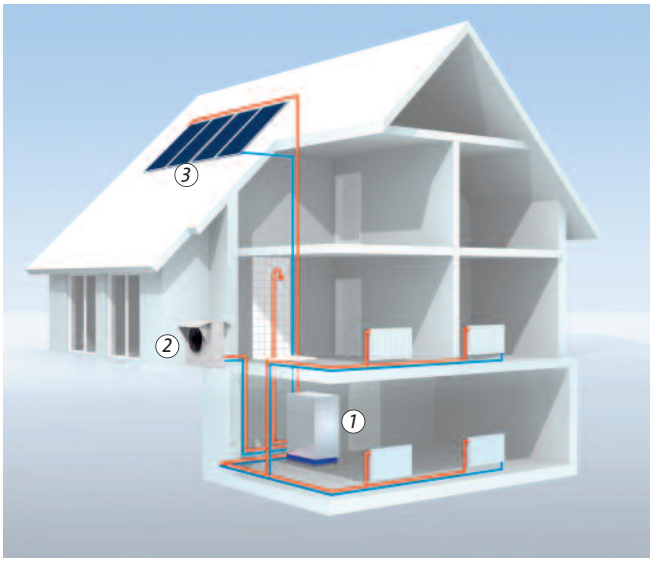




Hybrid heat pump – A multi-heat system for energy-efficient modernisation

The hybrid heat pump was especially developed for the upgrading of old central heating boilers without the need for a simultaneous building renovation. The integration of solar thermal, air-water heat pumps and gas condensing boiler means considerable savings without intervention in the building or heating circulation systems. In particular, the high inward flow temperatures of up to 70°C are no problem in conjunction with a gas condensing boiler. By restricting to a bivalent alternative mode of operation, the demand on the heat pump may be relatively small, in spite of the high heating load of the building. In this way, the hybrid heat pump represents an energy-efficient and economical alternative to high temperature heat pumps. The gas consumption for this combination can be reduced by over 80 % when upgrading from an old atmospheric gas boiler to a hybrid heat pump system installation.

Frank Thole,
Schüco International KG, Bielefeld



1 – Hybrid heat pump (integrated solar storage cylinder)
2 – External evaporator
3 – Collector array

news

European Technology Platform for heating and cooling incorporates heat pump technology

The EU energy and climate strategy has set a demanding goal. Changing today's energy demand and supply structure towards a truly sustainable one will require using the full potential of all renewable energy sources – in particular, as the defined "202020-targets" may not be sufficient in the long run.

Stakeholders in the European Technology Platform on Renewable Heating & Cooling (RHC-Platform) come from the biomass, geothermal and solar thermal sector and related industries are working towards defining a common strategy for increasing the use of renewable energy technologies used for heating, cooling and hot water production. Heat pumps are part of the platform as independent technology using renewable energy and as cross-cutting technology that serves as a multiplier increasing the possible impact of other energy sources and conversion technologies. More information, including all presentations of the platforms first conference in Bilbao can be found at *www.rhc-platform.org*.

Systems using solar thermal energy in combination with heat pumps

Both the markets for heat pumps and solar thermal systems are growing. More recently, a number of combined systems has been developed, that use renewable energy from air, water, ground and direct solar irradiation to provide heating, cooling and/or domestic hot water. Such systems are about to enter the market in larger numbers, however more research is needed to optimize their efficiency, simplicity and cost. Three different approaches can be distinguished:

1. No product interaction: Main system components are just placed one beside the other (thermal storage as integrator).
2. Partly integrated: heat pumps as support of a solar collector system to increase solar gain.
3. Truly integrated systems that make optimal use of both technologies to reach highest systems efficiency and RES share used for heating.

The IEA as recognizing this trend by implementing a new joint annex/tasks operated by its solar heating & cooling" and "heat pump" programs. The kick-off meeting took place in Bolzano (Bolzano, 28.–29.04.2010). *More information can be found at: www.iea-shc.org/task44/*.

Bivalent heat pump systems for the building stock

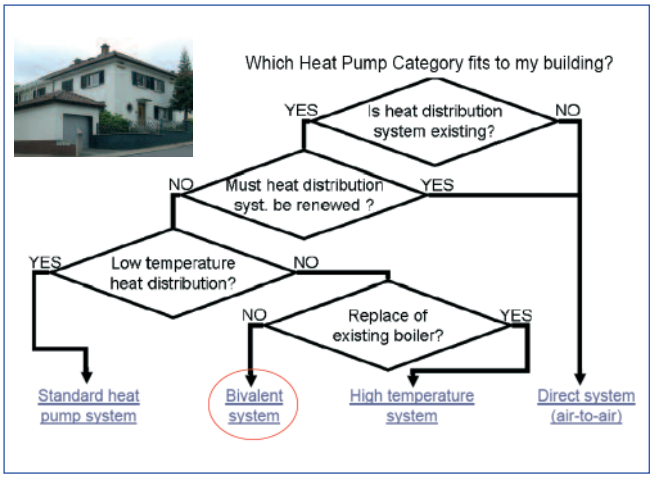
Due to the binding EU targets for 2020 to reduce greenhouse gas emissions by 20 %, ensuring 20 % of renewable energy sources in the EU energy mix and planning to reduce EU global primary energy use by 20 %, the building stock is under special focus. Bivalent systems, as a combination of existing boilers with a heat pump, are an interesting attractive solution for the house owner.

To meet the 2020 targets, an improved energy utilisation in the built environment is one of the most important aspects that needs to be addressed in the near future. Around 40 % of the primary energy use within Europe is related to the building sector. At present, heat use is responsible for almost 80 % of the energy demand in houses and utility buildings for space heating and hot water generation, whereas the energy demand for cooling is growing.

There are more than 150 millions dwellings in Europe. Around 30 % are built before 1940, around 45 % between 1950 and 1980 and only 25 % after 1980. Retrofitting is a means of overcoming deficiencies of existing buildings by improving the standard and the thermal insulation of buildings and/or by replacing old space conditioning systems by energy-efficient and environmentally sound heating and cooling systems.

In order to accomplish the ambitious goals for the reduction of fossil primary energy consumption and the related CO_2-emissions, the use of renewable energy in the existing building stock has to be addressed. This is possible and realistic with the existing basic technology and knowledge for new and renovated buildings.

Due to a current German study (www.intelligent-heizen.info) more than 28 % of 500 interviewed house owners have heating systems older than 15 years. 40 % of these house owners are older than 50 years. This means beside the average age of the building stock also the age of the private house owner has to be recognized. His decision in investments has another time horizon and different motivation than that of a young family building a new house.



Due to demographic change an increasing number of houses are inhabited by only a few people. Once built for families, these houses are today occupied by only 1 or 2 persons. While the heat demand in these buildings is often not at all appropriate to the current standards, their energy demand per person is even higher.

Which are the possibilities to motivate these house owners to invest in improved heating solutions?

Heat pumps are among the most environmentally friendly and efficient heating technologies available. While heat pumps are predominantly used in new residential buildings, the potential of using heat pumps in replacement projects is much larger, yet currently mostly overlooked.

Bivalent heating systems – the combination of the existing boiler with a heat pump are a cost-efficient option to improve the system due to reduction of primary energy and CO_2 emission. Such replacement builds on the existing heating system as an energy provider for very few cold days augmenting it with the heat pump technology. That is then used to provide heating, cooling and hot water during those milder climatic periods in the year. Nevertheless, any renovation should be accompanied by at least a basic renovation, as the feasibility (investment and operating costs) depends on the existing building and heating systems and the cost of necessary adaptations.

A widely shared opinion on the "appropriate" reduction of energy demand in older houses is the following "renovation sequence":

- New windows and complete thermal insulation of the building,
- Replacement of the boiler by a new high efficient one in combination with solar use for domestic hot water in combination with an improved heat distribution system

or

- Replacement of the boiler by a monovalent heat pump for space heating and domestic hot water in combination with an improved heat distribution system

This renovation is costly and demanding on the house owner: individual effort, time and the willingness to incur trouble related to necessary renovation measures. Not every house owner has the money or is willing to spend it for this purpose and has the goal depending on his personal situation to improve the energy efficiency of his house.

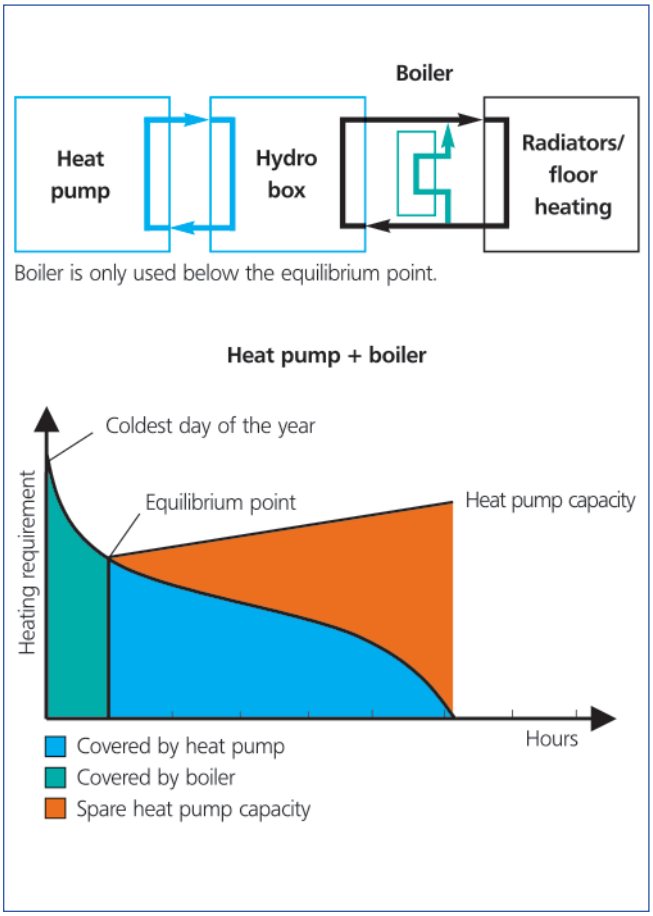
Bivalent heating systems – the combination of the existing boiler with a heat pump are a cost-efficient option to improve the energy demand and reduce the greenhouse gas emissions of the building at moderate cost. Experience from the early days of the mass market for heat pumps in Europe (the early 1980s) support this claim.

Bivalent heat pump

The type of bivalent system combines two separate heat sources: energy from air, water or ground – to be used by the heat pump – and fossil fuel to be used by an existing boiler to cover 100 % of the energy demand (see graph). There are two types of bivalent systems: parallel or alternative operation. When parallel operating boiler is sized to cover capacity peaks only, in alternative configuration the boiler is sized to cover the full capacity on the coldest day of the year. The alternative bivalent configuration is here recommended where a heating system exist.

The first simple example of an alternative set-up is the use of a domestic hot water heat pump to cover the hot water demand of a given building. In this case the two systems operating largely separate. This was in the 1980s and is today a very successful solution.

Alternatively standard heat pump systems can be used to upgrade an existing heating system by using the renewable energy for most of the annual energy demand and the installed boiler to cover peak demand.



The employment of bivalent heat pump based systems thus allows for another sequence for the house owner's "renovation sequence". Assuming a typical house build 40 years ago with an oil boiler 15 years old.

- Replacement of the hot water production (fossil fuel based) by a domestic hot water heat pump. *Fossil fuel boiler is now only working for heating during the colder times of the year. This investment is characterised by low investment costs, simple installation, a reduction of running costs and green-house gas emissions. It provides easy first contact with heat pump technology and may trigger a good feeling for the investor as he/she contributes to a better environmental impact of his/her heating system and profits from lower operating cost.*

More renovation steps can be done later. In our example, the investor has saved additional money some years later.

- He installs an air-water heat pump as bivalent system for the space heating, heat pump capacity should be in relation to the total heat demand after the entire renovation of the total building. *Again only a lower investment with limited installation demand, but a very high reduction of the running energy cost, based on only very few days using the oil boiler; using renewable energy sources. The owner has the safety to use the old boiler due to his "sceptical feeling" about heating in cold winter days. Successful results of case studies documented in the HPP-Annex 30 Retrofit heat pumps for existing buildings.*

- Improved heat distribution system as e.g. heat pump convectors or new larger radiators with more capacity and lower forerun temperatures should be done in a timely manner to the heat pump installation; the experience shows that there are only very few rooms that have to be upgraded.
- New windows and complete or partly thermal insulation of the building could be done in parallel or later or in a sequence of years or maybe by the children or the next house owner.
- The decision to disassemble the oil boiler and oil storage tank could be done driven by the personal concern (e.g. need for more space) and the experience with the working heat pump.

Conclusion

In order to accomplish the ambitious goals for the reduction of fossil primary energy consumption and for the use of renewable energy the existing building stock have to be addressed today. This is possible and realistic with the existing basic technology and knowledge for renovating buildings. Beside the average age of the building stock, the average age of the private house owner also has to be considered. His decision in investments has another time horizon and different motivation.

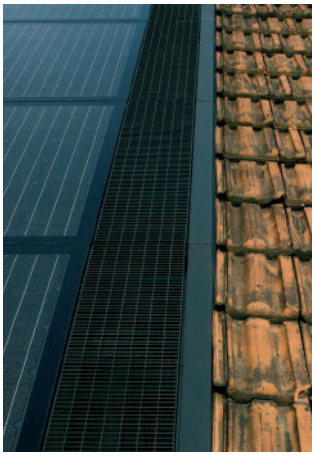
The bivalent systems using existing boilers in combination with heat pumps are an attractive way to minimize shortly the energy cost and to contribute in a quick and environmental friendly way to the binding EU goals.

These bivalents systems offer interesting possibilities to improve the certain house condition and taking care of the personal situation of the owner. Owner and installer can plan step by step optimizing demand and solution.

The effective renovation process of the building stock could accelerate by motivating the house owner with simple step by step solutions.

Dr. Rainer Jakobs, IZW





Heating through photovoltaic electricity

The SYSTAIC energy roof system

A new concept for an autonomous energy supply in buildings is presented and developed by Systaic. It combines electricity generation from photovoltaic panels and heating/hot water production by the use of a heat pump. Both technologies are combined by air: Waste heat from the photovoltaic cells is channelled into an air-water heat pump instead of discharging it unused to the environment.

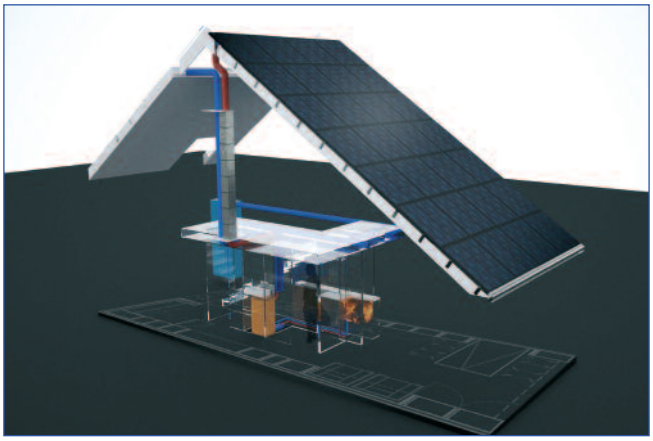
Producing its own electric energy is an important option to reduce the energy demand for ones' building. Consequently it is reasonable to use the available roof area for this purpose. The Systaic approach, called the energy roof, uses the photovoltaic panels both as the construction material for the roof and as a power plant for electricity. The full roof is elevated to allow for an air circulation below the PV panels. The warm air is then used by an air-water heat pump.

The photovoltaic panels benefit from a cooling effect caused by the drag of air via a heat pump process, the useful heat is being extracted from the waste heat of the electric energy units. The basis of this system consists of the energy roof created from PV panels for the electricity production. An air duct, installed beneath the energy units, serves to ventilate them and provides a cooling effect. Approx. 18% of the solar irradiation "arriving" on the roof can be used to produce electricity; the rest is being reflected or transformed into thermal energy. Unfortunately, increasing panel temperatures decrease the efficiency of electricity. Systems that can use the "waste heat" for another purpose will (partly) compensate for this effect. In the Systaic energy roof, the heat pump takes this compensating function by using the warm/hot air for heating/hot water production.

In bright sunlight, but even in overcast conditions the air temperature under the roof installation quickly rises above that of ambient air. Air being the heat source for the heat pumps, its temperature strongly influences the efficiency of the system (even though that source temperature is only one characterizing factor). The electric heat pump runs most efficiently when the difference of source temperature and the demand-side temperature on the side of the heat distribution system are minimized. The use of high temperature waste heat from the PV installation therefore represents an advantage compared to the use of ambient air in air-water heat pumps.

In order to make use of the ambient heat independent of the solar radiation, it is buffered in a PCM device which offers a very high energy density compared to a sensible heat storage tank. PCM makes use of the stored chemical energy during the phase change of a substance which allows providing the building with heat even at nighttimes or in times of low radiation.

Space heating can be guaranteed throughout a low temperature heating or ventilation. If solar irradiation is high (and PV electric production is peaking) sufficient waste heat will be gained to heat the house directly. On the contrary, if the temperature under the energy roof is not high enough, the ambient (outside) air itself might be used as heat source. The compact building construction as well as the large scale integration of the elements into the building allow the heat pump system to easily fit in with the energy roof. The evaporator of the refrigerant circuit is directly integrated into the roof, so that a perfect proportion of flow resistance and heat transfer is achieved.



In order to support the system especially during the winter, the roof can be equipped with additional air collectors that don't need any space or sunlight. Those are adaptable in size and form. The active ventilation of the solar installation allows an additional increase in efficiency. Electric energy units are most efficient if their temperature is as low as possible. The surplus of electricity is intended to be fed-in the public grid or in the batteries of a hybrid or electric car in the future.

Achim Zolke, Systaic

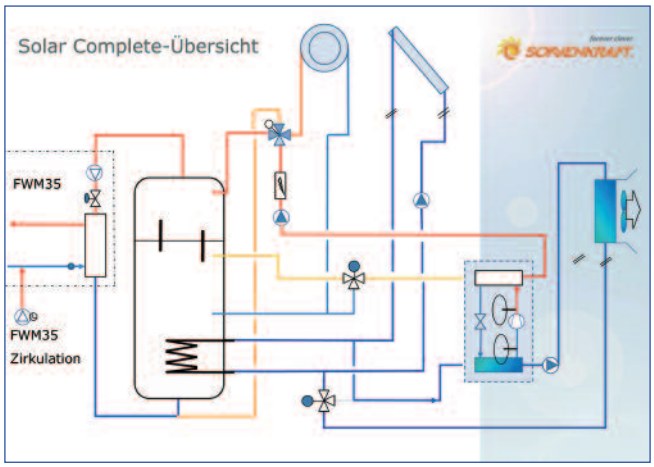
The solar boost

An air-water heat pump with integrated solar power

Air, Sun, Water – the Solar Boost

New solar assisted air-water heat pump successfully introduced to the market. The integrated Solar Boost rises the overall systems efficiency by 25 % because of the direct integration of solar in the primary circuit. End customers, who are looking for a new heating system, are increasingly often looking for a renewable based system. They want to get away from the speculation with oil and gas and the dependency on external decisions.

The Solar Complete system of Sonnenkraft GmbH combines solar power with an air-water heat pump. Both systems are combined to form a functional unit. Solar heat is supplied directly to the brine circuit of the heat pump, resulting in no transmission losses. Because the heat pump is directly involved in the solar cycle, the efficiency increases by approximately 25 percent compared to a conventional system. Sonnenkraft engineers call this enormous gain "Solar Boost", the "Solar Boost " makes seasonal performance factors (SPF) higher than 4 is possible.



Regarding the efficiency curve, the collectors in the Solar Complete operating directly at outdoor temperature level. This collector operating point corresponds to Etao in the efficiency curve and results in an Increase of up to 25 percent compared to normal solar operation.

Freshwater

Freshwater is provided in a hygienic flow through operation due to the integrated fresh water station – a solution typically used by Sonnenkraft. As drinking water is not buffered the growth of Legionella is effectively avoided.

Sonnenkraft introduced this revolutionary product last year in the German market at the ISH fair. Because of the success it is now introduced in more European markets like France and Italy.

Christian Stadler,
General Solar Systems Deutschland GmbH

geoTHERM air-water heat pump

Vaillant, one of the leading heating technology manufacturers has launched its brand-new so-called geoTHERM air-water heat pump with split system.

The system is characterized by an outdoor unit which consists of an heat exchanger and a fan as well as an indoor unit – the brine water heat pump. Both elements are connected via standard PE pipes including a brine liquid.

Great advantages of this new system are the flexibility in choosing the location for the installation and the fact that even in case of extreme cold or a power breakdown the heat pump operation is still guaranteed thanks to the brine containing pipe, so Andreas Christmann for Vaillant Germany. The installation process of the product is easy, there is no need for special knowledge of refrigeration and with the heat pump process itself happening inside the house and therefore avoiding a loss of heat outside the building, a maximum of energy efficiency is assured. Moreover, there is no need for heat insulation of the pipe, on the contrary, the brine inside the PE pipe might even still collect heat stored in the ground on its way from the outside to the inside installation.

This new heat pump is equiped with highly efficient pumps for an adapted delivery rate. Thanks to a special defroster system, the defrosting process is only put in place when it is really necessary. It is impossible for the heat exchanger on the outside installation to extremely freeze because of the non-existing phase change that conventional installations use. Only a smooth freezing which is quickly defrosted might happen, whereas conventional installations produce a lot of energy for the defrosting process which means in the same time a net loss of efficieny of the heat pump installation. The fan is produced out of glass fibre and aluminium, guaranteeing the smooth running and a low need of energy for its use. The outside installation has been developed according to the german norm DIN EN 1176 for a secure use it. Furthermore, cleaning is made easy by the possibility of use of simple household cleaning products. To facilitate the installation, the inside elements can be divided into to parts thanks to the so-called split mounting concept.

Interesting point is the next step of Vaillant towards a more sustainable future which will consist of the possible connection of other renewable sources like solar collectors into the existing brine circuit in order to boost even more the energy efficiency. All Vaillant air-water heat pumps with split system are already equiped for an additional connection.

Jan Christopher Müller, Vaillant Deutschland GmbH & Co. KG

Country in Focus: United Kingdom

'Considerable progress, and great potential'

The heat pump message has been preached in UK for many years, and we have passed through the same stages as many other European countries: firstly the technical arguments, secondly the feasibility of supply, thirdly the recognition by governments of the potential contribution to the CO_2 and energy efficiency agendas. Heat pumps are now a key part of present and future government energy policy in UK .

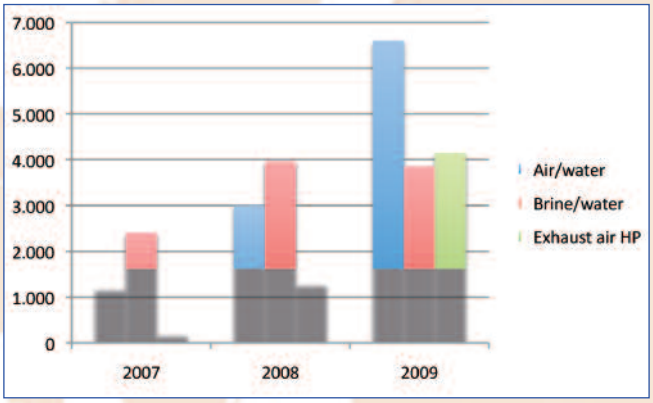
The building blocks required to develop the industry are at different stages, and readers may be interested in this development:

1. Building regulations. The UK is a mild climate with insulation standards which have historically been lower than in the colder European countries. This is no longer the case after three improvements in 10 years.

2. Product and Installer Certification. The UK started its programme before the development of the EHPA Quality Standard and before the Renewable Energy Directive. The programme, called the Microgeneration Certification Scheme (MCS), covers 6 technologies and provides for all relevant products sold in the UK to be of proven performance and installed by competent contractors. Key in the heat pump installers role is that he accepts responsibility for the design of the heat pump system, not simply its installation, a vital requirement when new installers are involved in boiler replacements. MCS has made an important but low profile entry to the UK market and will have a major effect after the introduction of RHI (see below). It is being updated in respect of a number of new heat pump criteria such as the EHPA Quality standard and wider training commitments.

3. The planning/design control parameter for domestic dwellings in UK is called the Standard Assessment Procedure (SAP), with which the heat pump industry has had problems for years. SAP uses a hypothetical SPF figure for efficiency calculations. The industry is in the process of developing a new set of SPFs known as SAPQ, these derived from an actual testing standard agreed by the parties and conforming to EN15316. The first products have now been qualified and SAP Q data will start to feed into the selection of products against SAP. Almost as important, however, is that SAPQ will provide the vital link to measurement of renewable energy under the RED which is now being incorporated into UK policy .

4. Renewable Heat Incentive. This is a big initiative for UK government, and follows years of lobbying by the Heat Pump Association and others to split electricity generating technologies from heat generation.



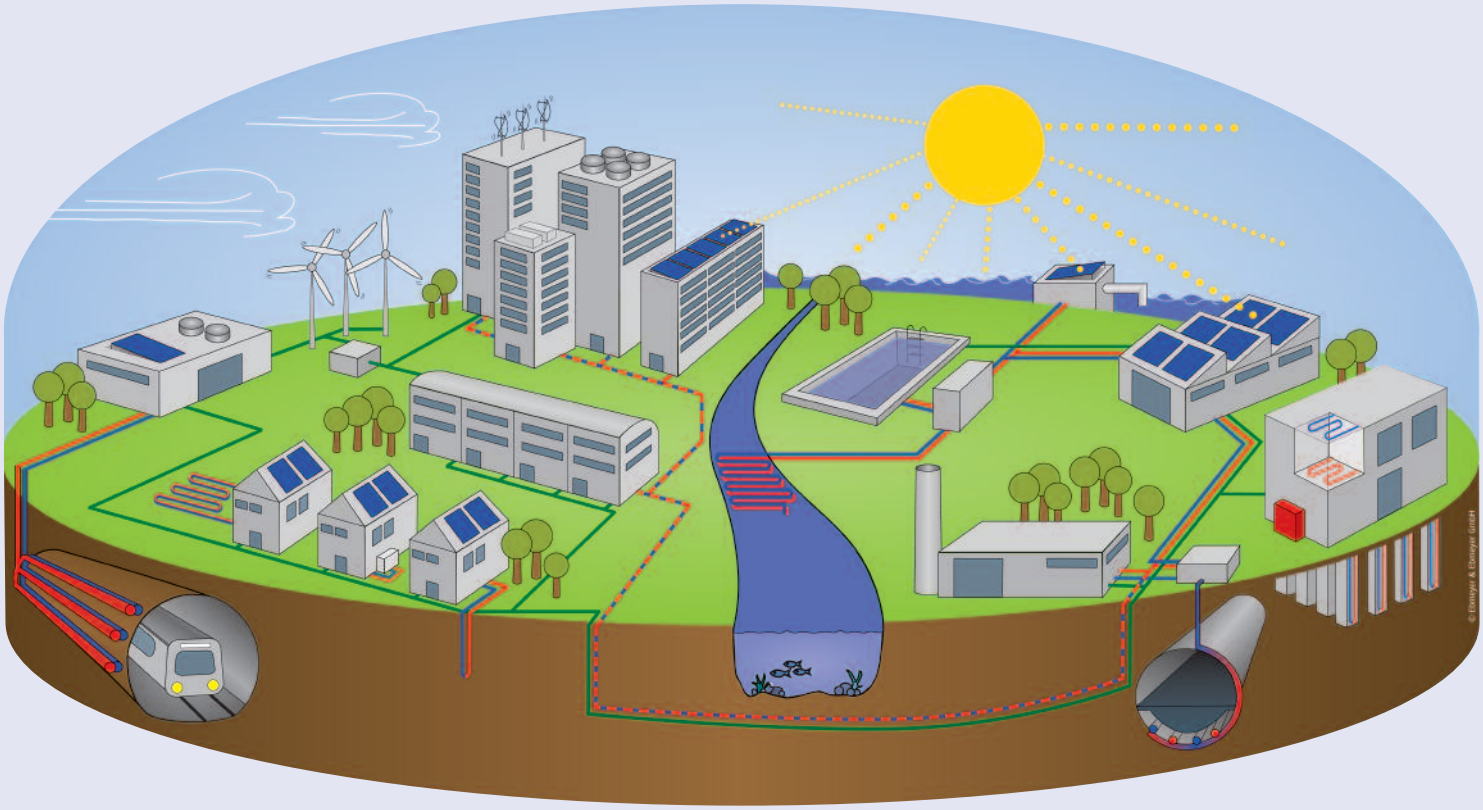
The government is committed to introduction of RHI by April 2011, and has just completed a consultation on the scheme. Installations of heat pumps both domestic and commercial will benefit from a payment per kW/h (sample proposal is 7p per kW/h for domestic groundsource), rather similar to electricity generation projects in Europe and Feed in Tariff (FIT) introduced in UK in April 2010. Payment duration for initial installations is proposed as 18 years for domestic air source, 23 years for domestic groundsource.

The RHI scheme is probably the first of its kind, is a major initiative, and the UK industry welcomes working with government to develop it into a workable project. However, there is no financial mechanism yet in place and the new UK government may need to review its priorities . So we will work to try to make it happen since it will have a very big effect on uptake of heat pumps.

Where are we now? Installations of heat pumps in UK are higher than government thought and a high percentage are not grant funded. The new BSRIA statistics show 2009 sales at 14.600 units, with a number of other sales from non contributors to be added.

Exhaust air units made a large contribution of 4.350, their first year of significant impact. Air to water is now starting to outsell ground to water for the first time in the UK market(air/air are seldom used in the UK domestic market). So a modest market is growing well and has great potential for the future!

Tony Bowen, UK Heat Pump Association



Future cities = heat pump cities?

This years European Sustainable Energy Week (EUSEW 2010) was organized under the theme "intelligent energy in cities". It felt as if the motto had been made to accommodate for heat pumps and consequently, the EHPA organized a workshop titled "Future cities = heat pump cities" on 23.3.2010 in Brussels. The event is part of the dissemination activities of the SEPEMO project (www.sepemo.eu).

The workshop aimed at explaining the basics of heat pump technology and its application fields in all areas of the market. It stressed that heat pumps can be employed to cover nearly all types of energy demand in a city. At the same time, every installation will contribute towards an increase in the use of energy from renewable sources, a reduction in fossil energy demand and a decrease in greenhouse gas emissions. Heat pump employment may even be helpful to significantly reduce an effect that is today know as "heat islands" describing a higher average temperature in agglomerations (compared to the surrounding area). As UN forecasts on population growth and migration foresee a tremendous increase of the number of large cities and mega-cities (more than 10 mio. inhabitants) from todays 19 to 27 in 2050 in cities a reliable, cost-efficient and renewable energy based supply of heating, cooling and hot water will become even more important in the future. Heat pumps – if properly designed and installed – are a solution to this development.

"Future cities = heat pump cities" targeted a wide audience of interested stakeholders. It aimed at increasing the understanding of heat pump application options as well as the parameters of efficient heat pump systems in terms of planning, installation, maintenance and measurement.

The event started with presentations outlining the potential of heat pump technology in general as well as its contribution to an overall renewable energy and climate strategy (using the example of the EU RES Directive). The concept of heat pump cities was introduced (see picture below). The picture gives a graphical representation of the different installation opportunities of heat pumps in residential, commercial and industrial applications as well as the options for integrating them in larger energy distribution grids for (renewable) energy and electricity.

This rather technical approach was complemented by presentations from the architects and the installers perspective showing opportunities and obstacles in making use of a technology still perceived as new. These contributions were particularly valuable as they underlined, that a technically mature, reliable product, such as heat pumps, still requires sufficiently trained experts for a successful market development.

The final presentation showed the link between heat pump potential and opportunities of improvement as seen by from the perspective of the SEPEMPO-Build project. This project aims at providing a uniform measurement method to make heat pump field tests comparable across Europe. The method applies to all kinds of energy source (air, water, ground) and heat distribution (water, air) combinations and will be tested in nearly 40 installations. The project participants expect to gain valuable insights from the measurements and aim at improving heat pump installer education as an additional result.

The final discussion among speakers and audience showed the high interest in the topic. All presentations are available online on the www.ehpa.org and www.sepemo.eu websites.

SEPEMO-build

Successful second EHPA Dinner Debate on the accounting methods in energy statistics

Hosted by MEP Dr. Paul Rübig, the EHPA organized its second parliamentary Dinner Debate in the MEP Salons of the European Parliament in Brussels on 13 April 2010. The event is part of the dissemination activities executed by EHPA as part of its participation in the IEE project SEPEMO-Build. Subject of the evening was the lack of renewable energy sources (RES) data in current European energy statistics which makes it obviously difficult to measure the development of RES as well as its promotion undertaken by different actors of the sector.

The Directive on the promotion of use of energy from renewable sources (2009/28/EC) is one step in the right direction setting binding targets of RES share for all Member States of the European Union and obliging them to notify their National Renewable Energy Action Plans by 30 June 2010 with concrete measures and data for the achievment of their targets.

In order to simplify this process and given the fact that the energy used for heating is estimated at about 40% of the total EU energy demand, the EHPA saw the necessity to further discuss the subject with the different actors of the European energy scene.

The keynote speech was held by Nikolaos Roubanis from Eurostat on the development of renewable energy statistics and its outlook in the EU. He presented an extensive overview on how renewables are counted in primary and final energy and pointed out important issues for future developments. He drew the attention to the fact that the accounting of energy sources of different nature is not evident and needs coherent methodological assumption in order to obtain correct and objective results of the contribution of each source. He explained the methodology for calculating the primary energy of different renewables and stressed at the end that statistical development must continue to rely upon pragmatic and cost effective approaches.

Nikos Roubanis, Eurostat, explaining EU energy statistics

Representatives from the biomass, solar thermal and heat pump sector commented on the subject and gave their point of view.

Jean-Marc Jossart from the European Biomass association AEBIOM presented the state of the art of biomass statistics, stressing that today, bioenergy accounts for 2/3 of RES and focusing on the importance of following emerging markets like pellets, biogas or biofuels. Werner Weiss explained status-quo and future development of counting the solar thermal contribution and the annual collector output on behalf of the European Solar Thermal Industry Federation ESTIF, and Thomas Nowak from the European Heat Pump Association highlighted a new approach towards appropriately counting the contribution from heat pumps in energy statistics explaining that by Annex VII of the RES Directive 2009/28/EC all heat pumps enter now in the system and are part of the statistics regarding their contribution. This new methods show positive results, like for example in Germany, on the basis of the new calculation method a RES contribution from new heat pumps of 1,213 TWh in 2008 was measured.

All in all, the number of participants, the feedback on the presentations as well as the fruitful and interesting discussions afterwards confirmed the success of the evening, the importance of the subject and the great interest coming from Brussels energy community and the Members of the European Parliament.

next meetings

Executive committee meetings
07.07.2010 | Brussels
09.09.2010 | Düsseldorf
11.11.2010 | Brussels

Education Committee meeting
21.–22.09.2010 | Paris

Quality label Committee meeting
23.–24.09.2010 | location tbc

Next Standardisation Committee
08.06.2010 | Lyon

EHPA EVENTS

General assembly
19.05.2010 | Brussels

3rd EHPA European Heat Pump Forum
20.05.2010 | Brussels

SEPEMO BUILD

Project meeting
17.–18.06.2010 | Athens

Imprint

European Heat Pump Association (EHPA)
Thomas Nowak (editor)
Rue du Congrès 35
B-1000 Brussels
mail: thomas.nowak@ehpa.org
online: www.ehpa.org

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