

EHPA NEWS

2008 is likely to mark the start of the change from our dependence upon fossil fuels such as oil and gas to renewable energy sources. The Commission's proposals were published on 23 January and are generally referred to as the 20/20/20 target; that is 20% energy from renewables, 20% increase in energy efficiency and 20% reduction in greenhouse gas emissions by 2020. We discuss the reasons that underlie these proposals and how heat pump systems can play a vital role in meeting these targets.

Global warming

The UN's Intergovernmental Panel on Climate Change delivered its 4th report on the causes of global warming in time for the Conference of Parties to the Kyoto agreement on greenhouse gas reductions in Bali (COP13). From a detailed analysis of all the available evidence, they confirmed that the increase in global temperatures were due to ever rising increases in greenhouse gas concentrations which congregate in the upper atmosphere. In Table 1 is shown the increase in concentration of the three most important greenhouse gases – carbon dioxide, methane and nitrous oxide. The increases since the middle of the eighteenth century are recognised as due to human activity during the industrial revolution. The highest concentration is that of carbon dioxide which is primarily associated with the combustion of fossil fuels.

Table 1: Atmospheric concentrations of important long-lived greenhouse gases over the last 1,000 years.

Year	1000	1500	1750	1750
Carbon dioxide (parts per million)	280	280	275	380
Methane (parts per billion)	650	700	725	1900
Nitrous oxide (parts per billion)	265	270	270	320

The Panel concluded that the global output of greenhouse gases has to be stabilised by 2015 in order to prevent irreversible changes in the climate. This should limit the global temperature rise to 2°C.

In a discussion at the dinner debate in the European Parliament on 5 December 2007, Ralph Sims, Renewable Energy Unit, International Energy Agency, referred to the recent IEA report on Renewable Energy Sources in Member States. The report had concluded that a mixture of incentives, penalties and regulations were the most successful in stimulating the installation of renewable energy sources on a large scale (Figure 1).

Figure 1: Examples of good policy practices for solar, biomass and geothermal heat across carrot, stick, and guidance policies together with market-led examples.

(Source: RENEWABLES FOR HEATING AND COOLING Untapped Potential, IEA Paris, 2007)

	Solar thermal	Biomass heat	Geothermal
Carrots	Germany: Market incentive Programme	Sweden: Tax Incentives	Switzerland: SwissEnergy Programme
Sticks	Spain: Barcelona Solar Thermal Ordinance	Denmark: regulations for biomass heat supply	12
Guidance	Austria: Subsidies & Information Scheme	Canada: REDI Information and Capital Subsidy Program	Sweden: Technology Procurement
Market-led	China	New Zealand	Iceland

12. No relevant example could be found within the timeframe of the project for a stick-based policy in support of geothermal.

Energy can no longer be taken for granted

In a memorandum (MEMO/08/33 of 23/01/08) that accompanied the Renewable Energy and Climate Change Package, the Commission explained why changes in the way we regard and use energy are essential.

"In recent decades, our lifestyle and growing wealth has had a profound effect on the energy sector, changing the energy outlook considerably in the process. Increasing demand for energy, soaring oil prices, uncertain energy supplies and fears of global warming have opened our eyes to the fact that energy can no longer be taken for granted. EU leaders have thus made a commitment to increase the use of renewable energy; energy that can replace fossil fuels, diversify our energy supply and reduce our carbon emissions. Boosting investment in renewable energy, energy efficiency and new technologies contributes to sustainable development and

security of supply, and helps create new jobs, economic growth, greater competitiveness and rural development. A comprehensive legislative framework is necessary for the promotion and the use of renewable energy. Only this can provide the business community with the long-term stability it needs to make rational investment decisions in the renewable energy sector and put the European Union on track towards a cleaner, more secure and more competitive energy future.

Commission Proposal

“To achieve the renewable energy policy goals, the European Commission has proposed a Directive. This aims to establish national renewable energy targets that result in an overall binding target of a 20% share of renewable energy sources in energy consumption in 2020 and a binding 10% minimum target for biofuels in transport to be achieved by each Member State.

Three sectors are implicated by renewable energy: electricity, heating and cooling and transport. It is up to the Member States to decide on the mix of contributions from these sectors to reach their national targets, choosing the means that best suits their national circumstances. They will also be given the option of achieving their targets by supporting the development of renewable energy in other Member States and third countries.

The minimum 10% share of biofuels in transport is applicable in all Member States. Biofuels tackle the oil dependence of the transport sector, which is one of the most serious issues affecting security of energy supply that the EU faces.

Finally, the Directive also aims to remove unnecessary barriers to the growth of renewable energy - for example by simplifying the administrative procedures for new renewable energy developments - and encourages the development of better types of renewable energy (by setting sustainability standards for biofuels etc).

What are the advantages of renewable energy?

The numerous benefits of renewable energy - in terms of the impact on climate change, security of energy supply and the long-term economic benefits - are widely accepted. The Commission's analysis shows that achieving our renewable energy targets will mean the following:

- Savings of 600 to 900 million tonnes of CO₂ emissions per year - holding back the rate of climate change and sending a signal to other countries to do the same
- Reductions in fossil fuel consumption of 200 to 300 million tonnes per year, most of it imported - making energy supplies more certain for European citizens
- A boost for high-tech industries, new economic opportunities and jobs

All this will cost approximately €13-18 billion per year. However, this investment will drive down the price of the

renewable energy technologies that will form a growing part of our energy supply in the future.

Renewable energy makes economic sense

With oil prices at today's levels, renewables are increasingly seen as an economically sound alternative. With increased deployment of renewable energy sources, we can expect to see the cost of renewable energy continue to fall over time, in a pattern similar to information technology. Indeed, costs have already fallen significantly in recent years.

Last year global investment in sustainable energy increased by 43%. Market revenues for solar, wind, biofuels and fuel cells are forecast to increase to approximately €150 billion by 2016, while record levels of investment in wind, solar and biofuels reflect technological maturity, a growth in policy incentives and increased investor confidence.

Continued and expanded deployment will continue this process. Conversely, the cost of fossil fuels, notably oil, has been steadily increasing since 1998. The dynamics at play are clear: falling renewable energy prices, rising fossil fuel energy prices.

But the use of renewable energy sources also contributes to increasing local and regional employment opportunities. Renewable energy in the EU has a turnover of €30 billion, providing approximately 350 000 jobs. Employment opportunities are vast, ranging from high-tech manufacturing of photovoltaic components to maintenance jobs at wind power plants or in the agricultural sector producing biomass.

The EU's proactive policies on renewable energy provide an industrial opportunity. By beginning the transition to a low carbon economy earlier than would otherwise be the case, the need for more radical and sudden adjustment is reduced. Money will be saved on imported fossil fuels, and greater diversity of energy sources ensures that the European Union is better protected against external shocks.

Renewable energy makes environmental sense

The renewable energy target is closely linked with our greenhouse gas emissions target. Without significantly increasing the share of renewable energy in the EU's energy mix it will be practically impossible to meet the EU's objectives for reduction of greenhouse gas emissions.

But the term “clean energy” doesn't just apply to reducing greenhouse gas emissions - it also covers traditional pollutants, such as nitrogen oxides, sulphur dioxides and particulates. These are as detrimental to our health as they are to the environment.

Fossil fuel energy causes environmental impacts all along the chain: from extraction and production to transportation and end-use. With renewable energy these negative effects are minimised, if not removed altogether.

Of course renewable energy is not always a flawless solution and certain environmental and aesthetic concerns cannot

be denied, but new technological solutions will contribute to lessening this impact over time. Looking at the bigger picture, however, there is no doubt that the adverse effects of climate change have far greater significance.

Renewable energy means secure energy supply

Our dependence on a limited number of energy sources (oil and gas) is of increasing concern. Oil is no longer a cheap commodity that we can afford to take for granted. Oil prices fluctuated around \$25-30 during the first years of this decade but today hover at around \$100 per barrel.

From a security of supply perspective, EU renewable energy is mostly generated in the EU. This means that it is less subject to supply disruptions and mitigates fuel price increases. It makes sense, therefore, to produce more of our own energy, and from a growing variety of renewable energy sources. A diverse supply of energy is a more secure supply of energy.”

EHPA welcomes the draft Directive on the promotion of the use of energy from renewable sources

The European Heat Pump Association (EHPA) welcomes the proposal for a Directive on the promotion of the use of energy from renewable sources (RES Directive) issued by the EU Commission on 23rd January 2008 (COM(2008) 19 final). The EHPA particularly appreciates the fact that, in line with other official publications, heat pumps are finally included as a technology that uses renewable energy from air, water and shallow ground. Heat pumps are a mature technology that has significant contribution potential towards the energy savings and climate protection goals of the EU. Heat pumps are one of the few technologies that can cover the entire heating, cooling and hot water needs through the use of renewable sources. While this potential is generally acknowledged in the proposed Directive, we have the concern that it is not used to its full extent. We see issues with regard to

- the requirements set for air-source heat pumps,
- the methodology (or lack thereof) to be used to calculate the contribution of heat pumps (and other RES), particularly with regard to Commission decision COM(2006) 850 on energy statistics.
- the implementation of data collection for heat pumps and related energy.

In addition, the EHPA would encourage decision makers at all policy levels to make sure that the use of renewable energy sources is neither directly nor indirectly taxed. EHPA believes that adjustments of the Directive to address these issues will result in a stronger impact on the reduction of use of non-renewable fossil fuels, the increased use of renewables and the reduction of greenhouse-gas emission.

Why renewables have a key role

Fossil fuels like oil, gas and coal have been created through geological processes over a period of millions of years. Their resource size is finite and is concentrated in certain areas which may be very distant from where they will be used.

Renewable energy sources are derived directly from sunlight and so are widespread, abundant and inexhaustible. Moreover, using such resources results in very little or zero emissions of greenhouse gases. These advantages have to be balanced by the variations in electricity and heat output on a daily and seasonable basis. In addition, many of the technologies are still maturing so capital costs are relatively high.

Heat pumps

Heat pumps provide renewable heating because they concentrate the low grade heat present in the air, water or ground. Energy is only used to concentrate the heat not to produce it. Typical heating systems will deliver four units of heat output for each unit of energy consumed.

Unlike other renewable technologies, heat pump technology is relatively mature as the first heat pump was designed and installed in 1862 using the heat in an Austrian lake as source.

In addition, heat pumps can also extract heat from a building thereby producing cooling. For countries bordering on the Mediterranean this is important as many people may wish to have cooling in the summer as well as heating in the winter.

Sherhpa workshop: Use of natural refrigerants

The final workshop of the Sherhpa project which the EHPA has helped coordinate, was held in Brussels on 13 November. Some 90 persons attended the workshop which attracted scientists and engineers from Japan, USA and Canada as well as Europe. The presentations and subsequent discussions covered the entire scope from design to application of heat pumps using natural rather than manmade refrigerants. Currently some 11 systems are under test across Europe (see October newsletter 8/4).

The consensus that emerged amongst the participants can be summarised as follows –

- natural refrigerants can replace manmade refrigerants in almost all applications
- it is essential to undertake rig tests to determine the optimum flow and heat transfer
- innovative heat exchangers such as mini-channel and spiral tube should be considered
- manufacturers should now consider developing

rotary (scroll) compressors to enable natural refrigerant heat pumps attain the highest efficiency

- to help manufacturers switch from manmade to natural refrigerants, further collaboration was necessary on a world-wide scale.

The project partners are now writing up their observations and measurements and it is hoped to publish their work in book form by the end of the year. The workshop proceedings can be accessed at <http://www.greth.fr/sherhpa/sp2007.php>.

Ground Med project is funded

An application to FP7 has resulted in the Ground Med project being approved for funding. The EHPA initiated this project which will be coordinated by the Centre for Renewable Energy (CRES) in Greece. Its prime goal is to demonstrate the role of ground source heat pumps for heating and cooling in countries around the Mediterranean.

EHPA active at EU sustainable energy week

The European Heat Pump Association has actively participated in the third EU sustainable energy week, which is part of the Sustainable Energy Europe Campaign (SEE). From January 28th to February 1st 2008, the major stakeholders concerned with sustainable energy issues in Europe gathered in Brussels to meet and to discuss. Besides a full week of presentations, an exhibition was organised in Brussels Charlemagne Building.

On its booth, the EHPA presented the contribution potential of heat pumps to interested parties. We had the pleasure of welcoming Commissioner Piebalgs who stopped by during his opening tour. He was particularly interested in a better understanding of whether or not heat pumps use too much electricity. Guido Wiertz from Emerson Climate Technologies explained that heat pumps manufactured, planned and installed by professionals are a very energy efficient heating solution that can largely contribute to achieving the goals set by the EU to reduce energy consumption, to reduce GHG emissions and to increase the share of renewable energies used for heating. He also highlighted that replacing traditional fossil fuel boilers by heat pumps could translate into a great reduction of the pollution by micro particles and NOx.

For the EHPA participation was successful as not only a large group of interested people, ranging from professionals to individual house owners, was looking for information on heat pumps, but also members of the association used the opportunity to meet each other and other stakeholders from the renewable energy field.

Expanding the UK market for ground source heat pumps

The Geothermal Live Conference will be held as part of the GeoDrilling 2008 Show on 30th April –1st May at the East of England Showground, Peterborough UK, and will examine how ground source heat pumps fit into government-planning, specifying a ground source heat pump system, and the future of the sector with specific seminars on how it will impact on drilling, both in the UK and internationally. EHPA will provide two of the speakers and further information can be found at <http://www.geodrilling-show.co.uk/home.asp>.

EHPA meeting dates:

Start-up meeting EU heat pump technology platform (ETP):

April 17th, 2008, Vienna (AT); 9.30 to 16.00

Quality label Committee:

April 22nd, Borås (SE); 9.00 to 16.00

Executive Committee:

May 19th, Zurich (CH); 14.30 to 18.00

General Assembly:

May 21st, Zurich; 14.30 to 18.00

Education Committee:

June 12th/13th, Helsinki (FI); time to be announced

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Next issue: Closing date for contributions to the next issue is 18 April 2008. Theme: Growing the heat pump market in Europe.