

Promotion of Renewable Energies for Heating and Cooling

The Background

The promotion of renewable energies is a world-wide crucial challenge. Those sources contribute to the security of the energy supply as they reduce the use of fossil resources and nuclear energy, thus alleviating dependence on energy imports. This is an important fact, regarding costs, balance of trade, political autonomy, economic security, etc., for most of the industrialised countries in the European Union as well as for most developing countries. Renewable energies are as well the important strategy to reduce greenhouse gases and to gain energy, therefore essential to meet the Kyoto-goals, to mitigate climate change and to build up a sustainable energy system.

The European Union as a leading region in renewables has shown at the world summit in Johannesburg and in its white paper and renewable energies-directive that the promotion of renewables is an important political issue. The EU instructs the member states to increase the share of renewable energies of the total electricity supply to 12 per cent in the year 2010. However most of the activities of the EU-member states concerning regulations and other promotional actions are addressing only the power sector – due to the directive 2001/77/EC. For instance the German Act on Granting Priority to Renewable Energy Sources (Renewable Energy Sources Act) as the most important regulative initiative worldwide addresses only the power sector. This successful instrument has led to a renewables share of more than 8 per cent to the overall power consumption.¹ The reason for the focus on the power sector so far is lying in its less complex structure compared to the heating and cooling sector: the widespread and nearly complete power supply system (grid) makes regulatory instruments work easily compared to other sectors.

The Challenge – Promotion of Renewable Heating & Cooling

Although there is a huge potential for using renewable energies for heating and cooling in nearly every industrialised country, only a few of them explore this option seriously.

Renewable heat is produced from

- the traditional resource **wood and other biomass** with old and innovative technologies (local space-/hot water heating, combined heat and power-plants and distributed heat, district heating)
- active **solar systems** (e.g. local space-/hot water heating)
- **geothermal sources** (including heat pumps).

The untapped potentials of renewable heat are large. *Fig. 1* shows the example of Germany. In the year 2003 only 58 TWh of renewable heat were produced, resulting in a percentage of 3.9% of the total heat consumption in Germany. Studies have identified a potential of 820 TWh per year. This corresponds to a rate of 55% of the present heat consumption. Considering that the total heat consumption is going down due to increases in efficiency, the rate of renewables can get even higher.

Regarding the expansion of renewables in the power sector we see some success stories in countries like Germany, but we also see the overall EU target to reach 12% renewables of the electricity consumption by 2010 likely to fail if no progress is made in the heat sector. The European Commission itself states in its evaluation report about the contribution of renewable energy sources in the EU: „With the measures that have been put in place, the Commission estimates that the share of renewable energy sources in the EU 15 is on course to reach 10%



Bernd Hirschl

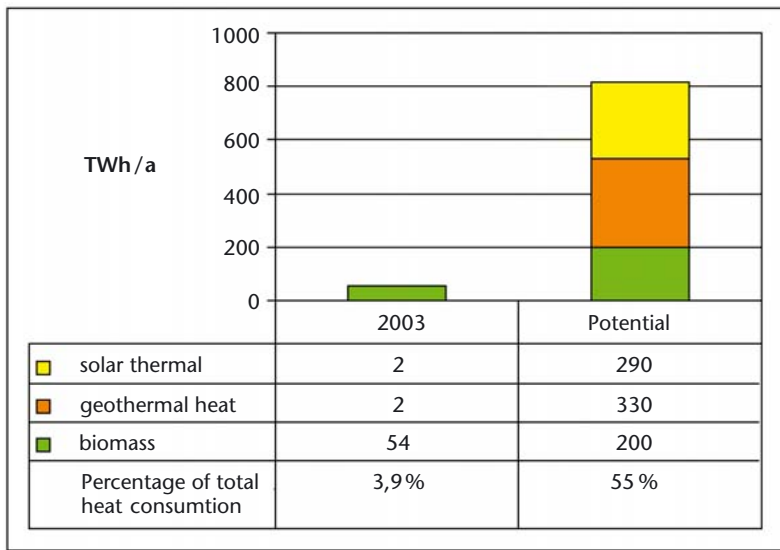
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¹ See Hirschl, Bernd et al. (2002): Markt- und Kostenentwicklung Erneuerbarer Energien. 2 Jahre EEG – Bilanz und Ausblick. Erich-Schmidt-Verlag, Berlin; and Hirschl, Bernd et al. (2004): Gutachten zum 2. EEG-Erfahrungsbericht (forthcoming).



Source: own diagram, data from Nitsch et al. (2004): Ökologisch optimierter Ausbau der Nutzung erneuerbarer Energien in Deutschland, BMU, Berlin.

Figure 1
Present use of renewable heat in Germany compared to potential use

in 2010. The shortfall compared to the 12 % target is caused by sluggish growth of renewable energy markets for heating and cooling, leading to the conclusion that considerable additional action is needed in this sector to allow the full 12 % target to be reached.”²

Discussion on instruments

Renewable heating and cooling technologies cannot reach significant market shares without political support. This is a crucial regulatory challenge of the years to come, because – as mentioned before – the heating & cooling market situation is much more complex than in the power sector. Innovative instruments with a wide-scale impact are rare as well as national regulatory attempts are.

The production of heat shows some specific problems that complicate the search for suitable solutions. First, in most countries there is an insufficient grid system. While in European countries electricity grids are almost every-

where, heating grids are concentrated in big cities and densely populated regions. The systems are mostly decentralised and, second, private resulting in a considerable amount of actors involved in the production of renewable heat, thus making it difficult to address these actors by political measures. Third, the demand for heat is unsteady due to seasonal influences and the possibilities to store heat during a longer period are still a matter of research.

In contrast to the electricity sector, there exists almost no systematic approach to political support systems for heating or cooling. Some countries address parts of the market, such as Israel, Spain and Australia that have regulations on solar thermal heat. Other countries like Germany and Austria search for solutions but are still in a conceptual phase.³

Fig. 2 gives an overview about possible political instruments for the heat sector. They can be distinguished in regulatory and market-based instruments, as well as accompanying measures.

Regulatory instruments are obligations and incentives or exemptions. Israel and some communities in Spain have applied obligations to install solar thermal systems when constructing or rehabilitating a building.

Market-based instruments can be distinguished in price-based and quantity-based instruments. Price-based instruments steer by the price. These are for instance feed-in tariffs, which are applied in the electricity sector. The German Renewable Energy Sources Act is an example for such a feed-in-tariff together with the prioritisation of grid-supplied electricity from renewable sources. It is difficult to adopt such a regulation for the heat sector that has no comparable grid, infrastructure and “simple” value chain. Thus, guaranteed prices for heat production are discussed. Other examples, which are already applied, are taxes (e.g. on

² Communication from the Commission to the Council and the European Parliament: The share of renewable energy in the EU Commission Report in accordance with Article 3 of Directive 2001/77/EC, evaluation of the effect of legislative instruments and other Community policies on the development of the contribution of renewable energy sources in the EU and proposals for concrete actions. COM (2004) 366 final, Brussels, 26.5.2004

³ The Institute for Ecological Economy Research (Institut für ökologische Wirtschaftsforschung IÖW) is currently working on a policy advice project on renewable heat instruments. The aim of the project is to develop assessment criteria, to assess different instruments and to develop alternative instruments. The project is commissioned by the German Environmental Ministry and the German Environmental Protection Agency.

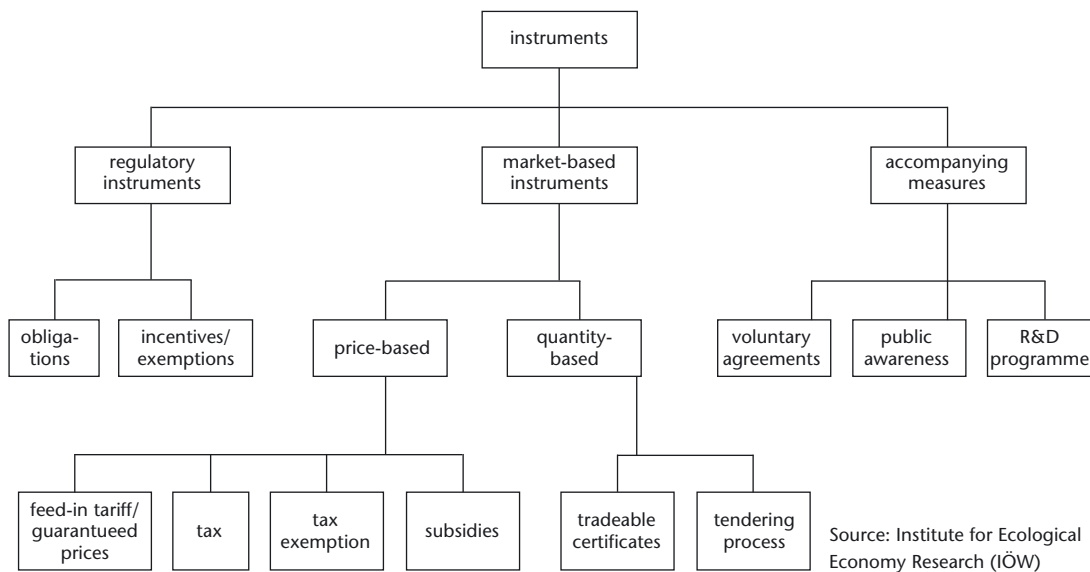


Figure 2
Possible political instruments for the renewable heat sector

fossil fuels or carbon dioxide), tax exemptions, and subsidies. In Germany, for instance, the present approach is a large subsidy programme which includes subsidies for the construction of solar thermal, geothermal and biomass heating systems. In times of decreasing public budgets, subsidy programmes are criticised and they are usually not sufficient to reach a significant market share of the supported technologies.

Quantity-based systems steer by the quantity. These are for instance tradable certificates and tendering processes. Australia has a certificate system for renewable electricity that additionally addresses parts of the heat market since solar thermal systems are included if they replace electrical heating systems. Tendering processes or bidding systems have so far been applied in the electricity sector, only.

Accompanying measures consist of voluntary agreements, public awareness campaigns, R&D programmes, and other measures. The city of Berlin went into a voluntary agreement with the local housing sector and the local industry, in 1997. This voluntary agreement contains the installation of solar thermal systems, thermal insulation of buildings, and the installation of district heating. Hitherto, this voluntary agreement did not meet the targets set for the installation rate of solar thermal systems. Public awareness campaigns are a useful tool for increasing the knowledge on and the interest in renewable heating systems. Moreover,

eco-labelling can be used to promote renewable heating systems. Since renewable heat technologies are rather young, R&D is needed to improve the systems and for cost cutting. The companies involved in this sector are mostly small or medium-sized and need financial support for R&D. In addition, the education and training of engineers, architects, and craftsmen have to be improved. The instruments most discussed for the heat sector are tradable quota-based certificates, guaranteed prices, and obligations. As shown above, obligations and tradable certificates are already applied to a certain extend, but larger experiences have to be made to get the possibility to assess them.

The side-event at the renewables

Against that background the Institute for Ecological Economy Research (Institut für ökologische Wirtschaftsforschung IÖW) organised together with the German Renewable Energy Federation (Bundesverband Erneuerbare Energien BEE) and the European Renewable Energy Federation (EREF) a side event at the RENEWABLES 2004 in Bonn, titled:

Promotion of renewable energies for heating (& cooling) – Innovative instruments in industrialised countries and initiatives in the EU

The intentions and objectives of the planned side event were

- to provide an overview on innovative instruments/mechanisms to promote renewable heat (with the focus on industrialised countries)
- to show good practise examples (selected countries and models respectively experiences) to foster discussion between politicians from different countries
- to stimulate/present national and EU-initiatives

Therefore a wide range of speakers had been invited to give “good examples” and to discuss perspectives and needs for the promotion of renewable heating and cooling.⁴

The first speaker was Esther Hoffmann from the Institute for Ecological Economy Research. She opened up the side-event by giving an overview on the subject. Main intention of her lecture was to show the points which are important to discuss within the field of renewable heat production and instruments to support it. She gave a short introduction about the situation in other countries. Although there is no systematic instrumental approach to promote renewable heating and cooling, some countries do already address parts of the market (e. g. Israel, Spain, Australia). Some countries like Germany and Austria are working on the development of broader instruments (see IÖW-project mentioned above). Esther Hoffmann explained also briefly the technologies available, the possibilities to use them and the main problems regarding a support-mechanism, which are: an insufficient grid, often decentralised and private systems and an unsteady demand.

The following speakers reported about the national situation concerning renewable energy instruments addressing heating and cooling in different European countries that can be named as “good practises” or instructive examples. All speakers are high representatives from national or international renewable energies associations.

Christiane Egger from an Austrian association (Oberösterreichischer Energiesparverband) focussed on biomass heating, which is a very fast growing field in Austria since many years now. So 14 % of total energy consumption comes from biomass at present. Main instruments to support renewable heating in Austria are legal and administrative measures and financial support as well as consulting for business and private sector to improve the awareness for possibilities of using renewable energy sources. She pointed out that positive and target group oriented communication and marketing was and is a crucial point to the success of any measures.

The example of Sweden was reported by **Peter Danielsson**, president of the European Renewable Energies Federation (EREF). In Sweden a share of 21% of total heat consumption is provided by biomass and biofuels. Whereas renewable heat has been supported in an indirect way by raising taxes on fuels, certificates are introduced at present to ensure a further growth of this share. The certificates mainly address larger plants. Therefore further improvements concerning the renewable heat in general and for smaller plants in particular are needed.

The third national example – Spain – has been depicted by **Raffaele Piria** from the European Solar Thermal Industry Federation (ESTIF). He focused on solar thermal heating and explained an action plan, which has allowed a very fast rising of installed capacity of solar thermal installations in Barcelona. In this example, an ordinance on solar thermal installations were given, which made solar thermal installations obligatory in case of new buildings or major renovations of such buildings which have a great demand of hot water. Within 15 months the capacity of solar thermal installations rose from 1,1 m² up to more than 10 m²/1000 inhabitants. Advantages of this so called “Barcelona model” are lower prices for solar thermal energy, awareness about the possibility of using renew-

⁴ The side-event was moderated by Bernd Hirschl (Institute for Ecological Economy Research) and Johannes Lackmann (German Renewable Energy Federation)

able energy sources, a consolidating of market structures and of course several long-term effects.

Piria introduced a Joint Declaration as well, presented in January 2004 at the European renewables conference in Berlin, the so called "RES-H initiative".⁵ A broad coalition of European industry, research and NGOs called for:

- Verifiable national and EU targets
- Strong regulations
- Financial incentives
- Promotion campaigns
- R & D

Burkhard Sanner from the German and European Geothermal Association put a focus on geothermal power. The principal advantage of geothermal power compared to most of the other renewable energy sources is the stability of availability. However there is no possibility to transport geothermal power. It has to be used very close to the place where it surfaces. Sanner reported about some good examples concerning grid-use and supporting instruments in Sweden and Italy.

The situation and possible measures in Germany have been discussed by Hans-Josef Fell, member of the German Parliament (Green Party, Euro-solar). He pointed out the problems with national finances and subsidies when households are short of cash. Possible instruments for Germany could be a modification of the German building act, to obligate people to use renewable energies, as well as increased prices through taxes for fossil energies.

Karl Kellner from DG TREN (transport and energy) of the European Commission explained the EU-policy for renewable heating and cooling. In his presentation he accentuated the relevance of cooling besides renewable heating and prospected the consideration of cooling within the next EU research program (FP 6). Kellner agreed that a legal base is needed, one example he mentioned is the European building directive. Furthermore he stresses the need of using cogeneration. The new member states of the

EU have started wide-spread activities in this field.

Finally **Mechthild Rothe**, member of the European Parliament (her paper was represented by an assistant) pointed out the role of EU policy for renewable energies and presented a second declaration for the promotion of renewable heating and cooling that was passed at a conference in Bielefeld, Germany (the "Bielefeld declaration"⁶).

The final discussion about national good practises and instruments for supporting renewable heating and cooling was dominated by the agreement, that a legal framework at a European level like the directive for the renewable power sector is needed. The side-event closed with recommendations for the further national development of instruments, the sharing of good practises, the development of differentiated and integrated approaches for all relevant renewable technologies and the creation of a framework and the expression of binding targets on a European level.

⁵ See <http://www.estif.org>

⁶ See <http://www.rothe-europa.de>

**Speakers at the Side-event
Promotion of RE for Heating & Cooling –
Innovative Instruments in Industrialized
Countries and Initiatives in the EU**

Bernd Hirschl/Johannes Lackmann
(IÖW, BEE)
Short welcome by organisers, facilitation

Esther Hoffmann
(IÖW)
Introductory input – the importance of
renewable heat and instrument overview

Peter Danielsson
(EREF)
National example 1: Sweden & focus biomass

Christiane Egger
(Oberösterreich. Energiesparverband)
National example 2: Austria & focus biomass

Raffaele Piria
(ESTIF)
National example 3: Spain & Focus solar thermal

Burkhard Sanner
(Geothermal Association e.V. GtV)
Focus on Geothermal Energy

Hans-Josef Fell
(Member of the German Parliament
(Bundestag) Green Party; Eurosolar)
National example 4: Germany & policy for
renewable heat

Karl Kellner
(DG TREN)
EU policy for renewable heating & cooling –
state of the art and perspectives

Mechthild Rothe
(MdEP, Eurofores)
EU policy for renewable heating & cooling –
the need for new initiatives