



WHAT ROLE CAN RENEWABLES PLAY IN HUNGARY'S HEAT SUPPLY

Written By: Lilla Csanaky, Katalin Varga

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In Member States of the European Union almost half of the gross energy end use is for heating and air conditioning. The heat produced comes primarily from converting fossil fuels, contributing significantly to anthropogenic greenhouse gas emissions. Heat production based on renewable sources may play a large role in moderating the climate change and achieving the EU's 2020 renewable energy targets. Despite all this the heat sector receives little attention internationally and domestically as well. ENERGIACLUB has no knowledge of any similar study focusing on renewable heat production that examines possibilities, support policies and legal background with a complex approach. This analysis is based on a synthesis of international literature on the subject; its main added value is its assessment of policy measures. It also presents renewable technologies with potential in heat production along with their environmental, economic and social advantages. This study gives an unbiased review of technologies and policy instruments that could be used to support renewable heat production. It is to be noted that further Hungarian research is needed to enable the creation of solutions that are most adequate for the properties of Hungary's heat sector.

In Hungary the ratio of renewable energy sources used for heat production is fairly low (below 10%) even though the country has potential for much more. The target ratio for this sector in Hungary's Renewable Energy Action Plan¹ is 18.9% by 2020. The document schedules a significant increase by the next decade in the utilisation of biomass, geothermal energy, heat pumps and solar thermal energy as well. However, assessing the capacities related to heat production is encumbered by

deficiencies in statistics, the lack of a database containing all existing systems. Estimates so far have dealt almost exclusively with theoretical potential, and their results show great deviation, mostly in the area of biomass usage. Even so, researchers agree that the use of renewable technologies in heating and air conditioning has great unexploited potential. In order to reach climate protection and energy policy targets using these possibilities we need a comprehensive research assessing theoretical, technical and economic potential at the same time.

Perfectly working systems all over Europe demonstrate the reliability of heat production technologies using renewable energy sources. Several renewable energy sources and various technologies are available for heat production from the heating system of individual buildings through district heating systems to industrial applications. Using these available, technically proven technologies involves significant environmental, economic and social advantages. Determining which renewable energy source is most suited for any given project always depends on given circumstances and specific demands. The ideal solution can only be found through conducting energetic assessments and involving qualified experts. Solar energy is inexhaustible in human terms, and the use of solar thermal collectors has low operational and maintenance costs. Geothermal energy is a reliable energy source that does not depend on weather conditions, therefore Hungary's great potential in this area should be put to use. The main advantage of heat pump systems is that they can be installed almost anywhere and they provide a cheap and environment friendly cooling solution through passive cooling. The various resources and technologies available provide a wide range of ways to use biomass. Its other major advantage is that the energy source can be stored, which is not the case with many other renewable energy sources.

According to the results of lifecycle analyses studying the environmental effects of technologies

¹ Hungary's Renewable Energy Action Plan was prepared in 2010 by the Ministry of National Development. Member States were required to provide data on and submit national action plans about measures aiming to increase the use of renewable energy sources according to the 2009/28/EC directive of the European Commission.



and products, renewable energy technologies emit less pollution and greenhouse gases than fossil energy sources. According to a special report of the IPCC (Intergovernmental Panel on Climate Change) on renewable energy sources², no ambitious climate protection targets can be achieved without the increased use of renewable energy sources. In comparison with heating systems using natural gas or oil, the use of any renewable-based heat production technology will result in a decrease in emission, but savings vary on a large scale. In terms of environmental effects solid biomass can be used the most efficiently with household-sized devices. The greenhouse gas emission per unit of energy of such a system is only one-tenth of that of devices fuelled with fossil energy sources. Among smaller scale district heating systems (with a total capacity of 3,000 kW) based on various energy sources, biomass has the best emission figures, while in the area of larger district heating systems (with a total capacity of 10,000 kW) deep geothermal heating exhibits the best environmental effects.

Under current economic circumstances most renewable energy technologies are not yet able to compete with traditional energy production devices. Results of studies analysing costs per unit of energy produced with heat generating technologies prove that in certain cases solutions based on renewable energy sources can provide a great, even economical alternative to fossil energy sources. International surveys show that this is especially true for geothermal energy used in greenhouses, aquaculture, district heating systems, or in combined energy generating systems. In the long run, the costs of energy production based on renewable energy sources can be expected to drop due to technological development and mass production while the price of fossil fuels will escalate.

The spread of renewable energy technologies will decrease Hungary's dependence on energy import, which is desirable both in terms of the national economy and energy supply security. Several elements of the supply chain related to decentralised, renewable-based heat generation require local labour, regardless of the type of renewable energy source used. The heat producing technologies presented in the study can play a key

role in conserving rural population through their ability to create and maintain jobs. Among renewable-based heat production solutions energy generation in biogas plants has the most potential to create jobs in light of the whole lifecycle; the least labour demanding technology is heating and cooling with heat pumps.

In order to benefit from the advantages of renewable energy source usage we need development in the legal and subsidy policy environment. The licensing procedure for devices using renewable energy sources is almost incomprehensible and is burdened with legal anomalies. The insufficiently transparent legal background and the lengthy procedure that can take up to a couple of years scare investors off. Because of all this it is time to inspect the support policy practices of other EU member states and make suggestions for the development of a Hungarian incentive system. As it is detailed in the study, decision-makers can choose from a number of incentives to support renewable-based heating and cooling. Differences between the natural conditions of the countries in question and between technological and market maturity levels of technologies must be taken into account when creating support policy. An impact analysis of incentives introduced in European countries revealed that the most important factor in support policy is stability, providing a basis for investor confidence. Subsidising heat generation is much more complicated than the incentives for renewable-based electricity generation due to the large number of small, scattered plants with small output capacities, therefore experiences from the electricity sector cannot be put to use in this area.

To facilitate the spread of investments using renewable energy sources different flanking measures (e.g. research and development, awareness raising) are also necessary. Well-functioning renewable energy systems increase social acceptance towards these technologies, therefore presenting good practices is very important.

In summary we can say that heat generation based on renewable energy sources has great potential in Hungary, but political commitment is necessary for improvement. The legal and support policy background should be comprehensively developed to ensure the spread of investments using renewable energy sources.

² Special Report on Renewable Energy and Climate Change Mitigation, IPCC, 2011