

Energy Savings in Buildings and District Heating

# Heat Roadmap Europe: Saving Money With District Heating

The European Union can save at least €100 billion by comprehensively addressing heating and cooling in its Energy and Climate Framework 2030. The new study, which comes as the second component of a large research effort, was performed by Aalborg University, Halmstad University and Ecofys on the initiative of Euroheat & Power.

**R**ising energy prices and fuel poverty are a major concern for all European governments. The study »Heat Roadmap Europe« (HRE) shows that ambitious targets can be achieved while keeping comfort affordable and without compromising on quality of life and health. While being ambitious to the limit of what can realistically be deemed feasible in terms of future reduction of space heat demands, additional cost savings identified by refining the energy efficiency scenario 2 originally proposed by the EU amount to at least €100 billion/a and up to €146 billion/a due to a reduction of the costs for the total heating and cooling supply for buildings in the range of 15 to 22%.

## Faster decarbonisation

Redesigning the heating and cooling supply as proposed in the study provides a fast-track solution to overcoming the constraints of compact urban environments and bringing renewable energies into cities. The HRE-EE scenario tables on the efficient use of combined heat and power, biomass, solar thermal, large-scale heat pumps, individual heat pumps, geothermal energy, as well as heat from waste incineration and excess heat from industry. At the same time, the HRE-EE scenario introduces additional flexibility to the EU-EE scenario that facilitates the integration of more wind and photovoltaic power in the electricity sector.

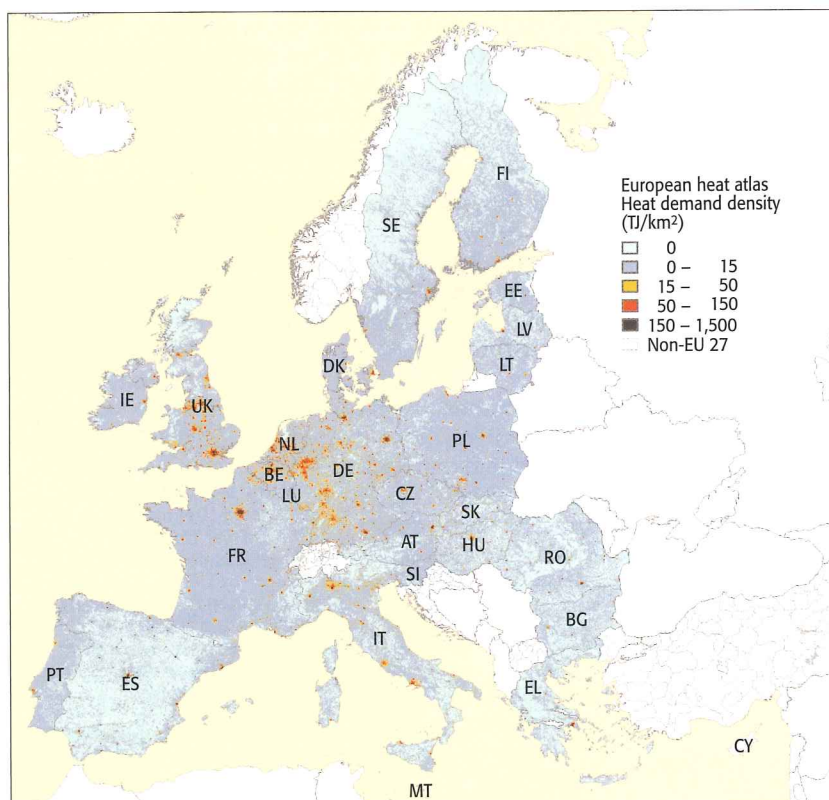
## Better energy

The HRE-EE scenario creates a more diverse energy supply than any other EU scenario, improves the security of supply and also creates welfare and jobs within smart communities in Europe. The HRE-EE scenario uses no-regrets technologies that ensure flexibility and help avoiding lock-in effects.

»The identified cost reductions will benefit European citizens from the most vulnerable customer to businesses and ultimately Europe's competitiveness. The study clearly shows that energy efficiency in buildings should not be considered in isolation but optimised by taking into account efficiency in energy supply, notably by expanding District Heating and Cooling. We thus hope that the European Commission will take into account these findings and messages when proposing a Strategy for heating and cooling in autumn,« says *Frédéric Hug*, President of Euroheat & Power.

## Background

The Heat Roadmap Europe report proposes a new strategy for heating buildings within the European Union. In general, the strategy promotes the use of district heating to heat buildings in urban areas and the use of individual heat pumps in rural and some suburban areas. The use of district heating is based on a combination of heat recycling and renewable heat supply.



**Figure 1.** By geographically dividing the heat demand across Europe on a 1 km² resolution, it is possible to identify areas which have a sufficiently high heat density for the development of district heating



The future volume of district heating which can be developed in the European Union is estimated in the Heat Roadmap Europe using the first ever EU Heat Atlas. By geographically dividing the heat demand across Europe on a 1 km<sup>2</sup> resolution, it is possible to identify areas which have a sufficiently high heat density for the development of district heating (figure 1).

Using this local information, district heating is analysed in the EU by modelling energy supply and demand. In the future, it is unclear how the energy sector in the EU will evolve and therefore, this new heating strategy has been analysed under two different contexts (figure 2):

First, the energy sector evolves under »Current policy initiatives« (EU-CPI scenario). This scenario covers updated existing and already planned policy measures. The effect of more district heating has been analysed under the first Heat Roadmap Study (HRE 1).

Second, the EU implements huge energy savings between now and 2050, mainly in end-use – such as more insulation and better windows. The effect of more district heating has been analysed under the second Heat Roadmap Study (HRE 2).

This elaborated assessment of district heating within the EU has never been performed before and the results indicate that district heating is a very good idea in the whole interval between the two contexts examined.

Even in the second energy efficiency context, where the EU implements a lot of heat savings, the results indicate that using district heating will be beneficial. With district heating, it is possible to reach EU targets for carbon dioxide reductions in 2050, while using more renewable energy and reducing the costs of providing heat. By 2050, the reduction in heat costs is approximately €100 billion/a as compared to the EU-EE scenario, which is approximately 70% of the current EU budget and almost 1% of the current EU GDP. These lower annual costs are mainly reached by replacing the most expensive end-use investments with less costly investments in district heating systems.

The new Heat Roadmap Europe report is available freely. It has been



*Frédéric Hug: »The study clearly shows that energy efficiency in buildings should not be considered in isolation but optimised by taking into account efficiency in energy supply, notably by expanding District heating and cooling«*

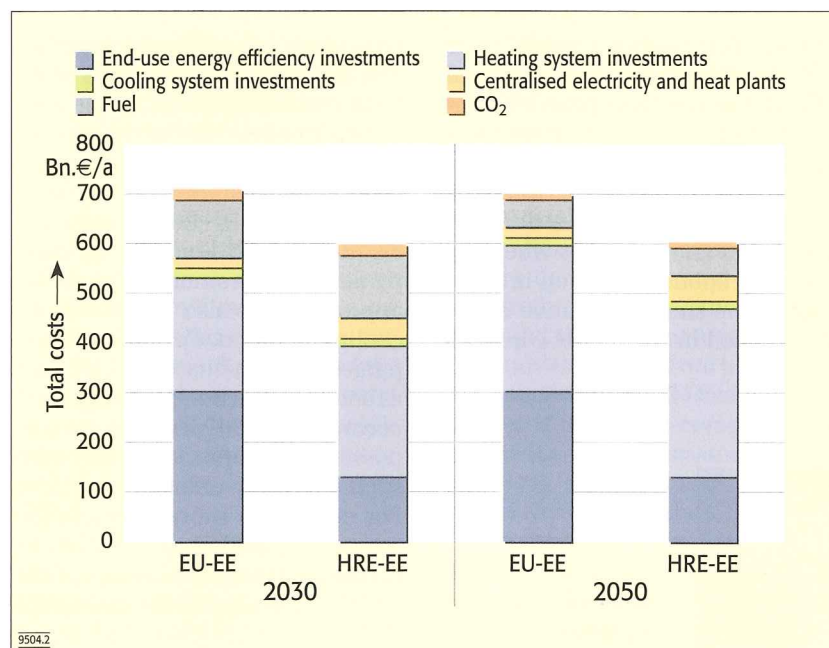


Figure 2. The new heating strategy has been analysed under two different contexts

completed by Aalborg University and Plan Energi from Denmark, Halmstad University from Sweden, and Ecofys from Germany. The project was initiated by Euroheat & Power and it was collaboratively financed by Euroheat & Power, the partners, and the Strategic Research Centre for 4th Generation District Heating Technologies and Systems (4DH), which is mainly financed by

the Danish Council for Strategic Research.

[www.heatroadmap.eu](http://www.heatroadmap.eu)

[www.4dh.dk/hre](http://www.4dh.dk/hre)

[www.euroheat.org](http://www.euroheat.org)



## INDUSTRY NEWS

### 12 Sea Water District Cooling



### 12 Fortum Extends its District Heating Network in Tartu

### 12 New Biomass Crane for Avedøre Power Station

### 12 Most Important Event for Professional Mobile Radio – PMR Expo in Cologne

## ENERGY POLITICS

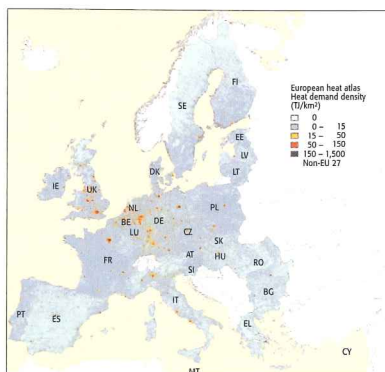
Stefan Holler

### 13 The Baltic Innovation Network for District Heating

BI-Net

### 14 Heat Roadmap Europe: Saving Money With District Heating

Energy Savings in Buildings and District Heating



## DHC+ STUDENT AWARDS

Kaisa Kontu, Tingting Fang, Risto Lahdelma

### 16 Forecasting District Heating Consumption Based on Customer Measurements

Forecasting Model for DH consumption

## DHC+ STUDENT AWARDS

Magnus Åberg

### 21 Future Heat Demand Change and Electricity Market Dynamics

Swedish District Heating Sensitivity

## SOLAR HEAT

Jan-Olof Dalenbäck

### 26 Solar District Heating and Cooling

An Emerging Option



Mats Carselid

### 30 A Future Team of Saviours?

Optimized Return Temperature and Solar Heating

Kenneth Hoffmann

### 32 The Application of Electric Heat Pumps in Combination with Solar Heating

Faster Payback Times

## DISTRICT COOLING

Tarek Kim El Barky, Sidsel Katrine Ernsten

### 36 Automated Mapping of Profitable District Cooling Areas

Determining District Cooling Potential



## NETWORK OPERATION

Thomas Oppelt, Thorsten Urbanek, Bernd Platzer

### 38 New Model for Calculating the Heat Flow through the Walls of Buried Parallel Pipes

District Cooling Networks



## CONSUMER INSTALLATIONS

Oddgeir Gudmundsson, Jan Eric Thorsen

### 44 Benefits of Using dP Controllers in District Heating Substations

Avoiding Overflow

## HEAT/COLD METERING

Hermann Trottler

### 48 100% Reading Performance

New Standards in Radio-Based AMR



## LAST PAGE

### 50 Advertisers' Index

### 50 Impressum

### 50 Preview

[www.ew-online.de](http://www.ew-online.de)