

Energy Technology Perspectives 2014



Emissions of greenhouse gases, such as carbon dioxide, have to decrease radically. In its recent report the IPCC (Intergovernmental Panel on Climate Change) points out the dramatic consequences of the climate change, and in previous reports the dominant cause has been pinpointed as emissions of greenhouse gases from human activities.

This fact is a cornerstone for the IEA publication **Energy Technology Perspectives 2014** (ETP 2014). The ETP 2014 sets out to suggest technology solutions essential to meeting long term global climate goals, in the so-called 2-degree scenario (2DS). It is possible to meet 2DS targets, provided a number of policy actions are implemented. In fact, there is a scenario that leads to even lower green-house gas emissions, the 2DS-EB, assuming increased electrification in two regions – the European Union and China – and in which heating in buildings is switched from gas to decarbonised electricity using heat pump technology. Thus, the ETP 2014 shows that emissions from the 2DS-EB scenario is lower than from the 2DS, provided heat pumps are used for space and water heating.

Heat Pumps can supply heating and cooling using renewable sources

Heat pumps are able to supply both space heating, hot water and space cooling from the same unit. Thus, heat pumps, when combined with clean electricity, can provide a sustainable solution to indoor climatisation and hot water needs.

In heating mode, heat pumps upgrade heat from a low-temperature heat source, such as ambient air or groundwater, to higher temperature, using a moderate amount of electric energy (typically using only one-sixth to one-half the energy of electric resistance heaters, depending on applications). The heat can be used for space and/or water heating.

In cooling mode, the process is reversed. For example, heat is transferred from a warm space to the warmer outside air, with input of electric energy. This is analogous to what happens in a refrigerator or freezer. Refrigerators and freezers are actually heat pumps.

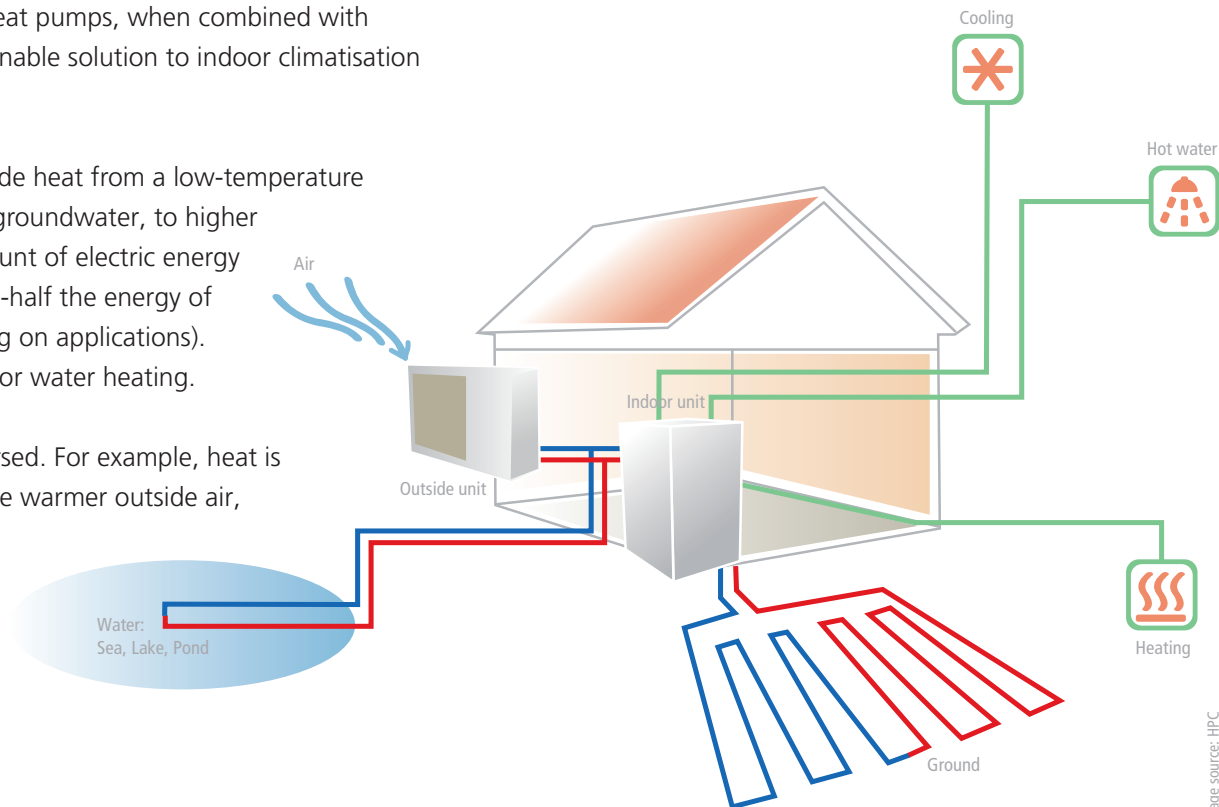


Image source: HPC

ETP 2014: Heat Pumps will significantly reduce GHG emissions... ...if supported by proper incentives and policies

With the ongoing de-carbonisation of the electric grid, variable sources of renewable power are being increasingly used, such as solar, wind, and wave power. In times of electricity surplus, their energy can be stored by heating water with the help of heat pumps. The stored hot water can then be used for space heating or domestic hot water.

Thus, in addition to providing energy-efficient heating, hot water and cooling, heat pumps can also play an important role in the smart energy system of the future by storing heat energy.

However, in order for all this to happen, policy measures need to be taken, according to the ETP 2014. Thus, in the short term (through 2025), there need to be **incentives** for effective heat pumps for space heating and for domestic hot water. Whenever practical within each country's political process, there need to be regulations that ban the use of electric resistance heaters for space heating and domestic hot water, that would result in significantly greater demand for heat pumps.

The IEA Heat Pump Programme sees future heat pump development trends as an important means of combating greenhouse gas emissions, while also improving the indoor climate environment through enhanced thermal comfort.

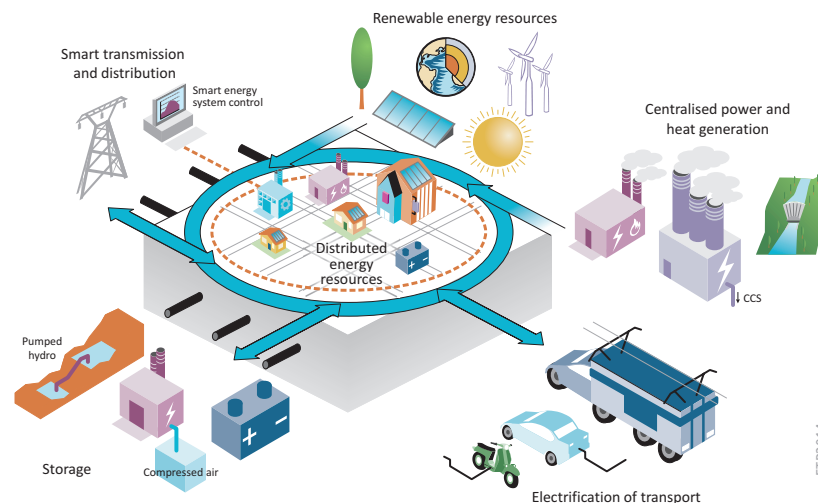


Image source: ETP2014



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Energy Technology Perspectives 2014 - Harnessing Electricity's Potential

Starting from the premise that electricity will be an increasingly important vector in the energy systems of the future, **Energy Technology Perspectives 2014 (ETP 2014)** takes a deep dive into actions needed to support deployment of sustainable options for generation, distribution and end-use consumption. In addition to modelling the global outlook up to the year 2050 under different scenarios for around 500 technology options, **ETP 2014** explores the possibility of “pushing the limits” in six key areas:

- Solar Power: Possibly the Dominant Source by 2050
- Natural Gas in Low-Carbon Electricity Systems
- Electrifying Transport: How Can E-mobility Replace Oil?
- Electricity Storage: Costs, Value and Competitiveness
- Attracting Finance for Low-Carbon Generation
- Power Generation in India

Since it was first published in 2006, ETP has evolved into a suite of publications that sets out pathways to a sustainable energy future in which optimal technology choices are driven by economics, energy security and environmental factors.

ETP 2014 purchase include extensive downloadable data, figures and visualisations.

Visit IEA Bookshop at <http://www.iea.org>

What is the IEA Heat Pump Programme?

The Programme is a non-profit organisation funded by its member countries. It is the foremost worldwide source of independent information and expertise on environmental and energy conservation benefits of heat pumping technologies.

What is the aim of the Heat Pump Programme?

The aim is to achieve widespread deployment of appropriate practical and reliable heat pumping technology systems that can save energy resources while helping to protect the environment.

Why is that important?

The world's energy and climate problems are well known. The buildings sector is responsible for a very considerable proportion of greenhouse gas emissions. Heat pumps are a key technology in the solution to break this trend.

What needs to be done?

By disseminating knowledge of heat pumps worldwide, we contribute to the battle against global warming. In order to increase the pace of development and deployment of heat pumps for buildings and industries, we need to increase R&D efforts for heat pumps, and we need to implement long-term policies for further deployment of heat pumps.

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