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Danfoss

Rethinking efficiency in buildings

The simple truth about Europe's buildings

We spend most of our time in buildings – working, shopping, learning, sleeping. It's not surprising, therefore, that these buildings consume a lot of energy.

Most of this is used to maintain the right temperature and air quality inside the building. This is controlled by heating, cooling and ventilation systems, which are known collectively as technical building systems. When these systems aren't set up properly or do not run efficiently, even more energy is required – leading to higher bills and increased CO_2 emissions.

It doesn't need to be this way. Simple improvements could help reduce energy wastage, cut costs, and make our buildings healthier, more comfortable and more productive places to be.

From drain to gain – unlocking our buildings' energy saving potential

Energy consultancy Ecofys has recently published a comprehensive report, addressing these challenges at an EU level. The report – ***Optimising the energy use of technical building systems*** – is the first of its kind to quantify energy savings potential that could be achieved by retrofitting and optimising these systems.

This huge improvement in energy efficiency can be realised using simple and innovative measures that have a very short payback period.

30%

average energy savings potential by optimising technical building systems

ECOFYS
A Navigant Company

The challenges

30%

of total EU energy consumption used to heat and cool our buildings

36%

of the EU's carbon emissions comes from buildings

70%

of an average household's energy bill spent on heating and cooling

€240bn

spent by EU citizens on space and water heating per year

1 in 10

people in the EU struggle to heat their homes

110m

EU citizens living in buildings with hazardous concentrations of pollutants due to inefficient ventilation

Learn more at **danfoss.com/buildingefficiency**

Cutting energy waste and **engineering wellbeing** for millions of Europeans

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Buildings need a central nervous system

There are technologies available that have been proven to make our buildings and the systems within them more efficient, yet they are still missing in most buildings.

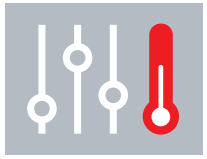
These technologies are like a building's central nervous system and are all interconnected to each other. They manage heating, cooling and ventilation and control everything that's happening inside a building in terms of its environment – including how much energy is being used.

Optimising technical building systems not only makes building environments more efficient, it empowers building users to better understand their environment – proactively managing their energy usage and maintaining a healthy, comfortable and productive living environment, adjusted to their liking.

The cost of these measures is **low**, they can be **easily retrofitted** in existing buildings, and the **energy and cost-saving benefits** can be remarkable.

Technical building systems – solutions for improvements

Space heating

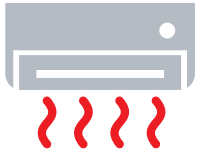


Individual room controls; automatic hydronic balancing; speed-controlled pumps

Hot water

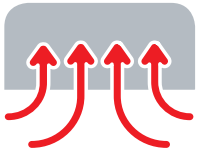
Automatic thermal balancing

Air conditioning



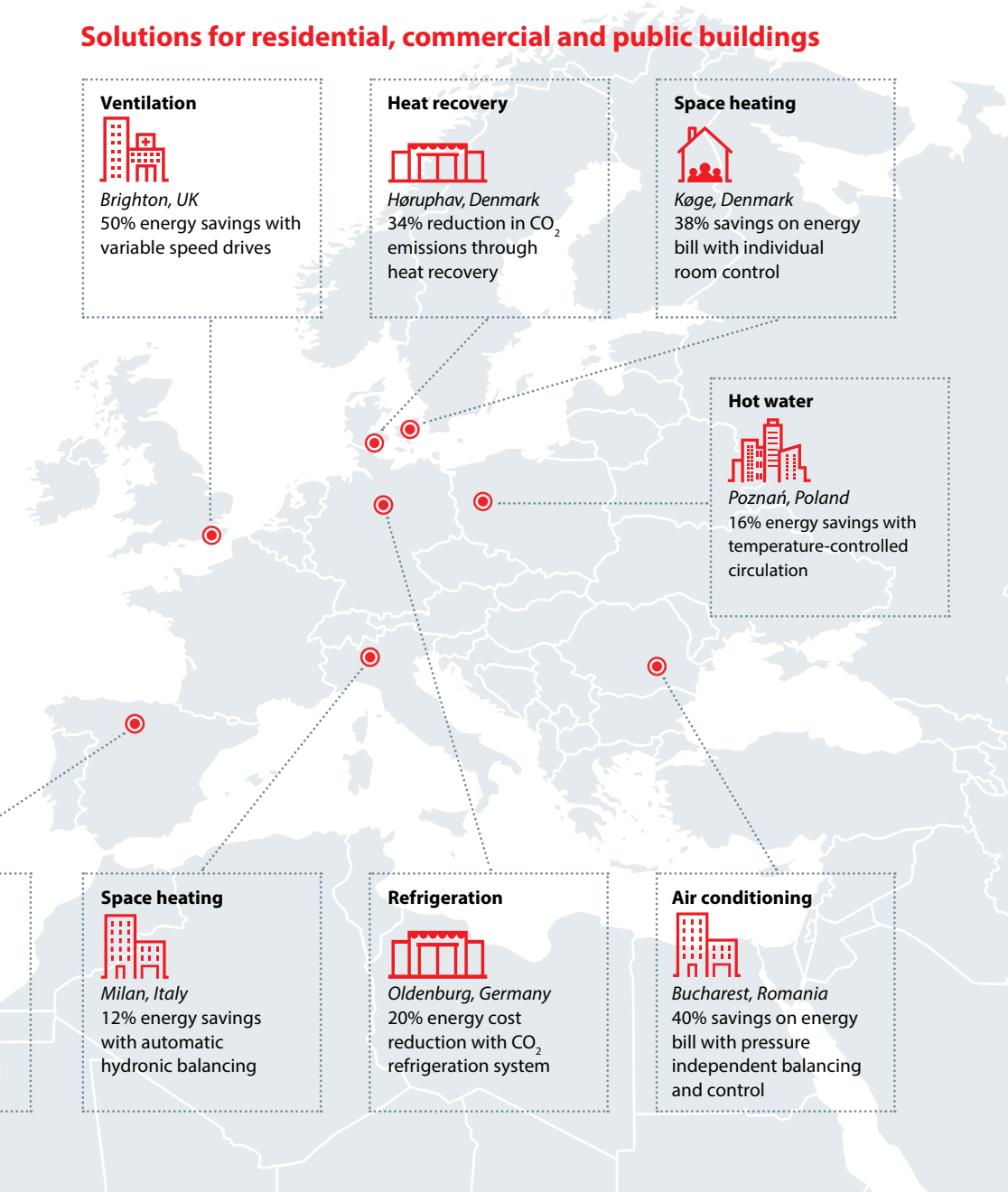
Individual room controls; speed-controlled compressors

Ventilation



Variable demand control

Solutions for residential, commercial and public buildings



Achieving energy ambitions with **simple and reliable solutions**

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300,000 jobs
the number of new jobs that could be created in Europe manufacturing and installing energy efficient products and services

156 Mt CO_2
the quantity of greenhouse gas emissions that could be saved by optimising building systems – equivalent to 82 million cars

13%
the reduction of natural gas imports into the EU that could be achieved

€67bn
the amount of money EU citizens could save on their energy bills annually in 2030

14%
of the EU 2030 energy efficiency target could be met by optimising technical building systems

2 years
the average payback period for getting the basics right in our buildings

Existing buildings: making the efficient, truly efficient

Achieving the EU's transition to a low-carbon economy by 2050 requires the full decarbonisation of our buildings.

With the current 1% renovation rate for existing building stock, neither the EU 2030 energy efficiency target nor the 2050 decarbonisation target will be achieved.

There is a clear need to accelerate the modernization of existing building stock. To achieve this, we need to ensure that technical building systems are operating at maximum efficiency.

The benefits of rethinking our approach to building efficiency

For consumers
- Reduces energy bills
- Improves comfort, health, wellbeing and productivity
- Pays back quickly

For towns and municipalities
- Significantly lowers CO_2 emissions
- Helps to fight fuel poverty
- Enables smart energy systems

For property owners, engineers and consultants
- Proven, easy-to-implement technology
- Builds a business case for energy efficiency
- Increases property value and reduces complaints

For the EU and EU member states
- Country and EU-wide reduction in CO_2 emissions
- Helps achieve ambitious climate targets
- Reduces energy imports and strengthens security of supply

Putting Europe on a fast track to **highly efficient, connected buildings**

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"**75% of our housing stock** is energy inefficient. To make our existing buildings more efficient, renewables and energy efficiency will have to work hand in hand"

– Commissioner Arias Canete

Now is the time to act

The review of the Energy Performance of Buildings Directive (EPBD) presents an unmissable opportunity to accelerate the optimisation of technical building systems.

This is the most cost-effective pathway towards achieving our targets.

Thinking ahead: connected buildings and smart energy systems

With renewables predicted to supply 27% of our energy by 2030, the move to smart, flexible energy systems is a necessity. Connected buildings and smart energy systems are right around the corner and policy makers must think ahead.

By turning commercial buildings into flexible energy providers, we can bridge the gap between supply and demand, reduce costs for consumers and help system operators to integrate renewables.

Heat recovery from commercial refrigeration systems, in particular, has gained much interest in recent years. With the introduction of CO_2 as a refrigerant, supermarkets can utilise the surplus heat from CO_2 refrigeration units to heat space and domestic water – either in their own buildings, or by feeding into the local district heating system.

Danfoss solutions deployed in supermarkets could also make the uptake of wind and solar power more efficient by storing energy in cooling batteries, offering additional flexibility to grid operators.

Taking action: the key steps to make it happen

1» **Enforcement of existing requirements**

- Enforcement of existing provisions such as Article 8 of the current EPBD.
- Guidance for member states on implementation of the EPBD, supported by best practice examples for different building types.
- The enforcement should be simplified by adopting at least binding requirements on key functionalities.

2» **Smartness indicator**

- They should also embrace the use of existing tools, such as the building renovation passport or the new smartness indicator, to stimulate market uptake.
- Assess and document the energy performance of technical building systems to increase awareness of possible efficiency gains and drive demand.

3» **Consistent terminology**

- Greater consistency is needed around the terminology used by the European Commission to avoid indecision and uncertainty among investors and users.
- Clarified requirements should be introduced for key functionalities to encourage implementation of the EPBD in member states.

4» **Harmonisation of standards**

- Regulation, standards and testing need to focus on system performance, in addition to looking at individual products, and should be more explicit about the energy performance requirements for technical building systems and the key functionalities.
- Member states need to track progress via a collection of data at national level on the state of technical building system in existing buildings.

5» **Clarity around the deep renovation journey**

- Member states must include optimisation of technical building systems in their national renovation and staged deep renovation strategies.
- To achieve this, the European Commission and the EPBD should provide a clear, comprehensive ranking of all available measures based on a) how fast they can deliver cost and carbon savings and b) how effectively they will facilitate the implementation of subsequent measures.
- The European Commission also needs to highlight the role of control systems in balancing the minimized energy losses, the internal gains and the remaining energy needs for nearly zero energy buildings (nZEB's).