



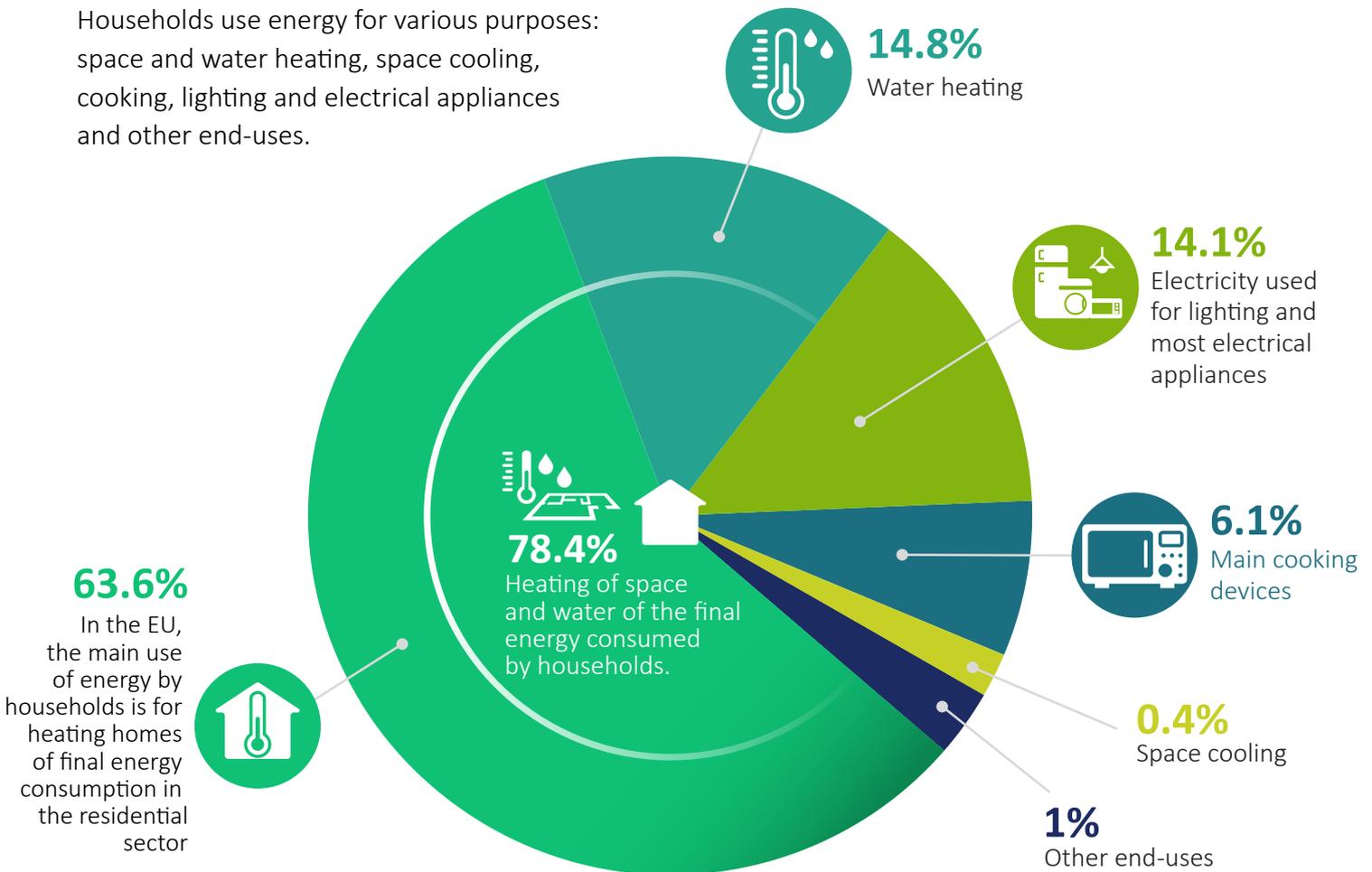
Energy consumption

ComAct educational materials



Categories of energy consumed in the typical household

Households use energy for various purposes: space and water heating, space cooling, cooking, lighting and electrical appliances and other end-uses.





Most efficient ways to reduce energy consumption:

1

Energy savings/improved building envelope

The highest reduction of energy demand can be achieved by improving the building envelope. Methods include:



Insulation



Eliminating thermal bridges



Increasing the airtightness (roof, window frames, doors)

Through better insulation and a tighter building envelope, less energy is lost to the environment so the demand for heat is reduced. In addition, summer comfort is increased.

Efficiency of technical equipment

2

Optimisation of equipment with proper control and regulation is a crucial aspect. Installing an efficient heating system with individual room control is the most important investment. The following opportunities should be checked and could be chosen for making the whole heating system more efficient:



Using well-dimensioned heaters



Using pump models with highly efficient electricity saving (5W) for heating and warm water circulation



Lowering temperature when heat is not needed (night, absence)



Insulation of all warm water pipes, leading to reduction of temperature



Installation of valves to regulate heaters, pre-adjustable valves and smart meters to raise awareness about energy consumption

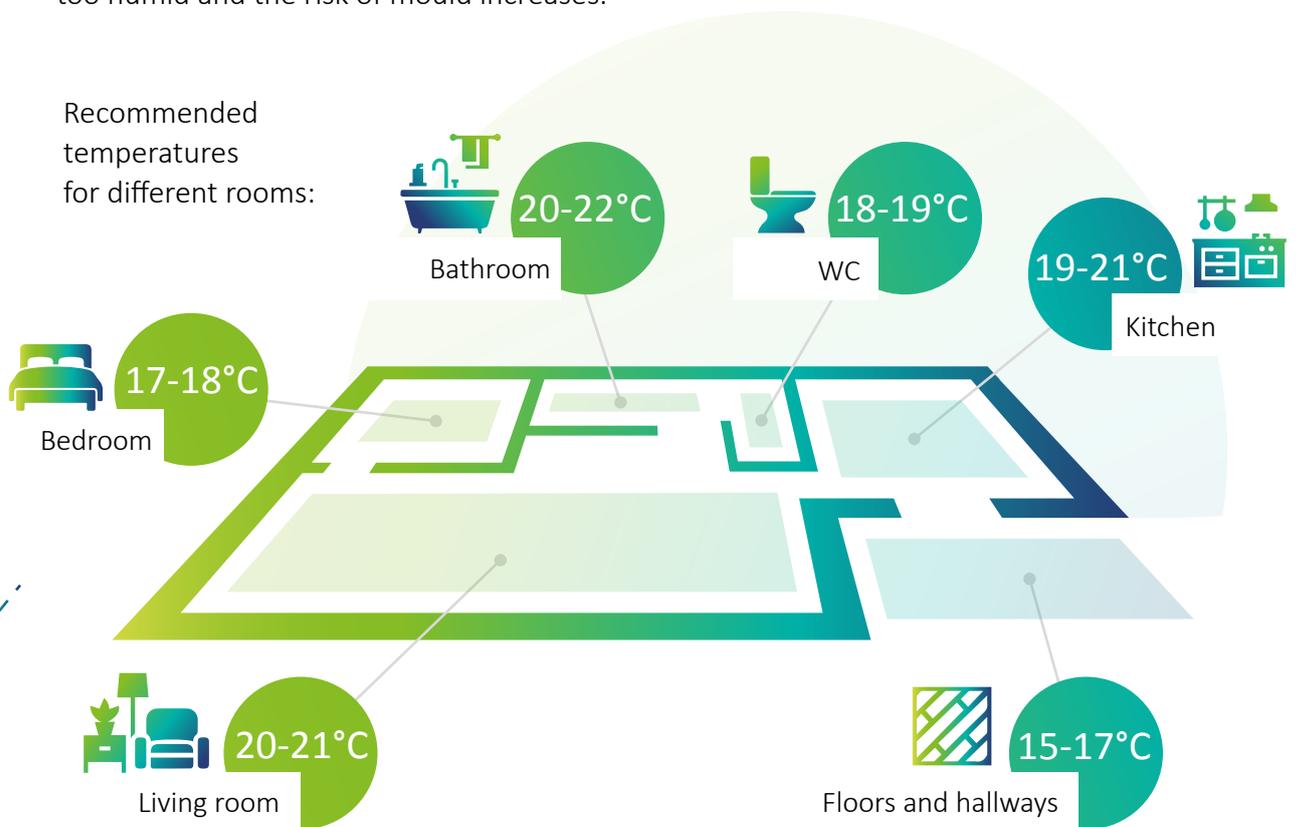
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Household energy saving

Efforts to save energy in households can lower energy consumption further. One of the most effective investments is an adjustable heating control system that gives households control of the temperature and monthly heating costs.

A first step is correct ventilation and heating, adjusting the temperature in each room separately if possible. Rooms which are not used for most of the day do not need to be fully heated. Usually, a temperature of 20-21°C in the living room and in the kitchen is comfortable, including in winter. In bedrooms, 17-18°C is normally enough. The temperature should not be set lower than 15°C otherwise the indoor climate gets too humid and the risk of mould increases.

Recommended temperatures for different rooms:



Inhabitants should take care that the air can ventilate freely around the radiators. No furniture should be placed in front of the radiators, and curtains should not hang in front of them. When the windows are opened to ventilate the room, the valve should be closed fully and opened after to the same position.

Smart devices can be installed to help with temperature adjustment.

Rooms should be ventilated by opening the windows widely, depending on the humidity sources and the outside temperature. Generally, you should ventilate more than twice a day for two to five minutes in winter. Do not leave your windows tilted for longer periods, otherwise you waste energy and cool down the walls next to the open window.

4

Simple low-cost measures

Simple measures are available to almost all users/tenants and require little technical knowledge or investment.



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Sash windows, especially old single-glazed ones, are notoriously draughty. If it is not possible to install double glazing, draughts can still be cut by using window foam seal. This is like a thick tape and comes in rolls in various colours. It is easy to install, cheap and available at larger stores. However, it does not work well for sliding windows.

Draught proofing

Draught proofing is one of the cheapest and most effective ways to save energy and money in any type of residential building. Draughts are uncontrolled: they let in too much cold air and waste too much heat. Draught proofing an apartment means blocking unwanted gaps that let cold air in and warm air out.



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Installing secondary-glazing film

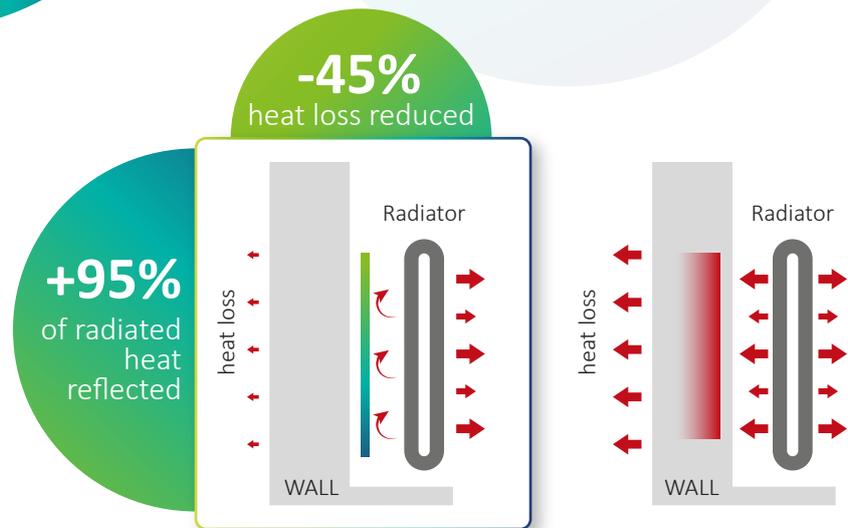
Secondary-glazing film is a transparent tape that fixes to windows to create a double-glazing effect. However, the film may need to be re-stretched periodically (with a hairdryer), which can be inconvenient, and it can easily tear. This measure can be used as a temporary solution to minimise heat loss. It is a cheap solution with short payback time and can be done without special technical knowledge.



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💡 Installing radiator reflectors

Another simple, cheap and cost-effective measure is installing radiator reflectors (radiator foils) on the walls behind heating bodies. Such foil consists of foam with aluminium foil at its surface, with thickness of about 4mm. It eliminates heat flow into the wall behind the radiator and redirects the heat into the room.



Ways to measure how much energy appliances are consuming:



Smart metering and customer displays

Being able to monitor electricity or heat consumption in a household and paying for the individual consumption is an important prerequisite for encouraging homeowners to implement energy-saving measures. Various devices – frequently called “smart meters” – are available to ensure accurate, real-time measurements and appropriate billing; this information can be communicated through a customer display.



Metering of electricity consumption

Smart meters can measure the electricity consumption of individual appliances. This enables customers to see the energy efficiency of household appliances (e.g. refrigerator, washing machine) and consider replacing high consumption appliances with energy-efficient models. In addition, customers can see which appliances continue to consume a small amount of power (usually up to a few watts per hour) when left on stand-by mode or sometimes even when switched off. These “phantom loads” relate to most modern household appliances (e.g., TV, radio, computer) that use electricity, and can be avoided only by unplugging the appliance. By plugging an electrical appliance into a smart meter, users can see how much electricity the appliance consumes, as well as the related costs. Smart meters can change consumers’ energy use habits in two ways – reducing overall energy consumption, and shifting energy consumption (e.g. avoiding consumption in peak hours).



Heat cost allocation

Devices called heat cost allocators provide data for billing individual residents’ usage of the heating system in a multi-family building. They are an accurate way to distribute heating costs where conventional metering is not possible, such as in buildings with no independent heat meter for each separate dwelling. Heat cost allocators measure and record both the radiators’ surface temperature and overall room temperature with high-precision sensors. They convert this information into percentages, providing the basis for calculating the cost of heating. A heat cost allocator needs to be installed on every radiator in all flats of the multi-family apartment building. Residents have to make a common decision to install allocators and invite professionals who can install them correctly and explain how the system works. A heat cost allocator system works automatically and there is no need for residents to control the operation of devices. Using a heat cost allocator system in a building with central heating can reduce fuel consumption by 20-30% on average.



Measuring of temperature and moisture level

A device called a thermo-hygrometer indicates the amount of moisture in the air and the indoor temperature. Although preferences for heating comfort are different, usually people feel comfortable if the temperature in the living room is 20-21°C and 17-18°C in the bedroom, and with a relative humidity of 40-60%.



Detecting thermal bridges

With the help a pocket size instrument – an infrared thermometer – it is possible to detect thermal bridges, e.g. spots around windows or doors and other areas where the house is losing heat. The accuracy of measurements is +/- 1 or 2°C.



Points to remember

1

Energy efficient renovation has to be complemented by behavioural changes of the renovated building's inhabitants in order to further decrease energy consumption and prevent mould.



2

Residents can greatly influence their energy consumption independently, by adjusting their indoor temperature, ventilating correctly and replacing inefficient household appliances.



3

Sealing air leaks around your home, is a great way to reduce your heating and cooling expenses. The most common sources of air leaks into your home are vents, windows, and doors. To prevent these leaks, you should ensure that there are no cracks or openings between the wall and vent, window, or doorframe.



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