



Making homes more energy-efficient

More savings. Better comfort.



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Why renovate?

With the EU goal in mind to achieve **climate neutrality by 2050**, most of the existing housing stock in Europe will have to undergo renovation in order to make them more **sustainable** and **energy-efficient**.

The heating, ventilation, and air conditioning ('HVAC') system accounts for 50% of a building's energy consumption. Therefore, the operation of this system sits at the heart of every major residential renovation project. However, changes do not have to be drastic for significant improvements to be seen and felt. In this ebook we aim to answer the most common questions about HVAC systems and guide you through changes you can carry out in order to make your home more energy-efficient.

As a hydronic expert with over **300 years** of combined experience **IMI Hydronic** is the perfect partner to help you tackle the challenges that come with the renovation of your residential building. We offer innovative products, reliable technologies, and personal support from the design stage all the way to the system start-up.



Energy Efficiency Roadmap

Buildings consume 40% of the world's energy and are one of the most significant sources of CO₂ emissions. As climate change concerns increase, and soaring oil and gas prices drive escalating energy costs, finding flexible and effective solutions that **make buildings more energy-efficient** is a key priority. Having a clear vision of the 2050 roadmap is therefore fundamental to achieving long-term climate goals.

Benefits of renovating your residential property



Reduce emissions and associated energy costs



Enhance tenants' living environment



Increase the resale value of your property

75%
of the building stock
in Europe is
energy-inefficient
by today's standards

40%
of the building stock
in Europe was constructed
before energy performance
requirements were
introduced

The transition to a carbon-neutral society is a pressing challenge, but also an opportunity to create a better world for all. To achieve this, the European Commission has set out a long-term strategy. Below we have compiled some of the key directives and targets that are important for you to know.



Climate Neutrality: Reduce emissions by 80-95% compared to 1990 levels

(Directive 2010/31/EU)

2030

At least 55% reduction in greenhouse gas emissions from 1990 levels

("Fit for 55" package, 2021)

Double the annual renovation rate = 35 million building compared to 2020 units renovated

(The Renovation Wave Strategy, 2020)

by 2030

2021

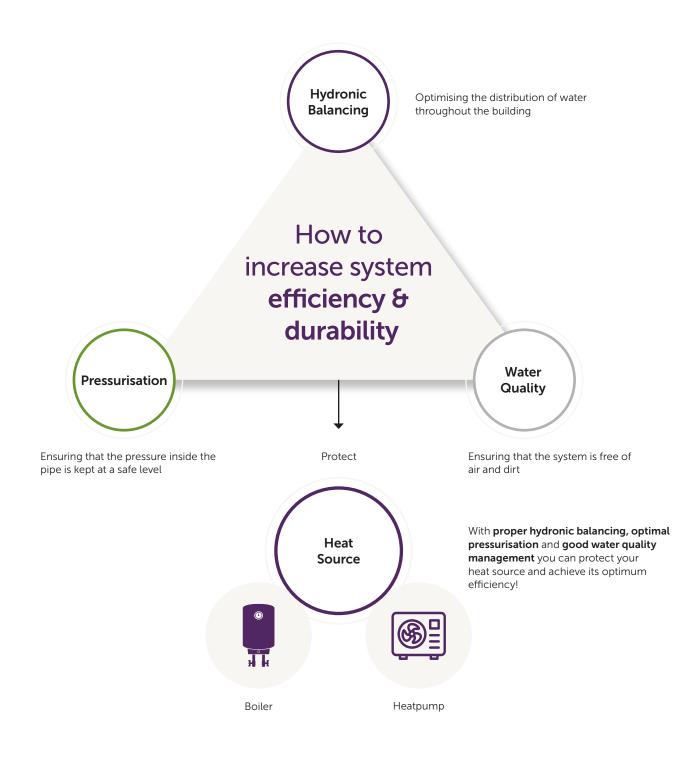
The comission proposed a revision of the Energy Performance of Buildings Directive (EPBD) Promotes energy efficiency in buildings

within the European Union. (2021/0426 (COD)

The first version of the EPBD was published in 2002 (Directive 2002/91/EC). A revised version was published in 2018 (Directive 2018/844/EU).

Key aspects to consider before renovating

Outside temperature, building size, number of people, and insulation are variables that can influence the energy consumption of your HVAC system. However, those are not the only ones. The efficiency of your energy source and how it operates will have a significant impact on energy consumption and therefore, potential savings.





Water expands and contracts as temperatures fluctuate. When temperatures rise, water expands, pressure builds up creating strain on individual components that can lead to rupture and failure. When temperatures decrease, the volume reduc-es and the drop in pressure can lead to air intake causing corrosion.

Optimal pressurisation can prevent damage to critical components such as pumps, avoiding leaks and corrosion, increasing system longevity.



Hydronic balancing is essential for obtaining the required water flows throughout the system guaranteeing that each radiator receives at least its design flow under all operating conditions.

It is the process of optimising the distribution of water throughout the building in order to obtain **maximum comfort at a minimum energy cost.**



Managing the water quality of your HVAC system by removing air and dirt is an effective way to **extend the lifetime of critical system elements while optimising system performance**.

The benefits of good water quality management are:

- Reduced energy consumption
- Prolonged system service life
- Quiet operation

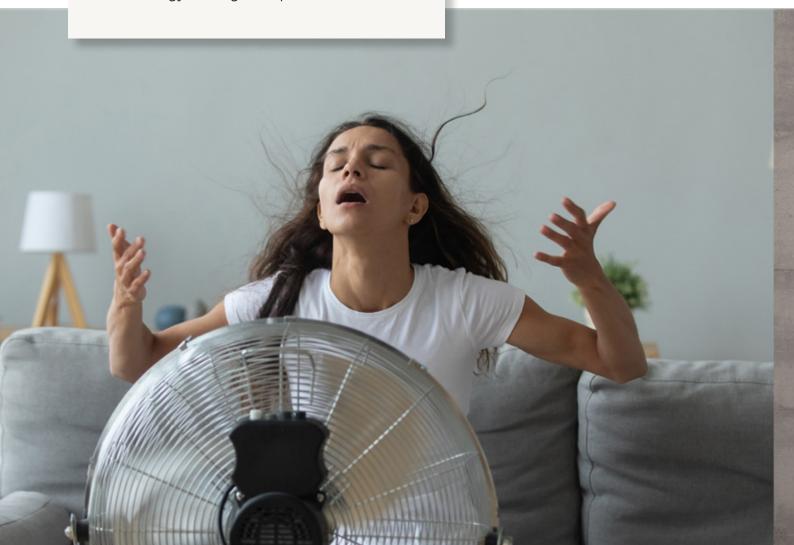
Homeowner FAQ

We are aware that the renovation journey comes with a set of challenges not always known by homeowners.

That's why we prepared 5 questions and answers to help you better understand your HVAC system!



A room temperature that is set at 1°C too high (for heating) or 1°C too low (for cooling) can cause energy wastage of up to 11%.

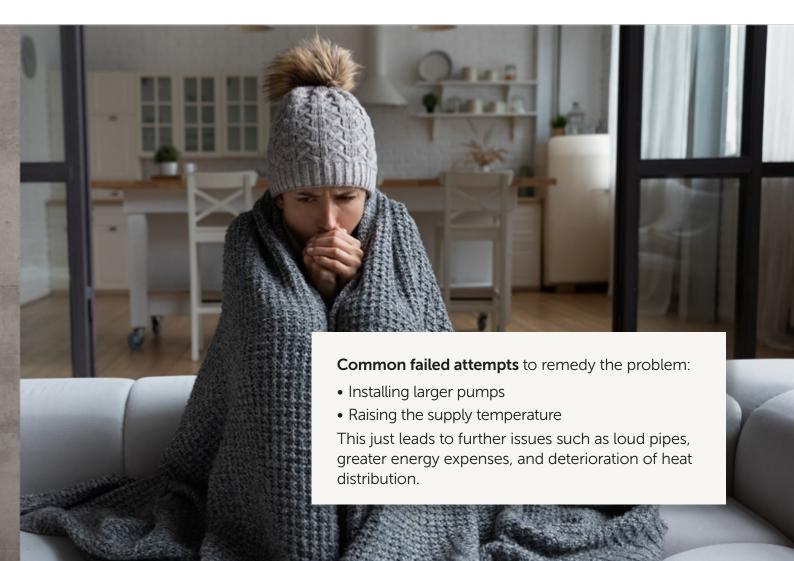


Why are some rooms warmer and others colder?

Water is lazy, it will always choose the path with the least amount of resistance. So, if a heating system is not balanced, it will allow too much flow to the radiators in rooms close to the pump, causing them to get overly hot, while not allowing enough flow to rooms further away, resulting in uneven temperatures and uncomfortable indoor climates.

Comfort isn't the only element that suffers when systems are out of balance; **maintenance and energy expenses** are also affected. As a result, making sure that your system is correctly balanced may be the best investment you ever make!





How can balancing help to save energy consumption and, therefore, reduce my heating bills?

When the heat is correctly distributed in the system, the average temperature can be reduced. For each degree the average temperature can be lowered, the energy consumption of the property is **reduced between 6% and 11%**.



An easy renovation upgrade is to replace old thermostatic heads. New thermostatic heads can reduce energy consumption by 28% in comparison to manual ones.

IMI Heimeier Thermostatic Head K comes with effective and incredibly convenient energy-saving clips:

• The **blue energy-saving clip** limits the lower temperature setting, e.g. the night setting.



• The **red energy-saving clip** restricts the upper temperature range and prevents any high temperatures from being accidentally set.



This is also extremely practical when airing rooms. If you pull back the blue clip, the thermostatic head can be set to 0 without forgetting the otherwise preferred temperature range.

A reduction in energy consumption of 20% to 35% and a payback period between six months to a year is not unusual. Systems that have been correctly balanced will make life more comfortable for the tenants, reduce building life-cycle costs for the owner and minimise the environmental impact. A win-win for all!

Why is my HVAC system making noise?

Disrupting system noise can be the result of vibrations across valves and the pipework due to:

- Air and dirt circulating in radiators and pipes
- High flow speed
- Too high pressure drop in valves

Air vents, **dirt separation**, and **degassing solutions** help to maintain a clean system and to avoid air bubbles that, when passing through valves and radiators, lead to system noise.

In addition, **balancing** will reduce and optimise the pressure drops in the system, avoiding high-pressure drops across the valves.

The added bonus is that these solutions will also increase system efficiency and create not only a silent but also high performing heating and cooling system.





Question #4

Why should I invest in a high quality dirt separator?

Installing a dirt separator is one of the best things you can do to safeguard the lifetime of your HVAC system. A system without dirt is more reliable, energy-efficient, and durable!

Dirt is the cause of a number of undesirable consequences, making it a major problem for HVAC systems leading to:

Higher energy costs

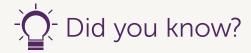
Dirt in the system sticks to surfaces where heat is transferred, for instance in heat exchangers and radiators, and creates an unwanted insulating layer that impairs the transfer of heat. Valves are likely to be blocked by the dirt, causing failures and expensive repairs.

Less indoor comfort

Dirt affects the circulation and output of components such as radiators and air diffusers, impairing the indoor climate.

Shorter system service life

Valves and other system components that are exposed to dirt are more likely to develop faults and the system has a shorter service life. Simply installing a filter will not solve the problem because it only stops the largest particles.



Poor water quality in the system can lead to scale deposits (calcium and magnesium salts) building up on the internal parts of the boiler, which means that more gas needs to be burnt to heat up the water. In fact, even one single millimetre of scale deposit can increase a boiler's energy consumption by up to 9%. What if I dont want to replace my radiators, how can I achieve some energy savings?

When it comes to renovation, HVAC systems can have their challenges. In older HVAC systems, radiators can be widely branched making it difficult to understand the flow requirements inside the different sections or radiators. When in addition reliable drawings of the HVAC system are missing, calculations of network resistance and output requirements in the different sections can be almost impossible.

With intelligent flow control technologies, such as AFC (Automatic Flow Control), complex calculations for hydronic balancing are no longer necessary as this technology automatically adjusts the design flow independently to the differential pressure variation, making them time savers and cost-efficient solutions

Common home renovation challenges

No available plan of the building	Partly unknown pipe layout
The pipe length can't be	Unknown pipe friction factor
measured	

The solution









Residential renovation projects have included:



The Jever project in Northern Germany involved modernising a building housing 1,300 apartments.

IMI Hydronic's bespoke solution focused on com-bating heat loss by ensuring that the heating system was accurately balanced and no apartment was overheated or undercooled. Incorporating the business' IMI TA products, including balancing valves, differential pressure controllers, and thermostatic radiator valves, the new system delivered energy savings of around 20% per annum.

Read more



The refurbishment of two large residential complexes in the Netherlands owned by the Wageningen Housing Association.

IMI Hydronic developed an energy-saving solution that involved the installation of IMI Heimeier Eclipse thermostatic valves in combination with thermostatic K-Heads, in 490 apartments. With built-in sensors and automatic frequency control technology, the easy-to-install and commission Eclipse thermostatic valves automatically regulate the flow of water through the heating system and enable precise control of indi-vidual room temperatures without the need for constant adjustment.

Read more



The renovation of a large 1970s housing complex in Sundsvall, Sweden containing more than 230 apartments spread across 30 buildings.

The project's key objective was to increase comfort within each apartment and, at the same time, reduce heating costs. Togeth-er with the complex owner, IMI Hydronic designed a new energy-efficient system incorporating balancing valves, including the STAD valve, which accurately regulates water flow, and thermostatic radiator valves that deliver optimal room temperature con-trol. Annual energy consumption across the complex was reduced by 15% and comfort levels within each apartment were signifi-cantly improved.

Read more



Climate Control

Our product brands: **IMI Pneumatex** IMI TA **IMI** Heimeier

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