

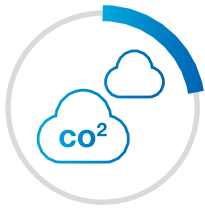


Hot water heat pumps

A technology for changing compliance

Glen Dimplex 
HEATING & VENTILATION

The way new buildings meet compliance *will change*



To achieve the fourth and fifth legally-binding carbon budgets, the UK must apply more challenging measures to reduce emissions - and construction will play a large role in this achievement.

To reach the carbon budget targets set out until 2032, the UK will need to drive the emissions intensity of the economy down by an average of 5% per year, an acceleration of the 4% annual reduction which has been achieved since 1990¹. These figures are currently not considering the soon-to-be legally-binding net-zero by 2050 target. This new development will likely see the carbon budgets updated to reflect the UK's new position, meaning the need to drive down emissions is likely to become even more intense.

To ensure that new buildings aid in meeting these targets, aspects of the Building Regulations are being updated to reflect the need to reduce carbon

emissions in the way we meet energy demand in our homes. This includes updates to Part L and Part F of the Building Regulations and, by extension, an update to the Standard Assessment Procedure, resulting in SAP10.

Further powers have also been given to local authorities to set their own regional targets for renewable contributions.

With this in mind, it is important to understand different technologies available to help you reach the new low carbon targets.





S A P

Under the conditions of Part L, heating a building requires less energy through the 'fabric first' approach.

This means that producing hot water in an efficient way is going to be a growing focus, as hot water requirements

become the dominant energy load for residential properties.

Therefore a significant amount of energy can be saved in the production of hot water through efficient sources, making it an important place to look for improvements.





Becoming NZEB *by 2021*

The Energy Performance of Buildings Directive (EPBD) requires all new buildings from 2021 (public buildings from 2019) to be nearly zero-energy buildings (NZEBs)ⁱⁱ

Article 2 of the EPBD defines a NZEB as ‘a building that has a very high energy performance, where the very low amount of energy that is required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby’.

Our obligation to comply with the terms of the EPBD has meant that Government is currently setting the UK’s NZEB definition, including the addition of primary energy into energy performance targets. This is heavily influencing the upcoming update to Approved Document L and F of the Building

Regulations and is currently being considered alongside the UK’s other legal requirements, such as the carbon budgets.

With the NZEB deadline fast approaching there needs to be a review of the current compliance system for new developments in the UK. With the EPBD aiming to reduce energy consumption, the industry will be steered towards adapting traditional HVAC strategies.

This will move buildings towards the specification of low energy technologies and the growing benefits associated with utilising the rapidly

decarbonising electricity grid.

Because low carbon, low energy technologies are already available, and the long-term targets are so ambitious, the Government released a revised National Policy Framework (NPPF) in 2018.

This allowed local authorities to set higher energy requirements than those currently contained within Part L of the Building Regulations. This has resulted in the application of new HVAC solutions which bridge the specification requirements from current designs to those needed for 2021 and beyond.

Navigating regional *requirements*

Many authorities have specified more stringent renewables targets for buildings in their region. For example, buildings in Nottingham and Poole require a 20% on-site renewable contribution.

In the residential market, a traditional compliant solution has often been to pair a gas-based solution with a renewable technology, such as PV. However, with increasing regulatory influence, there may be occasions where a new strategy is required.

Since the revised National Policy Planning Framework, local authorities have had the power to set energy requirements above those listed in the Building Regulations, leading to different areas requiring different levels of on-site renewable contribution.

Depending on the required target this often necessitates the revision of a project's HVAC strategy, as a more significant proportion of a building's energy consumption must be derived from renewable technologies.

This additional requirement must be considered alongside other regional consideration, including restrictions in infrastructure and available space in or on the building's design. Simply increasing the ratio of renewables in the old system may not be sufficient, as the limits of PV contribution are reached.

With the introduction of stricter targets and measures on the construction industry, it may become financially and practically beneficial to employ new technologies than to increase traditional methods of reaching the renewable contribution.





The future goal of Government is *clear*

They need to meet the NZEB target by 2021, achieve the Carbon Budgets by 2032, and be a net zero carbon society by 2050.

The Committee on Climate Change have warned that to achieve these targets the Government will need to apply more challenging measuresⁱⁱⁱ - although how this will exactly be achieved is still unknown. What is clear is that the longer this is left the stricter they will need to be, so change is imminent. Regardless of the exact methods used to achieve this, it can be seen that the

specification of low carbon technologies will increase, especially in new build developments.

Therefore, as regulations become tighter and HVAC strategies adapt, the industry will look for a technology which not only meets the needs of today, but will continue being a specifiable technology in the future.



Upcoming *changes* to regulations

The Government has committed to updating multiple aspects of the Building Regulations. This includes updating Approved Documents Part L and Part F and, by extension, the Standard Assessment Procedure (SAP).

The Consultation for these is expected towards the end of 2019, with a legal implementation date of Winter 2020 – just in time for the NZEB target.

Although it is difficult to say what will be included in these updates, it is expected that there will be an increased renewable contribution, changes to the way PV invertors can be utilised, and a possible move towards using primary energy as a means for targeting energy performance.



Benefiting from heat pump technology

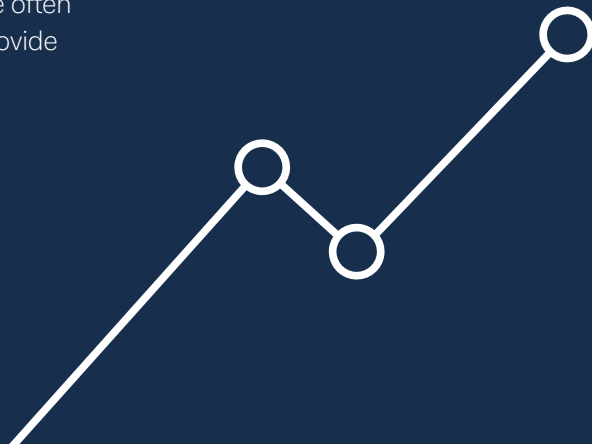
One evolution in heat pump technology has been the introduction of the hot water heat pump - offering efficiencies of up to 324%.

When considering a low carbon HVAC strategy there are many different heat pump technologies available. Due to their high efficiencies and utilisation of renewable energy they perform well under the current compliance methodology.

However, heat pump technology has evolved from the externally situated plant solution that springs to the mind of most designers. Internal heat pumps have also found their place in the market and show potential to step into the residential portfolio as a low carbon solution. Internal heat pumps are often cheaper than the larger plant alternatives, provide

opportunities to reduce the volume of refrigerant, and do not need to heavily impact the building's design - often saving cost and time during planning and construction.

With simple, integrated controls these technologies also add a benefit during the sale of the property, offering an easy to use, modern system that can deliver reduced energy bills for the end user.



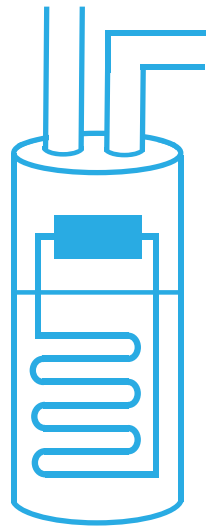
Hot water heat pumps

The Edel hot water heat pump, which is listed in SAP Appendix Q, has an efficiency of 324%ⁱⁱ

A hot water heat pump consists of a ducted system to supply fresh air to a small refrigeration circuit mounted on top of a water cylinder. The unit can be installed inside the property and support up to four occupants' hot water requirements.

With a hot water heat pump providing the hot water demand to a dwelling, the much smaller, seasonal space heating requirements can then be provided via direct acting panel heating, which is a solution currently benefiting from the decarbonisation of the electricity grid.

Both technologies are easy to install, removing the requirement for additional on-site skills often associated when building with renewable technology.



Edel

The Edel Hot Water Heat Pump is a low carbon option for heating hot water in residential properties up to three bed. The high COP of up to 3.24 means that it often exceeds regional renewable targets. It's compact footprint and internal placement makes it an ideal solution where building services cannot be viewed externally. It has also been designed to provide minimum disruptions to an existing building design.

Edel contains an unvented hot water cylinder, meaning it can connect directly to the mains water supply, removing the need for a cold-water store and saving space on-site.

Analysis show that the Edel hot water heat pump is likely to benefit from the upcoming changes to Building Regulations, so whatever residential project you're due to begin working on next, make sure you speak to us about Edel and the positive impact it can make your developments.



Speak to an expert today
email **GDHV.Contracting@glendimplex.com**
to be put in contact with your regional
Business Development Manager

¹<https://www.gov.uk/government/publications/clean-growth-strategy/clean-growth-strategy-executive-summary#tracking-our-progress>

²https://eur-lex.europa.eu/legal-content/EN/ALL/ELX_SESSIONID=FZMJThLLzfxmmMCQp2Y1s2d3Tjwtd8QS3pqdkhXZbwqGwlgY9KNI2064651424?uri=CELEX:32010L0031

³<https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/>