GlenDimplex
Heating and Ventilation

gdhv.co.uk

Low carbon HVAC technologies

Supporting Building Regulations for new build residential apartments

Foreword

Glen Dimplex Heating & Ventilation

We are here to help you succeed under the new Building Regulations.

With the 2025 Future Homes Standard just around the corner, we are experiencing the biggest regulatory overhaul in 40 years. We have over 50 years' experience in consulting on regulations, modelling, developing and manufacturing world leading HVAC solutions.

Whatever your project requirements, our heating, hot water, cooling and ventilation solutions can be designed to suit your objectives. With our expertise, we aim to make the whole process from specification to installation as simple as possible.

Electricfication of heat is a key strategy for the UK & EU

> *Electricity will play a central role in the low carbon economy. It can almost totally eliminate CO_2 emissions by 2050, and offers the prospect of partially replacing fossil fuels in transport and heating.*
>
> European Commission - A roadmap for moving to a competitive low carbon economy in 2050.

Contents

> *15th June 2022 marked a key milestone in our transition to net zero by 2050 as the new English Building Regulations governing energy efficiency, ventilation and overheating came into force.*
>
> *As a market leader in electrical HVAC solutions, we are proud to have been part of the conversation in creating this update for several years.*
>
> *Now that the updated regulations have come into law, it signals the start of an industry transition to the electrification of heat, as we aim to decarbonise our homes.*
>
> *This shift will naturally require a change to the way we heat, ventilate and cool our homes, but there is a range of trusted solutions already being used across the UK and Europe which can aid in this transition.*
>
> *Understanding which solutions will be best will require collaboration across our industry to model and assess technologies and find the best way forward for our customers and end users, and we at GDHV are ideally positioned to help you.*
>
> Pamela Bingham, CEO Glen Dimplex Heating & Ventilation

What changed?

On the 15th of June 2022 the regulations governing which heating, hot water, ventilation and cooling solutions can be used within new residential apartments changed.

Part L

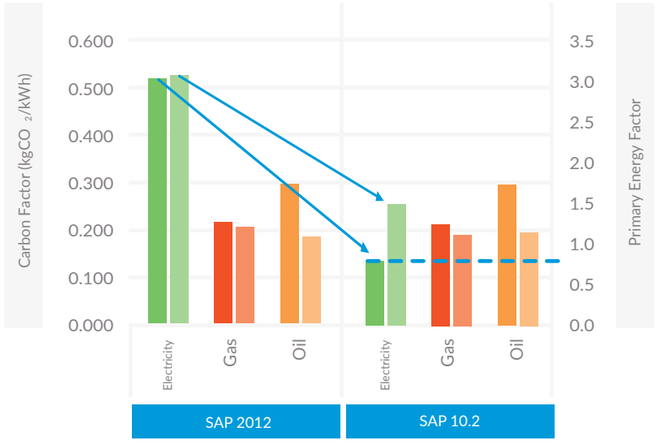
There are four new compliance metrics in the new Part L: Conversation of fuel & power

Primary energy target
Limiting how much fuel is consumed to produce a final unit of energy

Carbon emissions target
Limiting carbon dioxide emissions

Fabric energy efficiency standards
Limiting heat demands of properties

Minimum standards
for the efficiency of building services and building fabric



Electricty	PEF	CF
SAP 2012	3.07	0.519
SAP 10.2	1.501	0.136
Change	-51.1%	-73.8

Gas	PEF	CF
SAP 2012	1.22	0.216
SAP 10.2	1.130	0.210
Change	-8.0%	-2.8%

Oil	PEF	CF
SAP 2012	1.1	0.298
SAP 10.2	1.180	0.298
Change	8.0%	0.0%

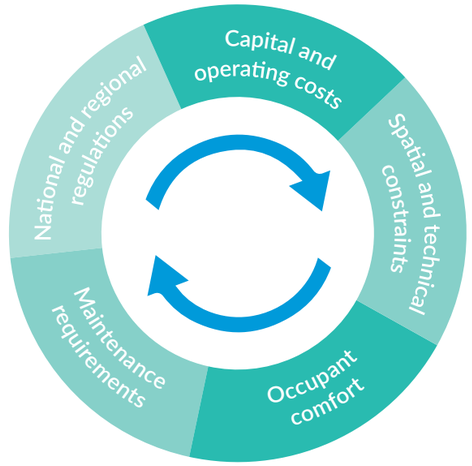
The graph shows the evolution of the carbon and primary energy factors from SAP 2012 to SAP 10.2. Electricity now has the lowest carbon factor and is the best solution to comply with a carbon target, however it still has the highest primary energy factor.

One way of reducing the primary energy factor is to introduce the local renewable generation efficiencies of heat pump technology. This improves both the carbon and primary energy impact of the HVAC system, supporting compliance. It doesn't just have to be traditional heat pump technology either, and you might be surprised at the number of innovative new ways that heat pumps are being applied to services to achieve the necessary improvements.

A notable new addition when considering HVAC solutions is the new BREL reporting system, designed to reduce performance gaps between designed and built scenarios.

The compliance process

Key aspects of a specification need to be selected and cyclically returned to, in order to ensure that the final design will be compliant. Many of these parameters have changed with the introduction of the new Building Regulations.



Part F

The ventilation system choice is defined by the buildings' airtightness

System type	Dwellings covered by guidance	Design air permeability	As built air permeability
Natural ventilation	Less airtight dwellings	Higher than $5m^3/(h.m^2)$ at 50 Pa	Higher than $3m^3/(h.m^2)$ at 50 Pa
Mechanical ventilation (continuous extract or continuous supply and extract)	All dwellings	Any level of air permeability	

Part O

This is a new regulation which offers two modelling simulations to calculate and mitigate a building's overheating risk

Simplified method
Focus on passive measures such as limiting solar gains and removing excess heat via ventilation. High risk areas need to meet higher standards.

Dynamic thermal modelling (TM59)
Strategies for limiting solar gains and removing excess heat via natural ventilation, mechanical ventilation or mechanical cooling. Developments using a communal heat network must use this assessment.

Read on to see how technologies such as hybrid electric solutions and ambient temperature networks are redefining the way compliance is achieved in apartment developments.

Hybrid electric solutions

Our connected range of innovative and sustainable heating, cooling, ventilation, and hot water technologies offers developers and specifiers a cost-effective route to compliant buildings under the new regulations.

Why does this technology support compliance under the new Building Regulations?

We wanted to demonstrate to specifiers what the changes in Building Regulations mean for a residential development in 2022 and beyond. The tables below illustrate a simple pass and fail in green and red for a gas boiler base specification and three hybrid electric solutions.

Base specification

		TER	DER	% reduction	TPER	DPER	% reduction
Gas boiler cMEV, single zone controls	SAP 2012	18.17	17.64	2.92	-	-	-
	SAP 10.2 modelling*	13.60	14.50	-6.68	72.81	81.95	-12.56

Hybrid electric specifications

		TER	DER	% reduction	TPER	DPER	% reduction
Electric panel heating, hot water heat pump & MVHR	SAP 2012	26.02	22.00	15.45	-	-	-
	SAP 10.2 modelling*	13.29	5.03	62.17	71.15	55.66	21.77
Electric panel heating, hot water heat pump & cMEV	SAP 2012	26.02	25.30	2.77	-	-	-
	SAP 10.2 modelling*	13.29	5.83	56.15	71.15	64.33	9.59
Electric panel heating, hot water heat pump & intermittent fans	SAP 2012	26.02	26.18	-0.61	-	-	-
	SAP 10.2 modelling*	13.29	6.05	54.50	71.15	66.68	6.29

*Beta modelling

Because of the significant decarbonisation achieved on the electrical grid over the last decade, the improved Carbon Emissions Factor (CEF) in the updated version of SAP has improved the position of electricity in relation to fossil fuels, specifically natural gas (Refer to table on page 4).

Combined with the new increased Fabric Energy Efficiency Standard (FEES) and resulting lower heat losses, many forms of electric space and water heating are now viable, simple and cost-effective options.

Find out more about hybrid electric solutions on our website CLICK HERE

The four main components of hybrid electric solutions

Heating

- Electric panel heaters
- Bathroom heaters
- Electric towel rails

Hot water

- Edel hot water heat pump
- Electric showers
- Instantaneous hot water

Ventilation

- Mechanical ventilation with heat recovery (MVHR)
- Centralised mechanical extract ventilation (cMEV)
- Intermittent extract ventilation (IEV)

Controls

- Intelligent on-board controls
- Dimplex Control
- Building management system BMS integration

Hybrid electric solutions

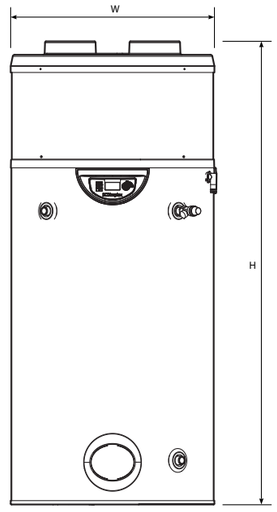
Edel hot water heat pump

As the predominant load in modern apartments is often hot water, it makes sense to prioritise the decarbonisation of this service when targeting compliance.

With three sizes available, a COP of up to 3.36 and excellent acoustic performance, this easy to install and operate technology is fast becoming the default specification for apartment developments looking to simplify and achieve new regulations.

The Edel hot water heat pump inner vessel is made from stainless steel with a hot water heat pump mounted on top, inside the unit. The heat pump can produce hot water efficiently as it extracts heat from external air supplied via insulated ductwork. There are no refrigerant handling requirements on-site, and when used with electric space heating the specification benefits from the simplified metering and maintenance of electric-only services.

	170L	200L	270L
Dimensions (mm) Circumference x height	520 x 1760	630 x 1460	630 x 1780
Output (kWh) Heat pump / immersion	1.17 / 1.2	1.3 / 1.2	
COP	2.85	3.36	3.30
Sound pressure level at 2m dB(A)	36	37 (speed one) / 40 (speed two)	

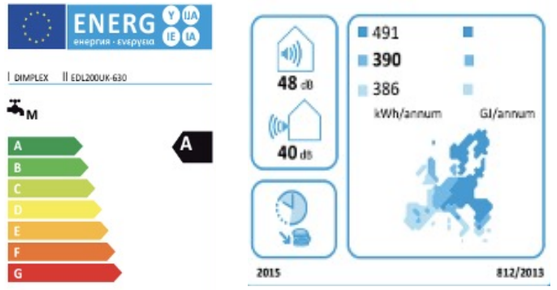


3.36
High COP

CO^2
High renewable contribution

Excellent acoustic performance

For more information on this technology, click (or scan) the QR code



Project 80 - Housing built to future expectations

A monitored demonstration site dedicated to the creation of homes built to 2025 standards achieves 80% carbon emission reduction using our Edel hot water heat pump.

READ MORE HERE

Find out more about space heating options that support the Edel hot water heat pump

Hybrid electric solutions

Space heating

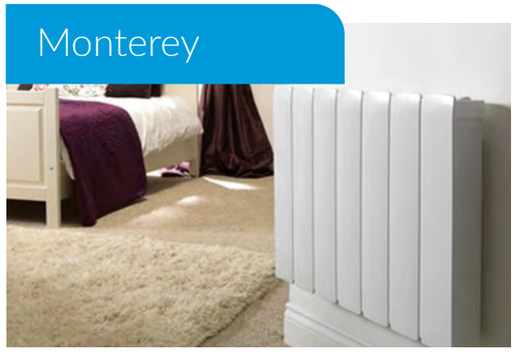
Electric radiators, often called ‘direct acting’ or ‘panel’ heaters, are ideal for space heating where high levels of insulation minimise the required output needed to fulfill the heating requirements of a space.

Being 100% efficient at point of use, simple to install and operate, and with low capital costs, these are a popular solution when combined with a renewable hot water technology, such as our Edel hot water heat pump. This combination delivers a modern, fully electric solution for apartments of all types at a competitive capital and operational cost.

Dimplex PLXE

Girona

Monterey



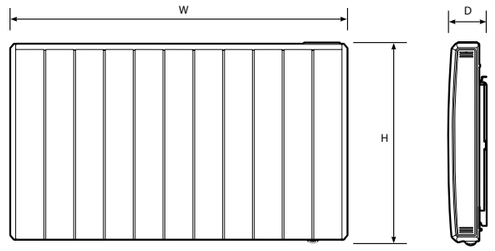
Saletto

> *It was time to start thinking outside of the box. We contacted GDHV because we specified their energy efficient panel heaters in previous projects. We wanted to explore what could be done to help us overcome the planning challenges and achieve the energy efficiency we aimed for, all within our budget.*
>
> *- Amy Phillips, commercial director of Dimora Homes*

Dimplex Q-Rad

Q-Rad combines the latest and most advanced technologies to give maximum control over space heating. The user can choose when they want heat and at what temperature using the intuitive on-board control, or via the Dimplex Control app (see page 15).

Model No.	Loading	Convective element	Radiant element	Height (H)	Width (W)	Depth (D)
QRAD050	0.5kW	301W	199W	546mm	513mm	105mm
QRAD075	0.75kW	551W	199W	546mm	513mm	105mm
QRAD100	1.0kW	714W	286W	546mm	675mm	105mm
QRAD150	1.5kW	1213W	287W	546mm	756mm	105mm
QRAD200	2.0kW	1660W	340W	546mm	918mm	105mm



For more information on this technology, click (or scan) the QR code

Flitch End makes the switch from gas to a hybrid electric solution

A collaboration between GDHV and Dimora Homes saw the successful installation of a hybrid electric HVAC solution for the delivery of hot water and space heating using the Edel hot water heat pump and Monterey panel heaters.

READ MORE HERE

Find out more about our range of bathroom heating & towel rails to support a hybrid electric solution specification.

Hybrid electric solutions

Bathroom heating & towel rails

Like the electric panel heaters used to heat living spaces, electric towel rail or bathroom heaters are specifically designed to heat well-insulated apartments and come in various output ranges from a few hundred watts to 1kW.

BPH bathroom panel heater

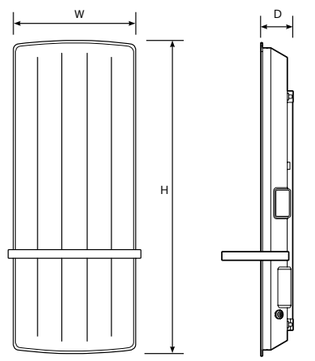
The Dimplex bathroom panel heater is specifically designed for bathrooms, with a narrow, shallow construction and two optional towel rails, each with a different depth.

The BPH is also fitted with a radiant front panel, assisting towel drying and the fast-heating of occupants in the space.

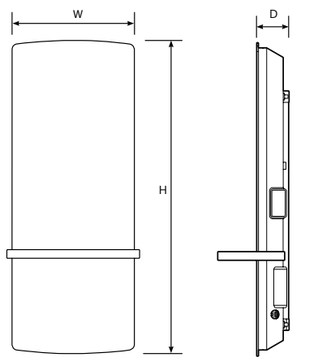
Easy to install, it features an advanced control system which is easy to use and allows complete control for maximum comfort.

- Aesthetics
- Efficiency
- Control
- Compliance
- Ease of installation

Model	Finish	Output (kWh)	Height (H)	Width (W)	Depth (D)
BPH100M	White	1	1100mm	430mm	265mm
BPH100G	Dark-grey glass front with white chassis	1	1100mm	430mm	265mm



Metal



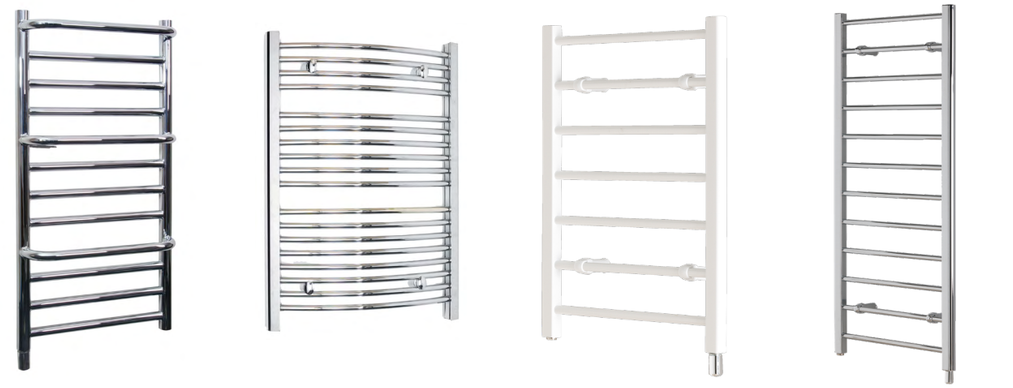
Glass

Towel rail range

Electric towel rails offer a simple, subtle and effective year-round solution to drying towels and heating bathrooms in apartments.

With space at a premium, GDHV provide a range of efficient high output bathroom panel heaters, electrically operated towel rails and hybrid units that can also connect to water central heating systems with an electric element providing heat when the main heating system is disabled. Designs vary from traditional to slimline units in a range of finishes.

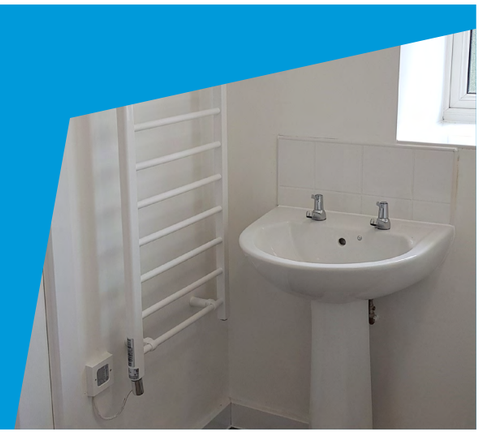
Dimplex CPTS	Dimplex TDTR350C	Creda CLR7W	Creda CLR12C



Project 80 - Housing built to future expectations

A monitored demonstration site dedicated to the creation of homes built to 2025 standards achieves 80% carbon emission reduction using our bathroom heating and towel rails.

READ MORE HERE



Find out more about our range of ventilation and control products to support a hybrid electric solution specification.

Hybrid electric solutions

Ventilation

MV with Heat Recovery

This system uses heat from extracted stale air to warm incoming air for a comfortable indoor environment and increased efficiency.

Xpelair Natural Air 180/180 PH

This compact Mechanical Ventilation with Heat Recovery (MVHR) unit provides whole-house ventilation.

	Natural Air 180	Natural Air 180 PH
Reference number	93333AW	93319AW
Motor type	EC	EC
Speeds	trickle/boost/purge	trickle/boost/purge
Maximum extract performance (FID, m^3/h)	230	230
Maximum extract performance (FID, m^3/h @250Pa)	218	218
Maximum extract performance (FID, l/s)	64	64
Maximum extract performance (l/s, m^3/h @250Pa)	60	60
Maximum fan power (W)	154	154
Spigot diameter (mm)	125	125
Weight (Kg)	19.5	19.8
UK guarantee (years)	2	2

Mechanical Extract Ventilation

This system extrats stale, moist air continuously from wet rooms to create a healthy, containmant-free indoor environment.

Xplus 2 EC

Centralised extraction system. The Xplus 2 brings the added benefit of a long-life, energy-efficient EC motor.

Intermittent Extract Ventilation

Installed through walls, windows, ceilings and fitted within wet rooms to provide rapid extraction of moisture and pollutants.

Simply Silent

The Simply Silent™ Contour range uses advanced Ghost™ Air Movement Technology to deliver near-silent running.

Hybrid electric solutions

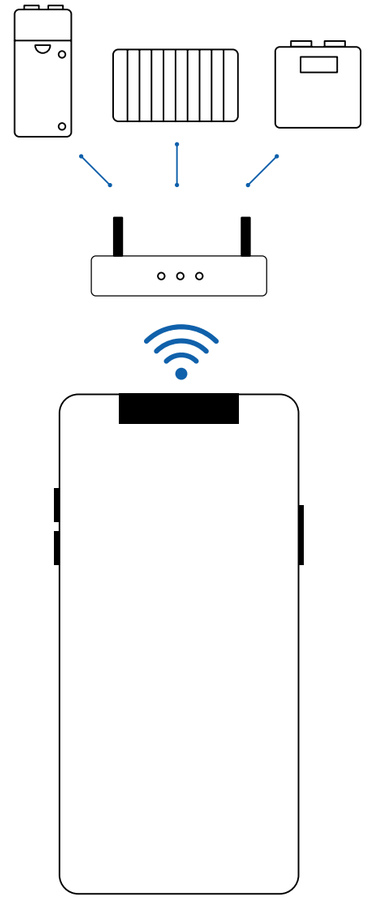
Controls

Dimplex Control - simple, secure, flexible

Integrating our hybrid electric system into a single point of control couldn't be simpler.

Our smart products provide installers, facilities managers and users with the flexibility to set up the HVAC system the way they want it.

Bluetooth capability means the controls can be installed in buildings without a Wi-Fi connection, or set up by contractors before a router has been installed.



On-board product controls

Our products feature accurate electronic thermostats and intuitive interfaces to give occupiers complete control over their comfort and energy use expenditure at a product level.

Connected living at Vesta Development by Twilite

The Dimplex Hub is part of a completely wireless system in the development, built around the principal of connectivity.

READ MORE HERE

Larger developments or urban locations can benefit from a whole new type of heat pump application. Read on for the benefits of ambient temperature networks and the Zeroth Energy System.

Ambient temperature networks

An ambient temperature network is an alternative to traditional high temperature solutions, such as combined heat and power (CHP) and high temperature communal heating systems with an HIU. A compact, integrated heat pump and water cylinder in each apartment is connected to a central ambient water loop, with an energy source housed in a central plant room. This setup brings many benefits to the building, its designers, builders and residents.

Why does the technology work with the updated Building Regulations?

We ran a simple 'pass /fail ' comparison on a typical gas boiler specification and two ambient temperature network options. These networks can use a variety of energy sources, such as district network or heat pump plant, to maintain an ambient central loop. From this loop, water-to-water in-apartment heat pumps deliver space and water heating (and optional comfort cooling) through a range of emitters, with local heat generation mitigating the potential for overheating and energy wastage into communal spaces.

Base specification

		TER	DER	% reduction	TPER	DPER	% reduction
Gas boiler cMEV, single zone controls	SAP 2012	18.17	17.64	2.92	-	-	-
	SAP 10.2 modelling*	13.60	14.50	-6.68	72.81	81.95	-12.56

Ambient networks

		TER	DER	% reduction	TPER	DPER	% reduction
ASHP (central plant), ambient network, in apartment & MVHR	SAP 2012	26.31	21.45	18.47	-	-	-
	SAP 10.2 modelling*	13.50	5.35	60.36	72.29	59.35	17.91
ASHP (central plant), ambient network, in apartment heat pump and intermittent fan	SAP 2012	-	-	-	-	-	-
	SAP 10.2 modelling*	9.45	2.89	69.42	49.86	26.81	46.23

*Beta modelling

This solution is proving to be very popular in developments where regional requirements set extended compliance targets, such as the London Plan. It also has great application where there is a potential risk of overheating, as highlighted in the new Part O Building Regulations (England) and CIBSE's TM59.

Find out more about ambient temperature networks on our website CLICK HERE

What does an ambient temperature network consist of?

In-apartment

- Zeroth in-apartment heat pump
- Smart electricity meter
- Pre-fabricated cupboard options

Emitters

- Fan coil units
- Underfloor heating
- Wet radiator systems & smart radiators

Controls

- Zeroth heat pump on-board control
- Range of in-apartment thermostats
- BMS integration

Plant / distribution

- Ambient water loop
- Central plant heat pump
- District heating connection

The Zeroth Energy System

The Zeroth unit, an in-apartment heat pump

The Zeroth unit contains a 172L water cylinder and a heat pump module. It has been specifically designed to fit within a standard utility cupboard or kitchen unit. We wanted to ensure that the technology is viable for designers without the need to increase service space in apartments.

Testing & guarantees

- ‘Set to work’ testing
- Witness testing available in fully functional operational envelope
- 2-year manufacturer guarantee
- Maintenance and servicing offer with an extended 5-year guarantee

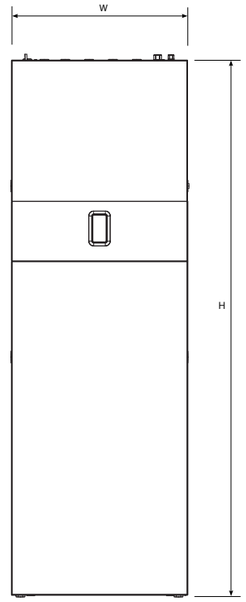
Installation & prefabrication

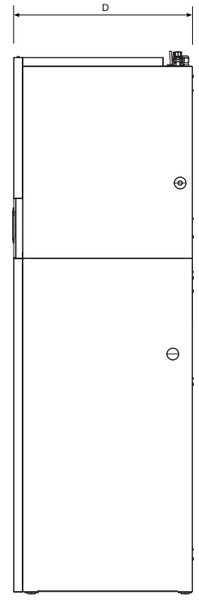
The Zeroth unit arrives pre-wired and pre-plumbed and can even be delivered fully fitted within a prefabricated service cupboard.

There are no refrigerant works required because the refrigerant is contained within the sealed unit.

	ZHP4H-180	ZHP4C-180	ZHP6H-180	ZHP6C-180
Services	heating	heating & cooling	heating	heating & cooling
Dimensions (mm) W x D x H	550 x 560 x 2000			
Output kW At flowrate S25 / 35	9.3	9.3	8.4	8.4
COP	4.0	4.0	6.4	6.4
Sound performance dB(A)	34	34	36	34

For more information on this technology, click (or scan) the QR code





300% Overall system efficiency

90% Communal heating reduction*

5 : 1 Space cooling efficiency

*When comparing the Zeroth Energy System with standard CHP solutions

Harbour Lofts utilises ambient temperature network

The Zeroth Energy System with an ASHP as a central plant provides a low carbon heating and hot water solution for a boutique regeneration project.

READ MORE HERE

Find out more about which emitters support ambient temperature network specification.

The Zeroth Energy System

Emitters

The hydronic delivery element of the Zeroth Energy System as a solution overall allows for flexible use of emitters.

Underfloor heating

Provides radiant heat across the entire floor area, giving a feeling of warmth and comfort throughout the room.

Wet radiator systems and smart radiators

Provide a heating source with individual control in each room.

Fan coil units (FCUs)

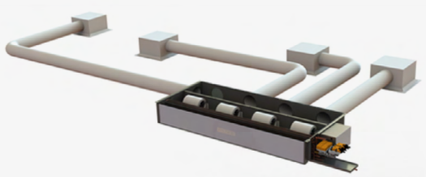
EVO range of fan coil units

Hydronic fan coil units are an energy efficient solution for heating and cooling spaces. The ability to choose from a wide range of universally available components, coupled with a reduced need for specialist installation and servicing engineers adds to the benefits.

Matrix Multiroom fan coil units

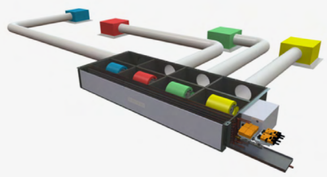
Patented Multiroom system allows each emitter to control individual temperatures in each zone or room. The system can combine the use of FCUs with other heat emitters such as underfloor heating and towel rails for a solution that works best for the needs of each project.

EVO



The EVO range consists of the core products within the Ability portfolio, offering quiet, highly efficient and cost-effective solutions.

Matrix Multiroom



The patent-protected design builds on the success of the EVO range, introducing a number of innovative features.

FCU witness testing

GDHV can provide you with an opportunity to experience a working version of your chosen fan coil unit system in an operational envelope that is as close as possible to the specifics of your project. This allows you to see for yourself how your chosen set up will operate and will allow us to walk you through any questions you may have.

Embassy Gardens utilises 2,042 fan coil units

In total, 2,042 units of EVO, Matrix and Matrix Multiroom fan coils were specified throughout the flagship development at London's South Bank.

READ MORE HERE

Find out more about which controls and plant support ambient temperature network specification.

The Zeroth Energy System

Controls

The Zeroth Energy System features an intuitive, wall mounted in-apartment control unit. This gives occupiers full control over the thermal requirements of their space heating and access to the features of the hot water system.

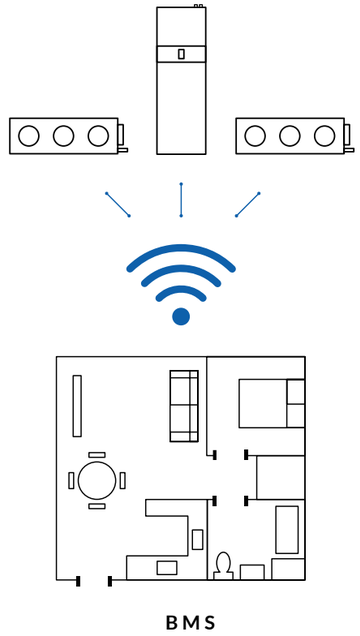
The Zeroth Energy System was designed for integration with building management systems, giving the specifier and the client full flexibility of design and not restricting them to a specific brand or manufacturer.

ATMO fan coil controls

Ultimate control system for controlling thermal comfort and hot water provision.

- App control of individual zone temperatures and schedules
- Step-by-step installation wizard to configure your system
- Remote access for temperature control and manual override
- Primary user can configure zones and scheduling, secondary users can adjust current operation and temperatures
- Boost modes for temperature control
- Up to 8 individual zones

ATMO can be configured to include additional emitters if these are specified to enable simpler control over multiple technologies.



The Zeroth Energy System

Plant room and ambient network

Ambient water loop

The ambient water loop is connected to the central plant and feeds the in-apartment heat pump units that provide hot water and either heating or heating and cooling. The ambient water loop runs at around 25°C, significantly increasing the systems efficiency.

Central plant

The central plant keeps the energy loop within operating parameters. The system has been designed to allow the building designer to pick their choice of plant technology.

A greater efficiency can be achieved when partnering the Zeroth Energy System with a renewable energy source such as an air source heat pump. A connection to a district heating network is also an option.

LA 60S-TUR Reversible air to water heat pump

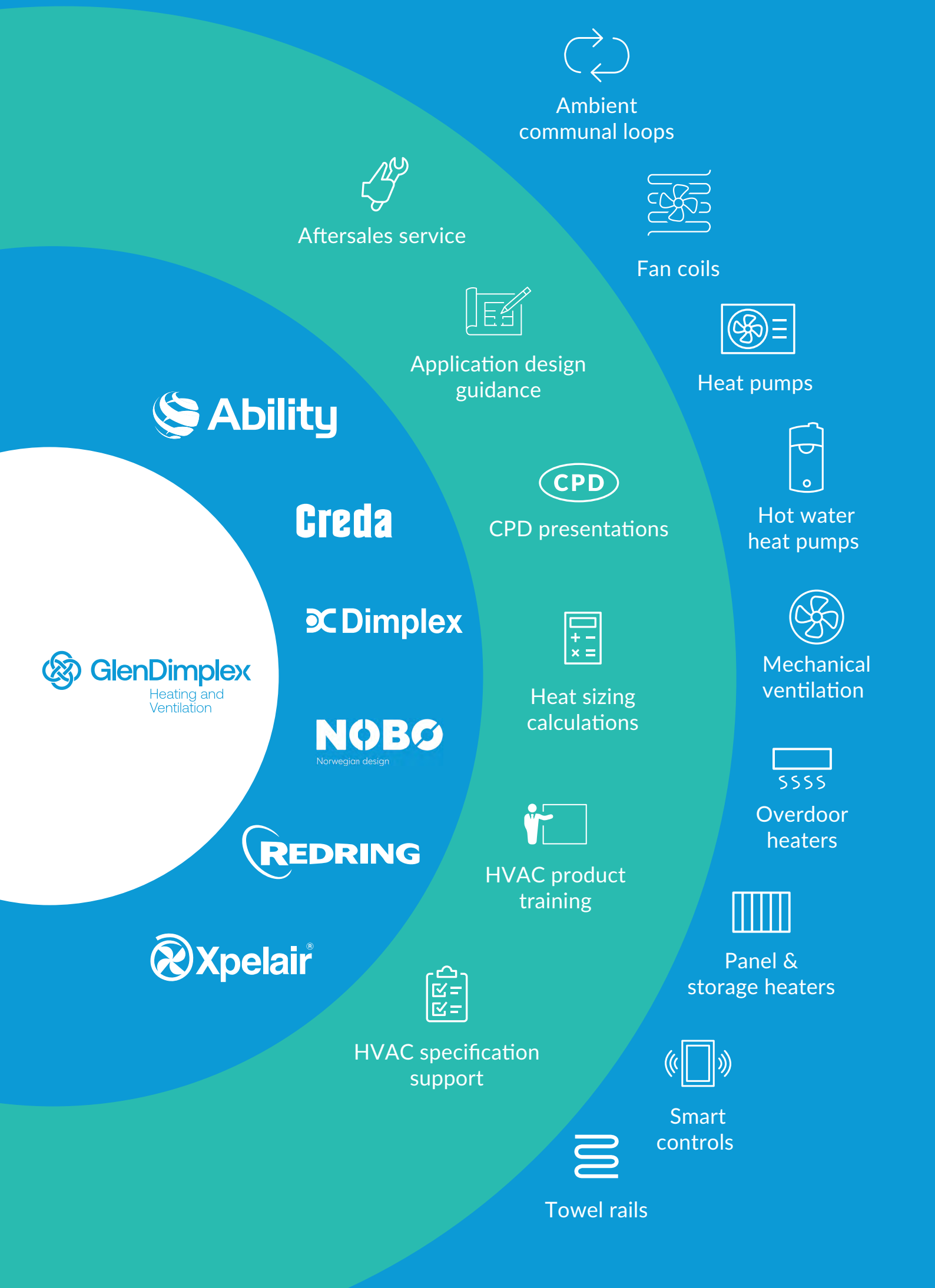
The LA 60S-TUR is perfectly suited to deliver heating and cooling for large-scale projects, such as apartment buildings with a building heat consumption of up to 60 kW.

This air-to-water heat pump is highly efficient, reversible and equipped with two compressors that work in a demand-based and cost-optimised way.

Church Road and the Zeroth Energy System

The development by Galliard Homes in comprises of 38 contemporary one-, two- and three-bedroom apartments and two luxurious 3-bedroom townhouses. It is one of the first in the UK to showcase the benefits of the cutting edge Zeroth Energy System.

READ MORE HERE


Ambient communal loops
Aftersales service
Fan coils
Application design guidance
Heat pumps
Ability
Creda
CPD
CPD presentations
Hot water heat pumps
Dimplex
GlenDimplex
Heating and Ventilation
Heat sizing calculations
Mechanical ventilation
NOBO
Norwegian design
Overdoor heaters
REDRING
HVAC product training
Xpelair
Panel & storage heaters
HVAC specification support
Smart controls
Towel rails