



# HVAC Specification

## Under New Regulatory Standards

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**GlenDimplex**   
HEATING & VENTILATION



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# Introduction

In 2015 almost every country in the world agreed to become a net-zero emissions economy later in this century under the terms of the Paris Agreement – which set a 2050 target of reducing greenhouse gasses to 80% below 1990 levels. This was the target that the UK had been working towards through the creation of the Climate Change Act and was the driving force behind compliance targets within the built environment.

In light of emerging scientific data, however, the net-zero target was brought forward to become a legal target for 2050, meaning that current UK legislation and targets are no longer sufficient to achieve this new milestone.

To understand how the UK can achieve the target within the new timeframe, the UK Government, in conjunction with the Scottish and Welsh Governments, commissioned research into what measures the UK and industry will need to take to be net-zero by 2050. The results showed that the UK will be able to achieve the new goal only if it applies significant, immediate and regulatory action.

Each Government is now looking to update the Building Regulations to set stricter compliance targets on the construction industry. They look to fundamentally change the way HVAC services are designed into new buildings and used to decarbonise the existing building stock, in increased efforts to meet the more challenging goals set as a response to climate change.



At Glen Dimplex Heating & Ventilation (GDHV) we have a team of people working not only to understand but to influence the direction of the industry, enabling us to update you on the changes which may alter the HVAC specification.

As new consultations for the Building Regulations affecting HVAC specification in new and existing buildings are released, then final drafts published, our aim is to bring you information on potential HVAC solutions that can help you to gain compliance.

It is only by discussing potential changes that we will make the most of and create new HVAC solutions to address the challenges facing the built environment.

# A future outlook

## KEY DATES

<p><b>Net-zero</b> greenhouse gas emissions in England by <b>2050<sup>1*</sup></b></p>	<p><b>Net-zero</b> greenhouse gas emissions in Scotland by <b>2045<sup>1*</sup></b></p>	<p><b>95%</b> reduction in emissions in Wales by <b>2050<sup>1*</sup></b></p>	<p><b>57%</b> reduction in emissions in the UK by <b>2030<sup>**</sup></b></p>
<p>Building Mission: At least halve the energy use of new buildings in England by <b>2030</b></p>	<p><b>51%</b> reduction in emissions in the UK by <b>2025<sup>**</sup></b></p>	<p>England and Wales introduce the Future Homes Standard <b>2025</b></p>	<p><b>37%</b> reduction in emissions in the UK by <b>2020<sup>**</sup></b></p>
<p><b>UK NZEB</b> target 31st December <b>2020</b></p>	<p>England and Wales introduce Part L &amp; Part F <b>2020</b></p>	<p>*Relative to 1990 **In accordance with the Carbon Budgets</p>	

## KEY STATS / POINTS

<p>The Energy Performance of Buildings Directive requires NZEBs to be measured in primary energy</p>	<p>2020 will see the introduction of the first Overheating Building Regulation for new dwellings</p>	<p>Building Regulation consultations are expected for Commercial new build and refurbishment</p>	<p>Part L and Part F for residential refurbishment are also being updated</p>	<p>Scotland is looking to introduce energy efficiency standards for owner occupiers</p>	<p>Homes – both new and existing – account for 20% of greenhouse gas emissions in the UK<sup>2</sup></p>	<p>Improving indoor air quality has been a key driver in updating the Building Regulations</p>
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<sup>1</sup><https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf>

<sup>2</sup><https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/>

## A view of 2025

In 2019, Government launched the consultation for the Future Homes Standard and the proposed 2020 updates to Part L and Part F of the Building Regulations for new residential developments.

The Future Homes Standard is a view of how central Government sees residential buildings in 2025, with very strong alignment between this and the future outlook from the Welsh Government. It has proposed that to meet this standard, new developments would need to produce 75- 80% less carbon dioxide emissions than one built to the 2013 Part L requirements.

### The Government has suggested that the notional dwelling could include:

Heat  
pump  
technology

Waste  
water heat  
recovery

Triple  
glazing

Minimum  
standards for  
walls, floors  
and roofs that  
significantly limit  
any heat loss

Government, however, is clear that this will represent only a notional building design and that compliance will be guided by performance targets, such as a primary energy or carbon emissions reduction, not through the specification of particular technologies.

The main aim of the 2025 Future Homes Standard is to futureproof the design of new dwellings. Although other fuels, such as hydrogen, may have a role to play in the future of heat, Government has supported electrification for new developments. With the electrical grid on track to become net-zero carbon over time; employing electrical solutions now reduces the need for further adaptations or changes within new homes as we move towards 2050.

This gives building designers an insight into the types of systems which they will likely specify in the future. Although new innovations may enter the market, Government has given three main sources of low carbon heating in new developments:

**Heat Pumps**  
in particular air  
source heat pumps

**Heat Networks**  
which take heat from a  
centralised source and distribute  
it to different buildings

**Direct Electric Heating**  
when paired with high  
fabric standards

# Do you have to comply with Government's notional building types?

A notional building is a theoretical design of a compliant building. It is intended to be an aid to designers, showing how compliance might be achieved. If a development meets the required performance targets and minimum standards within the regulations, the technologies used to achieve this can be specified by the building designer and need not mirror those used in the notional building.

## A five year stepping stone

With Government having clear ambitions for 2025, the 2020 update to Part L and Part F becomes a stepping stone in the journey to align the building industry with the future direction of UK sustainability policy. Alongside this, the timely updates allow the UK to comply with the Energy Performance of Buildings Directive (EPBD); a piece of European law which mandates that all new buildings post-2020 are nearly zero energy, which needs to be measured in primary energy.

As the newly proposed Building Regulations do not become law until the end of 2020, some of the proposed amendments may still be altered. One element which is likely to remain, however, is Government's commitment to starting industry down a path of low carbon, low primary energy and highly efficient homes which will transform HVAC specification within the built environment.





# England - New Homes Standards for 2020

## The 2020 consultation

Government’s ambition for 2020 is that new dwellings are built as close to the 2025 standards as possible. It is acknowledged that this is a substantial challenge for the industry and its supply chain. Therefore, the standards for new homes in 2020 are set to encourage market and supply chain development, whilst representing a significant improvement on 2013 compliance.

## Proposed Part L 2020

A main focus of the update to the 2013 version of Part L is to offer industry a choice between two options as the uplift in energy efficiency standards for 2020 compliance. The outcome from the consultation will be that one of these becomes the new compliance target.

Option 1 – Future Homes Fabric	Option 2 – Fabric Plus Technology
<b>Target reduction in carbon emissions compared to 2013 standards</b>	
<b>20%</b>	<b>31%</b>
<b>Government’s proposed notional building</b>	
Very high fabric standards to minimise heat loss from windows, walls, floors and roofs (typically with triple glazing) A gas boiler A waste water heat recovery system	An increase in fabric standards (likely to have double glazing) A gas boiler A waste water heat recovery system Photovoltaic panels

Regardless of which option is chosen for the final version of Part L 2020, compliance is based on meeting performance targets, such as a reduction in CO<sub>2</sub>, or minimum fabric standards (the minimum U-values for which do not change, depending on Option 1 and Option 2), rather than complying with the notional building type.

The result will be less about prioritising higher fabric standards or low carbon technologies as the name of each option suggests but instead concentrating on whether there will be a 20% or 31% reduction in carbon emissions with an aligning primary energy target. Once set, the designer will be able to meet this requirement with a strategy of their choosing, so long as it complies with all the relevant metrics within the Building Regulations, alongside any regional requirement from local authorities. The proposed compliance metrics and standards are:





## Proposed Part F 2020

The aim behind the update to Part F was to simplify ventilation requirements whilst aligning air tightness and system specification.

Government began by proposing that the four system types, as listed in the current Part F, are updated. Guidance has been removed for passive stack ventilation, formerly System 2 and the remaining three systems have been renamed and guidance given on aligning these with the most suitable level of air tightness.

System type	Dwellings covered by proposed guidance changes
Natural ventilation (formerly System 1)	Less-airtight (air permeability $>4\text{m}^3/\text{m}^2.\text{h}$ )
Continuous mechanical extract ventilation (formerly System 3)	Highly-airtight (air permeability $<3\text{m}^3/\text{m}^2.\text{h}$ )
Continuous mechanical supply and extract ventilation (formerly System 4)	Any level of airtightness

Should this proposal become law, designers will need to seek expert advice when using a system type in a dwelling different to the above, however, there is potential for SAP credits to be limited where this is the case.

In a move to make compliant design easier, Part F 2020 also proposes a change in the way that whole dwelling ventilation rates are calculated. This will eliminate the need for designers to estimate the number of people in bedrooms by changing to a constant factor.



## 2020 HVAC compliance

The 2020 consultation aims to encourage industry to design and build low carbon and low primary energy dwellings. Regardless of whether Option 1 or Option 2 becomes the CO<sub>2</sub> reduction target for compliance, Government’s proposed standards for new homes in 2020 will largely require industry to rethink its HVAC strategies.

This is why the BRE launched a BETA version of SAP 10.1. By using this draft software, different building types can be modelled using the 2020 proposal. A compliant dwelling built to 2013 standards acts as a base specification from which to compare what gains compliance today and what may be required for compliance in the near future.

**To compare potential 2020 HVAC solutions, the 2013 compliant specification\* is:**

Element	Apartments	Houses
External wall U-value	0.26	0.24
Party wall	E-WM-28	E-WM-28
Floor U-value	0.18	0.12-0.13
Roof U-value	0.11	0.11
Front door U-value	1.31 Door to corridor	1.30
Openings	1.4 U-value 0.63 Solar transmission	1.4 U-value 0.72 Solar transmission
Air pressure	4.00	4.00
Ventilation	cMEV	cMEV
Heating	Gas boiler	Gas boiler
Heating controls	Single zone controls	Single zone controls

\*Full details of the SAP modelling are available upon request. As the Zeroth Energy System will not be listed within the Product Characteristic Database until the final version of SAP 10 is released, Solution 2 for apartments uses a different building specification.

For the purpose of this research, the U-values remained constant throughout the modelling and only the heating and ventilation products were changed. This is because they still meet the new minimum standards proposed in the 2020 consultation. All scenarios were modelled with standing heat losses applied to hot water heat pump calculations.

## Apartment specification

In 2018/19, 22% of all completed dwellings were apartments\*, with 76% of tall buildings completed in London during 2018 being designed for residential use\*\*. Due to stricter building targets, apartment specification can already look vastly different to the housing alternative, however, with the inclusion of primary energy alongside carbon emissions as a compliance metric, specification options under the proposed 2020 proposal for new homes will likely narrow specification options further.

### Performance of the base specification

		Carbon Emissions	Primary Energy	Approx. system and installation cost
Gas boiler, cMEV, single zone controls	SAP 2012	<b>PASS</b>	-	<b>£3,500</b>
	Option 1	<b>FAIL</b>	<b>FAIL</b>	
	Option 2	<b>FAIL</b>	<b>FAIL</b>	

The base specification fails to pass compliance on both the carbon emission (target emission rate) and primary energy (target primary energy rate) targets for both Option 1 and Option 2. With the lower carbon factors applied to the electrical grid and the higher efficiencies of renewable technologies, adapting apartment HVAC strategies away from natural mains gas is likely to provide an advantage when gaining compliance.

\*[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/835887/House\\_Building\\_Release\\_June\\_2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835887/House_Building_Release_June_2019.pdf)

\*\*<https://nla-production.s3.amazonaws.com/2774/Tall-Buildings-2019-NLA-download.pdf>





## Meeting Building Regulations

The proposed 2020 standards for Part L and Part F of the Building Regulations have been designed to change the way we address energy use within new buildings. Utilising systems which are able to use or produce renewable energy offers the greatest gains when meeting both the primary energy and carbon emissions target.

		Carbon Emissions	Primary Energy	Approx. system and installation cost
Solution 1: ASHP & MVHR	SAP 2012	PASS	-	£6,500
	Option 1	PASS	PASS	
	Option 2	PASS	PASS	
Solution 2: ASHP (central plant), Zeroth heat pump & intermittent fans	SAP 2012	PASS	-	£4,750
	Option 1	PASS	PASS	
	Option 2	PASS	PASS	

This is why the Government has been vocal in supporting heat pumps. When modelled in the BETA compliance software, air source heat pumps pass both Option 1 and Option 2 with significant margins. Air source heat pumps, especially when run as part of a low temperature network, such as the Zeroth Energy System, are well suited to apartment developments in city centres: offering heating, hot water and potentially cooling services to apartments with installation and compliance benefits, when compared to alternative systems.

In varying levels, these compliance benefits can be gained from any renewable technology, even if this is only one part of the heating and hot water design.

Moving to solutions which address hot water production in a low carbon way will provide the greatest benefit when meeting the three energy-related compliance targets. This is because, as the building envelope tightens, the production of hot water becomes the greatest energy demand as the requirement for space heating reduces. It is this scenario which is driving more interest in hybrid space and water heating systems.

By adopting such a strategy, a design can utilise benefits from different technologies in order to meet each compliance metric.

### What is a hybrid heating system?

A hybrid heating system contains a mix of technologies for space and water heating. These do not need to be dual fuel but instead may be two different technologies working together to supply a dwelling's heating demand, often with integrated controls. An example could be installing a heat pump alongside a gas boiler, or a hot water heat pump combined with direct acting panel heating.

This is why DHW (domestic hot water) heat pump solutions are a growing specification in the UK. They offer flexibility in specification design, whilst contributing significantly to carbon and primary energy targets. This allows the designer to utilise a choice of space heating and ventilation solutions. There are various HVAC options available to aid designers in meeting carbon emissions and primary energy targets.

		Carbon Emissions	Primary Energy	Approx. system and installation cost
<b>Solution 3:</b> Electric panel heating, Edel hot water heat pump & MVHR	SAP 2012	<b>PASS</b>	-	<b>£4,750</b>
	Option 1	<b>PASS</b>	<b>PASS</b>	
	Option 2	<b>PASS</b>	<b>PASS</b>	
<b>Solution 4:</b> Electric panel heating, Edel hot water heat pump & intermittent fans	SAP 2012	<b>FAIL</b>	-	<b>£3,500</b>
	Option 1	<b>PASS</b>	<b>PASS</b>	
	Option 2	<b>PASS</b>	<b>PASS</b>	

The third compliance metric is the affordability target. This has been introduced due to the benefit that can be gained from specifying solutions which capitalise on the decarbonisation of the electrical grid. This includes direct electric solutions which are often more cost-effective than other alternatives.

The benefits of low carbon solutions, such as direct electric panels, are only realised in operational use when the fabric retains heat within the building. This metric aims to ensure that such solutions are not used in developments with low fabric performance due to the current high unit cost of electricity, if they are required to run on a constant basis. Research on the available BETA software has shown that where designs comply with primary energy and minimum fabric standards, the affordability target is also met.



## Meeting local planning requirements

Although the consultation is suggesting an amendment to the Planning and Energy Act to remove local authorities' power to mandate targets beyond those set in Part L, this will not affect their power to request other regional planning requirements.

One of the most common is the mandate for varying percentages of onsite renewables. Being in an area which requests a higher percentage of renewable energy will influence the HVAC specification choice, especially where roof space is also restricted or there is a regional requirement for building aesthetics, limiting external services.

This is where hybrid solutions can provide greater benefits beyond meeting energy-related compliance metrics. DHW heat pumps are especially suited to solving these challenges, providing a significant contribution to on-site renewable targets, whilst being an in-apartment solution. This also allows greater flexibility for space heating specification.

Another increasing planning requirement is to connect with, or show a future capability to connect to, a heat network. This will require the design to include a centralised plant, as well as hydronic emitters. Heat pumps will meet the requirement for this, providing additional benefits when designed to operate as part of a low temperature network with in-apartment heat pumps. This is due to the updated distribution loss factors associated with high temperature networks within the consultation, showing a more realistic picture of these systems within SAP. This will likely see the continued rise in the specification of ambient loops and associated technologies, such as the Zeroth Energy System, due to the benefit that lower temperature networks will provide on a compliance and a project level.

## Meeting project requirements

Once national and regional compliance have been reviewed, individual project requirements will finalise which HVAC solutions are ultimately specified. As Government's expectation for new developments increases, finding compliant solutions which meet cost expectations will drive the market, as traditional 'go-to' systems become harder to specify.

These will need to take into account any limitations on plant or apartment space, as well as safety or design choices specified by the developer. There are already solutions available designed to meet these requirements and collaboration with manufacturers which understand compliance, system design and application will be vital in ensuring the success of new apartment developments built to 2020 Building Regulations.





## Housing specification

Housing developments accounted for 78% of all completed dwellings in 2018/19, the highest proportion since 2001\*. The specification for houses has largely remained the same; with mains fed gas boilers the most commonplace solution for meeting hot water and heating demands since the late 1960s; now often paired with photovoltaics (PV).

This, however, is set to change as carbon reduction targets become increasingly strict to reduce the amount of fossil fuel used in heating UK homes, likely to result in no new gas connection post 2025.

## Performance of the base specification

By using the BETA compliance software to model HVAC specification under the proposed compliance standards, traditional solutions can be reviewed against new requirements. The result showed how the base specification often failed both carbon emissions and primary energy targets on both Option 1 and Option 2. Although PV could be used to reach compliance, this may no longer be the most cost-effective or viable solution and may only be a feasible strategy for the next five years.

			Carbon Emissions	Primary Energy	Approx. system and installation cost
Gas boiler, cMEV, single zone controls	2 Bed - 60.34m <sup>2</sup>	SAP 2012	PASS	-	£3,500
		Option 1	PASS	PASS	
		Option 2	FAIL	FAIL	
	3 Bed - 80.36m <sup>2</sup>	SAP 2012	PASS	-	£3,750
		Option 1	FAIL	FAIL	
		Option 2	FAIL	FAIL	
	4 Bed - 123.07m <sup>2</sup>	SAP 2012	PASS	-	£4,000
		Option 1	FAIL	FAIL	
		Option 2	FAIL	FAIL	

With the decarbonisation of the electrical grid, incorporating electrical solutions into housing designs could offer housebuilders a competitive advantage when gaining compliance.

\*[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/835887/House\\_Building\\_Release\\_June\\_2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835887/House_Building_Release_June_2019.pdf)

## Meeting Building Regulations

With Government aiming to reduce the use of fossil fuels used for heating new homes, there is an increasing need to evaluate the solutions specified into new build houses. Although Government is in strong support of domestic heat pumps in supplying this energy demand, there are alternative options available to achieve compliance, especially when utilising renewable energy solutions.

By using the available software to model HVAC compliance for houses under the proposed 2020 standards, it can be seen how different strategies may need to be employed based on increasing footprint sizes.

For smaller dwellings, hybrid solutions can offer significant installation and cost benefits, whilst contributing positively to both carbon and primary energy targets. Space heating requirements within new developments will reduce as the building envelope tightens, therefore, hot water becomes the dominant energy demand and employing technologies such as hot water heat pumps can aid in the achievement of compliance. This also allows greater flexibility for the specification of the space heating technology, which can be paired with a gas boiler or direct acting panel heaters.

### How can we meet the affordability metric?

The affordability metric has been introduced to stop the specification of direct electric solutions into dwellings with high air permeability. This is because a unit cost of electricity is currently higher than that of gas and where space heating demand is significantly high, this could lead to steep energy bills for occupiers.

Modelling has shown that, currently, passing the primary energy target results in the achievement of the affordability metric. Employing direct acting electric technologies, however, as part of a hybrid solution, can help designers to achieve compliance whilst also retaining the benefits of direct acting electric specification.



As a dwelling's footprint increases, there are fewer solutions capable of meeting the growing space and water heating demand in a low carbon, low primary energy way. In these designs, the key is to first reduce energy demand through high fabric efficiency, then to meet the remaining requirement with renewable technologies, such as domestic heat pumps. Benefit within compliance can also be gained through including heat recovery within ventilation systems, as this reduces the required energy demand.

			Carbon Emissions	Primary Energy	PV to Compliance	Approx. system and installation cost
<b>Solution 1:</b> Electric panel heating, Edel hot water heat pump & MVHR	2 Bed - 60.34m <sup>2</sup>	SAP 2012	PASS	-	-	£4,850
		Option 1	PASS	PASS	-	
		Option 2	PASS	PASS	-	
	3 Bed - 80.36m <sup>2</sup>	SAP 2012	PASS	-	-	£5,100 + £1,100 per kW of PV
		Option 1	PASS	PASS	-	
		Option 2	PASS	PASS	1.2kWp	
	4 Bed - 123.07m <sup>2</sup>	SAP 2012	PASS	-	-	£5,300 + £1,100 per kW of PV
		Option 1	PASS	PASS	0.75kWp	
		Option 2	PASS	PASS	3.5kWp	
<b>Solution 2:</b> Gas boiler, Edel hot water heat pump & MVHR	2 Bed - 60.34m <sup>2</sup>	SAP 2012	PASS	-	-	£4,850
		Option 1	PASS	PASS	-	
		Option 2	PASS	PASS	-	
	3 Bed - 80.36m <sup>2</sup>	SAP 2012	PASS	-	-	£5,000 + £1,100 per kW of PV
		Option 1	PASS	PASS	-	
		Option 2	PASS	PASS	0.7kWp	
	4 Bed - 123.07m <sup>2</sup>	SAP 2012	PASS	-	-	£5,100 + £1,100 per kW of PV
		Option 1	PASS	PASS	0.25kWp	
		Option 2	PASS	PASS	2.9kWp	

Note: For solutions requiring PV to gain compliance, there is a potential to use building fabric improvements to remove the need for additional PV altogether.



## Meeting local planning requirements

As part of the consultation, Government is suggesting an amendment to the Planning and Energy Act to remove local authorities' power to mandate targets beyond those set in Part L. Regardless of the outcome, local authorities will still be able to set certain regional requirements.

This includes the requirement for a certain percentage of on-site renewables. Although energy related compliance metrics are likely to already ensure that these current on-site targets are met, this may not align with a second local requirement dealing with grid capacity.

This is an area where employing a hot water heat pump as part of a hybrid solution could provide a viable alternative to dealing with local electrical grid constraints. Unlike with domestic heat pumps, hot water heat pumps do not require a Distribution Network Operator (DNO) application and can be combined with gas systems to provide for space heating demands.

## Meeting project requirements

Within any housing development, there will be project requirements that need to be met alongside gaining national and local planning compliance.

Cost is often a key driver when considering new housing designs. Government is expecting the housing industry to contribute significantly to the achievement of environmental targets through adapting HVAC strategies and building design. Meeting them in a cost-effective way will be vital in keeping house prices low, especially where this can tie into simplified installation processes.

Hybrid solutions are likely to be the key in bridging this gap. There are already solutions available which are supply chain ready and offer a range of benefits to housebuilders, such as the Dimplex 'Edel' hot water heat pump. Such hybrid solutions can also help where external space is limited, without significantly impacting on internal footprints.



An aerial photograph of a vast solar farm. The solar panels are arranged in neat, parallel rows across a green field. In the background, there are rolling hills covered in dense trees, and a few small buildings are visible near the solar farm. The sky is a clear, light blue, suggesting a bright day.

# Wales - New Homes Standards for 2020



## Welsh Future Homes Standard 2020

In December 2019, the Welsh Government published its proposal to update Part L and Part F of the Welsh Building Regulations. Wales is aiming for a 95% reduction in greenhouse gases from 1990 levels by 2050, aiming to secure this in legislation with a clear ambition to achieve net-zero.

There are many similarities between the central and Welsh Government’s consultation for updating Part L and Part F of the Building Regulations. Both set a very similar vision for a 2025 Future Homes Standard with clear recognition that time is needed to develop supply chains, skills and construction practice to deliver low carbon heat and highly efficient new homes.

### Proposed Part L 2020

The consultation offers industry two options for an uplift in energy efficiency standards for 2020 compliance for new homes in Wales.

Option 1	Option 2
<b>Target reduction in carbon emissions compared to 2014 standards</b>	
<b>37%</b>	<b>56%</b>
<b>Notional building</b>	
High fabric standards to minimise heat loss from windows, walls, floors and roofs Natural ventilation system A gas boiler A waste water heat recovery system Photovoltaic panels	High fabric standards to minimise heat loss from windows, walls, floors and roofs Mechanical ventilation with heat recovery A gas boiler A waste water heat recovery system Photovoltaic panels

The Government sets notional buildings to guide industry in understanding what is necessary to achieve compliance. The choice between Option 1 and Option 2 relates more to the challenge of the carbon emissions target than the requirement of the design guidance.

The Welsh Government has based its notional design on a possible route to gaining compliance within a semi-detached house. The consultation recognises that within apartments this guidance would not achieve the required compliance targets for either Option 1 or Option 2, due to limitations with roof space.

Regardless of the U-values and technologies used within the notional buildings, industry will be able to achieve compliance using the best solutions and strategies for that project, so long as the design meets the four proposed compliance metrics for new residential developments:



There is also a drive within the consultation to consider future-proofing; particularly by encouraging designs which allow new homes to install low carbon heating in the future. This could include making space for hot water storage, installing suitable emitters, improving the building fabric or installing low carbon technologies sooner.

## Proposed Part F 2020

When addressing the update to Part F, the main aim of the Welsh Government has been to align, where relevant, with the proposed update for Part F in England.

This includes adopting the proposed system name changes and the removal of guidance for passive stack ventilation for new build developments. They have also proposed guidance on where each of three remaining system types should be used in relation to air permeability.

System type	Dwellings covered by proposed guidance changes
Natural ventilation (formerly System 1)	Less-airtight (air permeability $>4\text{m}^3/\text{m}^2.\text{h}$ )
Continuous mechanical extract ventilation (formerly System 3)	Any level of airtightness
Continuous mechanical supply and extract ventilation (formerly System 4)	Any level of airtightness

Should this proposal become law without amendments, designers will need to seek expert advice when using natural ventilation systems in a dwelling with an air permeability of  $3\text{m}^3/\text{m}^2.\text{h}$  and below, however, in these scenarios there will likely be a limit to SAP credits.

In order to make the design of a compliant ventilation system easier, Part F 2020 also proposes a change in the way that whole dwelling ventilation rates are calculated. This will eliminate the need for designers to estimate the number of people in bedrooms by changing to a constant factor.





## Meeting Building Regulations

The move towards designing HVAC systems with the joint aim of reducing both primary energy and carbon emission will inevitably cause a change in building design. The consultation has a heavy focus on encouraging the use of renewable technologies. This will likely see a rise in the specification of heat pumps and photovoltaics (PV), as the energy created from on-site renewables is deducted from the electricity demand of the building.

Although PV has always been encouraged by the Welsh Government, it has noted that its notional building will not result in compliance for apartment developments, due to the restriction of available roof space for the amount of PV required.

The Welsh consultation also reflects the central Government's proposal for introducing a technology factor for heat networks. This supports the adoption of low temperature networks within communal heating systems due to their ability to connect to current or future district heat networks.

The increased U-values within the minimum standards for fabric also show how highly efficient, low carbon hot water solutions are likely to offer the greatest benefit to designers, when achieving compliance. This is because the high fabric standards are likely to reduce the space heating requirement within new developments, making hot water the dominant energy demand. This will make hybrid solutions more prevalent in new build housing, especially where they employ the benefits of hot water heat pumps. When combined with either a gas boiler or direct electric panels for space heating, this system is likely to offer significant design and compliance benefits within new build residential developments.



# Scotland - New Homes Standards for 2021





## A developing consultation

Section 6 of the Scottish Building Regulations includes all standards and guidance relevant to energy, including heating systems, ventilation and the building envelope. It is expected that the Scottish Government will release its consultation on the next set of standards for Section 6 in October 2020, to be introduced into law one year later.

Scotland is aiming to achieve net-zero by 2045, five years earlier than England. With this in mind and the Scottish Government's announcement at the start of 2020 that building regulations will be changed so that all new homes use renewable or low-carbon heating from 2024\*, it can be expected that the proposed update to Section 6 will be more challenging than proposals set by the central or Welsh Governments.

In order to align with the Energy Performance of Buildings Directive, Scotland is also likely to adopt primary energy as the compliance metric for new developments. As low primary energy solutions are not necessarily low carbon, this will likely be supported by a carbon emissions target.

With the Government clear on its support for renewable technologies to provide heat for new Scottish homes, the update to Section 6 will likely challenge new residential developments to deliver the lowest carbon emissions and primary energy targets in the UK.

\*<https://www.gov.scot/news/new-build-homes-to-be-more-energy-efficient/>



# Glen Dimplex Heating & Ventilation

The background of the page is a photograph of a modern building's exterior. It features a curved glass facade with dark, curved metal railings or window frames. The sky is a clear, deep blue. The overall aesthetic is clean and architectural.



## Glen Dimplex Heating & Ventilation

At Glen Dimplex Heating & Ventilation (GDHV), we are dedicated to the design and development of sustainable HVAC solutions for both commercial and residential projects. We offer multiple brands in combined HVAC solutions to the new build and refurbishment market.



## HVAC solutions

Our solutions are designed to aid with compliance whilst providing cost and installation benefits for your project. We do not believe that HVAC systems are 'one size fits all' and have built our portfolio to offer you a range of options to meet your requirements.

<b>The Zeroth Energy System:</b>	A refrigerant-free low temperature network and in-apartment heat pumps providing heating, hot water and potentially cooling to residential apartments	<b>Hot water heat pumps:</b>	A low carbon, energy efficient solution, utilising air source heat pump technology to provide hot water to residential dwellings
<b>Electric panel heaters:</b>	An energy-efficient, cost-effective and flexible solution to provide heating to residential and commercial spaces incorporating the latest smart technologies and IoT functionality. This delivers improved controllability and grid management when combined with flexible tariffs and smart metering	<b>MVHR:</b>	Supplying fresh air via ducts and fans to meet air quality requirements, combined with retained heat from extracted air to increase energy efficiency

These are just a few examples of the solutions that we are able to offer. They combine with products such as air source and ground source heat pumps, fan coils, HVAC control systems and high heat retention storage heaters to offer you a range of solutions for your requirements.

## Services, design guidance and CPDs

At GDHV we can offer expert advice using up-to-date industry knowledge and experience. Our team of specialists have an understanding of what is involved in specifying compliant HVAC systems and are on hand to help you find the most effective solution for your project. We also provide advice on applying these solutions to your designs, using our in-house team of engineers. Alongside guidance on specification, we are also able to provide a number of CPD presentations. Our titles aim to bring you information on industry and technological developments; including:

<b>Hot water heat pumps</b>	<b>Low temperature communal networks</b>	<b>Fan coil development</b>	<b>The Future Homes Standard 2020 consultation</b>
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We aim to take our information on changes in regulations and practices straight to industry; either through our CPDs, online Knowledge Centre or through face-to-face meetings.

GDHV offers guidance on specifying and applying the product range to your design. This helps to increase your confidence that new solutions are applied correctly to your project, minimising risk and potential system costs.



For more information on the Future Homes Standard and the 2020 consultation, visit our Knowledge Centre at [www.gdhv.co.uk/knowledgecentre](http://www.gdhv.co.uk/knowledgecentre)

Alternatively, to discuss our range of solutions in more detail, to request a CPD or to discuss any SAP calculations within this document in more detail, email us at [gdhv.contracting@glendimplex.com](mailto:gdhv.contracting@glendimplex.com) to be put in touch with your regional specialist.



HVAC Solutions GDHV



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