Commercial Heat Pump Solutions

A practical guide to decarbonising heating

Contents

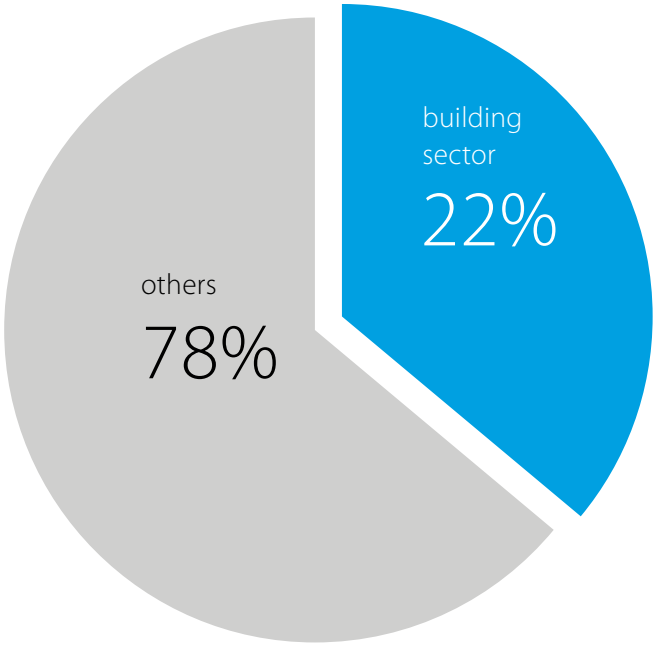
Heat pumps, a cornerstone of the UK's carbon reduction strategy

By 2050, the UK has committed to achieving net zero greenhouse gas emissions under the Climate Change Act 2008. Improving the energy performance of buildings is a key part of this, with the buildings and product use sector accounting for around 22% of UK emissions, according to the Department for Energy Security and Net Zero. Decarbonising the building stock remains a priority.

There are also clear operational benefits. Heat pumps deliver higher efficiencies than fossil fuel systems by transferring heat rather than generating it, helping to reduce energy use and running costs while supporting compliance with Part L Building Regulations and Minimum Energy Efficiency Standards.

This guide will help you navigate the range of heat pump solutions available and how to apply them across different applications, supporting informed decisions and helping you maximise system performance and carbon reduction.

Greenhouse gas emissions in the UK



Source: DESNZ, UK greenhouse gas emissions statistics (2025 provisional)

Greenhouse Gas (GHG) Protocol Corporate Standard:

The GHG Protocol Corporate Standard categorises greenhouse gas emissions associated with a company's Corporate Carbon Footprint (CCF) as Scope 1, Scope 2, and Scope 3 emissions.

Scopes 1 and 2 encompass various actions to reduce the CO_2 footprint of the companies such as the energy consumption reductions & transition to more green energy sources (i.e. electrification).

Scope 1 Direct

Scope 1 emissions include direct emissions from the company's owned or controlled sources.

- Direct emissions from company's facilities
- Direct emissions from company's vehicles

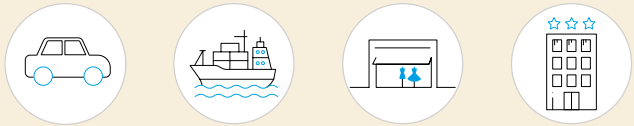
Scope 2 Indirect

Scope 2 emissions include indirect greenhouse gas emissions from purchased or acquired energy, like electricity steam, heat, or cooling, generated off-site and consumed by your company.

- Purchased heating, steam and cooling
- Purchased electricity

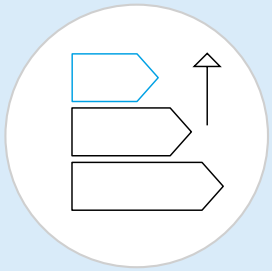
Scope 3 Indirect

Scope 3 includes all indirect emissions that occur in the value chain of a reporting company.



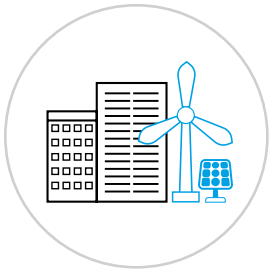
- Business travel and employee commuting
- Transportation and distribution
- Franchises
- Leasing of assets
- Investments
- Fuel and energy relatted activities
- Purchased goods and services
- End of life treatment of sold products

Key actions to reduce CO_2 footprint linked to Scope 1 & 2



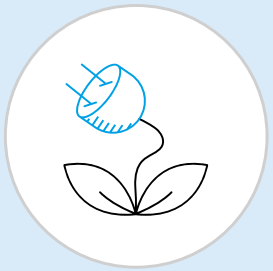
Reducing energy consumption at facilities

Replace, retrofit or optimise the existing equipment, appliances & systems for a more efficient operation. Limit unnecessary energy usage on site.



Producing energy on-site

Renewable energy production technologies set-up on site to produce clean energy (eg. PV panels, wind turbine.



Transition to electrification

Process of replacing technologies that use fossil fuels (coal, oil, and natural gas) with technologies that use electricity as a source of energy. Example: implementation of heat pump technologies for heating & cooling requirements of the site – limiting the boiler (e.g. fossil fuel) usage.

Renewable energy procurement

A method of tracking the actual amount of electricity produced from renewable energy resources. By buying renewable energy contracts, companies can effectively offset their own electricity consumption by purchasing an equivalent amount of electricity produced by renewable resources.

Off-setting

Any reduction of greenhouse gas (GHG) emissions to make up for emissions that occur elsewhere.

European Union (EU) Climate Target Plan 2030

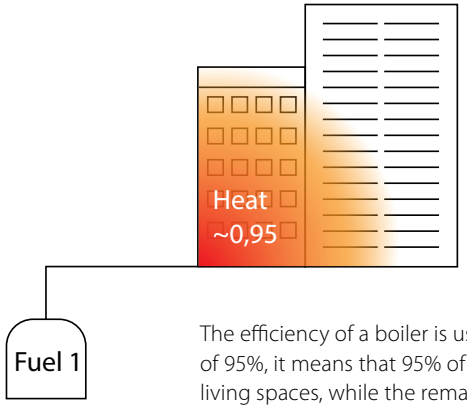
UK Climate Target 2030

Reduce greenhouse gas emissions by at least 68%*

*Compared to the 1990 levels

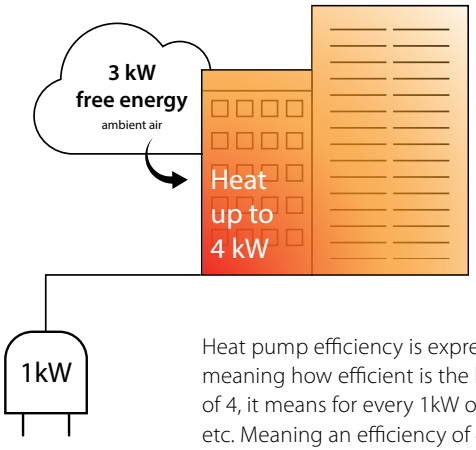
An introduction to heat pumps

Why heat pumps are efficient and how they reduce carbon emissions



Traditional boiler systems

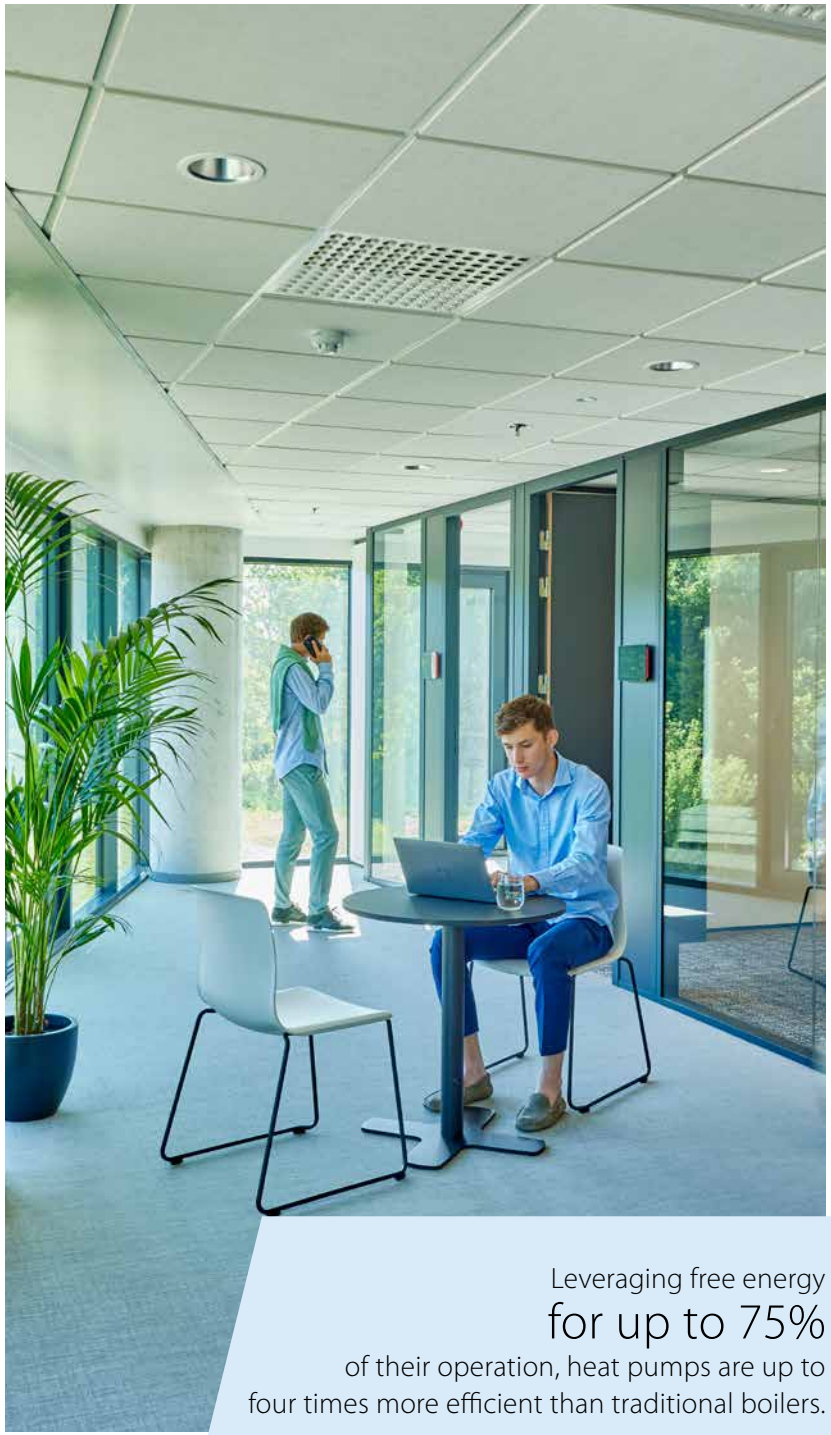
The efficiency of a boiler is usually expressed as a percentage. If a boiler has an efficiency of 95%, it means that 95% of the energy produced from gas is used to heat water and living spaces, while the remaining 5% escapes as heat through the exhaust.



Heat pumps

Heat pump efficiency is expressed in **SCOP**, the Seasonal Coefficient of Performance*, meaning how efficient is the heat pump over a heating season. If the heat pump has a SCOP of 4, it means for every 1kW of electricity it produces 4kW of heat for hot water, space heating etc. Meaning an efficiency of 400% if we use the percentage applied for boiler systems.

Heat pumps are so efficient because they use 75% of free heat from the air, water or ground and need only 25% of electricity to generate heat.



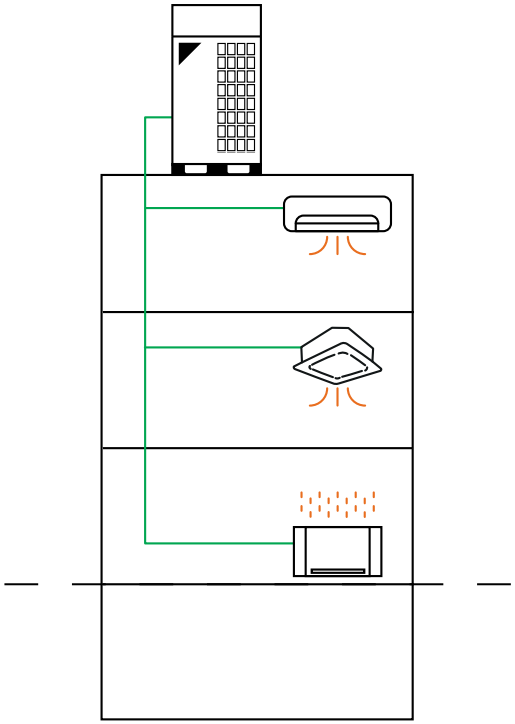
Leveraging free energy
for up to 75%
of their operation, heat pumps are up to four times more efficient than traditional boilers.

*https://www.ehpa.org/wp-content/uploads/2022/10/White_Paper_Heat_pumps-1.pdf (p. 28-29)

Heat pump classification

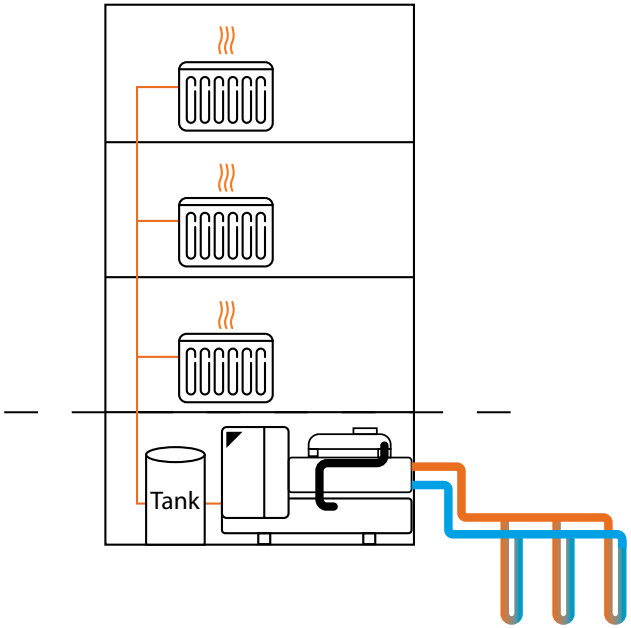
Air-to-air heat pumps

- Can provide heating, cooling and sanitary hot water
- All-in-one solution: all components are integrated
- Heat is transferred between the building and outside air using refrigerant gas
- Inside the building, heating and cooling is delivered via indoor units using air circulation
- Typically used for comfort applications. The 'indoor units' come in many different models to suit your design: wall mounted, floor standing, ceiling mounted etc.



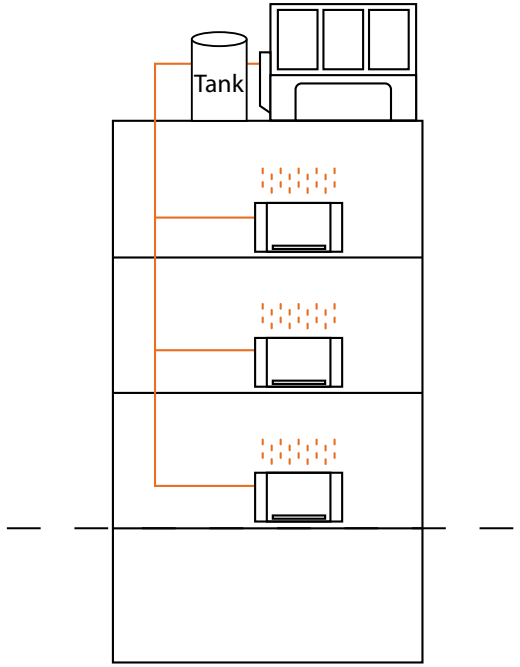
Water-to-water heat pumps

- Can provide heating, cooling and sanitary hot water
- Fully configurable system by selecting the heat pump, gauges, valves and water pumps
- Heat is transferred between the building and various energy sources (e.g. geothermal, outdoor air, etc.) using a refrigerant gas & water
- Can reach very high temperatures to serve radiators or process heating applications.



Air-to-water heat pumps

- Can provide heating, cooling and sanitary hot water
- Fully configurable system by selecting the heat pump, gauges, valves and water pumps
- Heat is transferred between the building and outside air using a refrigerant gas & water
- Inside the building, heating and cooling is delivered via indoor units using air circulation
- Can reach high enough water temperatures to serve the needs of most applications.



Air-to-water heat pump solutions for boiler replacement

The majority of the buildings in the UK still utilise gas boilers as the main heating source. UK decarbonisation targets and the uncertainty within the gas price market are making heat pumps one of the most viable solutions to reducing both the CO_2 footprint and dependency on gas.

Based on the building's heating load, Daikin can offer a range of heat pump solutions that replace the gas boiler without the need for additional works. These Air-to-water solutions are ideal for retrofit where the existing pipework can be used.

Single

A stand-alone heat pump solution can be recommended for buildings with relatively good insulation. With better insulated buildings, less heat loss will occur therefore the heating demand can be satisfied with lower water temperatures between 45°C and 75°C.

Cascade

For older buildings without any insulation retrofit plans, higher water temperatures might be required to match the water temperatures provided by the existing boiler solution. Daikin can provide up to 90°C within a cascade solution where the air-to-water and water-to-water heat pump units operate together.

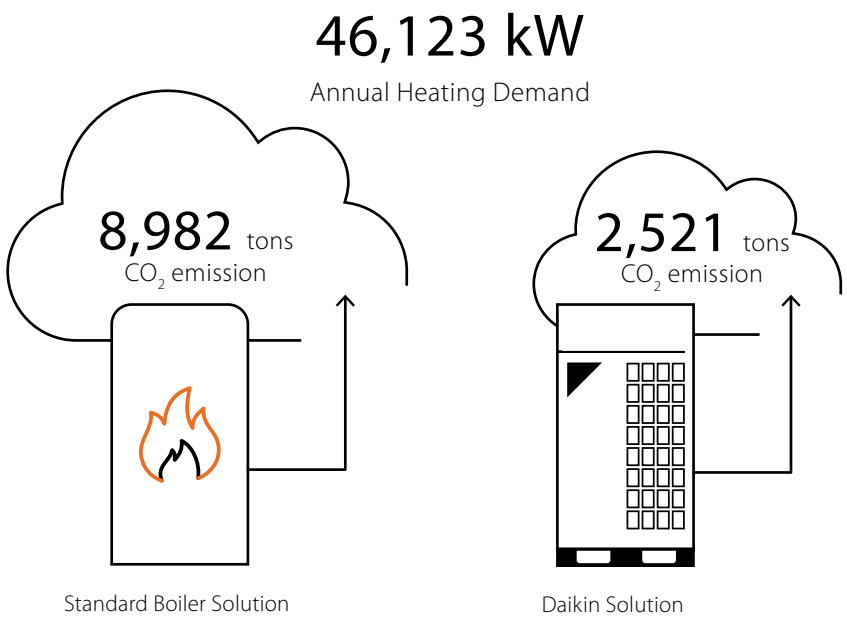
Decarbonisation effect

Reducing CO_2 emissions is the common goal of almost every company with ambitious sustainability goals. By delivering higher efficiencies and using lower-carbon electricity, heat pumps offer a clear route to reducing CO_2 emissions compared to gas boilers.

Case 1 – Process Heating	Gas Boiler	Heat Pump
Heating Demand (kWh)	46,123	
Boiler efficiency / Heat pump SCOP	95%	2.25
Emission factor (g/kWh)	185	123(1)
CO_2 emission in tons	8,982	2,521

Note: Project life time is considered as 15 years. Calculation above is based on the 70°C water temperature supply both for boiler and the heat pump.

(1) Expected average emission factor of electricity generation in Europe for project lifetime of 15 years based on https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emission-intensity-of-1



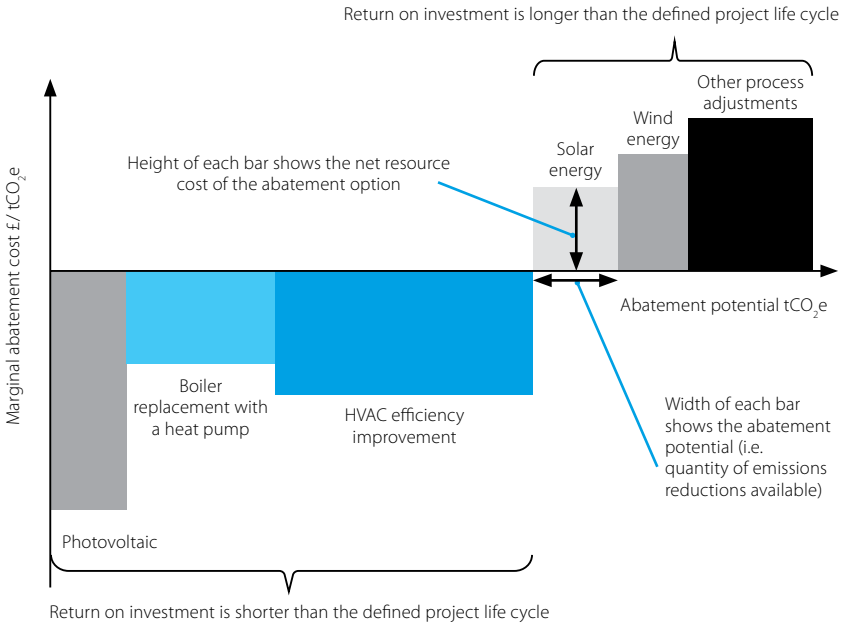
The results shown are valid only for the exact sample project conditions and will vary for each project.

Cost – Benefit Analysis

There are various other actions which can be taken to reduce CO_2 emissions. The balance between the investment costs and the achievable CO_2 reductions is a key decision criterion.

Marginal Abatement Cost Curve (MACC) is a common tool used by the industry to plan and prioritise their - emission reducing investments.

Sample case:



Replacing existing fossil fuel boiler systems with a heat pump, or upgrading HVAC equipment, can deliver significant CO_2 reductions, with a strong cost per tonne of carbon saved and an attractive return on investment.

WHOLE LIFE CARBON

Understanding carbon emissions

Operational and embodied carbon in buildings

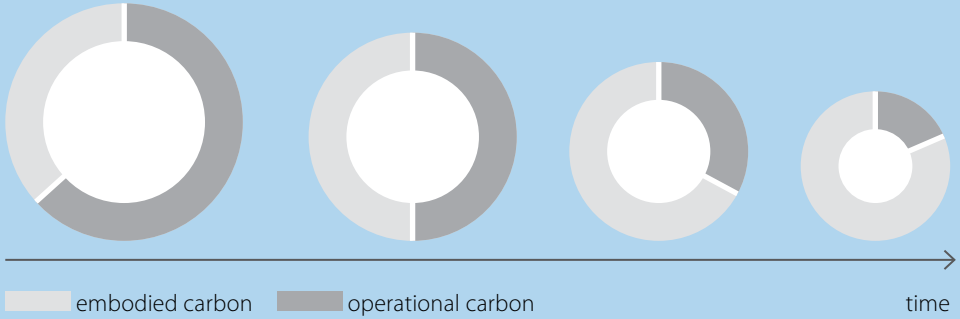
Reducing a building's carbon footprint requires looking at two distinct sources of emissions: operational carbon and embodied carbon.

Operational carbon refers to emissions produced during the day-to-day from day-to-day building use: heating, cooling, lighting and appliances. These can be direct (Scope 1) or indirect from purchased electricity (Scope 2), and vary by country depending on how electricity is generated.

Embodied carbon covers emissions across a material's full life cycle, from extraction and manufacturing through to installation and disposal. Often overlooked, these emissions represent a significant share of a building's total carbon footprint.

A new focus on emissions

As the energy mix gradually shifts towards greener sources, operational carbon emissions are expected to decrease while the significance of embodied carbon is likely to increase.



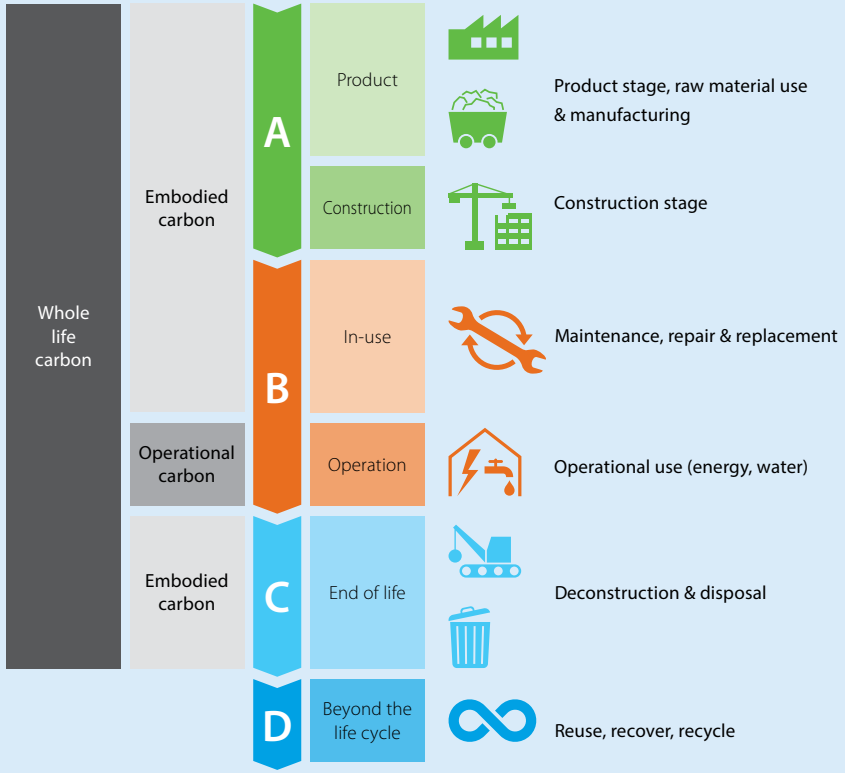
Environmental Product Declarations

Using EPDs to measure and reduce whole life carbon

As grids decarbonise and heat pumps replace fossil fuel systems, operational carbon will fall, shifting attention towards embodied carbon and accurate measurement.

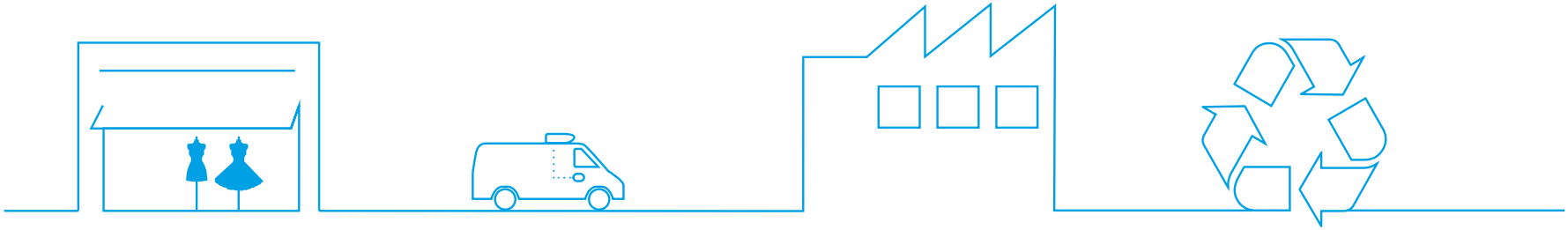
An Environmental Product Declaration (EPD) is a verified, standardised document quantifying a product's environmental impact across its full life cycle. EPDs enable calculation of a building's total carbon footprint and identify where the biggest impacts occur.

Daikin produces independently verified, product-specific EPDs. These give owners, developers and specifiers the data they need to make evidence-based decisions, report against sustainability targets and select the right solution.



L∞p by Daikin Recover – Reclaim – Reuse

Help prevent
the production of virgin gas and
save 3,590 tonnes
of CO_2 each year.



Recover

We recover your **old refrigerant** for you from any unit and any brand.

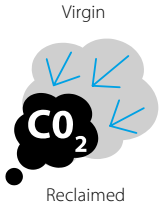
Reclaim

The refrigerant is reclaimed in UK, meaning regenerated in a **high-quality** way, in line with F-gas regulation definition.

Reuse

The reclaimed refrigerant is mixed with virgin refrigerant. The refrigerant's quality is **certified** by an independent laboratory. It meets AHRI 700 certified standards.

Circular economy of refrigerants to reduce the production of virgin gas

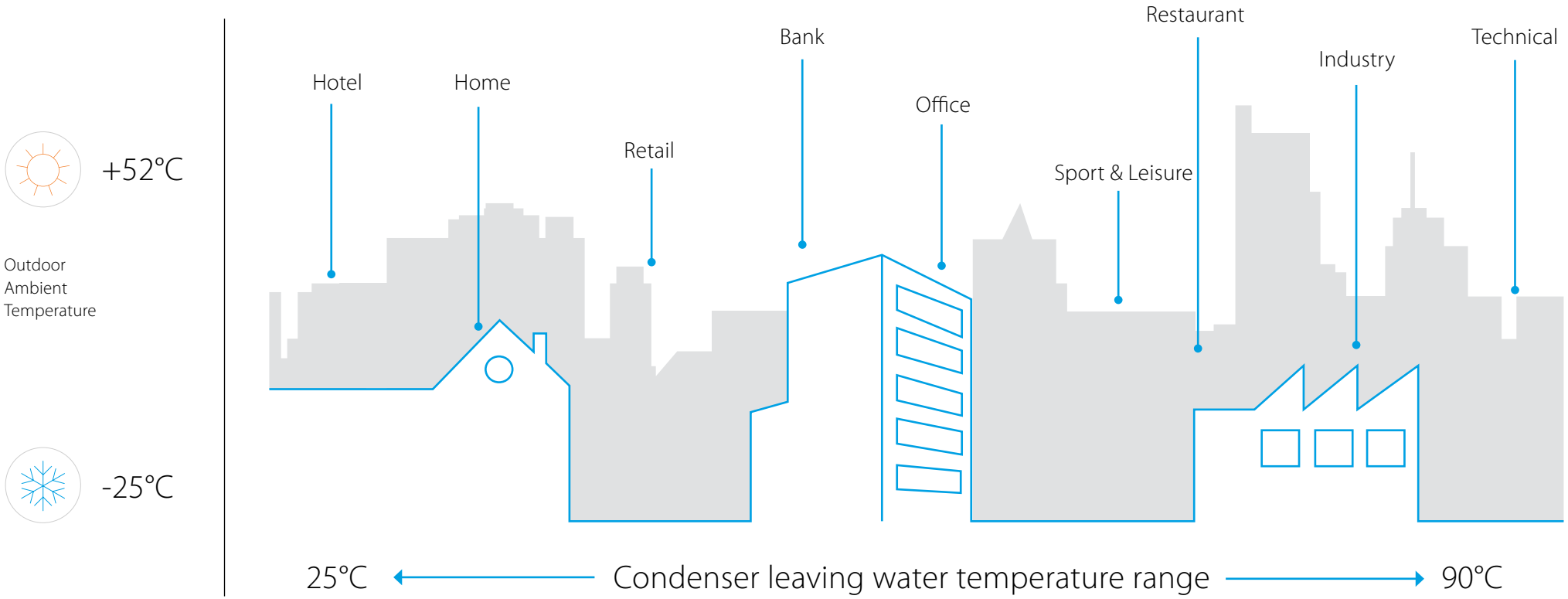


72% lower CO_2 fooprint for production

For more information about the Loop by Daikin, scan the QR code:

Commercial solutions from small to large applications

A wide range of commercial applications can be supported by Daikin heat pumps, with reliable operation down to -25°C outdoor ambient temperatures.



Heat pump overview

12 up to 190 kW
Air-to-Air

15 up to 2,200kW
Water-to-Water

4 up to 4,320kW
Air-to-Water

screw
scroll
swing

VRV Heat Pump &
VRV Heat Recovery

INVERTER
R-744
R-32
R-410A

12 - 150 kW
OAT down to -25°C

Rooftop

INVERTER
R-32

25 - 190 kW
OAT down to -20°C

EWYA-DV3(W1)P

INVERTER
R-32

4 - 16 kW
OAT down to -25°C
CLWT up to 65°C

Altherma
A2W, Hybrid,
Geothermal,
Water source

R-32
R-290

4 - 18 kW
OAT down to -28°C
LWT up to 70°C

EWYK-QZ

INVERTER
R-290

135 - 4320 kW (Modular)
OAT down to -20°C
CLWT up to 75°C

AVAILABLE NOW

EWYK-CZ

INVERTER
R-290

20 - 83 kW
OAT down to -25°C
CLWT up to 75°C

AVAILABLE NOW

EWY(T)(E)-CZ

INVERTER
R-32
R-454c

16 - 90 kW
OAT down to -25°C
CLWT up to 70°C (R-454C version)

EWWQ-KC

R-410A

15-70 kW
CLWT up to 55°C

EWW(H)(S)-VZ

INVERTER
R-513A
R-1234ze

329 - 2,200kW
CLWT up to 90°C

EWW(H)(S)-J

R-513A
R-1234ze

107 - 388 kW
CLWT up to 75°C

EW(W)(H)T-Q-

R-32

100, 125, 160 kW
CLWT up to 60°C

EWYT-B

R-32

82 - 1200 kW
OAT down to -15°C
CLWT up to 60°C

EWYS-4Z

INVERTER
R-513A

400 - 800 kW
OAT down to -10°C
CLWT up to 60°C

CLWT: condenser leaving water temperature; **OAT:** outdoor ambient temperature. **A2W:** air to water. Operating range can vary by model. For detailed information please contact your Daikin representative.

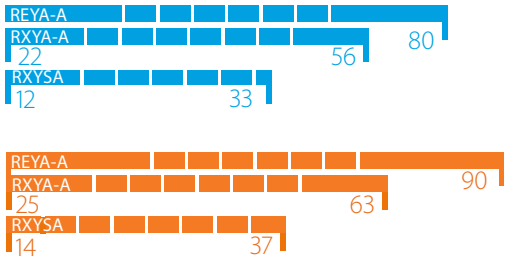
Air-to-air heat pump VRV solution

Daikin VRV solutions provide the best air-to-air comfort for cooling, heating and fresh air requirements while offering major energy savings compared to traditional boiler systems.

VRV 5 Heat Pump & Heat Recovery
RXYA-A & REYA-A

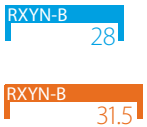
R-32
GWP 675

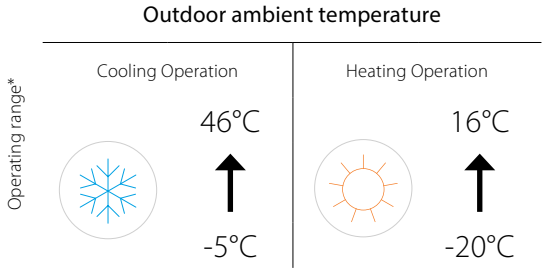
RXYA RXYSA



CO_2 VRV Heat Pump
RXYN-B

R-744
GWP 1





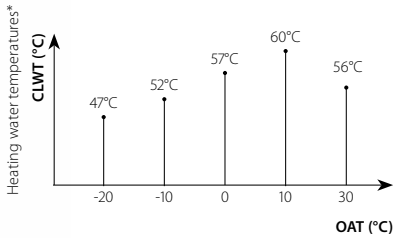
*Operating range may vary by model

Key benefits

- Stable heating capacities & minimal defrost cycles even down to -20°C during winter
- Fully integrated solution with heat recovery for maximum efficiency with SCOP of up to 7.24
- The perfect personal comfort for guests/tenants via simultaneous cooling and heating
- Limited space requirements: all components are integrated and refrigerant piping is compact
- Air to air technology ensures fast reaction to changing conditions, keeping a stable indoor temperature

Air-to-water heat pump solution

Daikin's air-to-water heat pump is the ideal solution for buildings where high efficiency comfort cooling and heating is a main requirement.



CLWT: condenser leaving water temperature;
OAT: outdoor ambient temperature;
*Operating range may vary by model

EWYT-CZ

R-32
GWP 675

Cooling Capacity (kW)
16 — 90
Heating Capacity (kW)
16 — 90

EWYE-CZ

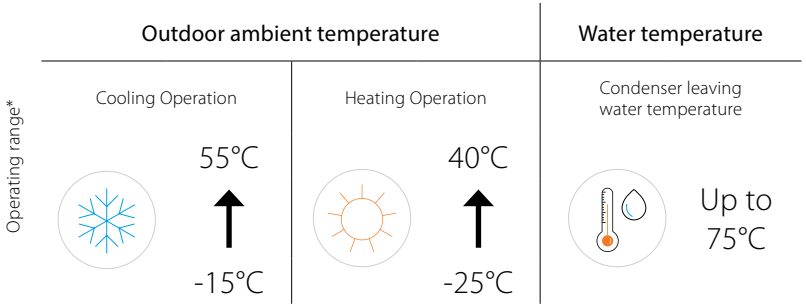
R-454C
GWP 148,5

Cooling Capacity (kW)
15 — 60
Heating Capacity (kW)
18 — 74

EWYK-(CZ)(QZ)

R-290
GWP 0,02

Cooling Capacity (kW)
14 — 145
Heating Capacity (kW)
16 — 135



Key benefits

- Top class efficiency: SEER up to 5.76, and SCOP(AW35) up to 4.197
- Extended capacity range: possibility to connect up to four units working as single system up to 4 x 90 kW
- Daikin inverter scroll compressors with vapor injection for hot water production up to 75°C on the R-290 version
- Inverter pump kit option with both low and high lift availability
- Heating operation down to -25°C
- High efficiency Daikin design inverter fans with a selectable silent mode
- One or two independent refrigerant circuits with one or two inverter scroll compressors
- Sanitary hot water feature available
- Split version is ideal for colder climate applications: hydronic module can be installed inside eliminating the need for glycol
- Optimised heating application: dedicated controller extension for water loop cascade, bivalent operation with gas boilers and advanced domestic hot water control including backup heater enabling

Cascade heat pump solution for high water temperatures

A Daikin cascade system consists of a solution with an air-to-water and a water source unit operating together to achieve high leaving water temperatures and making it suitable for refurbishment projects.

	Outdoor ambient temperature	Water temperature
Operating range*	Heating Operation	Condenser leaving water temperature
	35°C ↑ -20°C	Up to 90°C

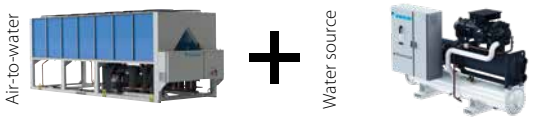
*Operating range may vary by model

R-32 GWP 675 **R-1234ze** GWP 1.37

EWYT-CZ + **EWWH-J**

Heating Capacity (kW)
90 – 360

EWYT-B + **EWWH-VZ**



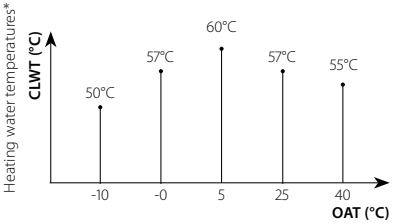
Heating Capacity (kW)
330 – 1540

Key Benefits

- Complete heat pump system (no gas boiler or district heating required)
- Able to produce up to 90°C water temperature at -20°C outdoor ambient temperature
- Suitable for comfort and process applications
- Possibility of heat or cold energy recovery in all operating conditions
- High efficiency
- Low GWP refrigerants (R-32 & R-1234ze)
- Ideal for boiler replacement due to the high temperatures reachable and compactness of water to water heat pump

Air-to-water heatpump with integrated heat recovery feature

Daikin's Polyvalent 4-pipe multipurpose unit is the best solution for buildings with all-year-round simultaneous cooling and heating requirement.



CLWT: condenser leaving water temperature;
OAT: outdoor ambient temperature;
For heating operation down to -15°C OAT, please contact your Daikin representative.

EWYS-4Z

R-513A
GWP 630

Cooling Capacity (kW)
400 800

Heating Capacity (kW)
400 800

	Outdoor ambient temperature		Water temperature
Operating range*	Cooling Operation	Heating Operation	Condenser leaving water temperature
	50°C ↑ -20°C	45°C ↑ -10°C	Up to 60°C

*Operating range may vary by model

Key Benefits

- Top class efficiency: TER (Total Energy Ratio) up to 8.8
- Single screw compressor with refrigerant cooled integrated inverter
- VVR (Variable Volume Ratio) technology optimises the discharge pressures of the refrigerant
- High efficiency inverter fans with optimised geometry ensure the best ratio between airflow and power input
- Two independent refrigerant circuits with two inverter screw compressors
- Two heat exchangers on water side: one operating as evaporator and one as condenser
- High flexibility: two sound configurations
- Possibility of recovering energy every time there is a heating and cooling load.

Collective housing solution

Daikin integrated solutions for collective housing provide comfort heating, comfort cooling and domestic hot water if required, to apartment buildings. This communal system connects individual in-apartment heat pumps to a shared central water loop. The central water loop can be warmed or cooled via Daikin air-to-water heat pumps working at low temperature and high efficiency.

Operating range*	Outdoor ambient temperature		Water temperature
	Cooling Operation	Heating Operation	Condenser leaving water temperature
	52°C ↑ -18°C	35°C ↑ -15°C	Up to 65°C

*Operating range may vary by model

R-32
GWP 675

EWYT-B

Air-to-water

ALTHERMA 3 WS

Water source

Cooling Capacity (kW)

Capacity range dependent on building load

Heating Capacity (kW)

Capacity range dependent on building load

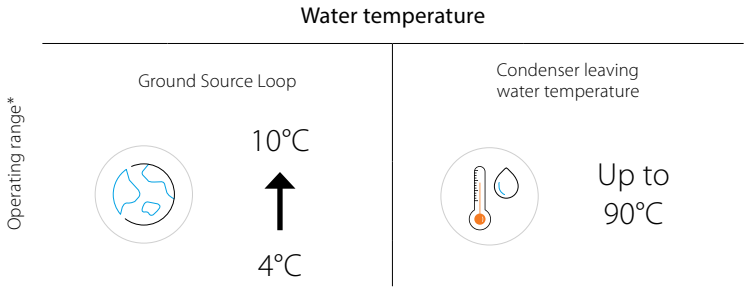
Sizing support tool for optimised pairing of air cooled and water cooled unit

Key benefits

- Low carbon heat pump solution delivers significant CO_2 reductions over traditional systems
- Maximum comfort thanks to low noise option for the communal air heat pump and in-apartment heat pump sound power down to 39dBA
- Space saved on the balcony
- Heating, hot water and cooling via a 2 pipes network offers capital savings over a traditional 4 pipes solution
- The in-apartment heat pump has an integrated back-up heater
- Any type of Daikin emitter can be connected to Daikin Altherma 3 WS
- Low ambient loop reduces heat loss by 90% and reduces risk of overheating
- Heat recovery further enhances system efficiency when heating and cooling occur simultaneously

Water-to-water heat pump solution with geothermal source

Daikin's water source heat pumps can utilise the geothermal energy to achieve highest efficiency operation while delivering high water temperatures.



*Operating range may vary by model

EWWH-VZ

R-1234ze
GWP 1.37

Heating Capacity (kW)
330 1540

Key benefits

- Optimised energy efficiency both at full and part load conditions
- Daikin's unique single screw design compressor combined with inverter technology
- VVR (Variable Volume Ratio) technology optimises the discharge pressures of the refrigerant
- Compact footprint through stacked heat exchanger layout
- High efficient flooded type heat exchanger allowing maximum unit performances
- One or two truly independent refrigerant circuits for outstanding reliability
- HFO R-1234ze refrigerant with Ozone Depletion Potential equal to zero and extremely low Global Warming Potential

Air-to-air heat pump – Rooftop solution

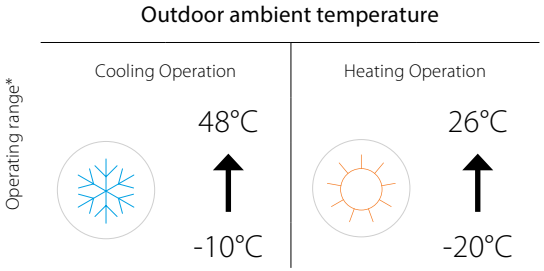
Daikin R-32 rooftops provide the best plug and play heating and cooling solution for various applications such as warehouses, industry, malls, etc. offering major energy savings compared to traditional boiler heating systems.

UATYA-B

R-32
GWP 675

Cooling Capacity (kW)
25 190

Heating Capacity (kW)
25 177



*Operating range may vary by model

Key benefits

- Stable heating capacities and minimal defrost cycles even down to -20°C during winter
- Fully integrated solution with heat recovery for maximum efficiency with SCOP of up to 3.67
- Indoor/outdoor packaged unit and factory charged refrigerant provide cost-effective installation
- High ESP up to 800Pa allows extensive ductwork to evenly distribute the air across a large space
- Scroll compressor and free cooling ensure highly efficient 24/7 operation
- Clogged filter alarm indicates when filter needs cleaning, ensuring optimum operation and minimial energy consumption
- Available in four configurations to meet cooling and heating demand, from 100% recirculation applications to fresh air with heat recovery applications

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Daikin, your partner in decarbonising your building

We're there for you!

Let's act now to decarbonise buildings, creating a healthy environment for generations to come.

Contact us here:

Every building requires a different solution to match its unique properties. That's why it is important to have an HVAC-R partner with expert knowledge and a product portfolio designed to achieve your objectives while staying within budget.

How will Daikin enable you to lower your carbon footprint?

- We continuously develop products with lower CO_2 footprints by using **lower GWP refrigerants** such as R-32 and natural refrigerants
- We reuse materials where possible, even refrigerants through the **LOOP by Daikin programme** aimed at reusing available resources and fully supporting the EU circular economy
- We maximise **real life seasonal efficiencies**, delivered in a transparent and trustworthy way
- Our **team of experts goes beyond product support** to reach your green objectives by providing in-depth knowledge in the use of EPDs, EPDB legislation and green building schemes such as BREEAM, LEED, WELL, etc.
- We provide **support** to continuously monitor our systems, ensuring they operate as intended, keeping running costs low and maximising uptime **throughout the entire building life cycle**
- We **help customers make the right choice** by offering easy to use tools to select the best solutions for their residential, commercial or industrial building

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