Heat Pump - Commercial Solutions

Your guide to decarbonise heating

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Heat pumps, a corner stone

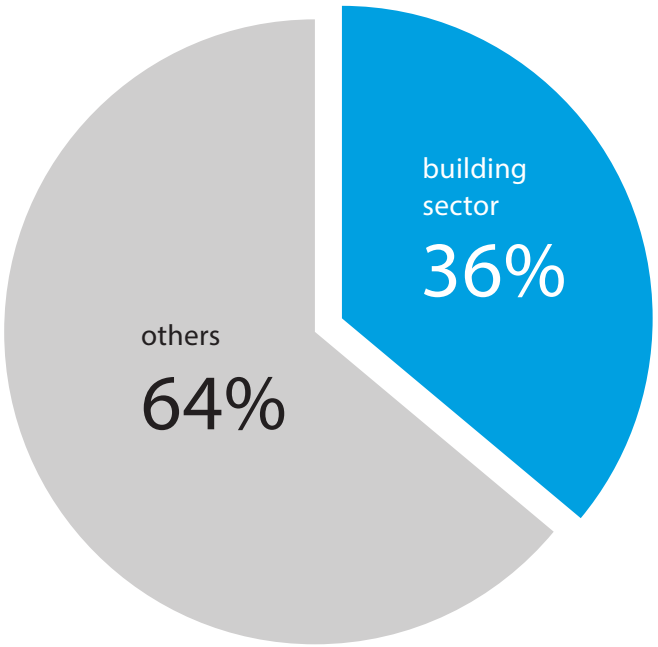
By 2050, the EU aims for an economy with net-zero greenhouse gas emissions, an objective that is at the heart of the EU Green Deal. A cornerstone of the EU Green Deal is to create more energy efficient buildings as the building sector is responsible for 36% of the total greenhouse gas emissions in the EU. Decarbonising the building stock is a priority.

And there are more reasons then reduced carbon emissions to invest in heat pumps: they are up to 75% more efficient then fossil fuel systems and with the EU Green Deal comes a €600 billion budget to stimulate investments that reduce CO_2 emissions from buildings, such as heat pumps.

This guide will help you navigate the different heat pump solutions that exist and what to apply in which application, ensuring you make the right choice for your building to maximise the benefits of your heat pump solution.

Source article

Greenhouse gas emissions in the EU



Source: https://ec.europa.eu/commission/presscorner/detail/en/IP_21_6683

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

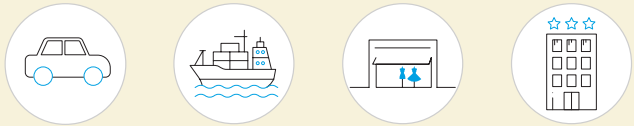
Scope 2 Indirect

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

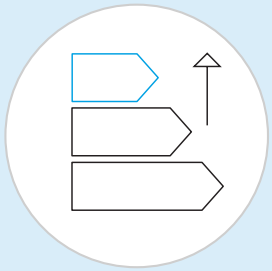
Scope 3 Indirect

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

Possible actions to reduce CO_2 footprint

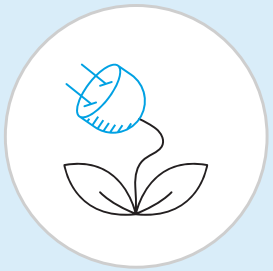


Reducing energy consumption at facilities

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 turbines…)



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:

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.

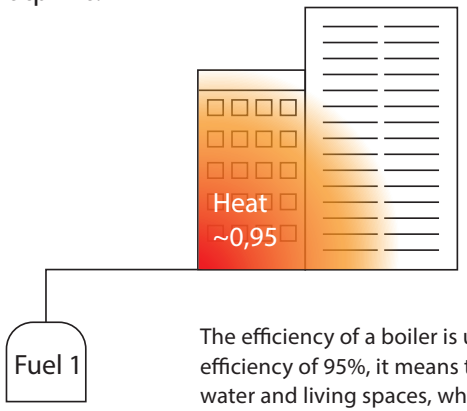
European Union (EU) Climate Target Plan 2030

Reduce net greenhouse gas emissions by 55% by 2030*

*Compared to the 1990

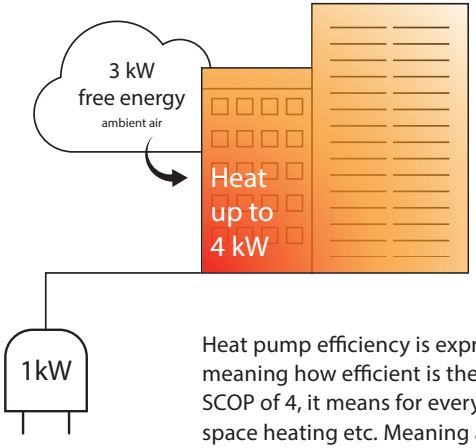
An introduction to heat pumps

Why are heat pumps so efficient and how to they reduce your carbon footprint?



Traditional boiler systems

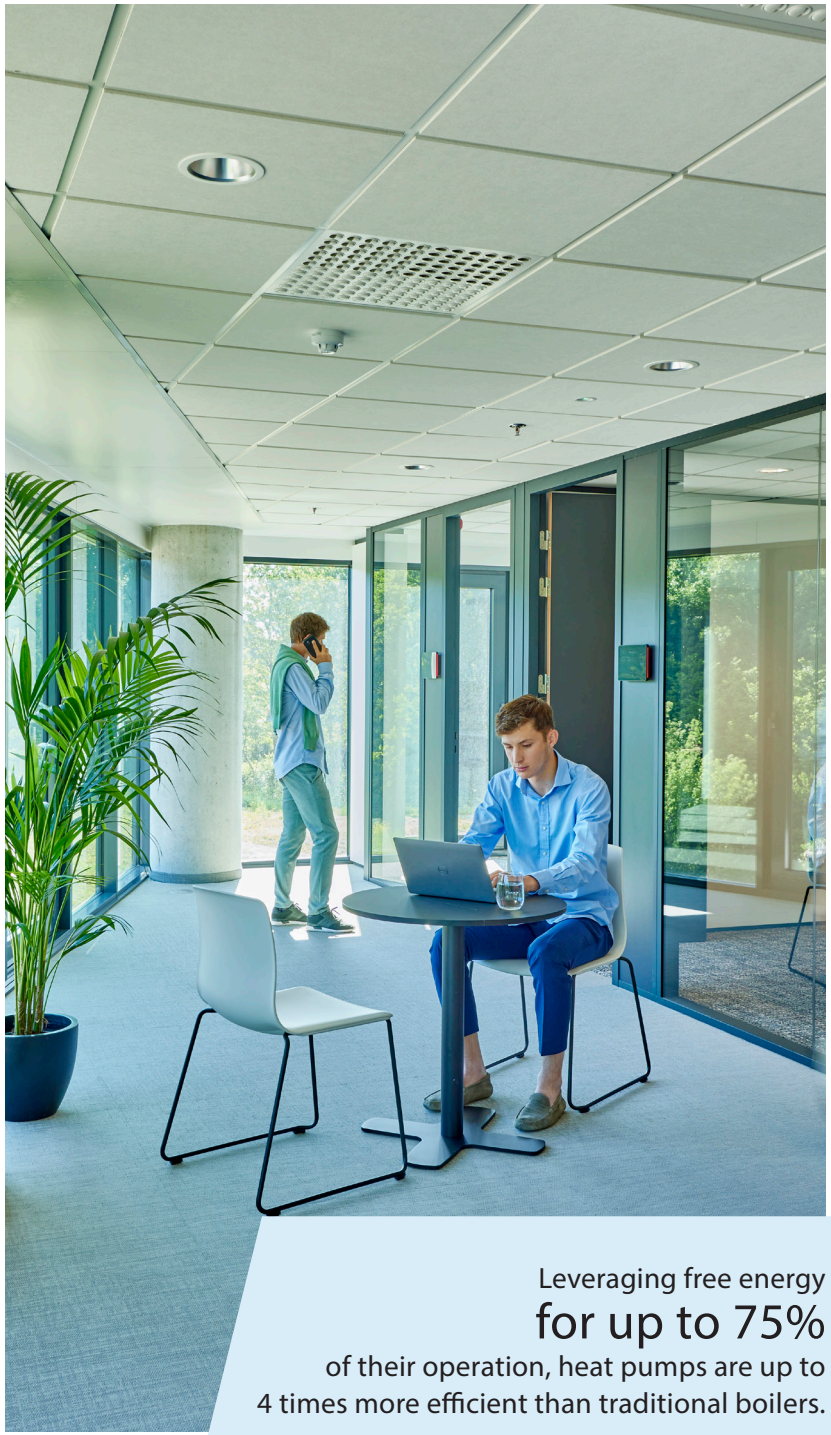
The efficiency of a boiler is usually expressed as a percentage. If a boiler has an efficiency of 95%, it means that 95% of the energy produced from gas is used to heat water and living spaces, while the remaining 5% escapes as heat through the exhaust.



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 the use 75% of free heat from the air, water or ground and need only 25% of electricity to generate heat.



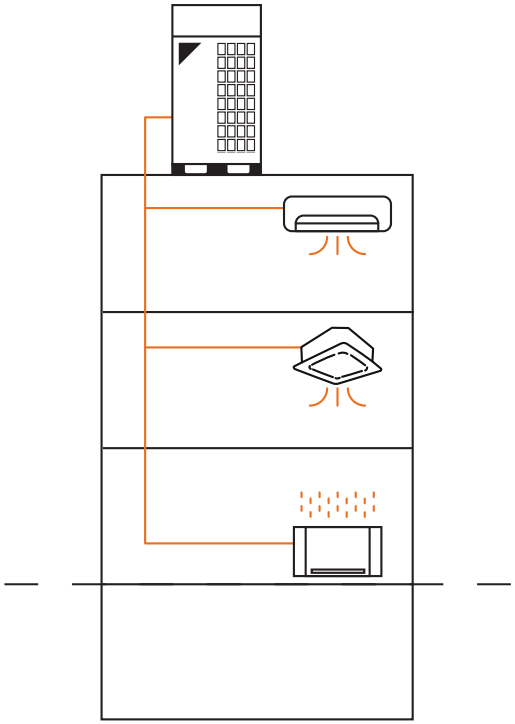
Leveraging free energy
for up to 75%
of their operation, heat pumps are up to 4 times more efficient than traditional boilers.

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

Heat pump classification

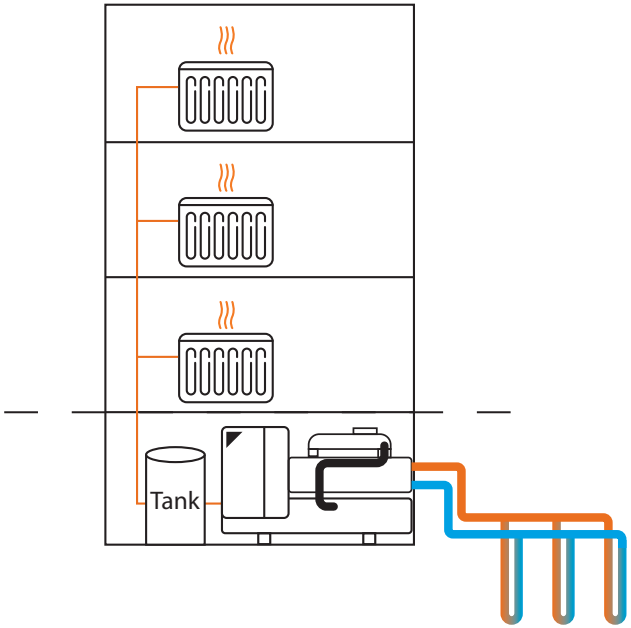
Air-to-air heat pumps

- 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.
- On the inside of the building, heating and cooling is done via 'indoor units' through 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.



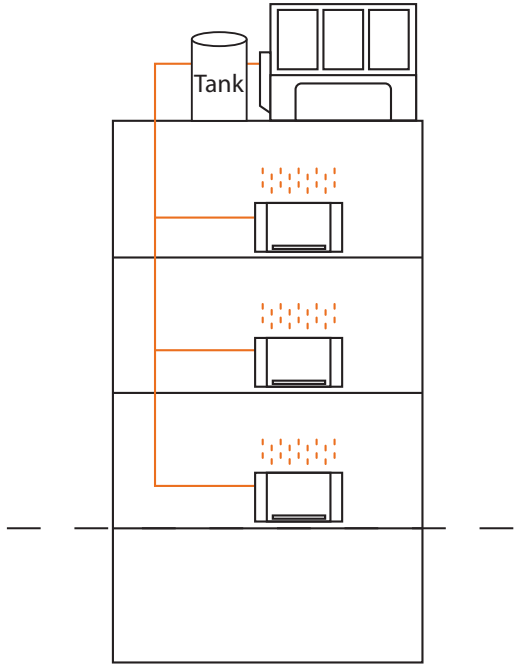
Water-to-water heat pumps

- 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.



Air-to-water heat pumps

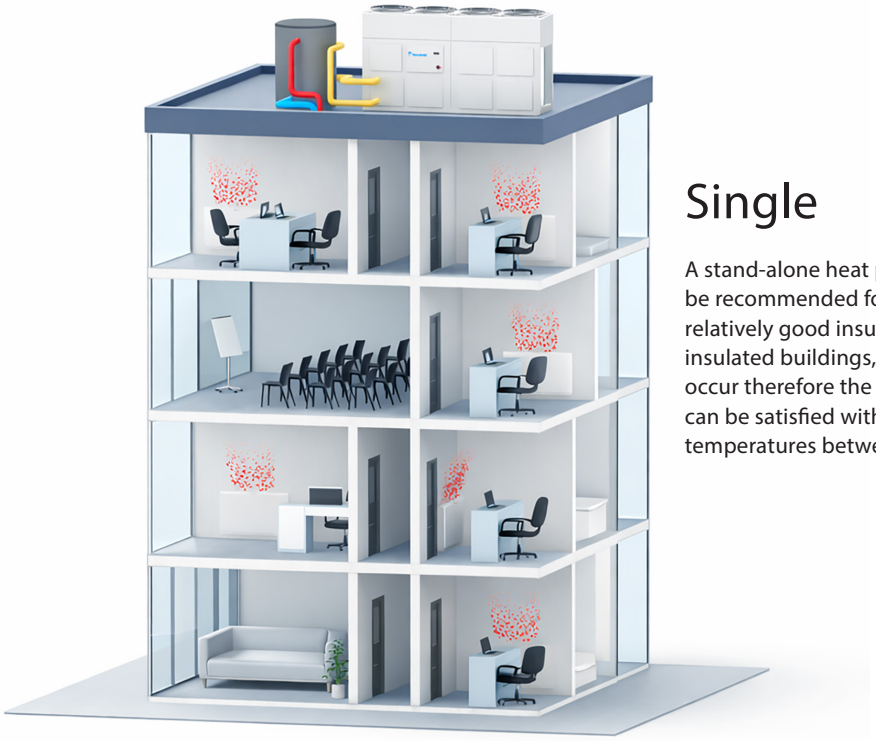
- Can provide heating, cooling and sanitary hot water.
- Fully configurable system by selecting the heat pump, gauges, valves and water pumps.
- Heat is transferred between the building and outside air using a refrigerant gas & water.
- On the inside of the building, heating and cooling is done via 'indoor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



Heat Pump Solutions for Boiler Replacement

The majority of the buildings in Europe still utilise gas boilers as the main heating source. EU 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 requirements Daikin can offer various heat pump system solutions where the heat pump replaces the gasboiler, without the need for additional works.



Single

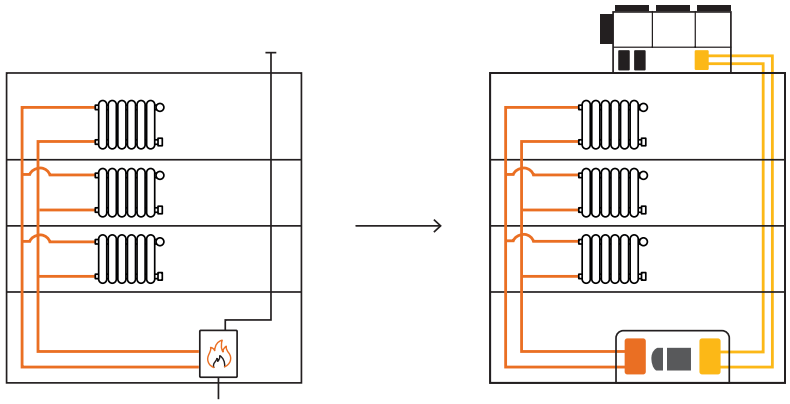
A stand-alone heat pump solution can be recommended for buildings with relatively good insulation. With better insulated buildings, less heat loss will occur therefore the heating demand can be satisfied with lower water temperatures between 45°C and 60°C.

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 75°C within a cascade solution where the air-to-water and water-to-water heat pump units operate together.

Return On Investment

Increased EU decarbonisation targets and unstable energy prices are the main drivers towards the electrification of heating systems. Replacing the existing gas boilers in a building with the latest heat pump technologies, will not only support to reach the ambitious decarbonisation targets but also yield massive energy savings with short return on investment (ROI) periods. The energy savings and therefore the ROI period are subject to operating hours, energy prices, equipment lifetime & system efficiencies.



Replacing the existing gas boiler system with a Daikin cascade heat pump solution where an air-to-water and water-to-water heat pump operate together.

- Location and climate data consisdered: Vienna, Austria
- Considering that the boiler works with higher temperature difference (delta T), minor modifications on hydronic side are considered within the part of installation costs to enable the replacement solution

Case 1 – Process Heating

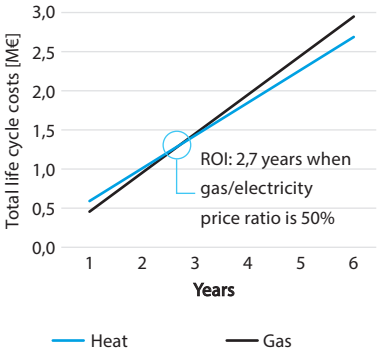
Heating demand with all year-round operation (8.760 hrs)

Comparison on CAPEX & OPEX

Process Heating		Gas Boiler	Heat Pump
Heating Capacity	kW	400	
Energy Consumption	MWh/year	3.292	1.375
CAPEX	k€	–	213
OPEX	k€/year	497	417
Total life cycle costs	k€	7.451	6.475
Gas/Electiricty price ratio	%	50%	
ROI	years	2,7	

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.

Return on



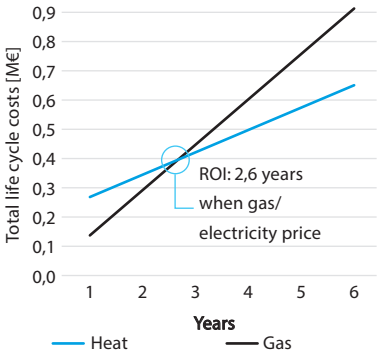
Case 2 – Comfort Heating

Heating demand with winter only operation (2.251

Comfort Heating		Gas Boiler	Heat Pump
Heating Capacity	kW	400	
Energy Consumption	MWh/year	497	222
CAPEX	k€	–	213
OPEX	k€/year	152	71
Total life cycle costs	k€	2.280	1.285
Gas/Electiricty price ratio	%	100%	
ROI	years	2,6	

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.

Return on



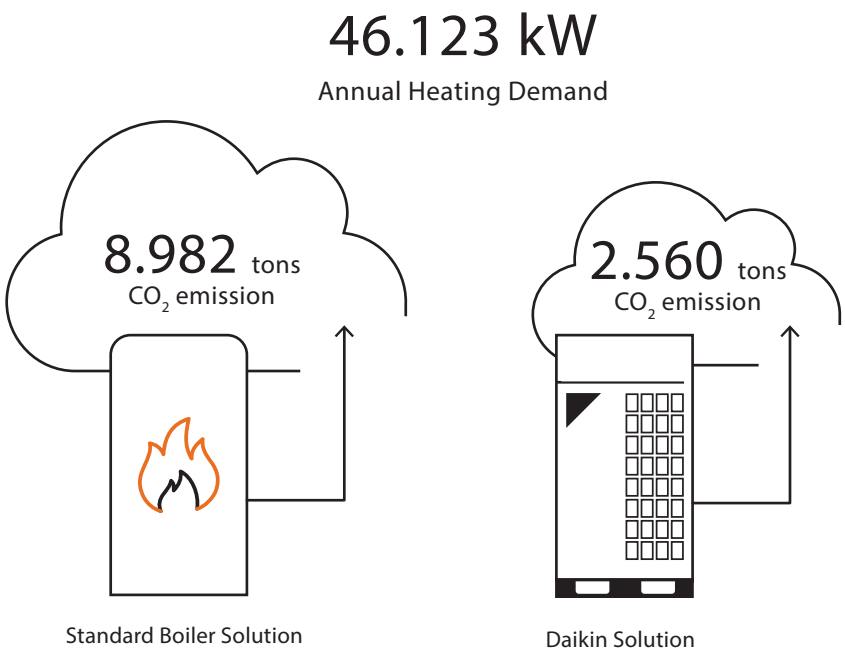
*The results shown are valid only for the exact sample project conditions and will vary for each project.

Decarbonisation effect

Reducing CO_2 emissions is the common goal of almost every company with ambitious sustainability goals. It is a known fact that CO_2 emissions can be greatly reduced thanks to both the higher efficiencies of the heat pump technology and the lower emission

Case 1 – Process Heating	Gas Boiler	Heat Pump
Heating Demand (kWh)	46.123	
Boiler efficiency / Heat pump COP	95%	2,25
Emission factor (g/kWh)	185(1)	125(2)
CO_2 emission in tons	8.982	2.560

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.

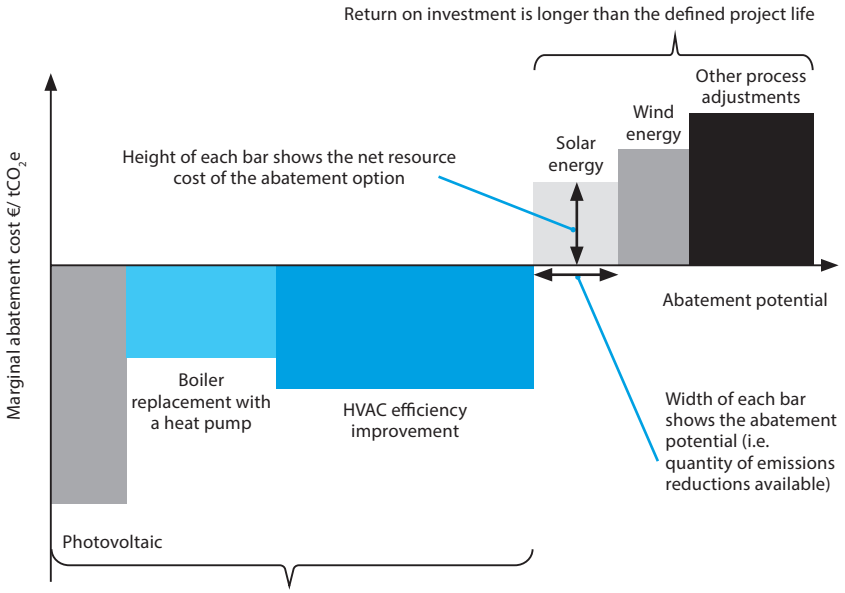


The results shown are valid only for the exact sample project conditions and will vary for each project.

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.



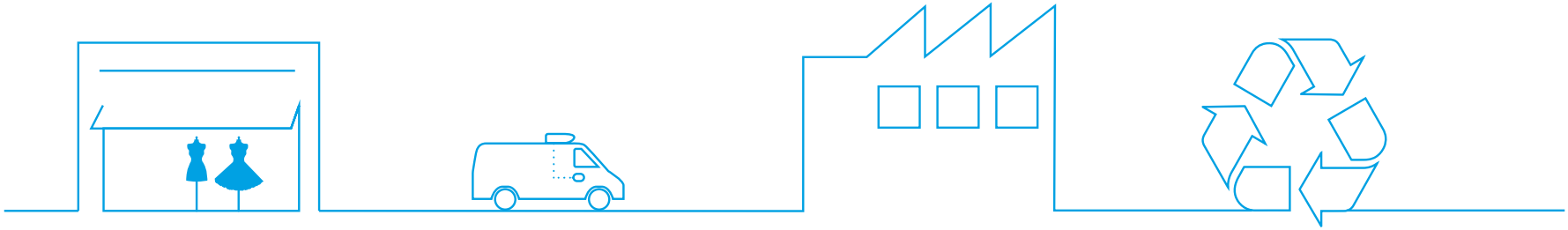
Replacing your existing fossil fuel driven boiler systems with a heat pump or upgrading your HVAC equipment could yield significant CO_2 emission reductions with an acceptable €/tCO_2e ratio, as well as a reasonable return on investment period.

(1) (2)

THE NEW REFRIGERANT SERVICE

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.

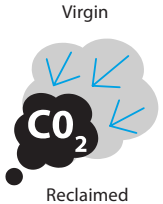
Reclaim

The refrigerant is reclaimed in Europe, meaning regenerated in a high-quality way, in line with F-gas regulation

Reuse

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

Circular economy of refrigerants to reduce the production of

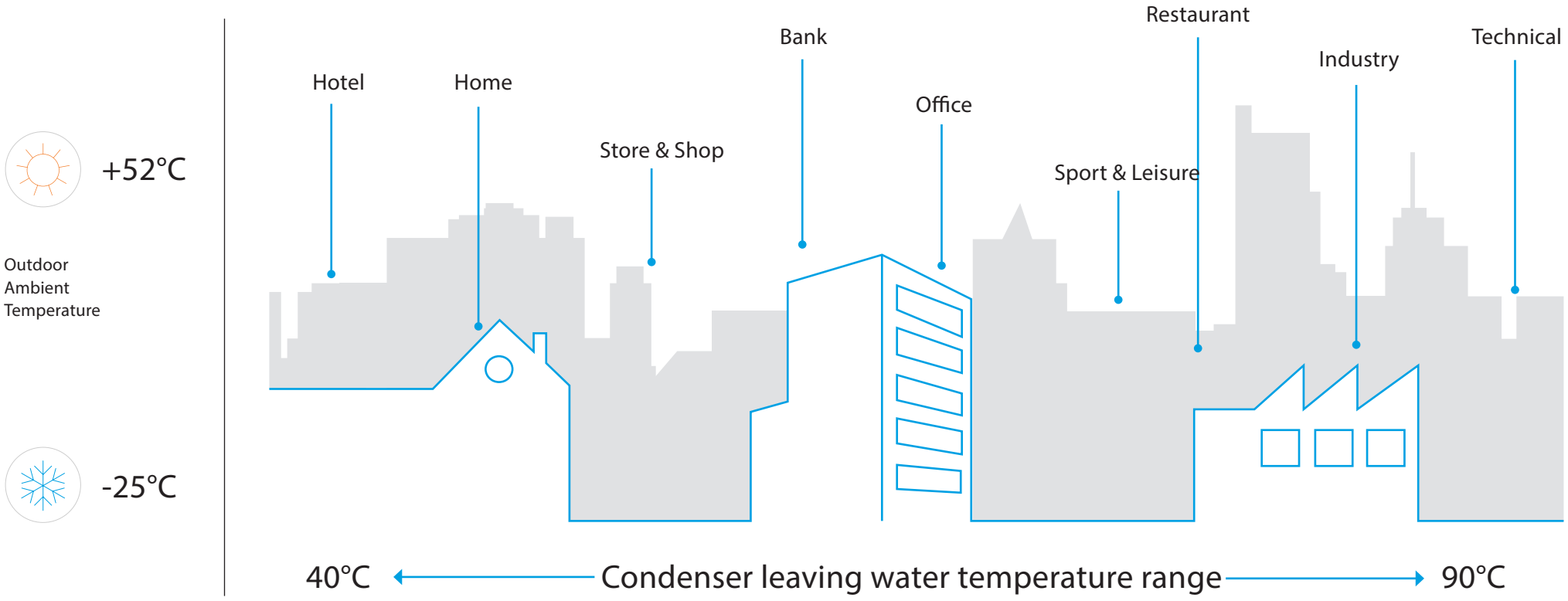


72% lower CO_2

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

Commercial solutions from small to large applications

Different kind of commercial applications can be managed by Daikin heat pumps which can guarantee operation down to -25°C outdoor ambient temperature.



Heat pumps overview

12 up to 190 kW Air-to-Air

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 80°C

EWYK-QZ

INVERTER
R-290

135 - 2000 kW (Modular)
OAT down to -20°C
CLWT up to 75°C
Available from April 2026

4 up to 2000 kW Air-to-Water

EWY(E)(K)(T)-CZ**

INVERTER
R-32
R-454c
R-290

16 - 90 kW
OAT down to -25°C
CLWT up to 75°C
R-290 version available from May 2026

EWYD-4Z

INVERTER
R-513a

400 - 800 kW
OAT down to -10°C
CLWT up to 65°C

EWYT-B

R-32

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

14 up to 2217 kW Water-to-Water

scroll

EWWQ-KC

R-410A

15 - 70 kW
CLWT up to 55°C

EWW(H)(S)-VZ*

INVERTER
R-513A
R-1234ze
R-134a

329 - 2217 kW
CLWT up to 90°C

EWW(H)(S)-J*

R-513A
R-1234ze
R-134a

107 - 388 kW
CLWT up to 75°C

EWWT-Q/EWHT-Q/
EWLT-Q

R-32

100, 125, 160 kW
CLWT up to 60°C

EWYD-BZ

INVERTER
R-134A

250 - 580 kW
OAT down to -10°C
CLWT up to 55°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. * Split version also available. ***OAT and CLWT can vary according to the

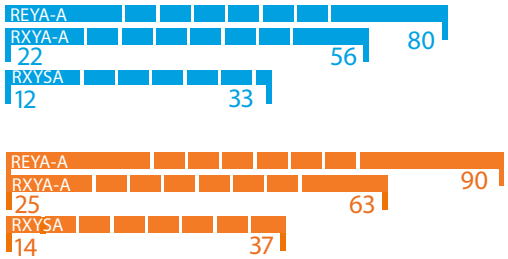
Air-to-air heat pump VRV solution

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

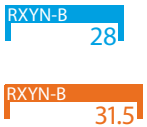
RXYA RXYSA

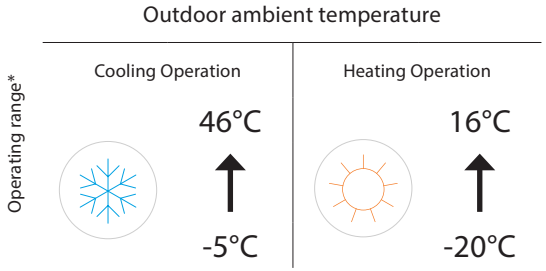
R-32
GWP 675



CO_2 VRV Heat Pump
RXYN-B

R-744
GWP 1





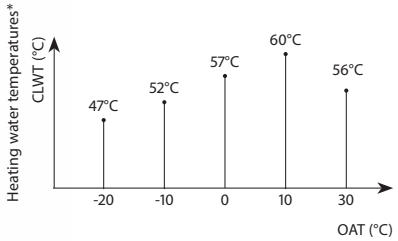
*Operating range may vary by model

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 4.5
- 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*
*exists in split

R-32
GWP 675

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

EWYE-CZN

R-454C
GWP 148,5

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

EWYK-*Z

R-290
GWP

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

Operating range*	Outdoor ambient temperature		Water temperature
	Cooling Operation	Heating Operation	Condenser leaving water temperature
	55°C ↑ -15°C	40°C ↑ -25°C	Up to 75°C

Key Benefits

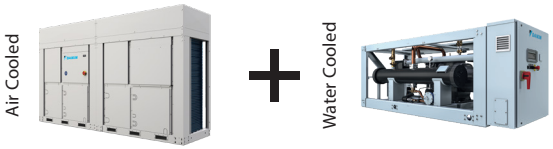
- Top class efficiency: SEER up to 5,76, SEPR up to 8,48 and SCOP(AW35) up to 4,197
- Extended capacity range: possibility to connect up to 4 units working as single system up to 4 x 90 kW
- Daikin inverter scroll compressors with vapor injection for hot water production up to 75°C
- Inverter pump kit 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 cooled and a water cooled unit operating together to achieve high leaving water temperatures and making it suitable for refurbishment projects.

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

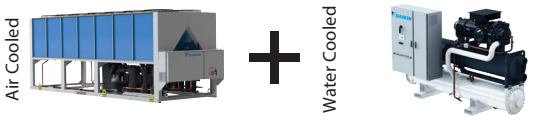
EWYT-CZ + EWWH-J



Heating Capacity (kW)

90 — 245

EWYT-B + EWWH-VZ



Heating Capacity (kW)

330 — 1540

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

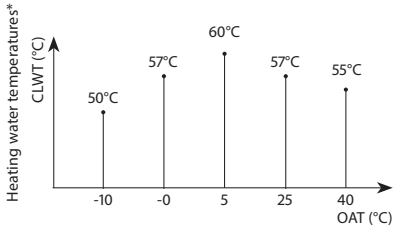
*Operating range may vary by model

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 air-to-water multipurpose unit is the best solution for buildings with all-year-round simultaneous cooling and heating requirement.



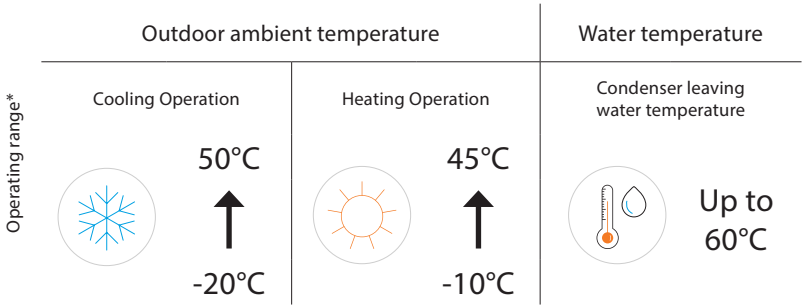
CLWT: condenser leaving water temperature;
OAT: outdoor ambient temperature;
For heating operation down to -15°C OAT,
please contact your Daikin representative.

EWYD-4Z

R-513a
GWP 630

Cooling Capacity (kW)
800

Heating Capacity (kW)
400 800



*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 contemporary request for hot and cold energyl

Collective housing solution

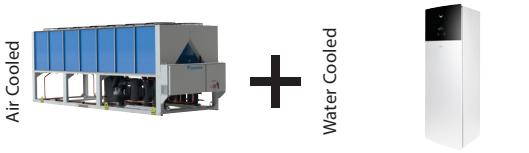
Daikin integrated solutions for collective housing provide heating, hot water and cooling if required, to apartment buildings. This communal system connects individual in-apartment heat pumps to a shared central water loop. The central water loop can be warmed or cooled via Daikin air source heat pumps 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 + ALTHERMA 3 WS



Cooling Capacity (kW)
22 — 150

Heating Capacity (kW)
22 — 150

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

Key Benefits

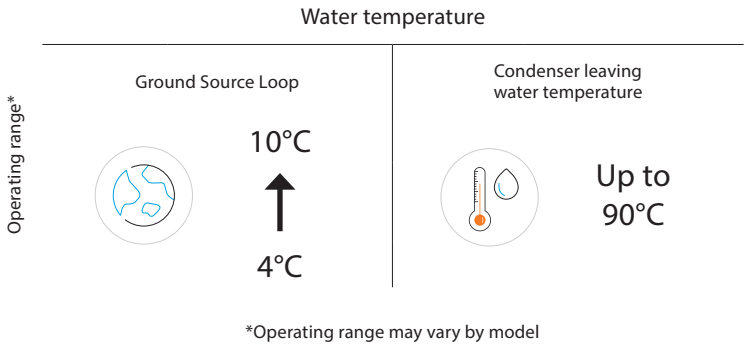
- Low carbon heat pump solution delivers significant CO_2 reductions over traditional systems
- Maximum comfort thanks to low noise option for the communal air heat pump and in-apartment heat pump sound power down to 39dBA
- Space saved on the balcony
- Heating, hot water and cooling via a 2 pipes network offers capital savings over a traditional

4 pipes solution

- The in-apartment heat pump has an integrated back-up heater
- Any type of Daikin emitters 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



*Operating range may vary by model

EWWH-VZ

R-1234ze
GWP 1.37

Heating Capacity (kW)

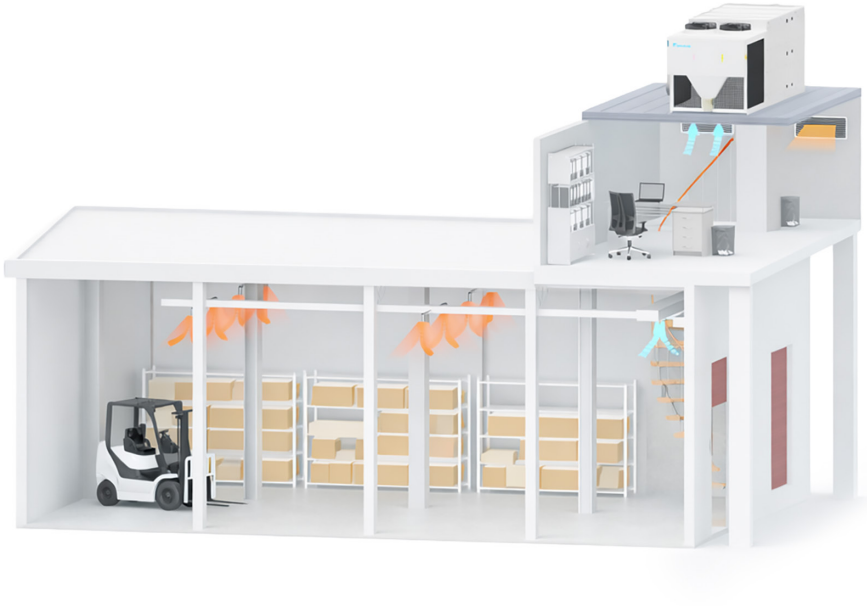
330 — 1540

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.

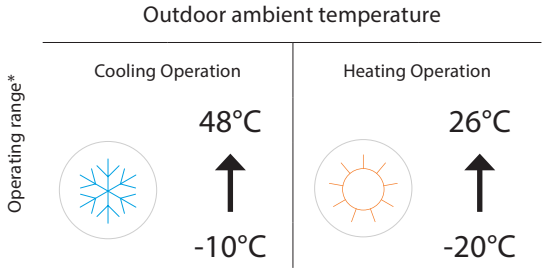


UATYA-B

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 4 configurations to meet cooling and heating demand, from 100% recirculation applications to fresh air with heat recovery applications

NOTES

NOTES

Daikin, your partner in decarbonising your building

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Contact us here:

We're there for you!

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

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