DAIKIN

Heat Pump
Commercial Solutions

The right technologies for decarbonisation of heating

Table of Content

European Outlook on

Decarbonisation

In 2020 the EU Commission published the strategy **"A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives"** to boost renovation in the EU. It aims to double annual energy renovation rates in the next 10 years in order to reduce emissions by decarbonising heating and cooling as one of the key focus actions.

REPowerEU

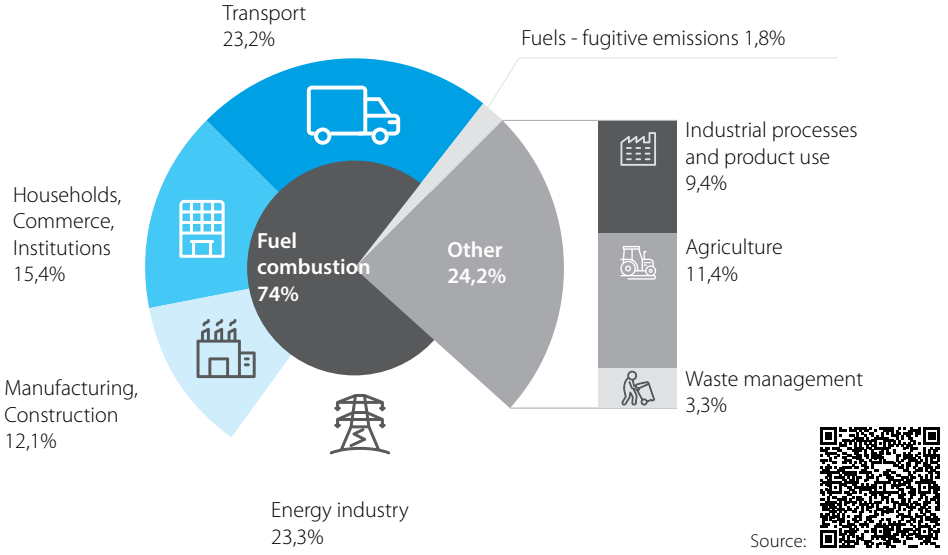
A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition:

On 18.05.22, the EU Commission launched their plan to reduce dependency to Russian fossil fuels. One of the key actions planned is to accelerate the shift to renewable energy sources. This also includes the ambitious target of doubling the rate of deployment of heat pumps.

Greenhouse Gas Emissions

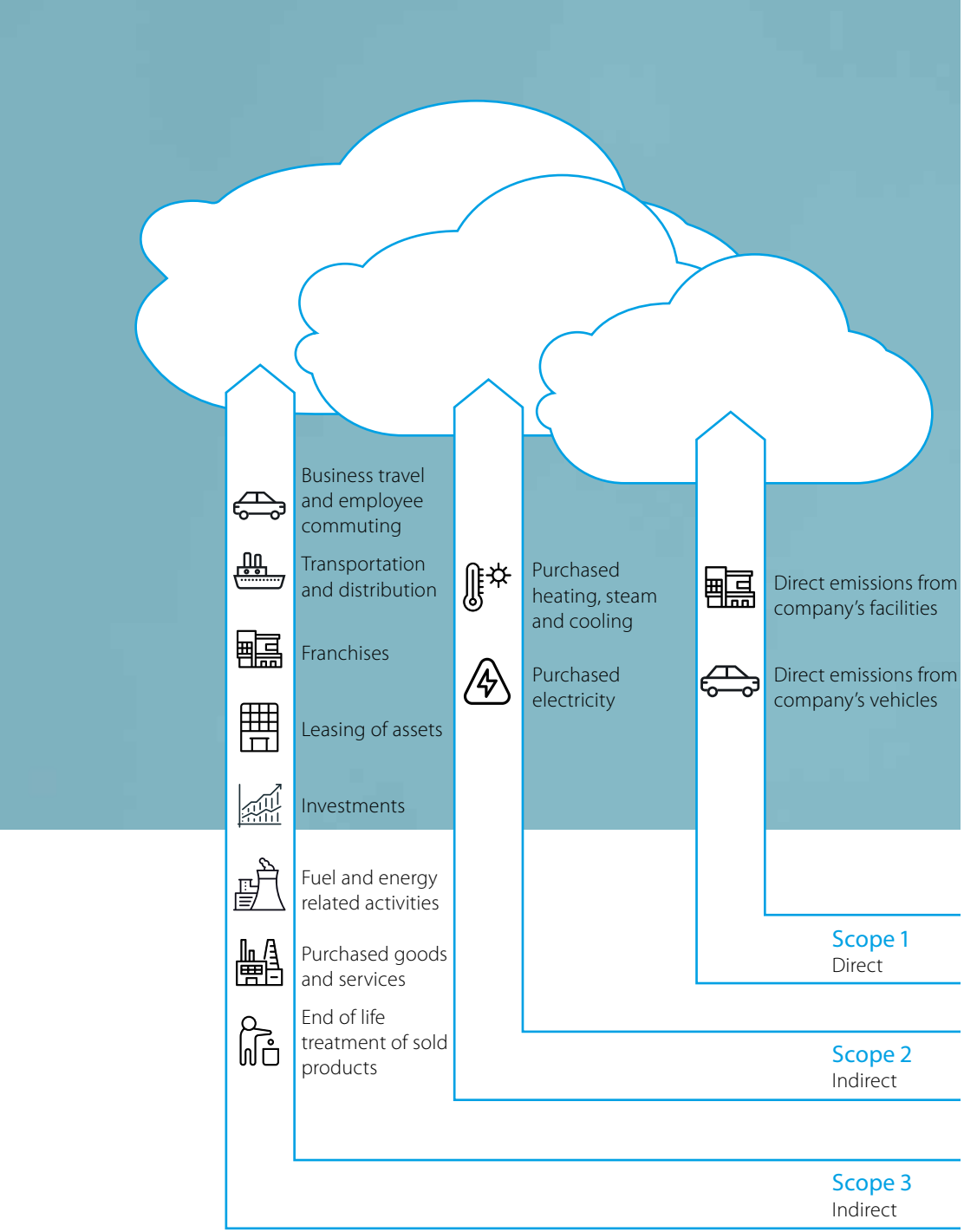
Based on 2020 data, the manufacturing industries, commercial applications, institutions & households are responsible for one of the highest greenhouse gas emissions in the EU (27,5%).

Inefficient building stock is still responsible for 40% of the EU's total energy consumption and for 36% of its greenhouse gas emissions.*



Source:

* https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en



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

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

Scope 2

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.

Scope 3

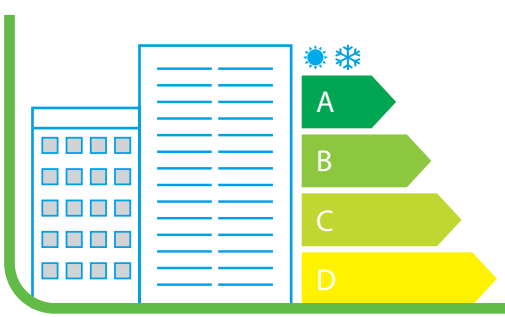
Scope 3 includes all indirect emissions that occur in the value chain of a reporting company.

European Union (EU) Climate Target Plan 2030

Reduce net greenhouse gas emissions by 55% by 2030*

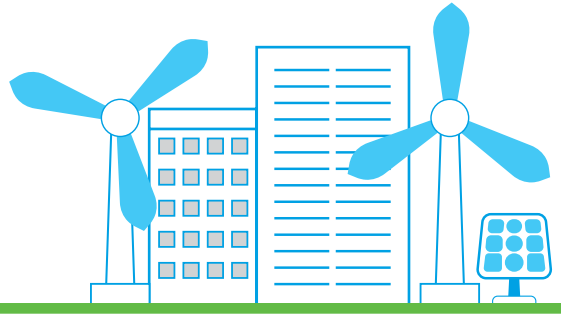
*Compared to the 1990 levels

Possible 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 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: 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.

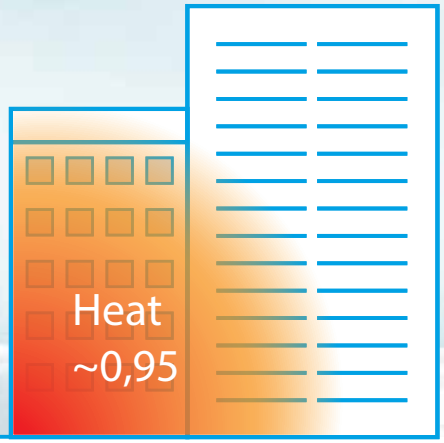
Off-setting

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

Reducing CO_2 footprint with

Heat Pump technology

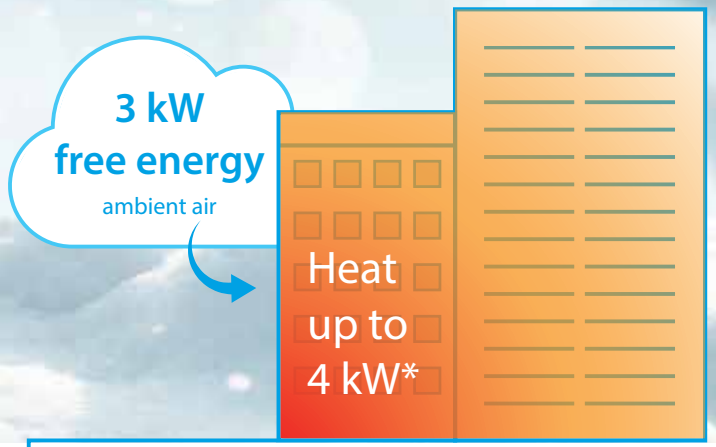
The electrification of heat through heat pumps, where the electricity to operate the heat pumps comes from renewable sources, is seen as a key technology in cutting carbon emissions.



Traditional boiler systems

Fuel 1

The efficiency of a boiler is usually expressed in terms of percentage. For instance, if a boiler is said to be 95% efficient, then 95% of the gas energy comes out as useful heat to water, and 5% is lost as heat out of the flue.



Heat Pumps

1kW

Heat pumps can transfer the free heat energy even from cold ambience, ground or other possible sources to the building. While doing this, heat pumps utilise electricity (i.e. power input), which is usually much lower than the heat energy that is transferred to the building.

Source:

Heat Pump Classification

Air-to-air heat pumps

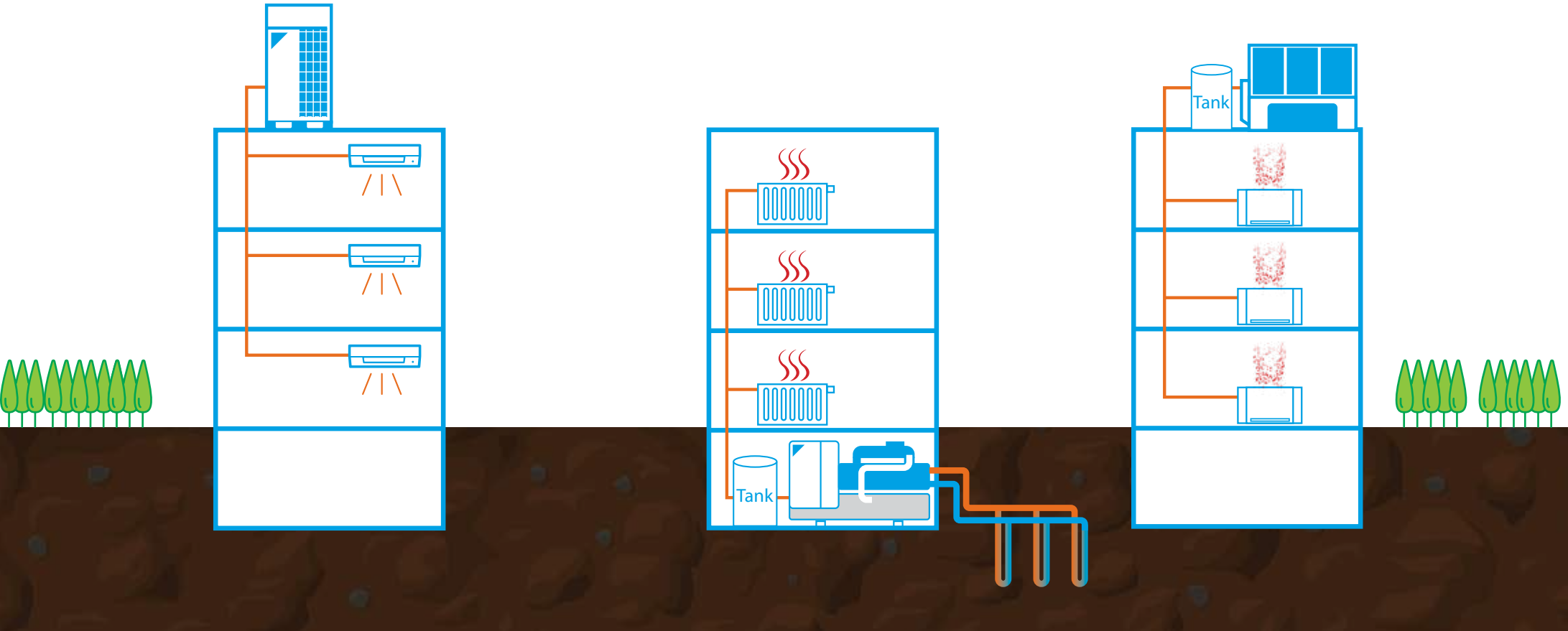
- Can provide heating, cooling and sanitary hot water.
- Heat is transferred between the building and outside air using refrigerant gas.
- Heating and cooling are done via indoor terminal units that are blowing air, rather than traditional radiators.

Water-to-water heat pumps

- Can provide heating, cooling and sanitary hot water.
- 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 replace even boiler solutions to serve radiators or process heating applications.

Air-to-water heat pumps

- Can provide heating, cooling and sanitary hot water.
- Heat is transferred between the building and outside air using a refrigerant gas & water.
- 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

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.

Scan code for 3D experience

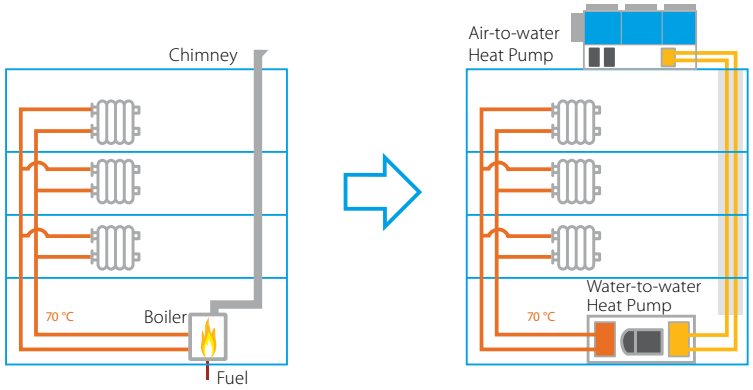
Cascade

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.

Scan code for 3D experience

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 considered: 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

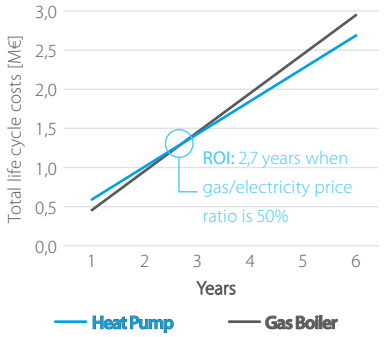
Heating demand with all year-round operation (8.760 hrs)

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 Investment



Case 2 – Comfort Heating

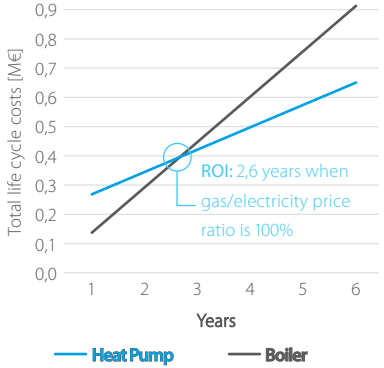
Heating demand with winter only operation (2.251 hrs)

Comparison on CAPEX & OPEX

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 Investment



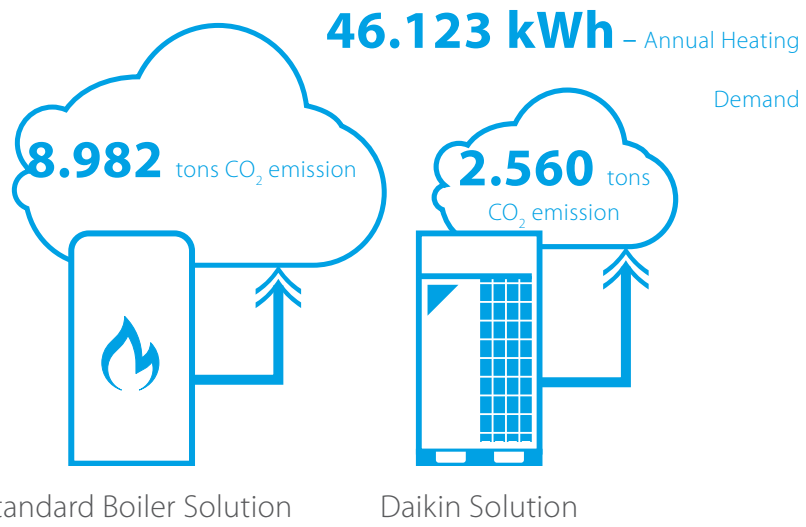
*The results shown are valid only for the exact sample project conditions and will vary for each project.

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 factors of electricity grids in comparison to the gas boilers'.

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.



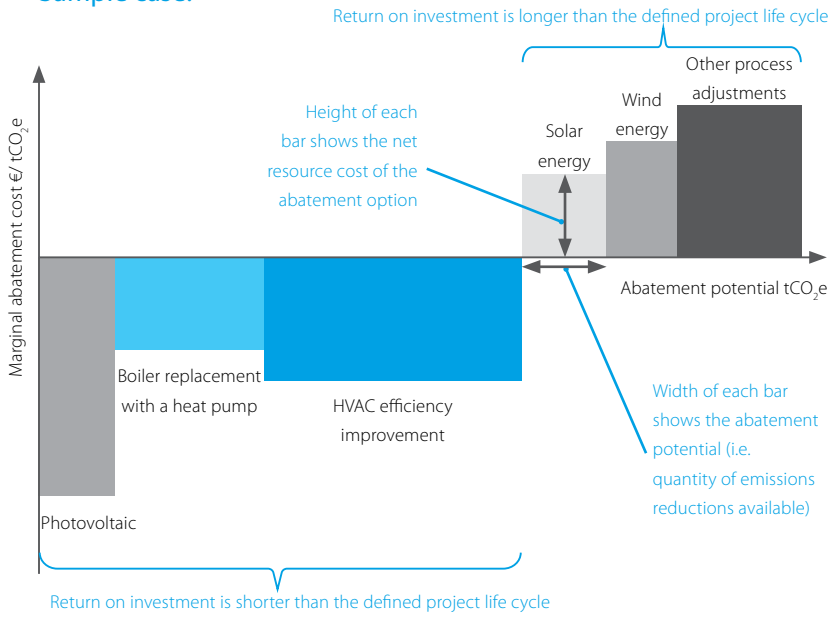
*The results shown are valid only for the exact sample project conditions and will vary for each project.

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 CO_2 emission reducing investments.

Sample case:



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) Source:

(2) Source:

LOOP
BY DAIKIN
RECOVER - RECLAIM - REUSE

For more information about the Loop by Daikin program please visit:
www.daikin-ce.com/loop

The new refrigerant service

L∞p by Daikin
Recover – Reclaim – Reuse

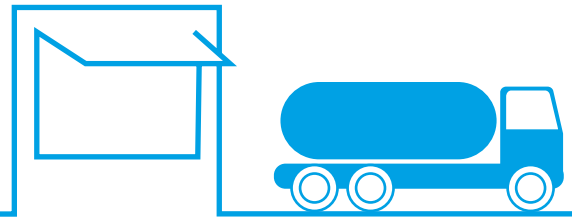
Help prevent the production of more than 400.000 kg of virgin gas and save 3.590 tonnes of CO_2 each year.

How does it work?

Recover, Reclaim, Reuse

are the magic words and the core principle of our new all-in-one service.

The Loop by Daikin program is revolutionary in our industry and an essential part of our commitment to create a sustainable future.



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 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.

Daikin Solutions

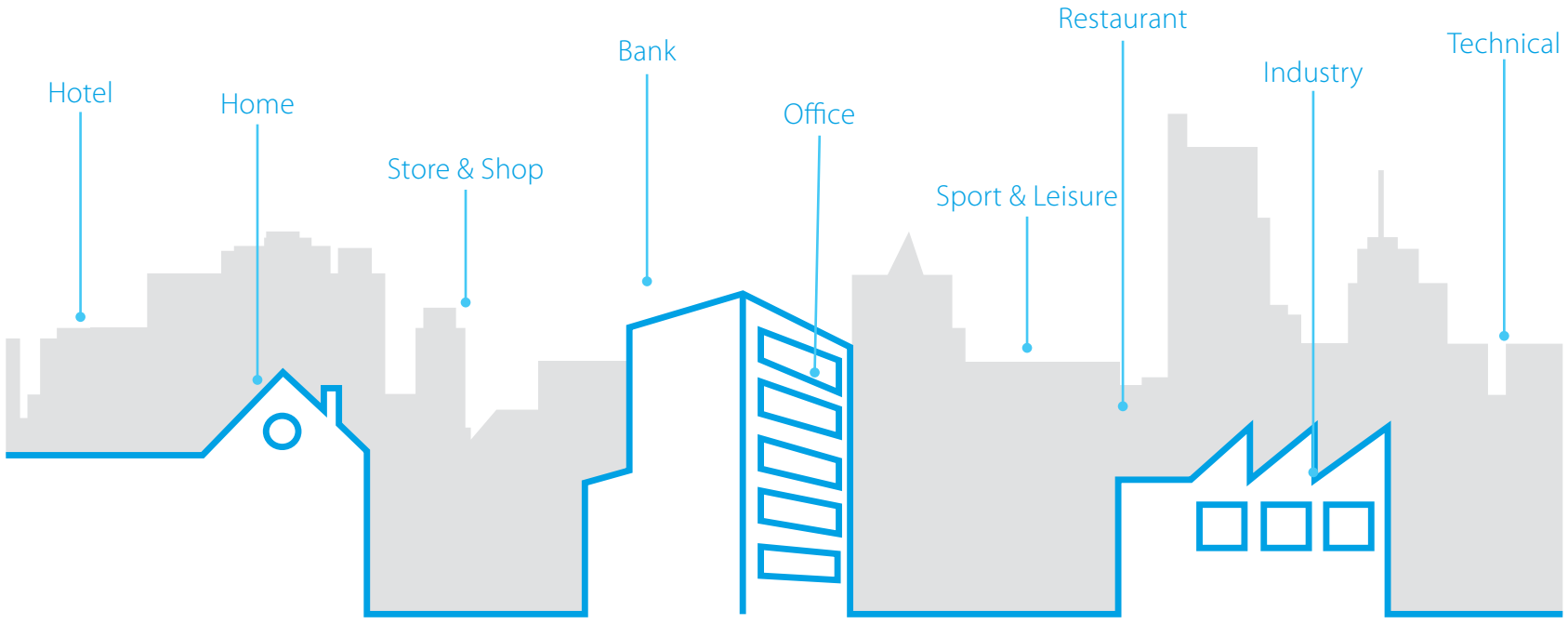
Commercial solutions from small to large applications

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

+46 °C

Outdoor Ambient Temperature

-25 °C



40 °C ← Condenser leaving water temperature range → **75 °C**

Heat Pumps Overview

14 to 2.000 kW

12 to 190 kW

4 to 800 kW

Air-to-Air

VRV IV+ and VRV V Heat Pump & Heat Recovery

INVERTER · R-32 · R-410A

12 - 150 kW
OAT down to -25°C

Rooftop

INVERTER · R-32

25 - 190 kW
OAT down to -20°C

Water-to-Water

EWWQ-KC

R-410A

15 - 70 kW
CLWT up to 55°C

EWHQ-G/ EWWQ-G/ EWWQ-L

R-410A

91 - 390 kW
CLWT up to 55°C

EWWD(H)(S)-J

R-134a · R-513A · R-1234ze

107 - 338 kW
CLWT up to 75°C

EWWD(H)(S)-VZ

INVERTER · R-134a · R-513A · R-1234ze

329 - 2.074 kW
CLWT up to 75°C

Air-to-Water

EWYA-DV3(W1)P

INVERTER · R-32

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

EWYT-B

R-32

82 - 650 kW
OAT down to -15°C
CLWT up to 60°C

Altherma
A2W, Hybrid, Geothermal, Water source

R-32 · R-134a · R-410A

4kW - 18kW
OAT down to -28°C
LWT up to 80°C

EWYT-CZ*

INVERTER · R-32

16 - 90 kW
OAT down to -20°C
CLWT up to 60°C

EWYD-BZ

INVERTER · R-134a

250 - 580 kW
OAT down to -10°C
CLWT up to 55°C

EWYD-4Z

INVERTER · R-134a

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

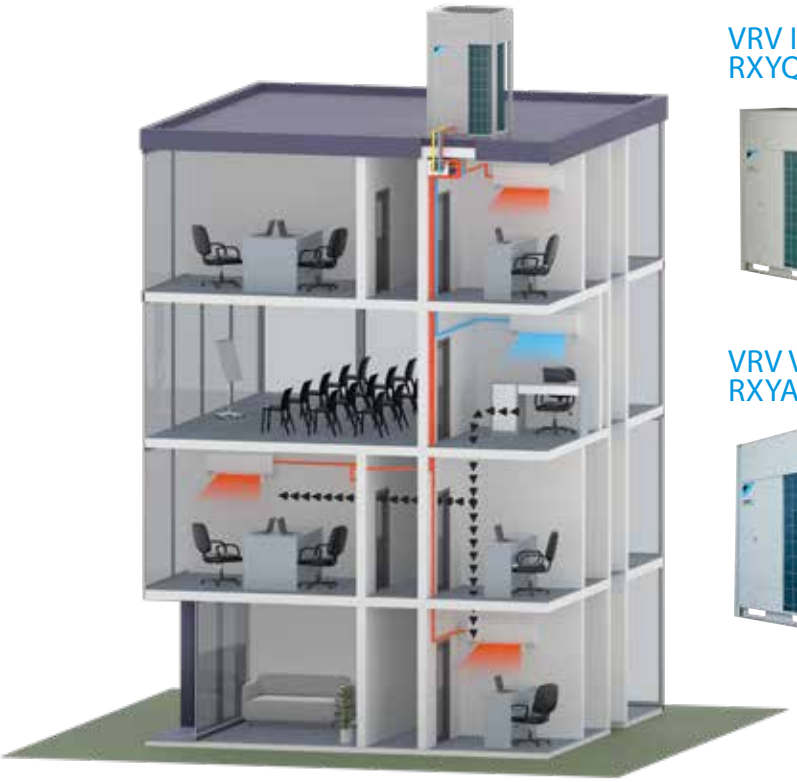
screw · scroll · swing

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

Air-to-air heat pump VRV solution

Scan code for 3D experience

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



VRV IV+ Heat Pump & Heat Recovery RXYQ-U & REYQ-U

R-410A
GWP 2.087,5

Cooling Capacity (kW)
22 – 150

Heating Capacity (kW)
22 – 150

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

R-32
GWP 675

Cooling Capacity (kW)
REYA-A: 22 – 80
RXYA-A: 22 – 56

Heating Capacity (kW)
REYA-A: 25 – 90
RXYA-A: 25 – 63

	Outdoor ambient temperature		Water temperature
	Cooling Operation	Heating Operation	Condenser leaving water temperature
Operating range*	46 °C ↑ -50 °C	16 °C ↑ -25 °C	80 °C ↑ 25 °C

*Operating range may vary by model

Key Benefits

- Stable heating capacities & minimal defrost cycles even down to -15°C during winter
- Fully integrated solution with heat recovery for maximum efficiency with SCOP of up to 4,7
- "Free" heating and hot water production provided by transferring heat from areas requiring cooling to areas requiring heating or hot water production
- The perfect personal comfort for guests/ tenants via simultaneous cooling and heating
- Unique **continuous heating technology** makes VRV the best alternative to traditional heating systems – ensuring continuous comfort

Reducing heating costs up to 30%!

Scan code for 3D experience

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.

EWYT-CZ

R-32

GWP 675

Cooling Capacity (kW)

16 — 90

Heating Capacity (kW)

16 — 90

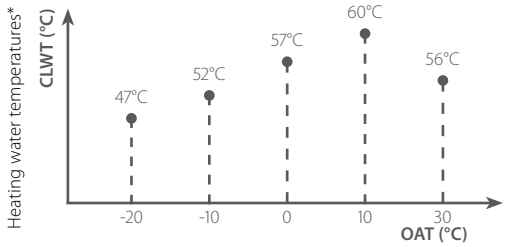
EWYT-CZI + EWYT-CZO

Cooling Capacity (kW)

21 — 64

Heating Capacity (kW)

21 — 64



Operating range*	Outdoor ambient temperature		Water temperature
	Cooling Operation	Heating Operation	Condenser leaving water temperature
	45 °C	35 °C	Up to 60 °C
	-20 °C	-20 °C	

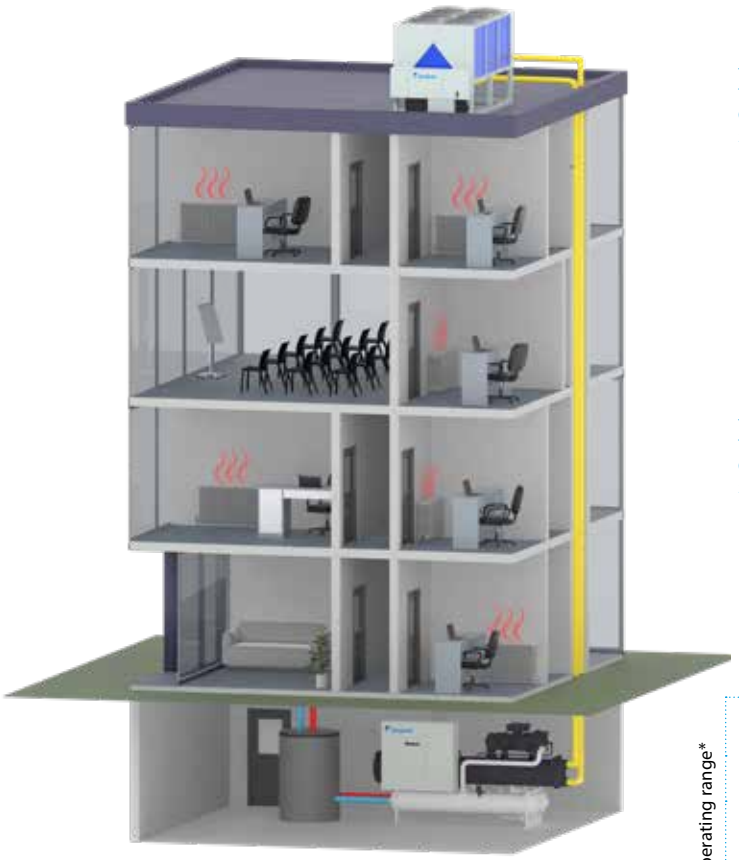
CLWT: condenser leaving water temperature; **OAT:** outdoor ambient temperature;
*Operating range may vary by model

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 design inverter scroll compressors for hot water production up to 60°C
- Inverter pump kit option with both low and high lift availability
- Heating operation down to -20°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

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 7

EWYT-CZ + **EWWH-J**

Heating Capacity (kW): 90 – 200

EWYT-B + **EWWH-VZ**

Heating Capacity (kW): 330 – 1540

Operating range*

Outdoor ambient temperature	Water temperature
Heating Operation	Condenser leaving water temperature
35°C ↑ -20 °C	Up to 75 °C

*Operating range may vary by model

Scan code for 3D experience

Key Benefits

- Complete heat pump system (no gas boiler or district heating required)
- Able to produce up to 75 °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.

Scan code for 3D experience

EWYD-4Z

R-134a

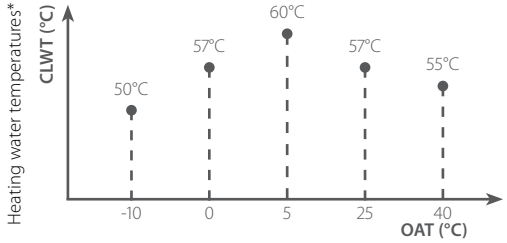
GWP 1430

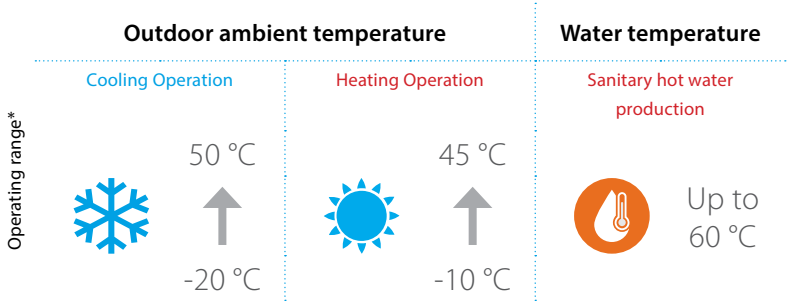
Cooling Capacity (kW)

400 — 800

Heating Capacity (kW)

400 — 800





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

*Operating range may vary by model

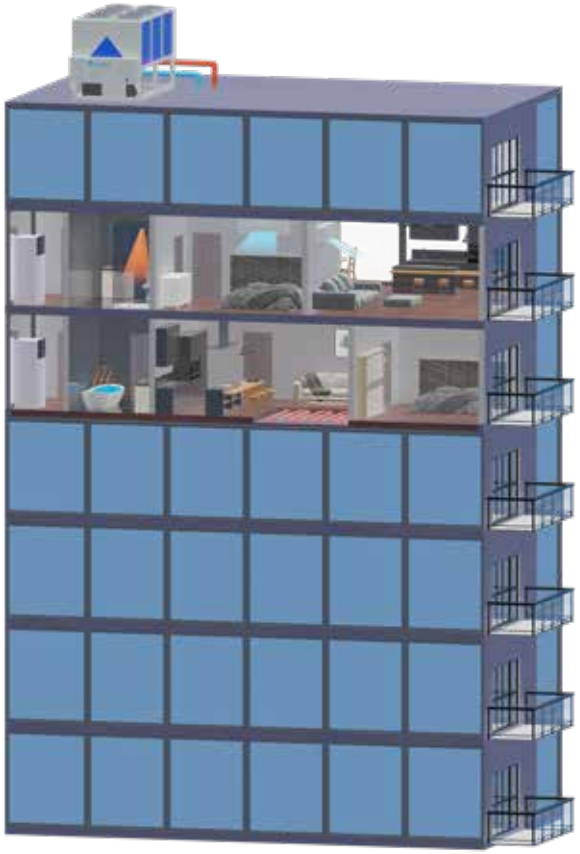
Key Benefits

- 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 energy

Collective housing solution

Scan code for 3D experience

Daikin integrated solutions for collective housing provide heating, hot water and cooling if required, to apartment buildings. The system is comprised of a network of in-apartment water-to-water heat pumps connected to a common central water loop to form a communal system. The central water loop can be warmed or cooled via Daikin air source heat pumps working at low temperature and high efficiency.



R-32
GWP 675

EWYT-B + **ALTHERMA 3 WS**

Cooling Capacity (kW)
22 — 150

Heating Capacity (kW)
22 — 150

Operating range*

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

*Operating range may vary by model

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

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

Scan code for 3D experience

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.

EWWH-VZ

R-1234ze
GWP 7

Heating Capacity (kW)

330 — 1540

Water temperature

Operating range*

Ground source loop	Condenser leaving water temperature
10°C ↑ 4 °C	Up to 75 °C

*Operating range may vary by model

Key Benefits

- Optimised energy efficiency both at full and part load conditions
- Single screw compressor with refrigerant cooled integrated inverter
- 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

Scan code for 3D experience

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

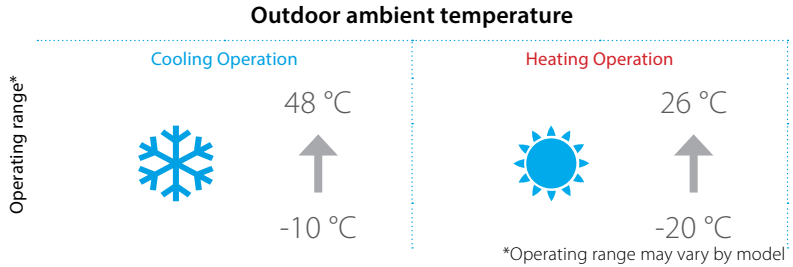
GWP 675

Cooling Capacity (kW)

25 – 190

Heating Capacity (kW)

25 – 177



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

R-32 Small Inverter Heat Pump

DAIKIN AIRCONDITIONING CENTRAL EUROPE HandelsgmbH
Lemböckgasse 59/1/1, 1230 Vienna, Austria · Tel.: + 43 (0) 1 253 21 11 · e-mail: office@daikin-ce.com · www.daikin-ce.com

Daikin products are distributed by:

ISO 14001:2015 No.03299/0
ISO 9001:2015 No.18728/0

Daikin Europe N.V participates in the Eurovent Certified Performance programme for Fan Coil Units and Variable Refrigerant Flow systems. Daikin Applied Europe S.P.A participates in the Eurovent Certified Performance programme for Liquid Chilling Packages, Hydronic Heat Pumps and Air Handling Units.
Check ongoing validity of certificate: www.eurovent-certification.com

DACE Commercial Heat Pump Solutions | Version December 2023
We reserve the right for printing errors and model changes