A Better Life, A Better World

Optimum solutions for premium comfort

heating & cooling solutions | www.aircon.panasonic.eu

September, 2019

Panasonic

AIR TO WATER HEAT PUMP

AQUAREA

CONCEPT BOOK

A Better Life, A Better World

Optimum solutions for premium comfort

CONTENTS

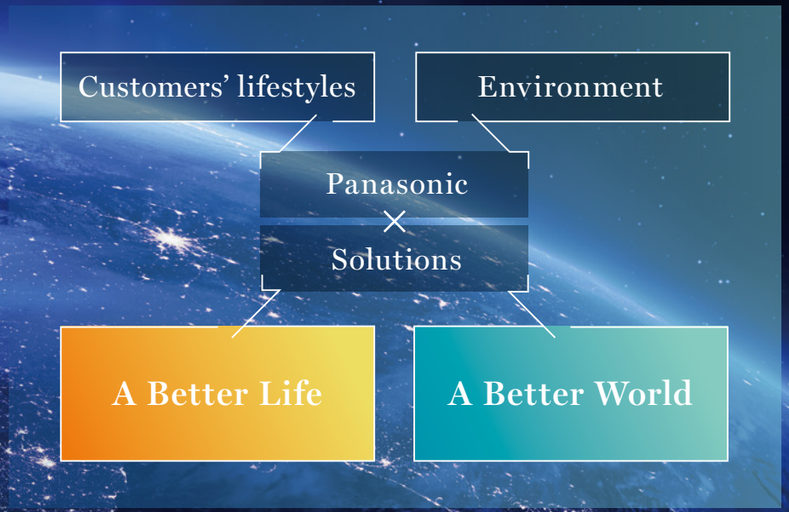
Realising “A Better Life, A Better World”

In the past, in order to enjoy a comfortable life, we humans have used quite a lot of energy, primarily in the form of fossil fuels. At our current rate of consuming these fuels, we will continue to make worse a range of environmental problems, the most significant of which is global climate change. The scientific consensus is that, in order to deal with this crisis, we must significantly reduce our output of CO_2 and other greenhouse gases.

The exact methods by which to accomplish this goal are the subject of an ongoing discussion worldwide. Moreover, for us as individuals, it can be difficult to see how we can make a positive contribution when the problem we face is unfolding on a planetary scale. Thus, at Panasonic, our goal is to help people make a difference they can see for themselves, continue to live a comfortable lifestyle, and feel more positive about the future.
In this way, we strive to realise “A Better Life, A Better World.”

Optimum solutions for premium comfort

Leveraging heat pump technology and our unique expertise, Panasonic has been working for many years to help realise a sustainable society and enrich people's lives. The wide range of Aquarea products makes possible optimum solutions that are tailored to individual lifestyles while offering outstanding environmental performance.



If we change now, we can help save the future

What kind of world will our children—and their children—inherit? Along with a growing global population coupled with rapid economic development, CO_2 emissions continue to increase year after year. At the current rate, it is estimated that the average global surface temperature will rise by 4℃ over the next 100 years[1]. To help prevent this, we have been engaged in a variety of initiatives over the past several decades. One of our solutions is an indoor heating and cooling system that leverages our heat pump technology. Protecting the world of today means protecting the children of tomorrow. That's why we are committed to offering solutions that provide comfort and help us fulfil our responsibility to the environment.

[1] https://www.ipcc.ch/report/ar5/wg2/summary-for-policymakers/

In European households,
as much as 79% of energy consumption comes from heating and producing DHW(domestic hot water).
In order to fight climate change, it is essential to take action to decarbonise.
One way is to replace fossil fuels with renewable energy.[2]

Eight risks of climate change[3]


Negative impacts on marine ecosystems and biodiversity


Negative impact on human health and livelihoods due to storm surges, coastal flooding, and rising sea levels


Negative impact on human health and livelihoods due to inland flooding


Food scarcity and decreased food security due to rising temperatures and drought


Negative impact on inland and freshwater ecosystems and biodiversity


Infrastructure shutdowns due to extreme weather


Scarcity of water resources and reduced agricultural productivity


Deaths and illness due to heat waves

[2] https://ec.europa.eu/eurostat
[3] https://www.ipcc.ch/report/ar5/wg2/summary-for-policymakers/

Panasonic Environmental Vision

2050

To achieve "a better life" and "a sustainable global environment," Panasonic will work towards creation and more efficient utilisation of energy which exceeds the amount of energy used, aiming for a society with clean energy and a more comfortable lifestyle.

Energy used < Energy created

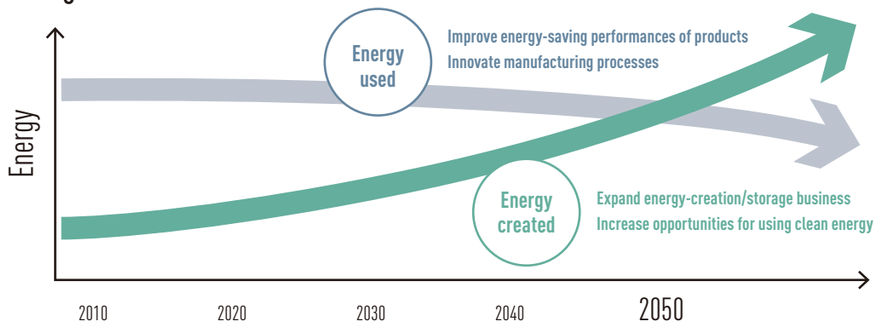
One initiative in the Panasonic Environmental Vision 2050 is offering products with greater energy efficiency. In 2018, we celebrated the 60th anniversary of our heating and cooling solutions business. Our expertise gained over the years has helped us launch a range of products that contribute to a more carbon-free society.

Current status of energy used and energy created

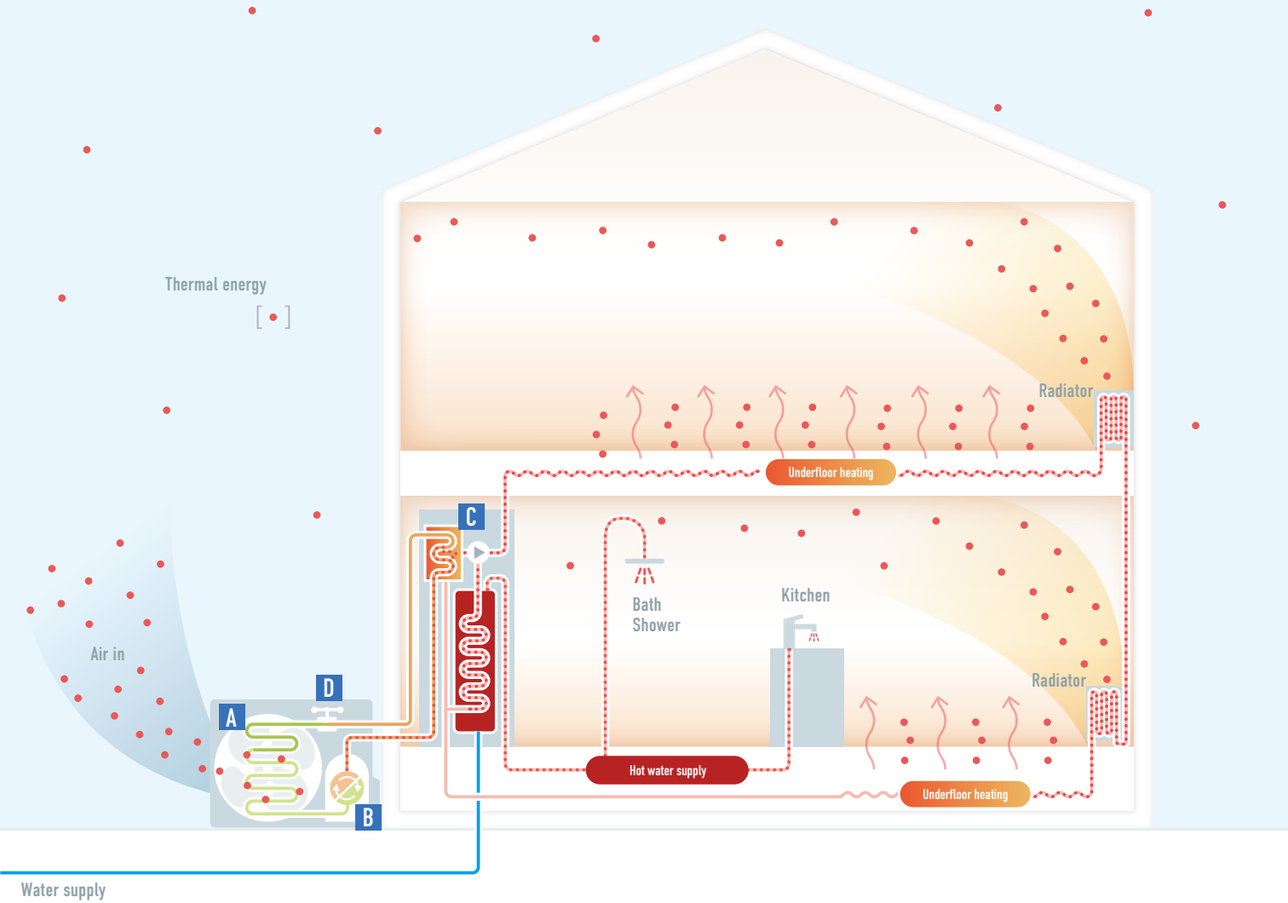
Energy used by Panasonic business activities and products — 10 — Energy used

Clean energy created and/or made available by Panasonic products, etc. — 1 — Energy created

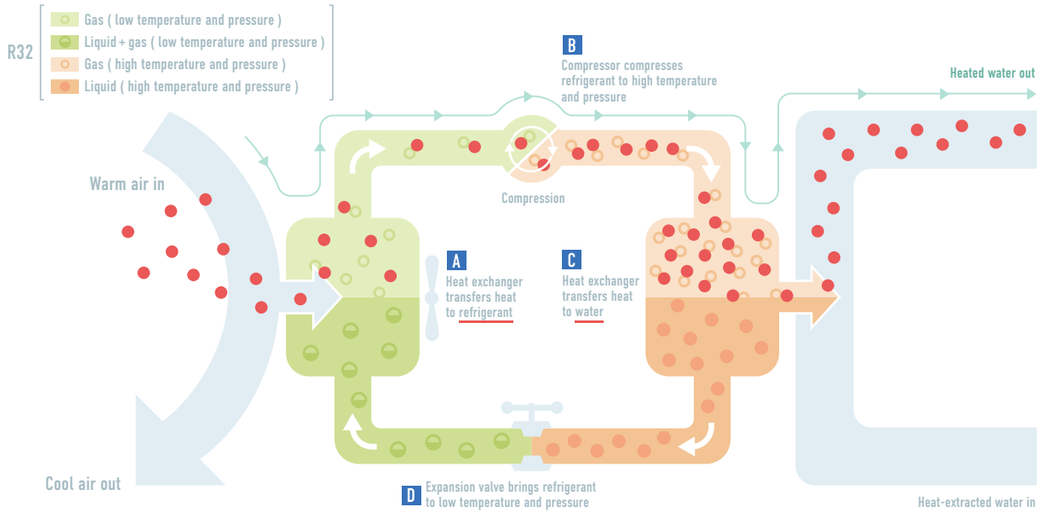
Working to realise Environmental Vision 2050



A heat pump turns heat energy outside into warmth inside



Air to Water Heat Pump technology

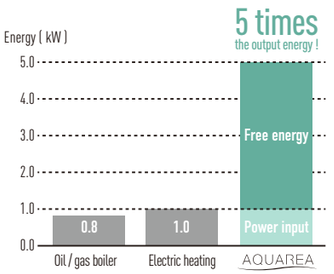


Advantages of Air to Water Heat Pump

As much as 79% of the energy consumption of European homes comes from heating and producing DHW.* That's why, compared to conventional boilers and electric heaters, highly efficient Panasonic Air to Water Heat Pump technology can make a significant difference. Moreover, by converting heat energy in the air into household warmth, this technology helps reduce CO_2 emissions and environmental impact.
Compared to an electric heater, the Air to Water Heat Pump offers five times the output in kilowatts per every input in kilowatts. Leveraging the power of this technology can revolutionise the efficiency of heating, cooling and supplying hot water while cutting CO_2. It's the right solution for the new era of environmental consciousness.

*https://ec.europa.eu/eurostat

Comparison:1 kW input versus output in kW



Panasonic environmental solutions

AIR TO WATER HEAT PUMP

AQUAREA

Contributing to a decarbonised society

Top-level efficiency across the board

The Aquarea line meets the best energy efficiency criteria of European energy rating system.*

*Energy Labelling Regulation (EU) No. 811/2013

Heating A+++

DHW* A+

*Domestic hot water

ErP 35°C
Classes from A+++ to D

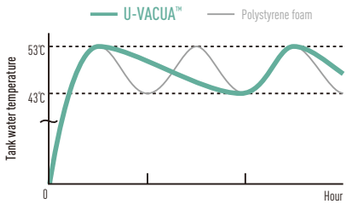
DHW
Classes from A+ to F

EU energy efficiency classes applicable starting September 26, 2019

U-VACUA™

Vacuum insulation panel (VIP) technology developed by Panasonic

Because they leverage VIP technology, U-Vacua™ panels offer 19 times the insulation performance of polystyrene foam. Since the system retains heat longer, it needs to heat up fewer times each day, resulting in energy savings.



Note: Image for illustrative purposes

Reducing environmental burden

With comparatively low global warming potential (GWP), refrigerant gas R32 helps reduce the environmental burden of heating and cooling solutions.

Comparison of GWP

Type	HFC	HFC
No.	R32	R410A
GWP	675	2,090

Panasonic lifestyle solutions

AIR TO WATER HEAT PUMP

AQUAREA

Enhanced safety and peace of mind

All-electric for enhanced safety and minimal maintenance

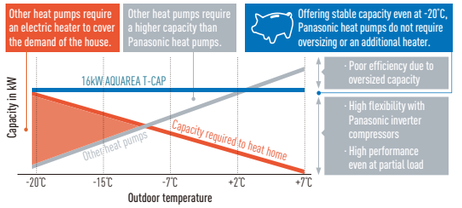
Panasonic heat pump technology requires no gas. That means no flame and zero potential for poisoning due to gas leaks.

Remote monitoring 24/7

Aquarea Service Cloud offers remote monitoring via Panasonic IoT technology. It provides you with quick and reliable service for enhanced peace of mind.

Powerful capacity even at low temperatures

With Aquarea T-CAP technology, Panasonic heat pumps can work in outdoor temperatures as low as -28°C and maintain capacity without backup heating at -20°C.



Convenience and flexibility

Flexibility of placement for flexibility of design

Since no combustion is required, Panasonic heat pump technology takes up less space, giving you more flexibility in designing your interior.

Convenient remote control via IoT

The electric heating system offers both enhanced safety and remote control capability. Even outside the home, the Aquarea Smart Cloud allows users to set a different temperature based on when they plan to return. Electricity consumption can also be monitored remotely.

View and control Aquarea from the living room

Separable from the main unit, Aquarea's advanced remote control allows the system to be accessed in the living room and elsewhere in the home. The system senses the outdoor temperature via a sensor located outside the home, automatically switching to heating or cooling mode to maintain a comfortable indoor temperature. For convenient monitoring of energy usage, the remote control displays electricity consumption separately for heating, cooling and hot water.

What “A Better Life” means to Panasonic

In the past, to make our homes warm and comfortable, we humans have had to burn fossil fuels. While maintaining this lifestyle, we’ve closed our eyes to a variety of environmental problems.

To Panasonic, “A Better Life” means achieving the warmth, peace of mind and flexibility we desire without tolerating the problems caused by fossil fuel consumption. We offer Air to Water Heat Pump Aquarea as one way to fulfill this commitment.

RELIABILITY

Enhanced safety

and

peace of mind

Remote monitoring 24/7

The Aquarea unit is connected via the internet to the Aquarea Service Cloud* and is remotely monitored with 71 available parameters. If a problem should arise, it will be quickly and effectively attended to.

Aquarea can be accessed 24/7 via IoT.

*Optional accessory CZ-TAW1 and service contract are required.

All-electric for enhanced safety and minimal maintenance

Since boilers use a flame, it's natural to have concerns about gas leaks, fires and other safety issues. Since Aquarea is all-electric, users do not have to worry about such issues.
Furthermore, the system produces no odours and operates silently.

As Aquarea is all-electric, it ensures safety in operation and requires minimal maintenance.

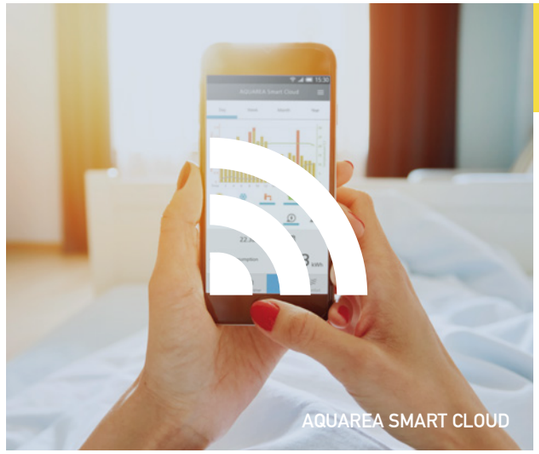
Powerful capacity even at low temperatures

Aquarea heat pumps can work in outdoor temperatures as low as -28°C and maintain capacity without backup heating at -20°C.

Aquarea offers ample power and capacity while being all-electric.

COMFORT

Convenience and Flexibility

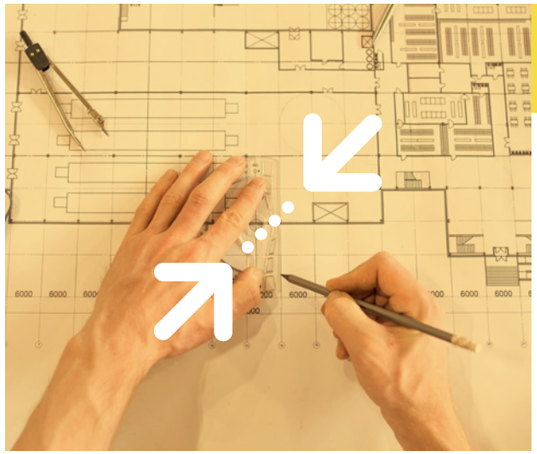


Convenient remote control via IoT

The Aquarea Smart Cloud allows access to the unit via smartphone. Users can view displays for energy consumption and temperature and conveniently control the unit while away—for a lifestyle that's always comfortable.

Aquarea can be accessed via IoT*
during shopping, on a vacation—anywhere, anytime.

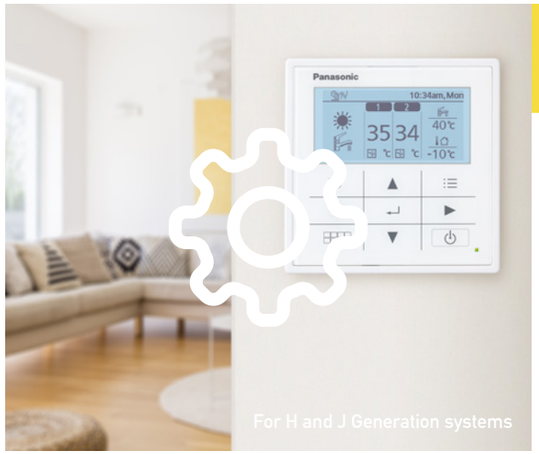
*Optional accessory CZ-TAW1 is required.



Flexibility of placement for flexibility of design

Since Aquarea is all-electric, the unit is compact and requires minimal space. Moreover, since it uses no gas, there is no concern about leaks or fumes, and the unit can freely be placed in basements and similar locations. The end result is much greater flexibility of interior design.

All-electric Aquarea enables greater flexibility in designing your home to fit your lifestyle.



View and control Aquarea from the living room

Separable from the main unit, the remote control offers 16 language options and includes a temperature sensor to automatically keep the temperature perfect at all times.

The separable remote control allows users to adjust room and hot water temperatures and check energy efficiency and energy consumption statistics in the comfort of their living room.

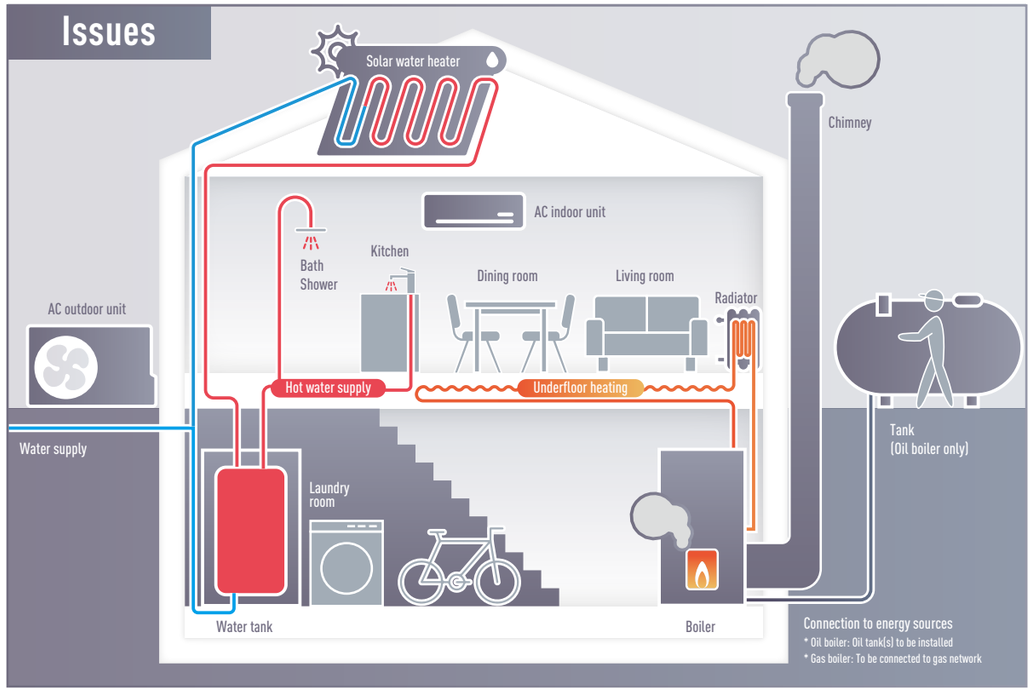
Solutions 1: Newly built

When new heating systems are installed, renewable energy is required to heat the house and produce hot water.
In the case of gas or oil boilers, some additional devices are needed to meet the renewable energy requirement.
Specific regulations differ from country to country.

NOW → **THE FUTURE**

Aquarea heats and cools the home and produces hot water in one system, making possible more flexible use of space.

Issues

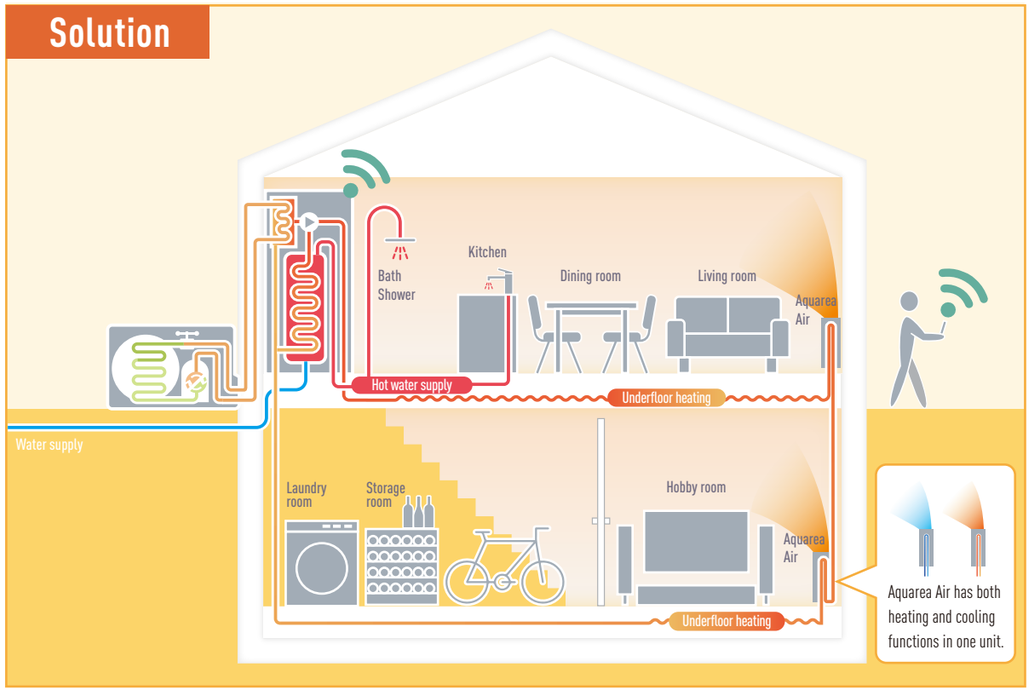


Heating / DHW: Boiler + Chimney + Radiator + Water tank + Solar water heater

Cooling: AC indoor unit + AC outdoor unit

SPACE LIMITED

Solution



Heating / DHW: Boiler + Chimney + Radiator + Water tank + Solar water heater

Cooling: AC indoor unit + AC outdoor unit

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Heating / DHW / Cooling: Aquarea + Outdoor unit + Aquarea Air*

*Radiators can be used for heating

SPACE ABUNDANT

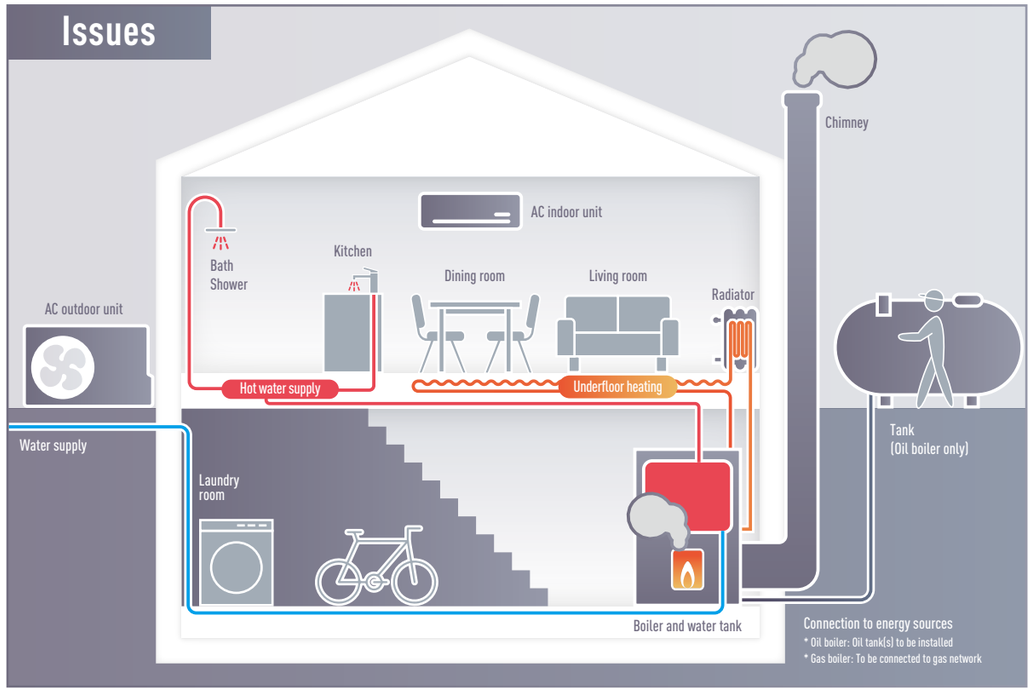
Solutions 2: Retrofit

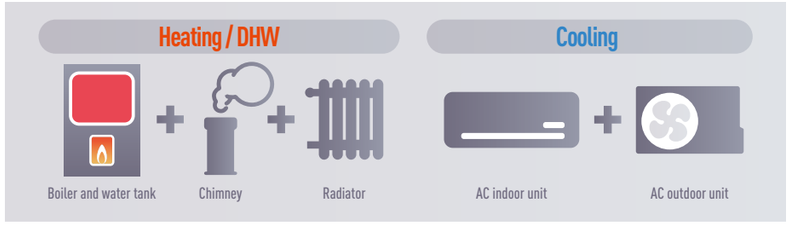
Using a conventional boiler involves a variety of problems and risks. In addition, a separate air conditioning solution is required for cooling.

NOW → **THE FUTURE**

Aquarea heats and cools the home and produces hot water in one system. This system solves a variety of problems while allowing the user to enjoy greater comfort, enhanced peace of mind and greater flexibility of design.

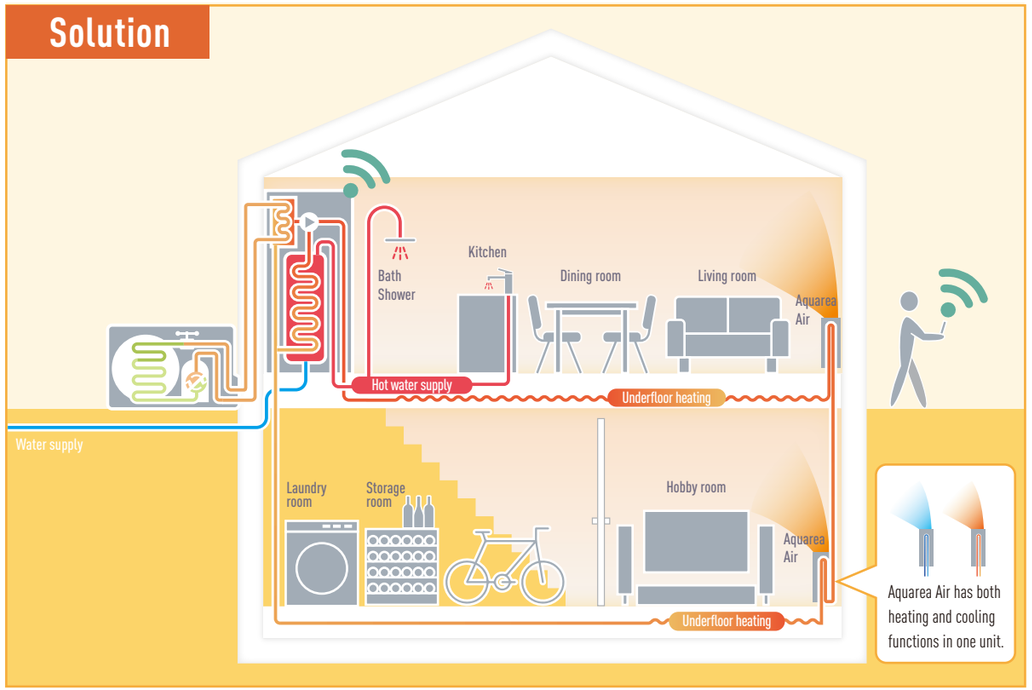
Issues

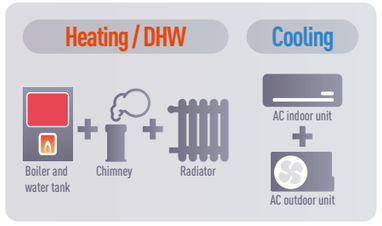




SPACE LIMITED

Solution





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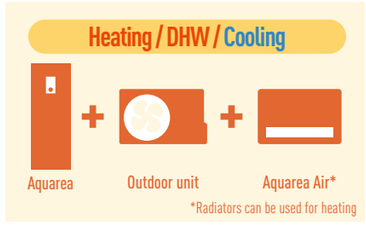
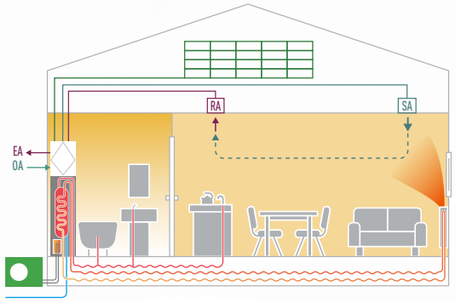


SPACE ABUNDANT

Optimum solutions for premium comfort

The Air to Water Heat Pump is powerful technology designed with the future in mind. It maintains a comfortable indoor temperature while significantly reducing environmental burden. Offering enhanced connectivity, Aquarea continues to improve the convenience and comfort of users. For example, with ventilation equipment connected, it will make the indoor air cleaner and fresher. With solar panels, it can operate using renewable energy. The Aquarea system continues to evolve to provide a better lifestyle at home.



Panasonic

Key Panasonic technologies

U-VACUA™

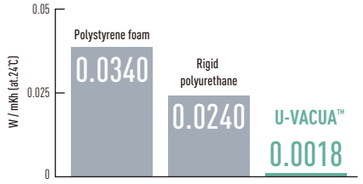
Developed by Panasonic, U-Vacua™ high-performance vacuum insulation panels (VIPs) offer world-leading thermal conductivity of only 0.0018 W/m·K at 24˚C.* In insulation performance, U-Vacua™ offers 13 times the insulation performance of rigid polyurethane foam and 19 times the performance of expanded polystyrene foam, resulting in significant energy savings.

*Panasonic measurement

Vacuum insulation panel (VIP) technology

U-Vacua™ VIPs consist of a unique fiberglass core encased in a laminate film made up of several layers that include nylon, aluminum, and a protective layer. Interior pressure is reduced to a vacuum of 1-20 Pa, thereby minimising thermal conductivity.

Comparison of thermal conductivity



AQUAREA T-CAP

Ideal for both retrofitting and new construction, this model delivers the output required to meet high demand.

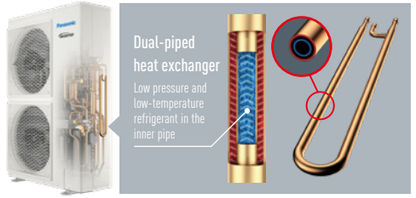
Ensure ample heating capacity—even at low temperatures

The entire Aquarea T-CAP lineup is excellent for replacing gas or oil boilers and for connecting to new underfloor heating, radiators or fan coil units. All Aquarea heat pumps can also be connected to a solar thermal or PV system in order to increase efficiency and minimise environmental impact.

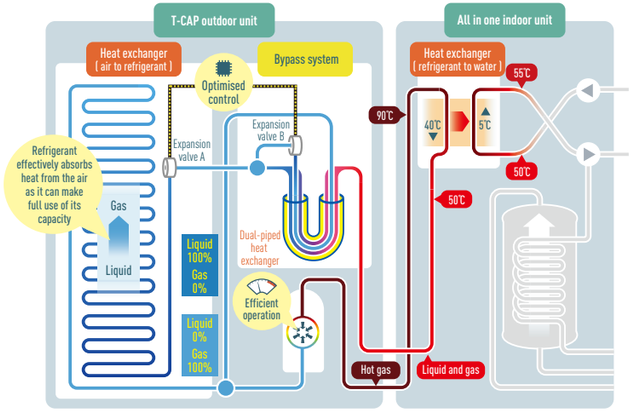
No need to oversize to reach required capacity at low temperatures

Panasonic heat pumps can work in outdoor temperatures as low as -28˚C and maintain capacity without backup heating at -20˚C*. With other heat pumps, a larger capacity is required to achieve the same level of comfort at low temperatures.

* 35˚C flow temperature.



How Aquarea T-CAP maintains performance even at -20˚C outdoors



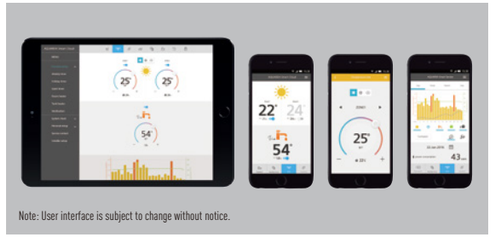
Thanks to effective refrigerant control via our unique dual-piped heat exchanger and bypass, Aquarea T-CAP provides stable heating even at -20 ˚C.

AQUAREA SMART CLOUD

Convenient remote control via IoT

Easy and powerful energy management

The Aquarea Smart Cloud is much more than a simple controller for switching a heating device ON or OFF. It is a powerful and intuitive service for remotely controlling the full range of heating and hot water functions, including monitoring energy consumption.



Note: User interface is subject to change without notice.

Functions:

- Display and control
- Scheduling
- Energy statistics
- Malfunction notifications

Advantages

Enjoy energy savings, comfort and convenient control from any location. Enhance the efficiency of resources management, reduce operating costs and increase customer satisfaction. The new Aquarea Smart Cloud services are focused on enabling full remote maintenance of the Aquarea system, allowing professionals to engage in predictive maintenance and system fine-tuning and respond rapidly to any malfunctions.

AQUAREA SERVICE CLOUD

Remote monitoring 24/7

Real remote maintenance made simple

The Aquarea Service Cloud enables remote maintenance of your heating systems. This feature ensures peace of mind and helps increase your satisfaction.

Advanced remote maintenance functions:

- Global view at a glance
- Error log history
- Full unit information
- Statistics always available
- Most settings available

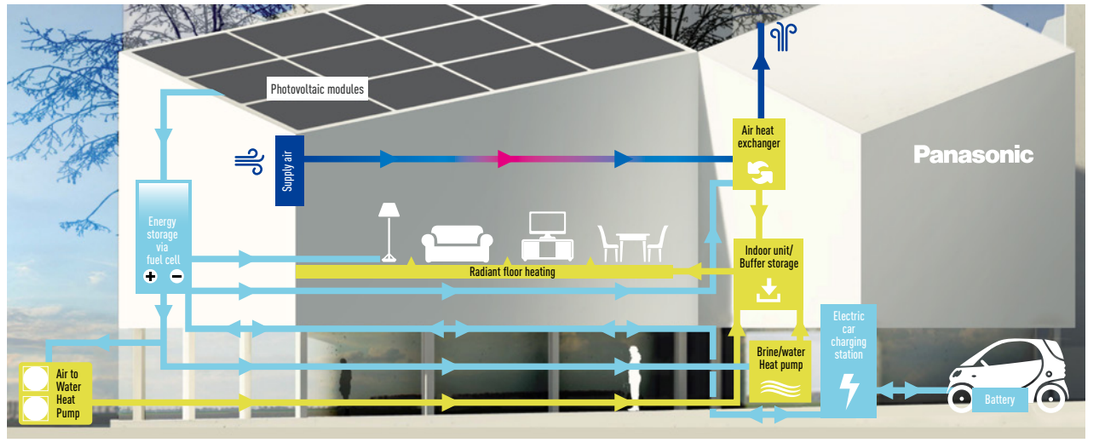
FUTURE LIVING® BERLIN

Panasonic solution example: Future Living® Berlin

Panasonic is a founding member of Future Living® Berlin, one of the first smart cities in Germany. To Panasonic, developing smart technology means more than simply making our lifestyles smarter. It also means maximising sustainability and minimising environmental impact. In this way, Panasonic is aiming for "A Better Life, A Better World."

Smart home

This is how Panasonic envisions carbon-free energy management in the smart city of tomorrow. Solar panels produce energy that is stored in a fuel cell and used by Aquarea.



Case studies

Aquarea has been widely adopted across Europe.
Key reasons why Aquarea has been selected:

Top-level energy efficiency

Minimal maintenance

Flexibility of placement

Varna Wave: 98 luxury apartments in Varna (Bulgaria)

75 low-energy-consumption houses in Hasselager (Denmark)

House in Totalbanken (Denmark)

610m² house with underfloor heating and DHW in Saint-Prest (France)

New house in Erlensee near Frankfurt am Main (Germany)

Mansion in new housing estate in Bruchköbel (Germany)

14 holiday houses near the beach in Klützer Winkel (Germany)

Villa "Domus Manager" in Cornuda (Italy)

Residence "Civico 13" in Sarmeola di Rubano (Italy)

Multifamily villa in Boves (Italy)

"Marina Village Greystones": 205 apartments and 153 houses in Co. Wicklow. (Ireland)

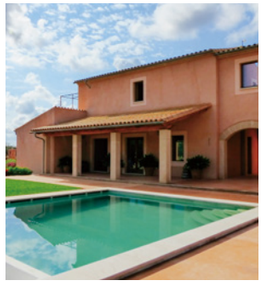
21 luxury homes with 5-6 bedrooms in Straffan, Co. Kildare (Ireland)

77 low-energy-consumption houses with 3 levels in Vilnius (Latvia)

Passive house in Tychowo (Poland)

Studenci Sunset Elite: 21 luxury low-energy houses in Maribor (Slovenia)

Vila blok Šubičeva: 25 luxury low-energy apartments in Maribor (Slovenia)



Premium passive refurbishment villa "Proyecto Tierra" in Llucmajor, Mallorca (Spain)

New passive house in Sant Cugat del Vallès (Spain)

Eco-friendly Georgian style project in Cambridgeshire (UK)

17th century barn renovation with floor heating in Essex (UK)

New house in Scotland (UK)

Tower Ridge Courtyard in Scotland (UK)

Aquarea offers outstanding solutions from 3 to 16 kW.

Cold climate

AQUAREA T-CAP

- Heating
- Cooling
- DHW

For extremely cold ambient temperatures

Panasonic heat pumps can work in outdoor temperatures as low as -28°C and maintain capacity without backup heating at -20°C.

All-in-one

Bi-bloc

Mono-bloc

Newly built

AQUAREA High Performance

- Heating
- Cooling
- DHW

Normal installation

This model is ideal for new installations and well-insulated homes.
It offers outstanding efficiency and energy savings with low CO_2 emissions.

All-in-one

Bi-bloc

Mono-bloc

Retrofit

AQUAREA HT

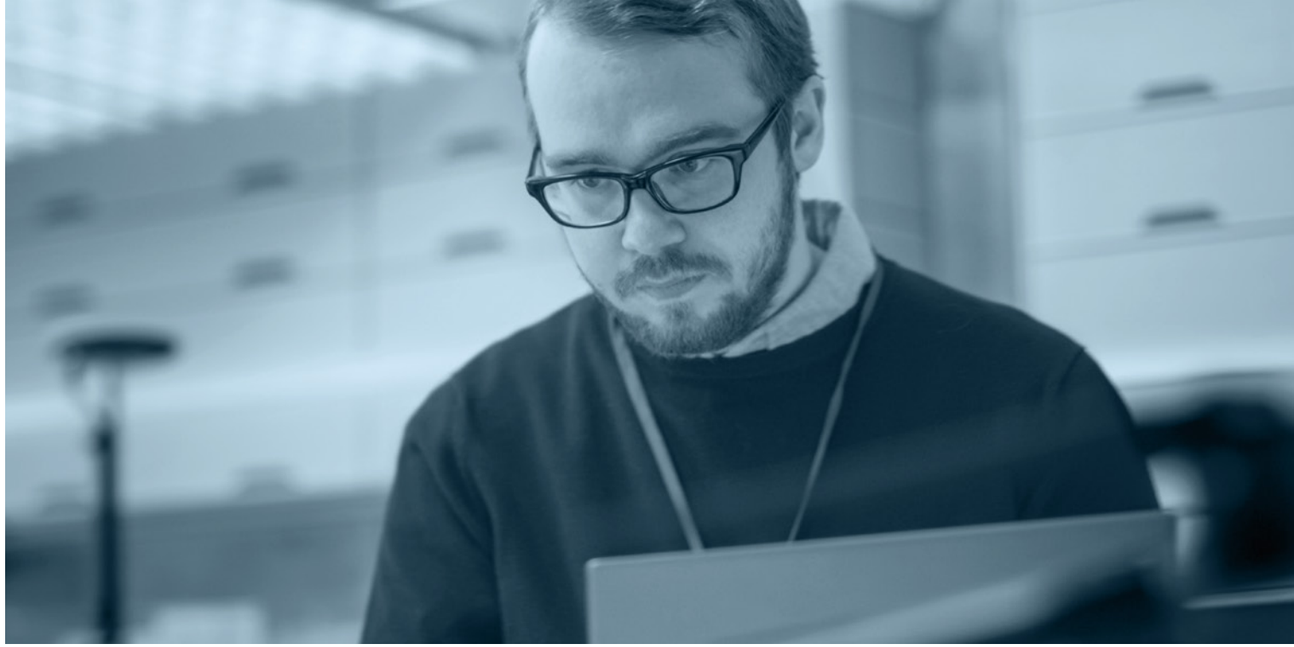
- Heating
- DHW

Retrofit for old radiators

The best option for replacing boilers.
Aquarea HT can provide output water temperatures of 65°C even at outdoor temperatures as low as -15°C.

Bi-bloc

Mono-bloc



A wide variety of Aquarea solutions can meet the needs of virtually any home.

Aquarea can be combined with various products such as DHW, ventilation, fan coils and connected devices.
Integration with Aquarea Smart Cloud / Aquarea Service Cloud and BMS (Modbus / KNX) control makes Aquarea an ideal choice for many different kinds of construction.

DHW

DHW+ventilation

Aquarea Air

Fan coils

Connected devices