



全球热泵行业市场前景和发展趋势

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Aug 2023



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Infineon is a global leader in power systems and IoT

Global leader

in automotive, power management, energy efficient technologies and IoT

~56,200

employees¹

Market position

Automotive

#1

TechInsights,
March 2023

Power

#1

Omdia,
October 2022

Microcontroller

#5

Omdia,
May 2023



¹ As of 30 September 2022

Infineon at a glance

Growth areas



Energy
green and efficient



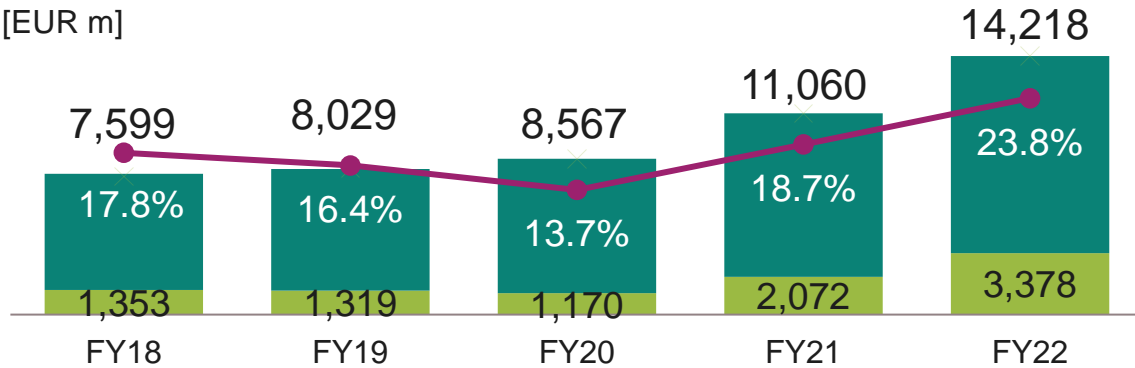
Mobility
clean and safe



IoT
smart and secure

Financials

[EUR m]



■ Revenue ■ Segment result — Segment result margin

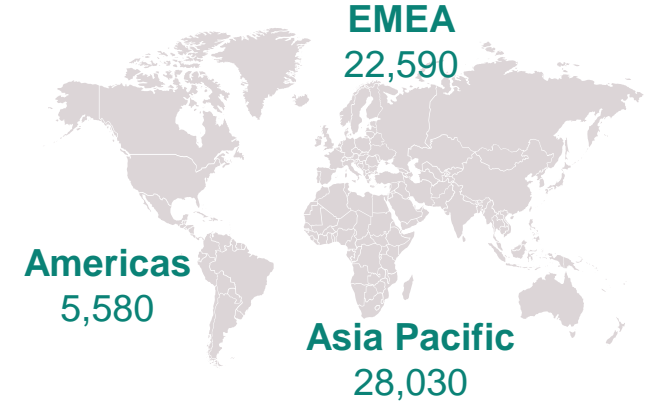
¹ As of 30 September 2022 | ² 2022 Fiscal year (as of 30 September 2022)

Employees¹

56,200
employees worldwide

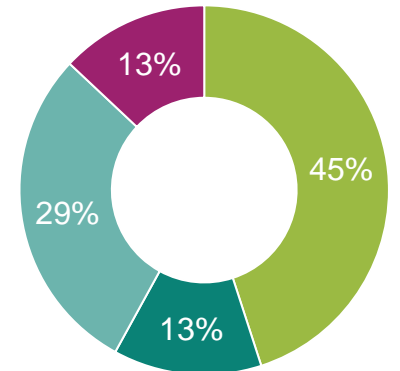
59
R&D and

19
manufacturing locations¹



Business segments revenue²

- Automotive (ATV)
- Green Industrial Power (GIP)
- Power & Sensor Systems (PSS)
- Connected Secure Systems (CSS)

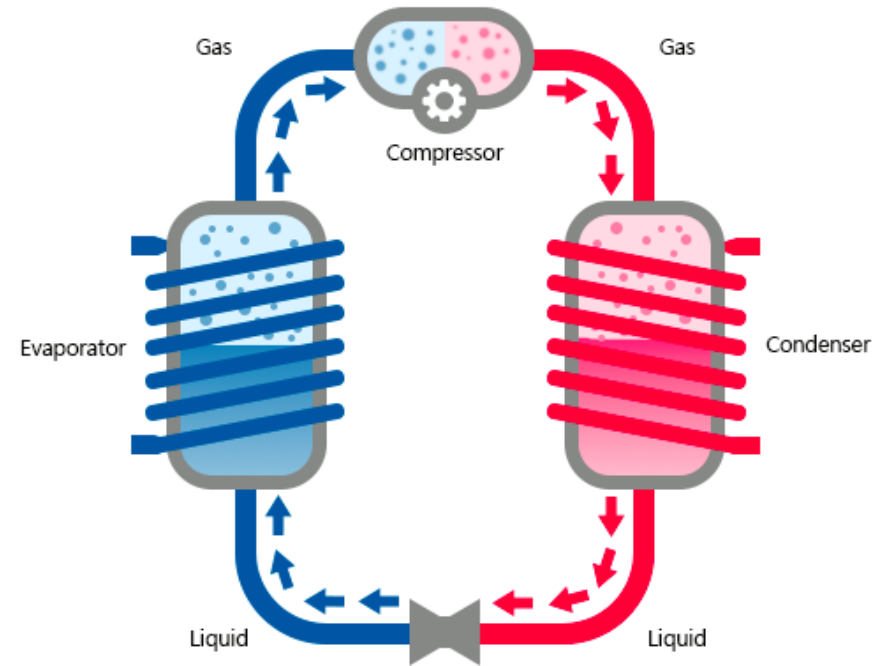
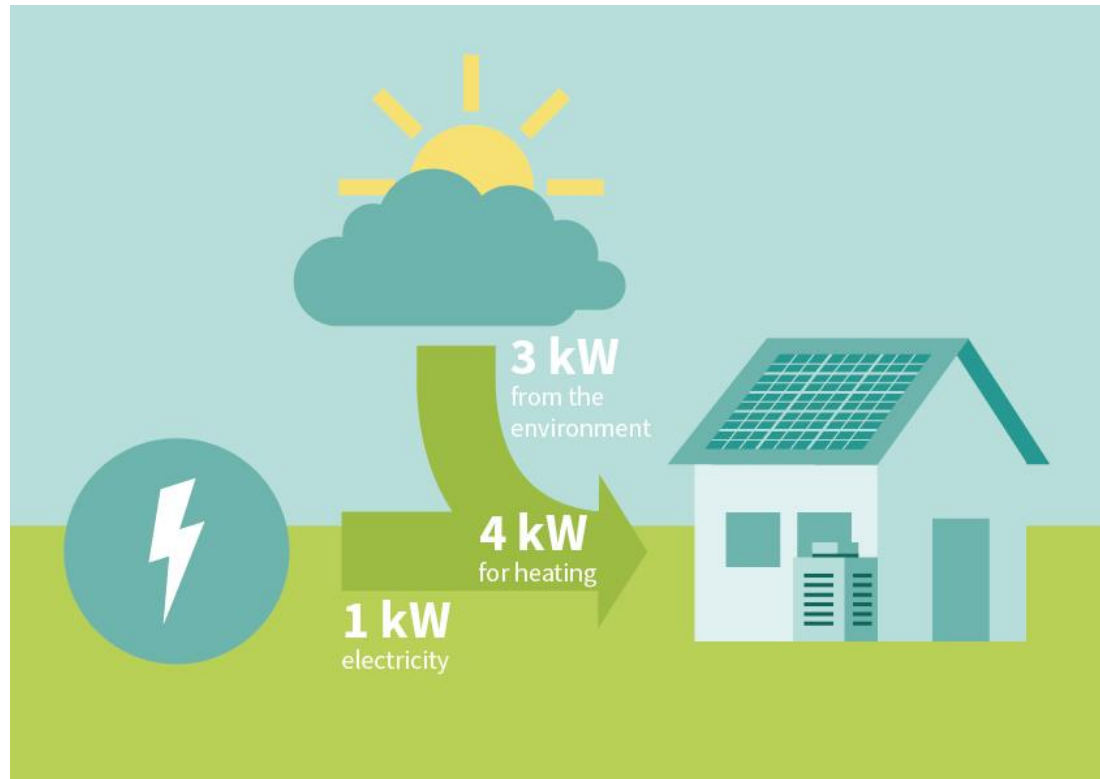


For further information: [Infineon Annual Report 2022](#).

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The magic of the heat pump lies in its ability to move heat from the environment, not in creating it.

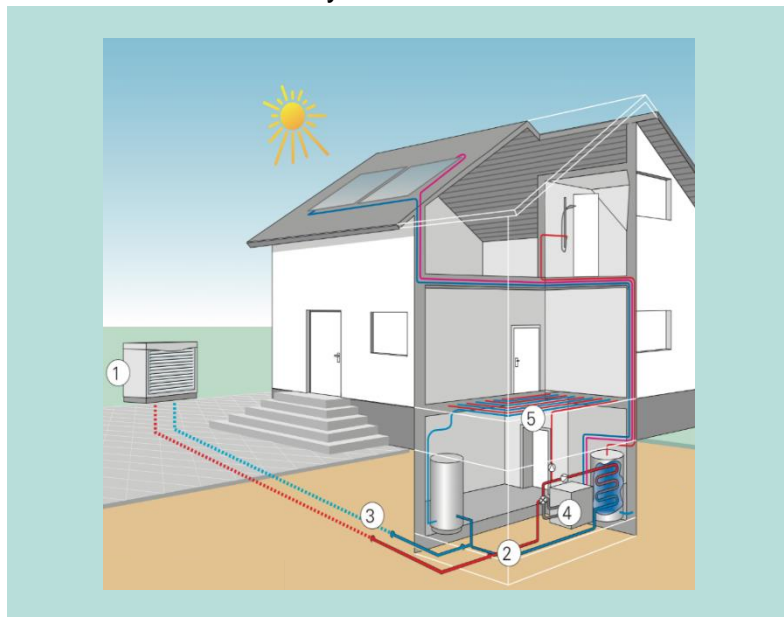


Electricity is not used to generate heat, but to move energy from the environment!

Heat pump in terms of energy source

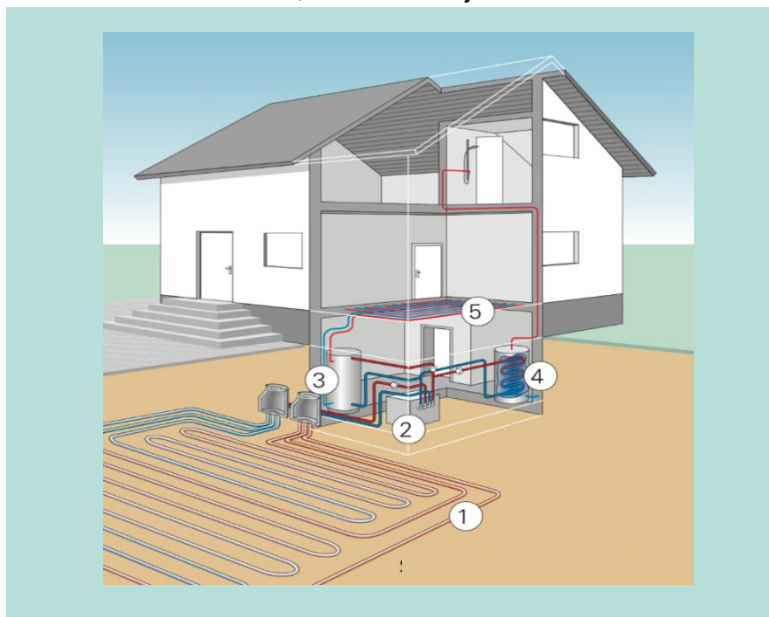
Air Source Heat Pump

- › Heat distribution by hydronic, air using fan or ducted ventilation system



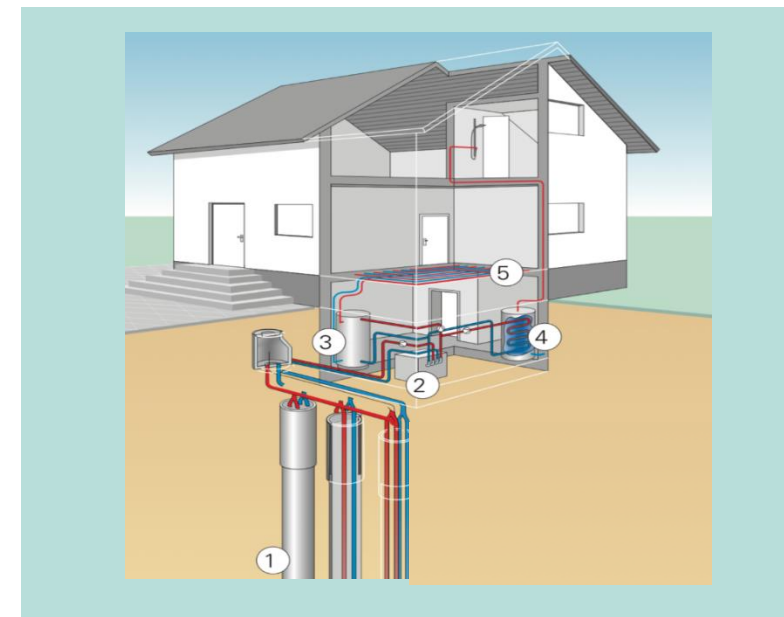
Water Source Heat Pump

- › Use of energy in surface or sea water (2 drillings) = 1 water source, one to reinject water



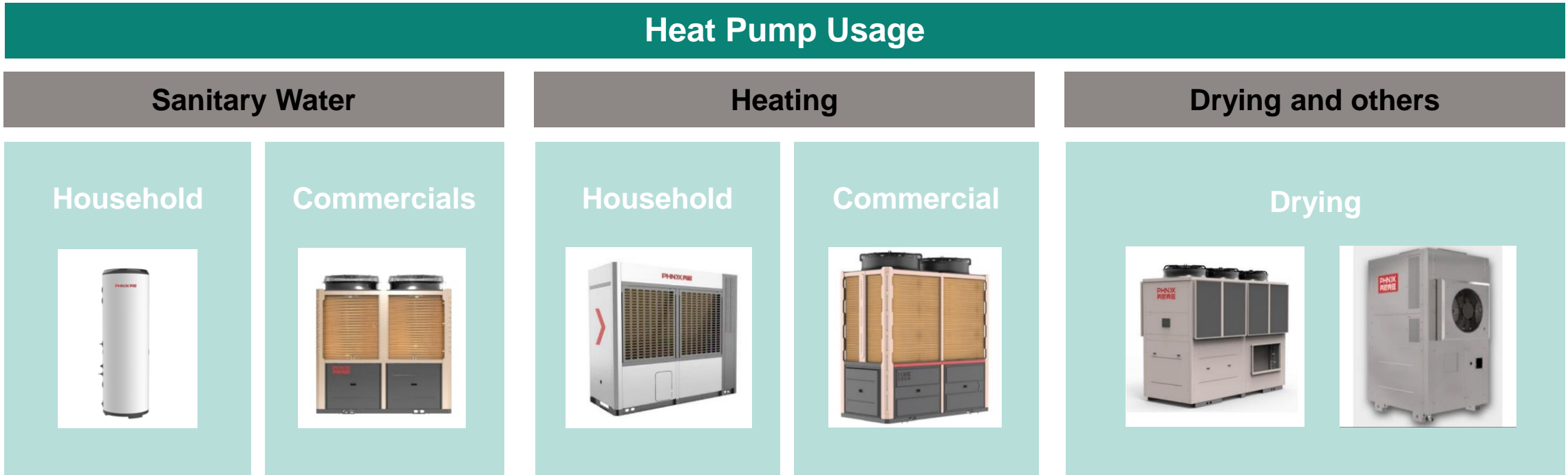
Grand Source Heat Pump

- › Use energy stored in the ground extract heat by vertical & horizontal collector



- › Compare to air source. Water/Ground source has higher COP(Water/Ground temperature is more stable)
- › Water/Ground source has pipe underground therefore higher Capex. At least RMB 100K and above
- › Air Source Heat Pump Occupies over 90% of Total Market in China

Heat pump usage targeting different demand



- Sanitary water is current in low inverterize rate. Lower than 20% due to cost sensitivity compare with electric water heater
- Household was almost fully covered with inverterization solution
- Commercial water& heating is currently developing in inverterization rate along with more and more energy performance contracting acts

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The heat pump market is hot – More than €4bn investment announced in 2022 alone



Bloomberg

Carrier to Buy Viessmann Climate Solutions Unit for €12 Billion

2

Eyk Henning and Aaron Kirchf
Tue, April 25, 2023 at 11:12 PM GMT+2

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Midea starts work on new heat pump plant in Italy

By QIU QIANLIN in Guangzhou | China Daily | Updated: 2022-10-15 08:25

13:03

Unternehmen 03.05.22

WÄRMEPUMPEN

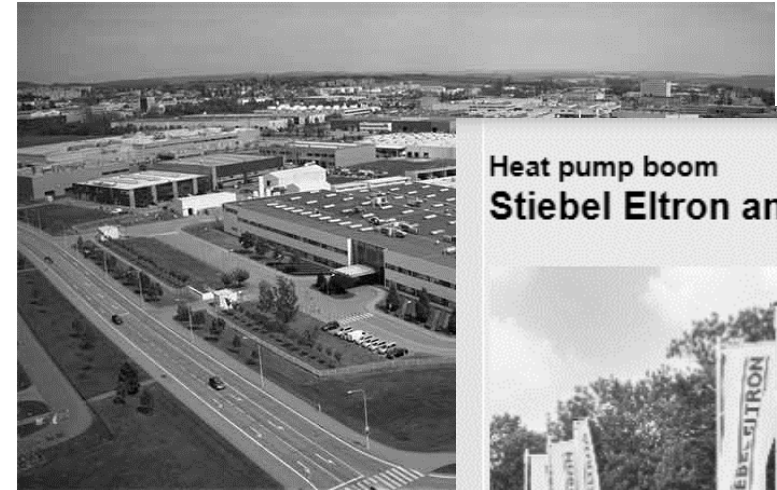
Viessmann investiert historische Summe

Familienunternehmen wendet eine Milliarde Euro auf.

BEITRAG TEILEN MERKEN

€50m boost for Brno heat pump plant

19 OCT 2022



BELGIUM: Daikin Europe has announced a €50m investment in

Heat pump boom

Stiebel Eltron announces investments of 600 million euros



Holzminden - As early as 2021, almost 30 p more heat pumps were installed in Germany 2020 in a dynamic market environment with devices than in 2020.

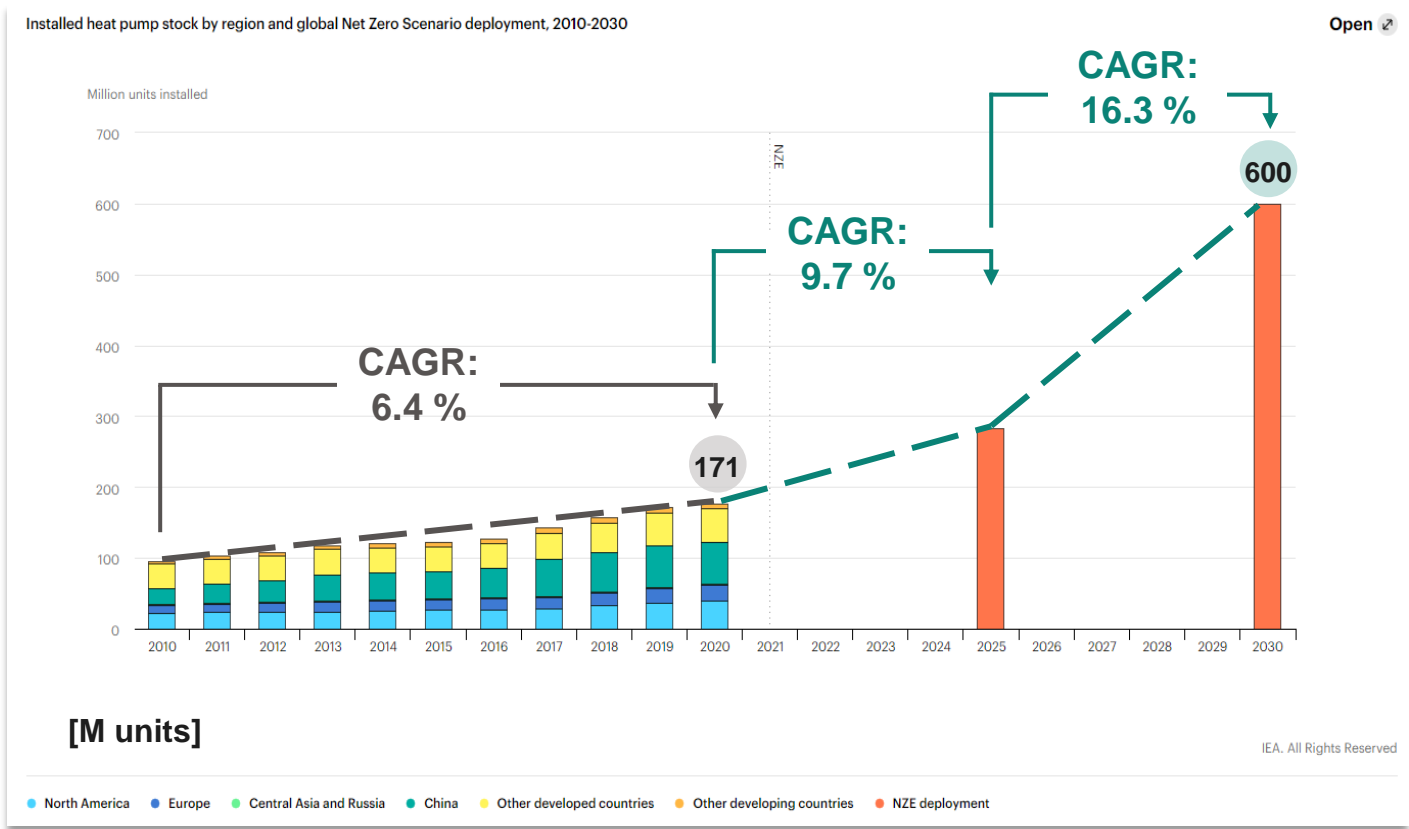
In the course of the turmoil on the gas mark representatives now expect an even larger j

The New York Times

An Oily Challenge: Evict Stinky Old Furnaces in Favor of Heat Pumps

Building by building, New York and other cities are trying to stop the age-old use of fossil fuels to heat homes and buildings. In the U.S., new climate laws aim to speed things up.

Global focus: Booming heat pump market deployment scenario by 2030



Source: IEA, 2021

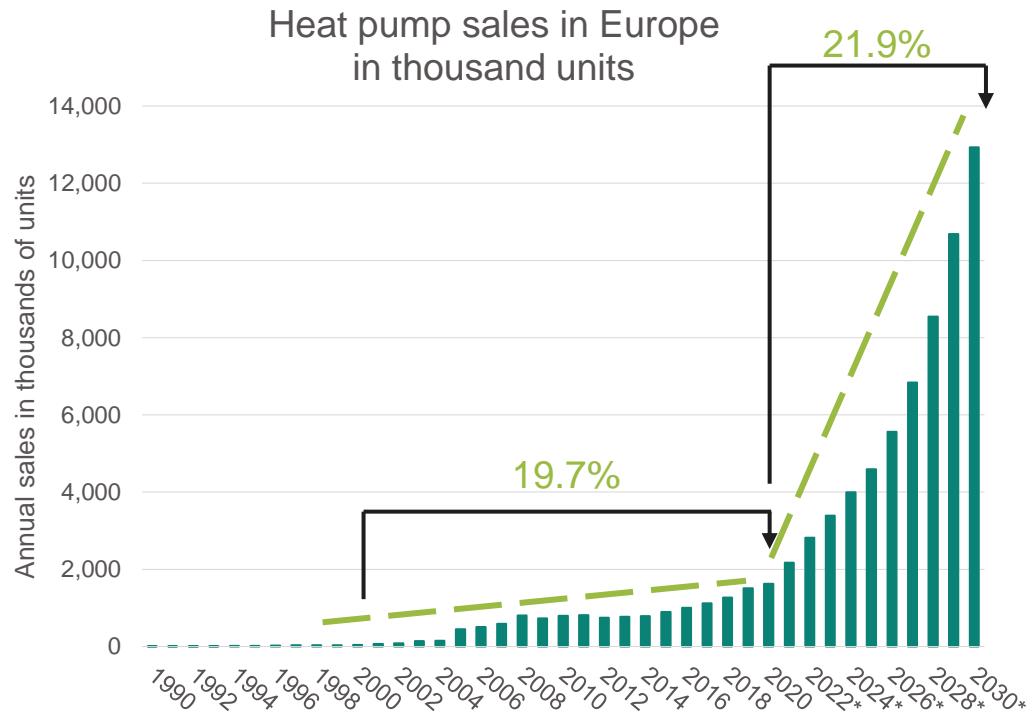
> 450 M units *heat pump set will be needed*

> 1,500 M pcs *Power devices will be needed*

- PFC
- Compressor
- ODU fan
- IDU fan
- Circulation pump

Net-zero target and new regulatory frameworks result in high growth, in particular in Europe

Heat pump market in **Europe** has been growing at 20% CAGR for the past 20 years. It is expected to grow even faster due to new regulations.



Source: European Heat Pump Association, 2022

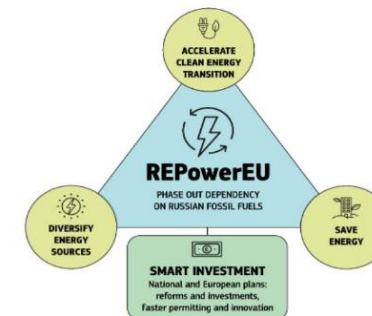
REPowerEU creates massive demand for heat pumps in Europe.

Objective: Independence from Russian fossil fuels.

Amongst the set of actions: Replace gas in heating systems.

How? Stricter eco design rules and increased energy saving targets.

Estimation of total heat pumps necessary by 2030: 60 million installed heat pumps.



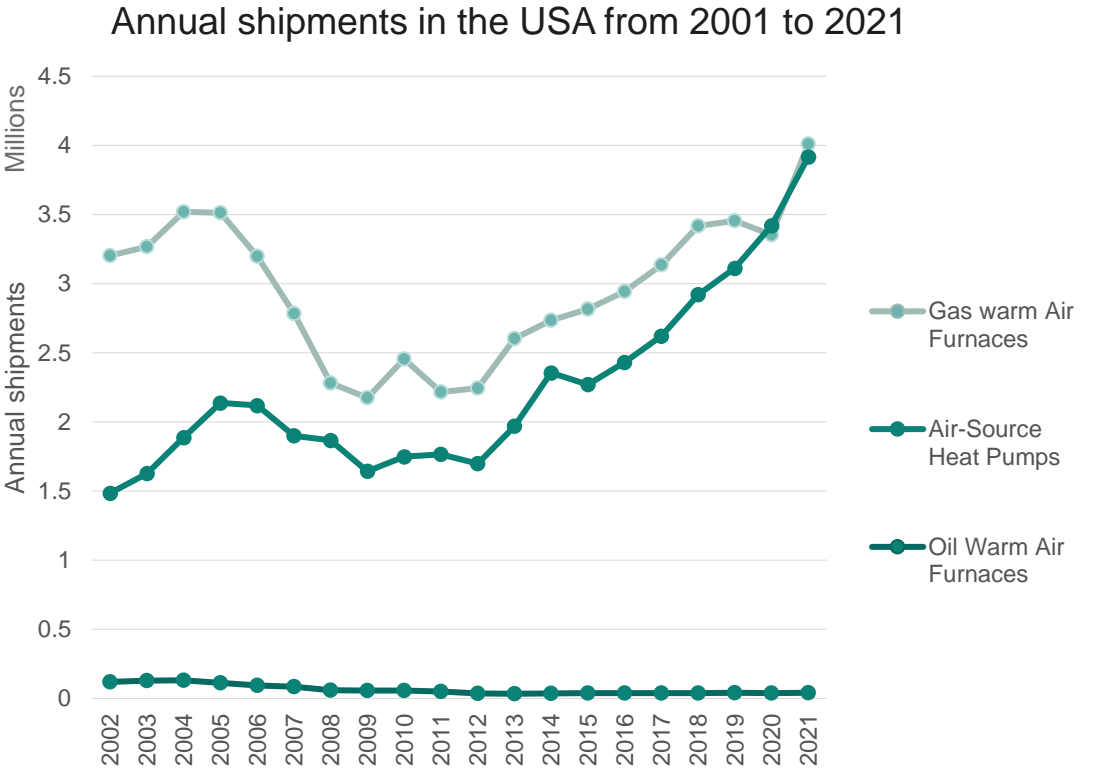
Market research – Focus: USA

In 2020 heat pumps surpassed gas furnaces for the first time –
But: Low inverterization rate (<10%)

US Inflation Reduction Act offers tax credits to home builders and owner who install heat pump

Regulatory changes in 2024 (SEER 15) and 2029 (SEER 18).

Inverterization will remain low for the next years without regulation, as gas is much cheaper than electricity.



Source: Air-Conditioning, Heating & Refrigeration Institute

ESG IMPACT

Heat pumps are an energy upgrade for homeowners that's becoming a climate and financial winner

PUBLISHED SAT, DEC 10 2022-10:00 AM EST

Cheryl Winokur Munk @CHERYLMUNK

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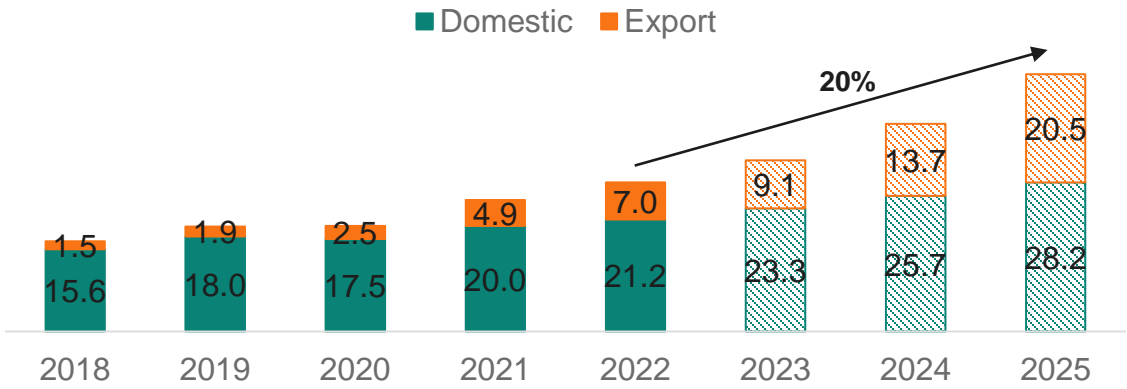
Bloomberg

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Domestic heat pump market development

China air source heat pump sales rev

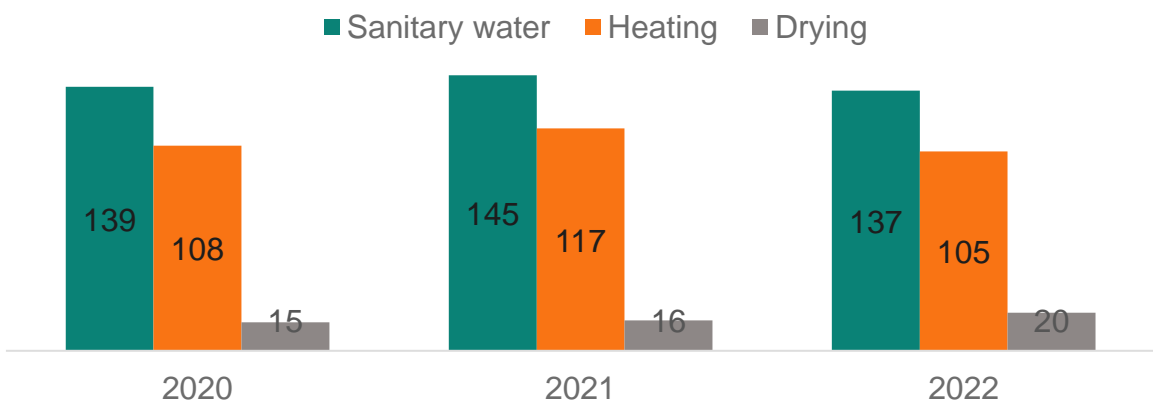


Domestic keep single digit growth while export market was booming with energy crisis globally

Hot water is very concrete contributor with ~6-7b RMB as maturing demand from c2c model influenced by property market

Heating is still dominant rev wise. Household air to air was impacted by policy however air to water turning more into retail market over 85%

China air source heat pump sales unit



From policy-driven to market-driven. Product acceptance becomes higher with its high COP

Market keep consolidates and heating market's occupation keep growing

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Trend 1: Efficiency push and new architectures



More efficient PFC topologies

New Vienna rectifier module
Totem Pole reference design

SiC MOS inverter drive optimized
for $\leq 50\%$ load condition and
attention to die size optimization.

WBG benefit in COP improvement
verified by customers.

Energy efficiency

...and many other opportunities to increase efficiency.

- A+++ since 2019
- New standards can be expected in Europe, especially in 3-ph systems
- In the US new standard only in 2029

Trend 2: Retrofitting will lead to higher power heat pumps



- Inflation and higher material cost are leading to lower construction activity
- Most heat pumps used to be sold into new buildings with very good isolation



- Regulatory requirements and subsidies will lead to older buildings being equipped with heat pumps
- Due to inferior insulation, higher power heat pumps will be required

Infineon's product portfolio well set up for this trend:
Modules cover entire power range, IPM roadmap foresees higher power IPMs

Trend 3: Smartification

Ease-of-use connectivity (modules) and security, strong market position in touch and next controllers enable you to design next generation systems.

Main control

Connectivity

Display

Security



- Smartification mainly happening in indoor unit
- Design and digitalization driving growth in this segment
- Indoor unit still very low-tech, but moving to advanced features
- Bigger companies can transfer thermostat and aircon know how to heat pumps
- Grid management will be huge driver for connectivity and security
- Secure element for online access & parts authentication in maintenance



