

BLUE H♥RT

Thermo-acoustic engines for heat pumps

The future of home climate



A big market
opportunity



The problem

F-gases ban (Jan. '27) pushes the industry to **propane**, but with **constraints**

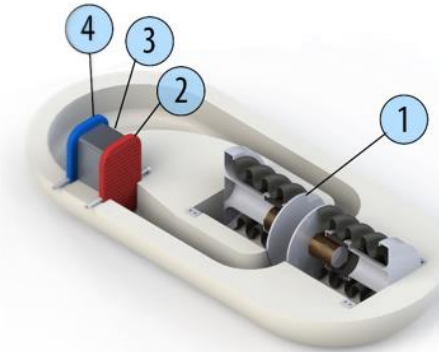
- Only Monoblock solutions (suitable for max. 35% of the market)
- Indoor max 150 gr. (lower power & compromises)
- Higher temperatures with durability challenges
- Flammable (& related cost)
- Noise

EU climate targets 2030 (55%) ► urgent need to act!

→ **obstacles** to make heat pumps **the standard in existing houses**

From “best available” solution to the next generation of heat pumps

The Solution



- 1 - Electric drive: Pressure wave inside 50 bar helium
- 3 - Regenerator
- 2 & 4 - Internal heat exchangers

BlueHeart replaces the complete refrigerant circuit with a thermo-acoustic unit, using **soundwaves** to create a temperature difference
No phase change

Patented thermo-acoustic technology enables heat pumps with **superior performance** and **without harmful refrigerants**



The Opportunity: Residential HP



Detached & semi det.



Row medium/small



Apartments

Existing houses

Good solutions available
e.g. A-W mono,
W-W
+ **BHE**

18%, 28m units

32%, 51m units

50%, 77m units

Blue Ocean

Lack of suitable solutions for most of the market

New houses

Good solutions available
e.g. A-W mono, W-W +
BHE

Semi solutions available
e.g. A-W mono, W-W + **BHE**

Complex solutions available
e.g. A-W mono, W-W + **BHE**

approx. 20%, 600k/y

approx. 30%, 900k/y

approx. 50%, 1500k/y

BlueHeart: premium product,
high DHW & colder climates

Blue Ocean (6kW)

- 90% of the apartments
- 38% of the terraced houses
- Smaller shares in other segments



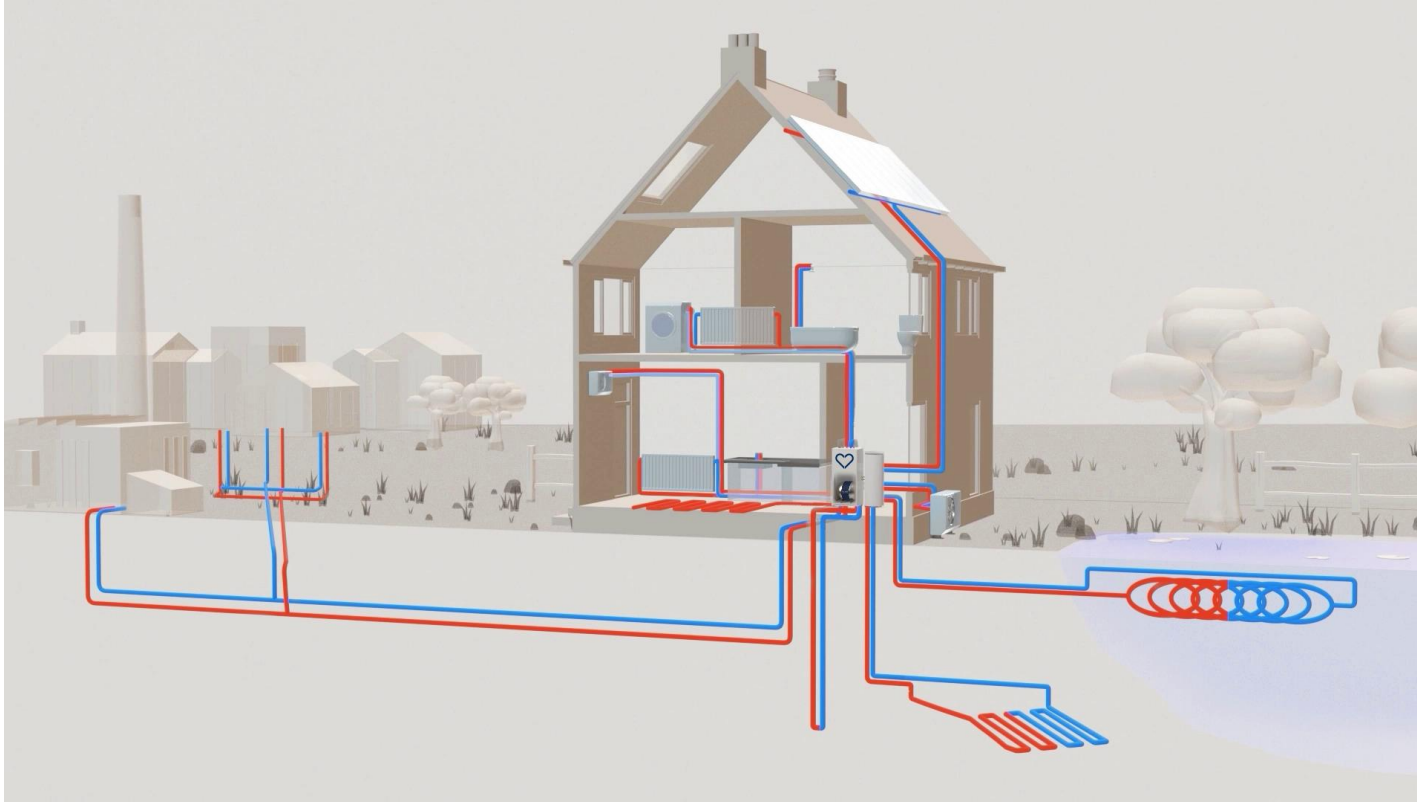
BH fit for overall 56% of the houses

BlueHeart meets the
requirements to fulfill these
segments needs

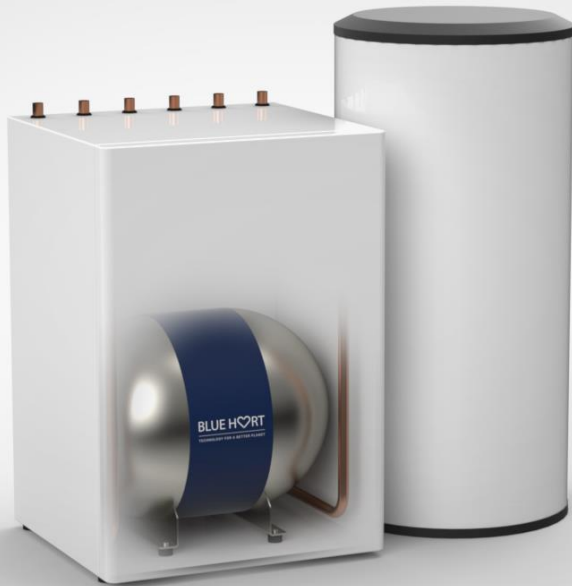
Propane and current
solutions can not fulfill these
requirements appropriately

BlueHeart: premium product,
high DHW & colder climates

Very flexible and tolerant for different applications



- The BlueHeart unit can operate with **different sources**: air, PVT, ground, water, or district heating.
- BlueHeart can be used for **underfloor heating, existing radiators, DHW** and cooling.



The Solution – Benefits HP + Airco

BlueHeart replaces the refrigerant circuit with a thermo-acoustic engine using **sound waves** to create a temperature difference for HP's and Airco's

1

No refrigerants (or flammable gas)

- Widely applicable solution → new use cases
- Fully compliant with end '26 refrigerant ban
- Safe + environmentally friendly

2

Very silent

- Increased comfort
- Flexible installation location

3

No temperature boundaries

- Exit - suitable for new and existing houses & DHW
- Inlet - suitable for all different sources

4

Production and installer standardization

- Reduced assembly time for OEM
- Easier & more fool-proof installation

5

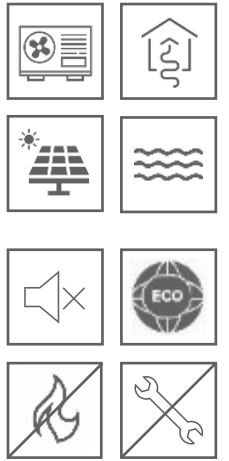
Longer lifetime

- 20 years
- Improved LCA

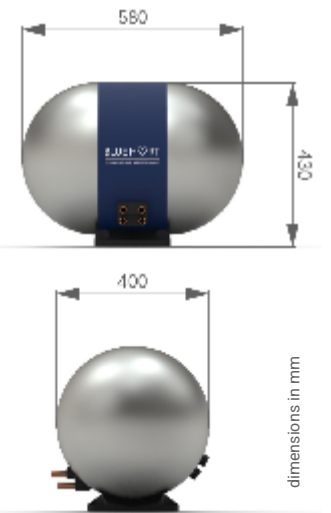
Specification Summary



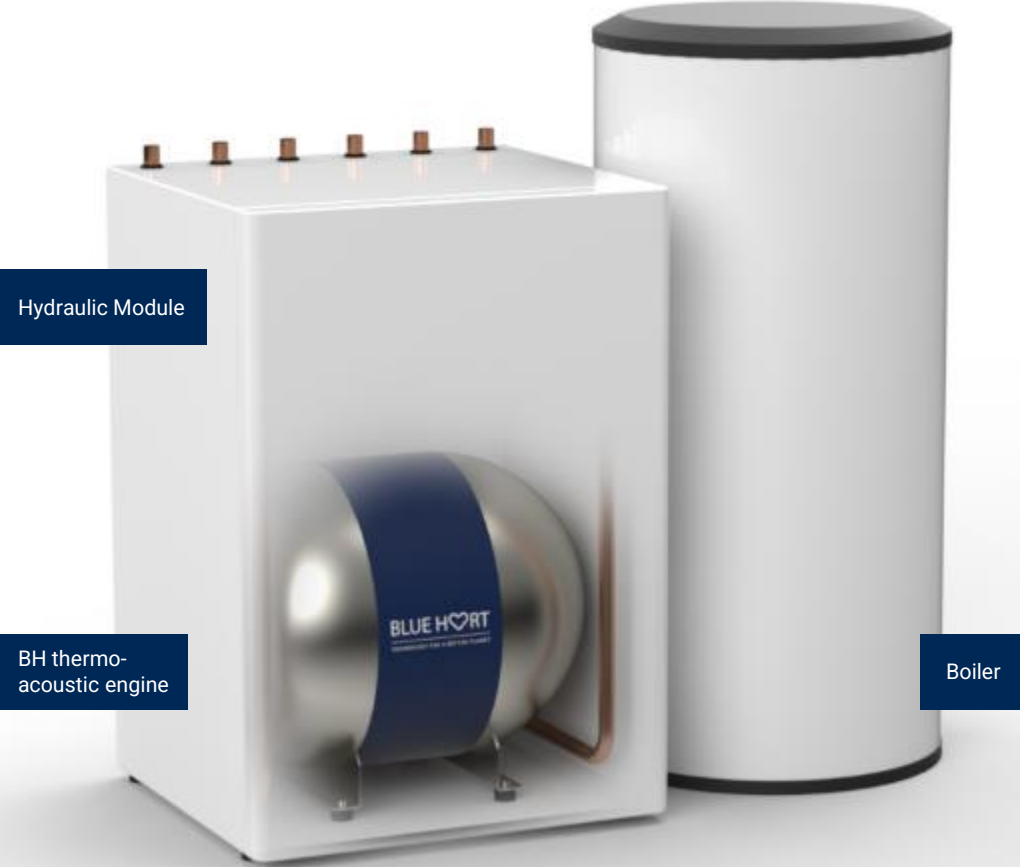
- ❑ **Wide operating envelope** enables wide source compatibility
- ❑ **Simplified controls** and **plug and play installation**
- ❑ **Quiet operation** gives indoor installation flexibility
- ❑ **Safe, non-flammable, non-toxic, zero-GWP** Helium working gas
- ❑ **Long lifetime** (exp. 20 years)
- ❑ **Maintenance free**



- ❑ **Place of installation:** Inside / Outside
- ❑ **Source compatibility:** Air / PVT / Ground / Water
- ❑ **Source brine(s):** Water / Detoxified Ethylene Glycol
- ❑ **Supported applications:** Space Heating / DHW / Cooling
- ❑ **Working gas:** Helium
- ❑ **Nominal pressure:** 60 bar
- ❑ **Weight:** 60 kg



Heat Pump with BlueHeart Inside



BlueHeart Unit Interfaces

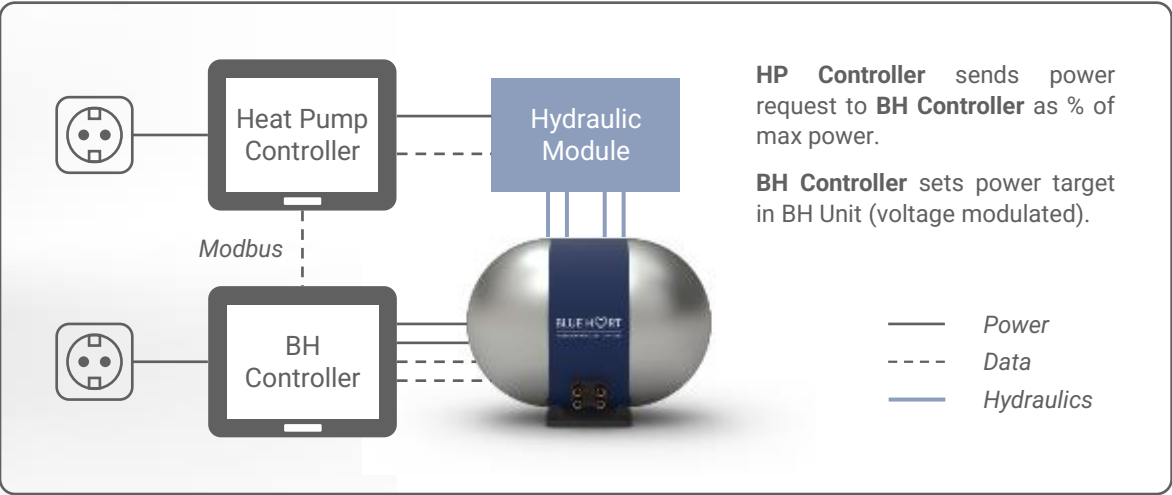


2x Supply connections (hot)
2x Source connections (cold)



2x Power cables
2x Data cables

Controller Overview



BLUE H[♥]RT

Technology for a better planet



www.blueheartenergy.com