

Zero restrictions. Zero waste. Glen Dimplex Thermal Solutions has achieved a revolution in temperature management for commercial and industrial applications. With System Zero we present a heating-cooling system which is simply versatile – because System Zero is the only heat pump with zero restrictions when it comes to the choice of heat source: whether outside air, geothermal energy or waste heat from cooling systems... At the same time, System Zero makes saving money radically simple – because only System Zero offers zero waste: valuable energy, squandered in the past, is now put to profitable use. See for yourself what System Zero can do!

Cooling.
Heating.
Ventilation.



**Glen
Dimplex**
Thermal
Solutions

System Zero.

A revolution in
heat pumps
for trade and industry.

System Zero...

Zero restrictions.

Outside air? Waste heat? Geothermal energy? With System Zero you can use whatever combination of freely available heat sources is best suited to your purpose. In the warehouse, data centre or block of flats, System Zero always does the job.

... meets System Zero.

Zero waste.

Is the waste heat from your cooling system going to waste? With System Zero you can stop your money going up in smoke and start tapping into a valuable, hitherto unused source of energy. System Zero cuts your energy costs – by up to 25%.

The new heat pump system for
commercial and industrial clients.

System Zero is here.

There's a new force in heat pumps for commercial and industrial applications: System Zero. Forget "either/or" – System Zero is the first series-produced heat pump to combine various heat sources, including waste heat, and regulate them for maximum efficiency. All while running on the environmentally friendly cooling agent propane. The result? Zero energy wasted, and zero money wasted. That makes System Zero a highly flexible all-purpose solution for a huge range of applications. For warehouses, computer centres or apartment blocks, System Zero is a patented all-rounder.



Heat source: external air

Heat source: waste heat

Heat source: geothermal energy



Air outlet side



Air intake side

Heating
flow
Heating
return

Brine flow

Brine return

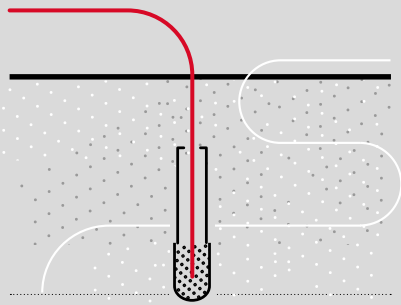
Facts. System Zero.

- + Air-to-water and brine-to-water heat pumps in a single housing
- + Combined heating and cooling function (reversible technology)
- + Comfort throughout buildings up to 1,000 m² (including hot water)
- + Environmentally friendly propane cooling agent
- + The air-to-water circuit uses air, a constantly available heat/cold source
- + The brine-to-water circuit uses geothermal energy and waste heat, and allows multiple sources in parallel
- + Intelligent control of air and brine sources through alternating or parallel operation is always efficient and always automatic



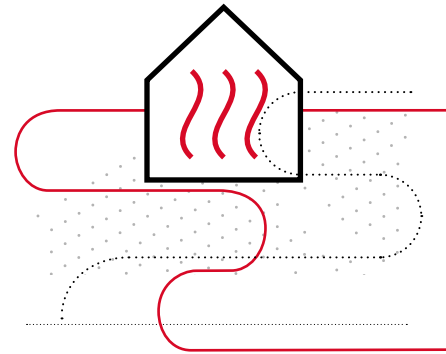
Heat source Air

- + Simple and cheap to access
- Efficiency and performance decreases as outside temperature falls



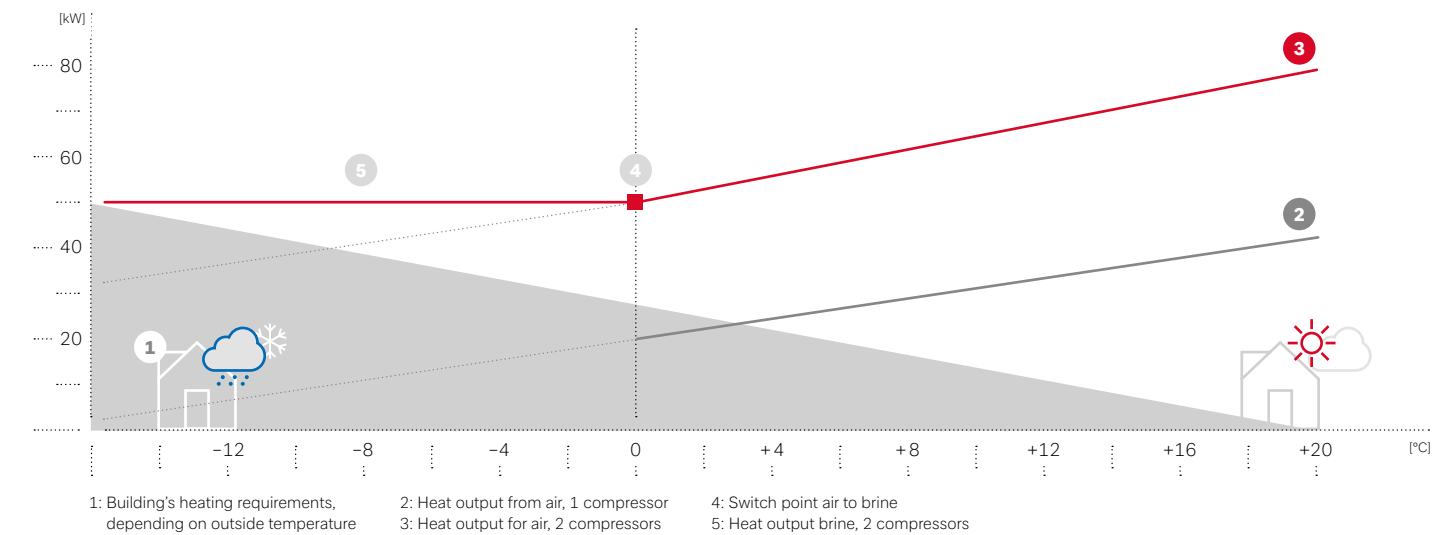
Heat source Geothermal energy

- + Constant source temperature all year round
- Expensive to access due to space requirements, excavation work and/or drilling



Heat source Waste heat

- + Freely available "waste product" from many different processes (e.g. cooling)
- Volume and continuity can sometimes be insufficient



The System Zero principle: Zero "either/or".

System Zero is the first large-format, series-produced heat pump in the world that combines two different technologies – technologies that in the past you had to choose between. In the old days, you either used the freely available energy from the outside air via an "air-to-water circuit" or you used the energy available in the ground via a "brine-to-water" circuit. But System Zero has put an end to "either/or". Every System Zero machine contains both types of circuit – so it can use both the outside air and geothermal energy. And it gets even better. With System Zero there are zero restrictions: the brine-to-water circuit can be used not only to extract heating (or cooling) energy from the ground, but also –

and even in parallel – to tap into a whole range of different sources of waste heat... whether it's from a food or pharmaceutical storage facility or a data centre.

The trick? Once individually configured, System Zero automatically determines the most efficient mix of energy sources, depending on the available heat supply – and makes the best possible use of their different temperature levels to achieve an optimal COP (see graphic above). The result? Zero downside. Instead, you profit from a combination of advantages, in all seasons. For example, peak loads can be covered. Operating reliability increases thanks to redundancy. Higher performance is achieved

in partial load operation. Active oil management is no longer necessary. Less investment is required thanks to less (and less deep) drilling. But above all, the energy costs and therefore the operating costs fall: day in, day out.

Maik Heydrich and his team: in the beginning was the idea. Six months later came the revolution in heating and cooling.

The three GDTS engineers behind the System Zero success story:
Maik Heydrich (main image), Uwe Steeger (above, left), Dieter Müller (above, right)



The heroes
of the refrigeration circuit.

How we came up with System Zero.

It was a cold, rainy October day in 2012. Maik Heydrich was on his way back home from his 220th customer visit. To date he had developed 220 different tailor-made models for cooling computer centres, or used geothermal energy to heat whole apartment complexes, or set up systems to supply warehouses and their offices with heat. And for the 220th time, Heydrich asked himself the question: can't we do more? Can't we combine different technologies and construction principles even better into one highly efficient overall system... ideally one that also incorporates waste heat? It was a thought that Maik Heydrich just couldn't shake off as he drove through the rain. "It was the loss of waste heat in particular that had always bugged me," he explains. "That was the same for all of us at Glen Dimplex Thermal Solutions: we just hate losing energy." Instead of driving home, Heydrich headed to the office. A night at the drawing board followed. The idea had taken root. An idea that would revolutionise the heating and cooling of commercial and industrial facilities as well as large buildings – in an extremely cost-efficient way.

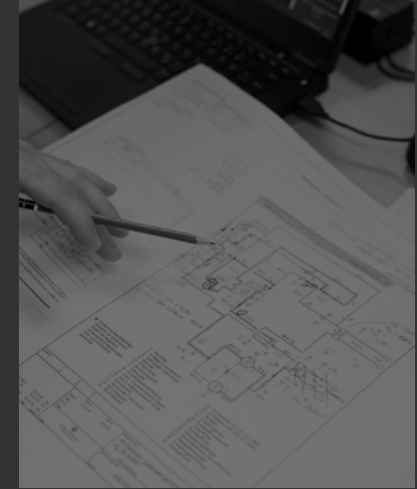
The next morning Maik Heydrich called together his team of experts under Project Manager Dieter Müller and Engineer Uwe Steeger. Together they kept tinkering – and developed a plan for a heat pump that could do more than any other available heating solution. First, the new system would use at least two different heat sources, including waste heat. Second, the system would constantly optimise itself thanks to clever regulation, and depending on requirements decide which source should be tapped and in what quantity. This would guarantee maximum efficiency at all times. Third, the new system would naturally cool as well, thanks to its reverse circuit. Fourth, the new system would use the environmentally friendly cooling agent propane. Also, customers would be able to use the new system in a radically simple way: no-fuss installation, no maintenance woes during operation. And, at the same time the, new system would be highly flexible so it could

fulfil as many different tasks as possible – in the warehouse, in the apartment block, in the computer centre. It didn't take long to come up with a name for the new system: System Zero. Zero as in zero restrictions, zero difficulty, zero waste, zero problems, zero cost explosions. Just six months later the prototype was ready.

Technically speaking, System Zero hits the jackpot. "External air is used as the primary heat source," explains Heydrich. "A brine circuit uses other heat sources, such as geothermal energy, and above all waste heat." In the past the only options were air-to-heat or brine-to-heat pumps. What does combining the two offer? "The best of both worlds – depending on requirements!" says Uwe Steeger. "And that goes for normal load as much as full load." That's particularly apparent when the system is used in apartment blocks. System Zero can use air as a heat source down to an exterior temperature of 2 °C. At lower temperatures, and when the demand for heating is greater, it switches over to the ground, a constantly available heat source, via the brine circuit. "The control technology recognises precisely when it make sense to do so," says Dieter Müller.

The brine circuit can draw energy from other waste heat sources besides the ground, too. As a result, System Zero is suitable for use in many different settings. Anywhere, in fact, where previously unused heat is available. In the warehouse of a restaurant chain the heat can come from the refrigerated section, in the computer centre from water- or air-based server coolers. "In both scenarios System Zero can use these sources to heat or even cool rooms more efficiently than an air-to-heat pump could on its own," says Müller admiringly. The cost savings? "Up to 25%"

And that's all with an amazingly low initial investment. "That brainwave in the car really paid off," says Heydrich.



System Zero is here.

Zero waste heat wasted. Zero cost explosions.

Waste heat isn't wasted any more – in fact it helps save costs for heating and cooling. System Zero.

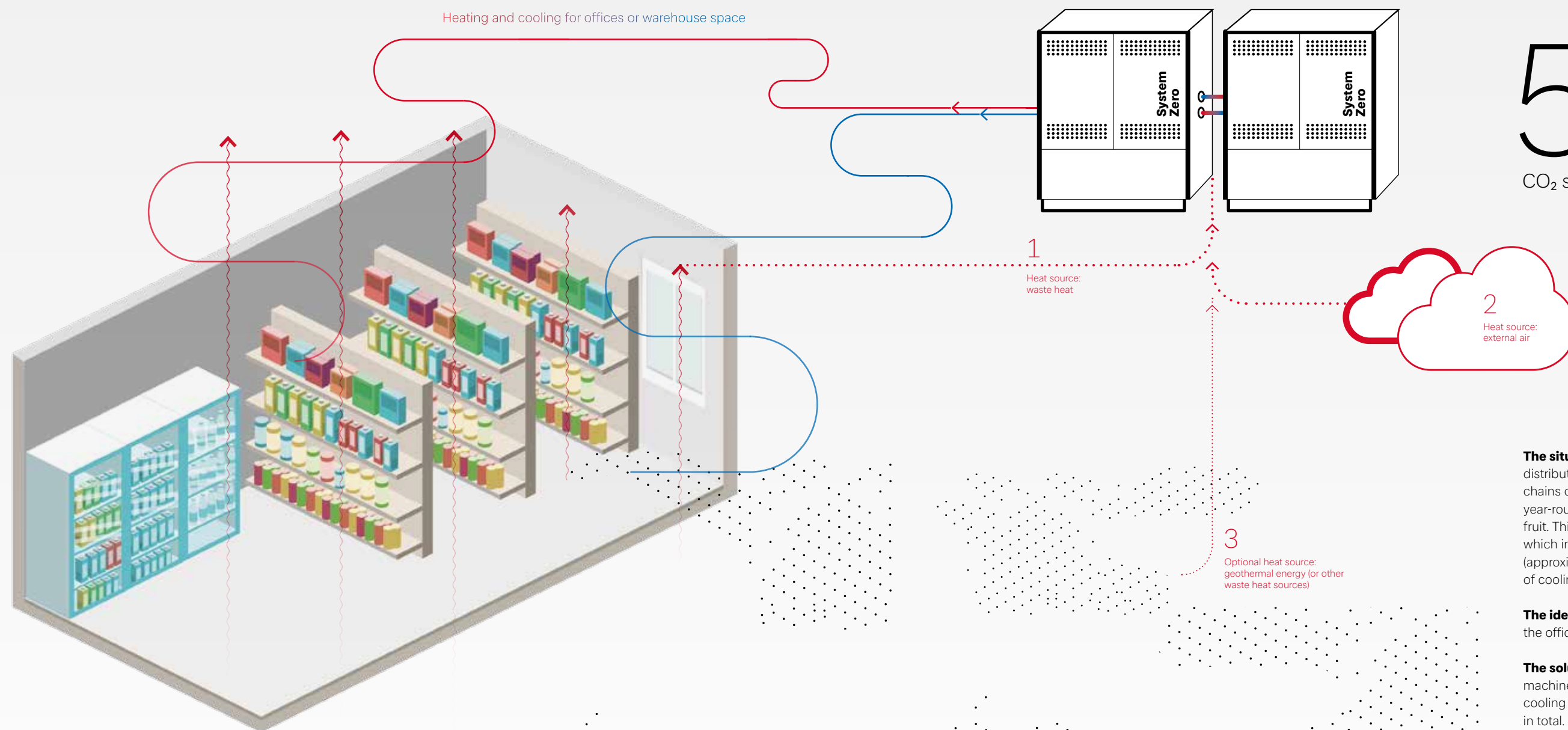
"You can't make an omelette without breaking eggs," goes the old proverb. And if you're heating or cooling, you're wasting valuable energy. Whether it's a computer centre, cold store or apartment complex, large buildings and commercial and industrial facilities produce a lot of waste heat. That's hardly to be avoided, given the laws of physics. But does the energy really have to go to waste? That was the question that led a team at Glen Dimplex Thermal Solutions to come up with an unusual solution: System Zero. Zero waste heat wasted. Zero fear that heating and cooling costs will go through the roof. System Zero is the world's first large-format propane heat pump system that draws energy from various different heat sources, especially waste heat sources, potentially even in parallel. The result? Radically efficient energy usage. Radically lower energy costs.





Warehouse of
a restaurant chain:
**heating from
cooling units.**

Heating and cooling for offices or warehouse space



52^t
CO₂ savings per year*

The situation Large warehouses and distribution facilities, belonging to restaurant chains or online vendors, for example, have year-round cooling for meat, milk and fresh fruit. This produces plenty of waste heat, which in the past largely went unused (approximately 657 MWh/year for 100 kW of cooling).

The idea Use waste heat to heat and cool the offices.

The solution Two linked System Zero machines draw excess heat energy from the cooling units via the brine circuit – 2 x 40 kW in total. Freely available external air is used as an additional heat source. System Zero combines them to ensure pleasant office temperatures. Heating in winter, cooling in summer... 120 kW in total.

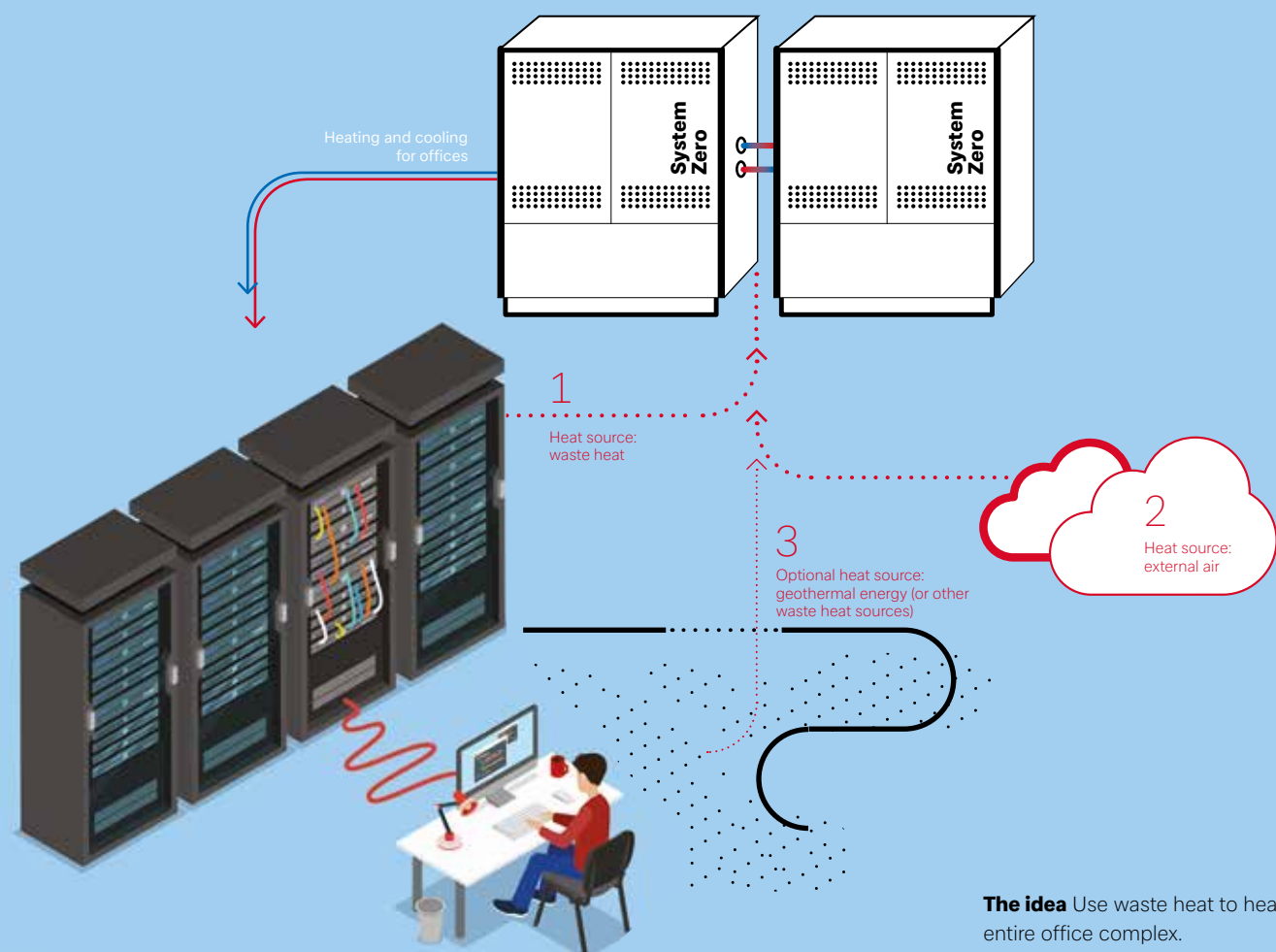
Savings per year*:
EUR 9,500 in heating costs
52 t less CO₂

* sample realistic values compared to relevant systems using fossil fuels (oil); values for locations in Central Europe. Also applies to * on pages 60-61.

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Computer centre:
**heating with
server coolers.**

EUR 10,000
saved per year in heating costs*



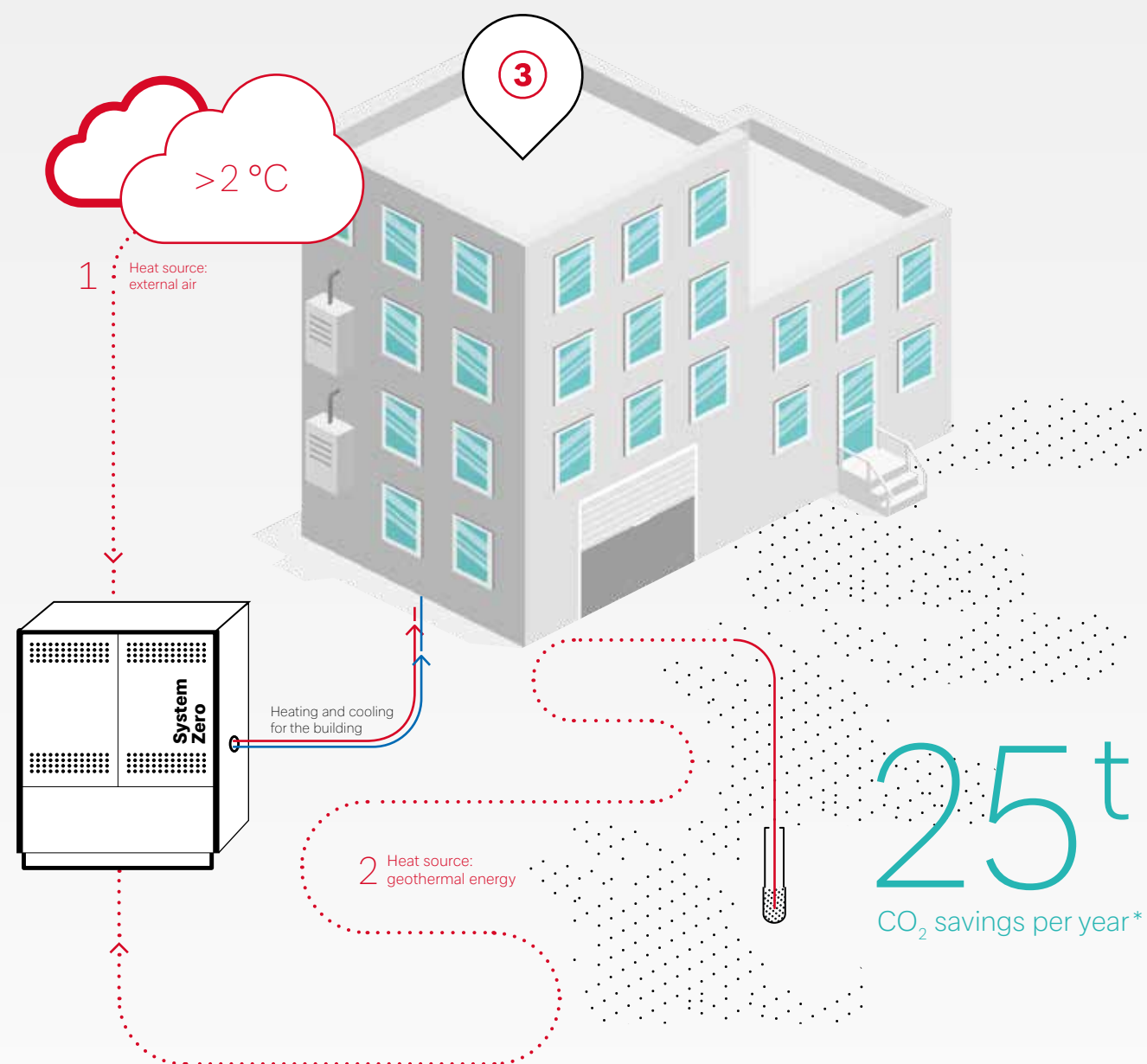
The idea Use waste heat to heat and cool the entire office complex.

The solution Two System Zero heat pumps with a heating load of 120 kW tap the air- or water-based cooling units of the servers – or, to be precise, the waste heat they emit – via a heat exchange and the brine circuit. External air is used as an additional heat source. System Zero is thus able to ensure well-regulated office temperatures – cool in summer, warm in winter.

Savings per year*:
EUR 10,000 on heating costs
52 t less CO₂

The situation Millions of gigabytes of data are processed and stored in computer centres, with around 40% of energy consumption going on cooling alone. This produces an enormous amount of waste heat (approximately 548 MWh/year for 100 kW of cooling). This is energy that was unused in the past.

Apartment blocks
or luxury villas:
**plenty of heating,
minimal costs.**



The situation A warm tropical shower in a private wellness temple in the morning, the perfect temperature in every room, the outdoor pool heated to just the right degree – in large apartment blocks and luxury villas, there is a lot to heat and cool. And that drives costs up.

The idea Realise savings potential through the intelligent use of dual heat sources.

The solution A System Zero heat pump – positioned on the roof, next to the building or in the underground car park – taps a geothermal probe or well via a heat exchange and the brine circuit. In addition, external air is used as a free heat source down to temperatures of 2 °C. Because of not having to drill so deep into the earth, the combination already reduces the acquisition costs for the geothermal installation by EUR 15,000.

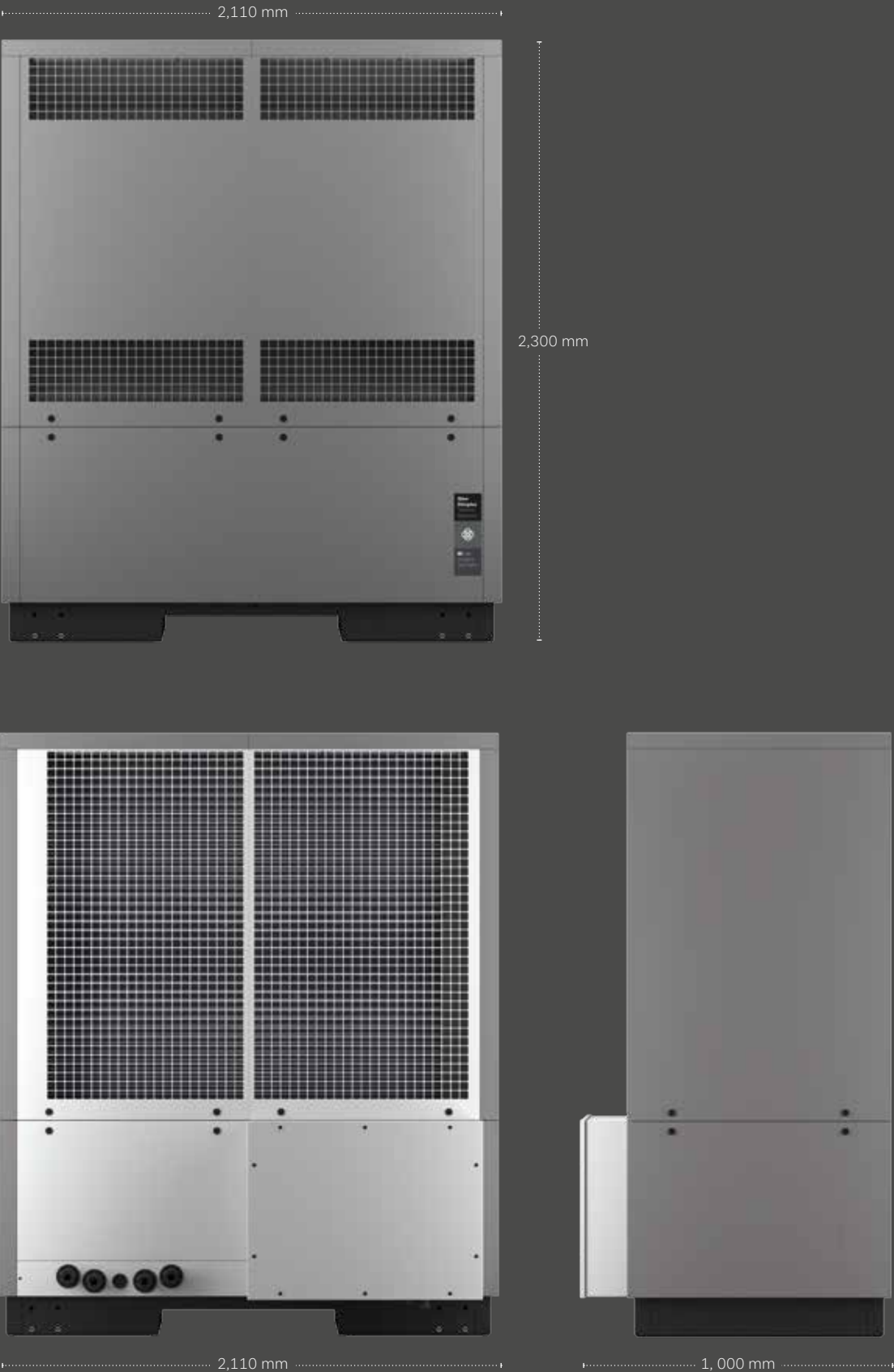
Savings per year*:
EUR 4,500 in heating costs
25 t less CO₂

System Zero.

Technical data:

A hot-water heat pump is an efficient solution for hot water in both new and old buildings. It can supply all the hot water needed by a family home all year round, independently of the heating system. It draws up to 70% of the energy it needs for producing hot water from the ambient air or the waste heat present in the air inside the building. A particular plus is that it can store an extra-large amount of photovoltaic electricity and use it to increase self-consumption as and when necessary.

Product name	System Zero Propan	System Zero
Heat sources	air & brine	air & brine
Model	reversible with mode for 2 heat sources	reversible with mode for 2 heat sources
Performance levels	2	2
Heating water flow	60 +/- 2 °C	60 +/- 2 °C
Min. return temperature	18 °C	18 °C
Cooling water flow	+6 to +20 °C	+6 to +20 °C
Operating limits heat source air (heating)	-20 to +35 °C	-20 to +40 °C
Operating limits heat source brine (heating)	+5 to +25 °C	+5 to +25 °C
Operating limits heat source air (cooling)	+15 to +45 °C	+15 to +45 °C
Minimum throughput heating / cooling water	6.0 / 2,150 m³/h	6.0 / 2,150 m³/h
Nominal throughput heating / cooling water / pressure drop	8.5 / 4,300 m³/h / Pa	8.5 / 4,300 m³/h / Pa
Sound pressure level at a distance of 10 m (normal mode / owered operation)	to 45 /to 41 dB(A)	to 45 /to 41 dB(A)
Device dimensions (W x H x D)	2,110 x 2,300 x 1,000 mm	2,110 x 2,300 x 1,000 mm
Gross weight	1,020 kg	1,090 kg
Refrigerant / quantity	R290 / 11.8 kg	R417A / 33.0 kg
Heat output / COP A7/W40 (air/water)	56.8 kW / 4.2	57.9 kW / 3.8
Heat output / COP B15/W40 (brine/water)	74.6 kW / 5.1	79.6 kW / 4.8
Heat output / COP A2-B10/W40 (air & brine/water)	52.0 kW / 4.1	56.9 kW / 3.6
Cooling capacity / EER A35/W9 (air/water)	44.8 kW / 2.7	49.0 kW / 2.3



Our services for your System Zero.

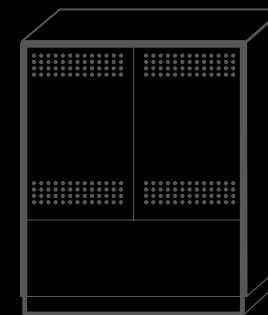
Every System Zero is put together individually. Our experts know exactly what they are doing.

Analysis & consulting We start by visiting the site to see what you really need and what the best technical options are for you.

**Implementation
& installation** We take care of coordinating the various specialists, making sure you get the right pipes and the right connectivity. Our experienced installation team then starts the system up.

Service As well as annual maintenance, System Zero comes with a monitoring system that ensures trouble-free operation. If necessary, our service engineers can be with you within a few hours. Plus our hotline is available 24/7.

Need financing? On request we can design a financing concept adapted to your individual needs.



www.gdts.one/system-zero

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