Thermally Driven Heat Pump by Cooll

Cooll's TDHP combines the energy savings of a heat pump with the comfort of a boiler.

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- ✔ Drop-in solution for existing condensing boilers
- ✔ Installation in 1 day. Common interfaces, no outdoor unit
- ✔ Runs on natural gas, biogas, synthetic gas or hydrogen
- ✔ Saves up to 40% on fuel compared to a gas boiler
- ✔ Silent space engineered adsorption technology

Explainer video

What is a Thermally Driven Heat Pump (TDHP)?

A TDHP combines the energy savings of a heat pump with the comfort of a boiler.

- Cooll's TDHP uses heat of combustion from natural gas, biogas/synthetic gas or hydrogen to drive a heat pump cycle that extracts heat from the outside air. The technology consumes **30-40% less fuel** compared to condensing boilers, reducing CO_2 emissions overnight.
- The adsorption technology origins from **space engineering**, delivering a compact system, with low noise due to absence of a rotating compressor. Our technology is protected with 4 patents granted and 2 additional patents filed.
- Cooll targets the **existing building market** and reduces emissions in hard-to-abate dense urban areas. Specifically for older buildings, small apartments with individual heating, homes with high temperature heating and buildings that can't accommodate an outdoor unit.
- Our TDHP **replaces existing condensing boilers**. It's a drop-in solution to decarbonize through easy installation (no changes to radiators and piping needed).
- The technology is ready (TRL7/8 based on EU specs) for **market introduction**. Cooll will collaborate with manufacturing partners to scale up production.

Product prototype FP1

- 10 kW space heating output (scalable in 5 kW steps)
- Refrigerant: Ammonia (R-717), charge 1 kg, GWP=0
- Dimensions: 600 x 500 x 1200 mm
- Installation in one day / No outside unit needed
- Several test units installed in Dutch houses
- 100% hydrogen readiness demonstrated
- CE-marking, EU Declaration of Conformity
- GAR certificates issued by Kiwa

Supply and demand mismatch

There is a significant mismatch between renewable energy supply and peak heating demands, both daily and seasonally. To balance this, the future energy system will require seasonal storage of renewable fuels made from surplus electricity to meet winter peak demands.

Balanced energy infrastructure

Cooll's TDHP seamlessly integrates into this system, reducing fuel consumption by up to 40% without adding any extra pressure on the electricity grid. This not only improves energy infrastructure balance, but also suits hard-to-abate households as it requires minimal changes to these houses. Rather than a singular focus on electrification, efforts should focus on **reducing carbon emissions** through efficiency improvements and adopting low-carbon solutions.
Our TDHP technology does just that.

2025 » 2026 » 2027

TRL 8 demonstration

- Demonstration with 3 CE marked FP1 heat pumps in Dutch households.
- 3 additional appliances available for partners and/or institutes.
- Independent cost price confirmation small and large batch numbers.

Market introduction

- Market entry with ~200 heat pumps, produced with a manufacturing partner.
- Offtakers for smaller batch numbers in high potential markets: BE, UK and NL.
- Minor changes to design, focus on manufacturing improvements.

Commercial production

- International expansion with 5,000+ heat pumps per year (potentially a lot more), produced by large scale manufacturing partner(s).
- Select international sales partners (EU, US, Asia).
- Adapt product design for volume manufacturing and local markets.

Market entry in Belgium

Cooll has selected Belgium as a primary market to introduce it's TDHP. This is due to the following aspects:

- A favorable electricity-to-gas price ratio makes our TDHP highly competitive compared to electric and hybrid heat pumps.
- A significant part of the existing housing stock is connected to the gas grid and insufficiently insulated for electric heat pumps.
- Our inside product configuration matches with typical Belgian households that are currently heated with gas boilers.
- Subsidy incentives and lower VAT rates enable attractive initial costs for early adaptors.

Interested to work with us?
Cooll seeks partners to support market introduction with 50-100 installations in Belgium, including **installation companies**, **wholesalers**, **utilities** and **funding partners**. Please contact one of us to explore any opportunities!

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