

# Heat pumps in a gas fired country

**The Netherlands country report 2021**

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## Key messages

- *Gas-free* policy stimulates all-electric and sustainable heat options.
- Municipalities and neighborhoods go “off the gas”. Strong coalitions between municipalities, building owners, grid operators, builders, installers, manufacturers and end users to develop and scale up *Off the Gas* affordable solutions.
- Heat pumps need to be more affordable and acceptable in existing building stock -> subsidy support schemes for small renewable heating options, R&D funding programs.
- Public-private cooperation on training centers for installers, awareness campaigns, monitoring and data, and more.
- Innovation programs are mission-driven

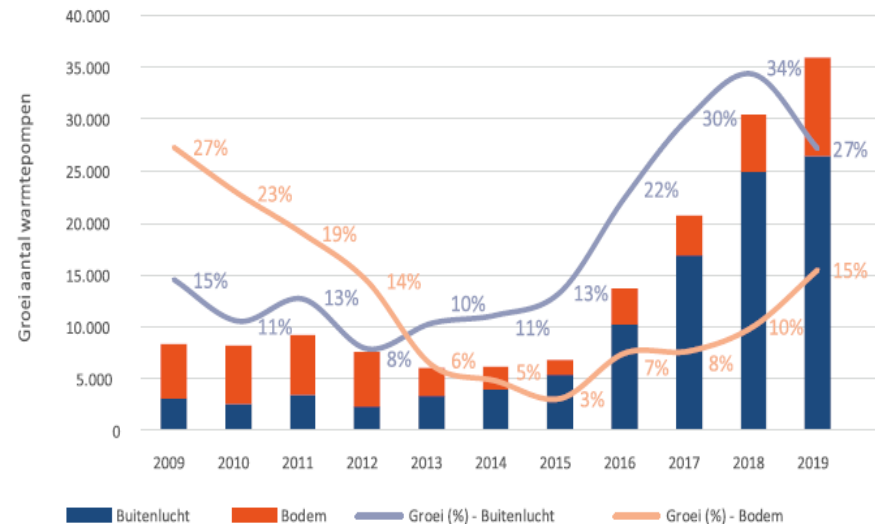
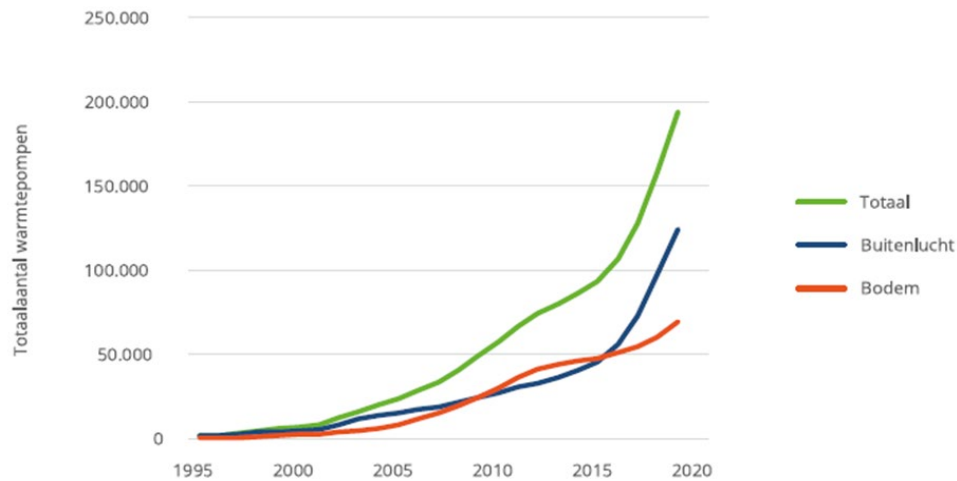


## The Netherlands

- 41,865 km<sup>2</sup>
- 17.5 million inhabitants
- 8 million homes
- 7.2 million gas boilers
- 400,000 district heating
- >200,000 heat pumps



# Market statistics



Source: Warmtepomp Trendrapport, 2020



# Policy: 2030->2050 mission

- 100% “off the gas grid” in 2050; 1.5 million existing homes “off the gas grid” in 2030 (out of 8 million total).
- New homes already all-electric/district heated.
- [Experiments](#) with districts going “off the gas grid” within the ‘*Proeftuinen Aardgasvrij*’-program. Third and final round in 2021, total budget: €270 million.
- [Extensive grant scheme](#) for heat pumps (up to 40% of upfront costs) until 2030. Budget in 2021: 124 million, including insulation. Condition: quality of installation.
- [Innovation tenders](#) stimulating consortia to develop integrated energy systems for different types of houses, buildings, communities, industry. appr. €20-40\* million (of 600 million) (2019-2021)
- Tax incentive: gas up, electricity down
- PPA-type pilot and monitoring projects on (hybrid) heat pumps are being implemented
- April 2021, new noise standard: outdoor units maximum of 40 decibels at the property line



## Some innovative products by Dutch industry

- **Hybrid heat pump technology** for existing houses, to make the transfer from gas to all electric concepts more affordable.
- **Booster heat pump technology** and development of **4<sup>th</sup> generation smart grids with thermal storage**, which started with ideas on how to reduce transportation losses in heat distribution systems.
- **Very low capacity water-to-water heat pump**, using heat sources of 25 to 40 °C at the evaporator side for the DHW production, which is stored in a storage tank with a capacity of 100 – 150 litres.
- **Combination with PV(T)**. Smart schemes determine whether the available energy is used for tap water, heating or regeneration of the source.
- **High-temperature cascade heat pump**. Development of a full-electric high temperature heat pump and control technology with high efficiency (>COP 4.5) for generation of domestic hot water (65°C) in individual and collective systems, as well as simultaneous generation of tap water (65°C).
- **Zero-on-the-Meter (NOM)** renovation (total approach façade, roof, HP packages).



# Focus mission driven innovation programs

Affordable heating and cooling: better performance, reduction costs by innovation & integration

- Heat pumps with **low-GWP/natural refrigerants**. CO<sub>2</sub>, propane for residential sector
- **Noise reduction** due to Noise standard <40 decibels.
- **Use in existing construction**: miniaturization of components as heat exchanger and total system size; the aim is to achieve a halving of the volume for the devices to be used, compared to the current state-of-the-art;
- **New principles/new applications** existing techniques that are more efficient, quieter, cleaner, more compact and/or cheaper: **thermo acoustic technology**, sorption cooling; heat exchanger with nanofluids, magnetocaloric heat pumps.
- Application of heat pumps for **flexibility**, combined with smart grid technology and **thermal storage**
- Better price/performance ratio of heat pumps (at installed level); plug&play, integrated packages

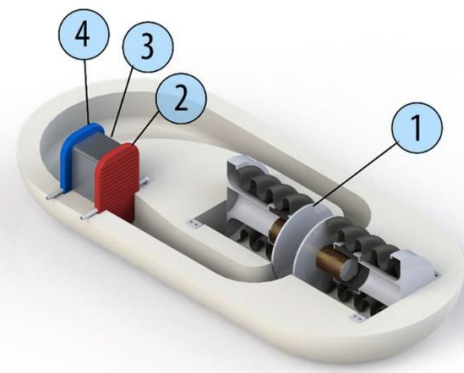
see also: [www.hpt-annex46.org](http://www.hpt-annex46.org) (English)

[www.heatpumpingtechnologies.org](http://www.heatpumpingtechnologies.org)



## Mission-driven : thermo acoustic technology

- can be easily and effectively incorporated into any renovation concept;
- is adaptive to the source systems and the delivery systems in the home;
- contains all the technology to thermo-acoustically regulate heat and cold;
- has a market-based COP and, due to its temperature flexibility, has a higher than average SCOP. The thermal capacity is geared to market demand;
- contains no harmful refrigerants and greenhouse gases (no GWP);
- can be used flexibly in terms of temperature range, sources and release, temperatures up to 80 ° C can be supplied;
- has a continuously adjustable output power;
- has a silent effect;
- is suitable for different installation types in terms of dimensions and weight;
- is affordable in terms of cost price for mass production.





# Mission driven: integrated W-W HP/PVT package

**A sustainable, affordable and user-friendly integrated package to convert the existing home to energy-neutral with regard to the building-related installations. PVT panel, lightweight and higher efficiency.**

- (Prefab) roof in which PVT and piping are integrated.
- Water-water heat pump including (tap water) buffer that is suitable for alternative sources, integrated and durably insulated.
- Software / Hardware link sources and W-W heat pump for high efficiency.
- Multifunctional SKID with standing / lying boiler for optimal integration into the home.



# Mission driven: enabler for heat pump Digital<sup>®</sup> evolution renovation



- During renovation to Zero-on-the-Meter (NOM), homes will be provided with a new outer shell. The aim is to design the best possible fitting façade and roof that will be placed against the existing façade and roof.
- Prototype of a new scanning method based on dynamic scanning and of the automatic conversion of scans into 3D-BIM objects for NOM renovation projects;
- Verification of the expected performance of the new scanning method and translation of scans into 3D-BIM objects in practical tests with regard to the expected benefits faster, better and cheaper, resulting in a report;
- Identification of additional optimizations required in the new scanning method and translation of scans into 3D BIM objects, recorded in a report. Where possible, optimizations are realized in this project.





# More information

## Climate agreement

<https://www.klimaatakkoord.nl/documenten/publicaties/2019/06/28/national-climate-agreement-the-netherlands>

## New: updated website (in English)

[www.hpt-annex46.org](http://www.hpt-annex46.org)



# Questions?



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