Dutch local energy transition

Multi level instruments and perspectives

Netherlands Enterprise Agency

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The Netherlands

Most gas dependent country in Europe

7.9 million existing homes 90% with individual gas boilers;

0.57 million non-residential buildings (production halls, offices etc.);

End of national natural gas production;

Climate targets, increasing share of renewables

Energy crisis, fluctuation of price of natural gas;

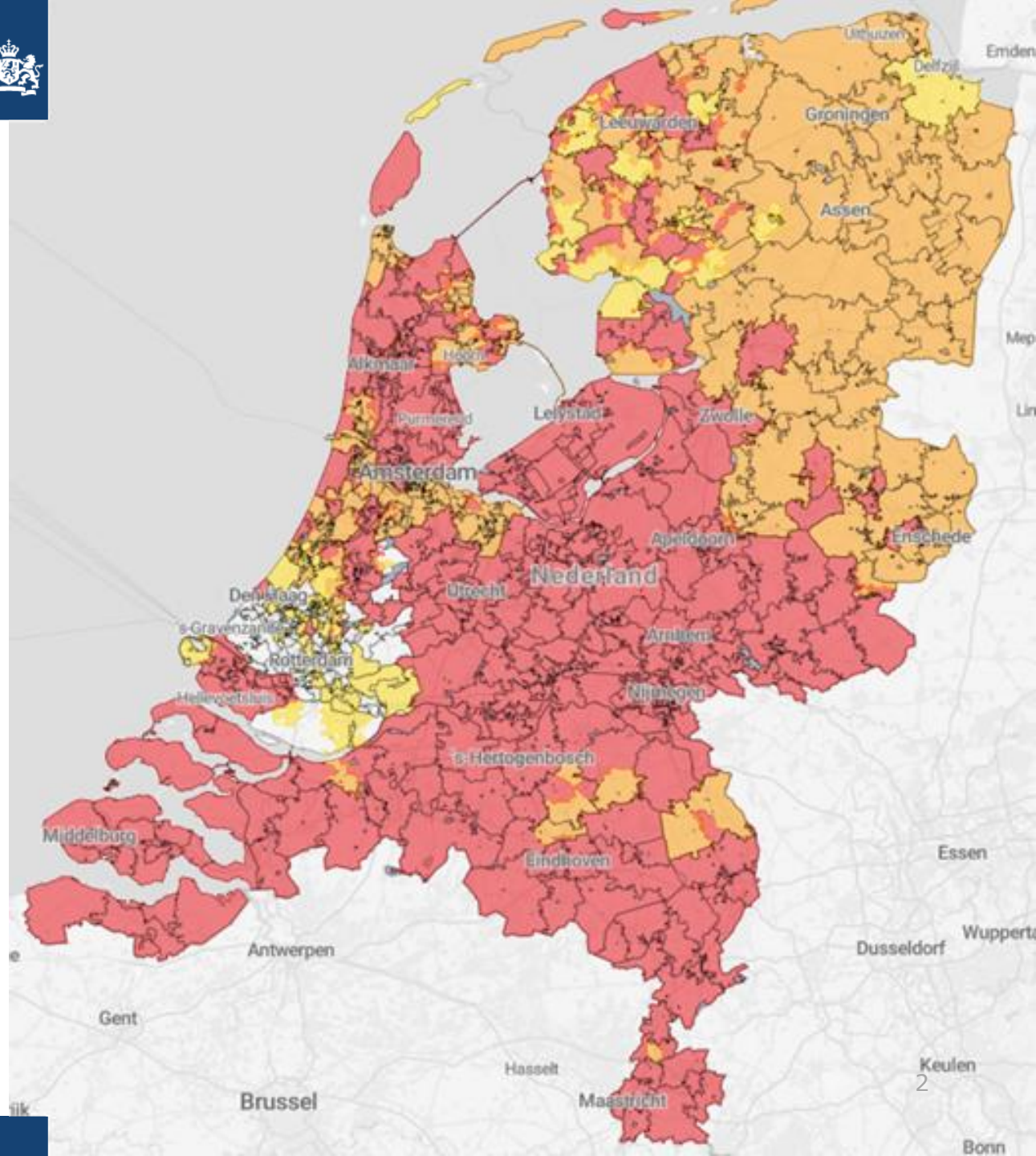
Netting arrangements for solar panels and load infrastructure;

6% district heating;

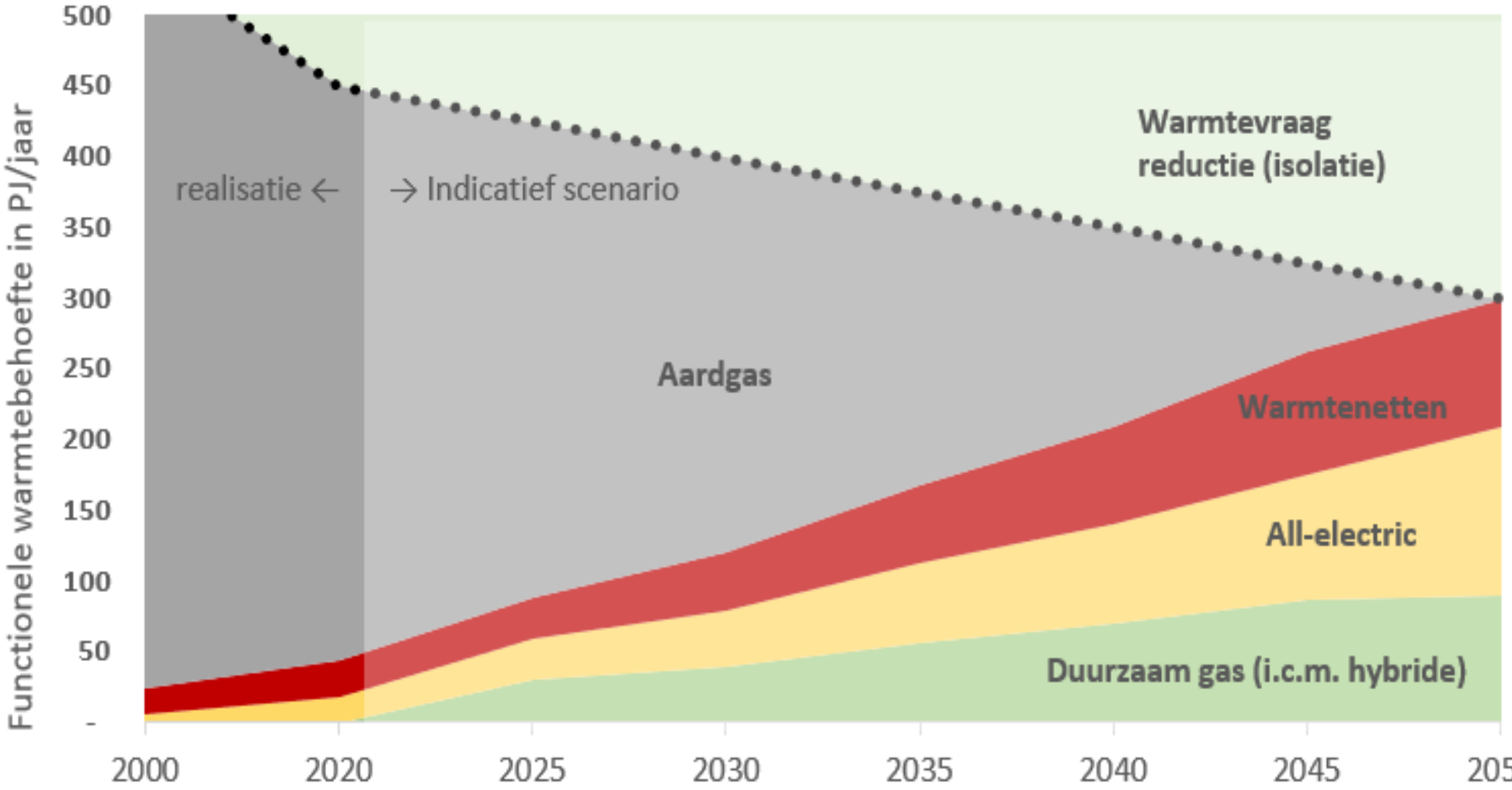
Deployment of (hybrid) heat pumps, energy hubs;

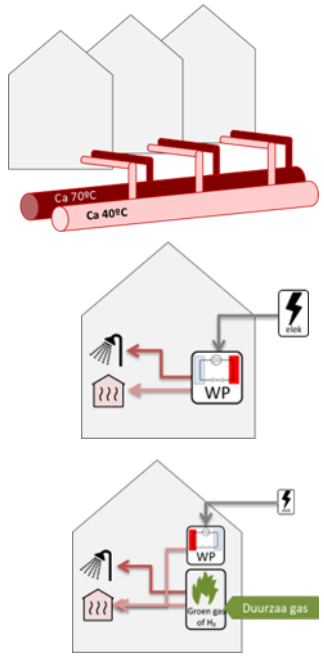
Urgent action infrastructure: building faster, better utilisation, smarter insight.

Actual capacity figures from grid operators can be found on de following website, grid lower than 110 kV: https://capaciteitskaart.netbeheernederland.nl/

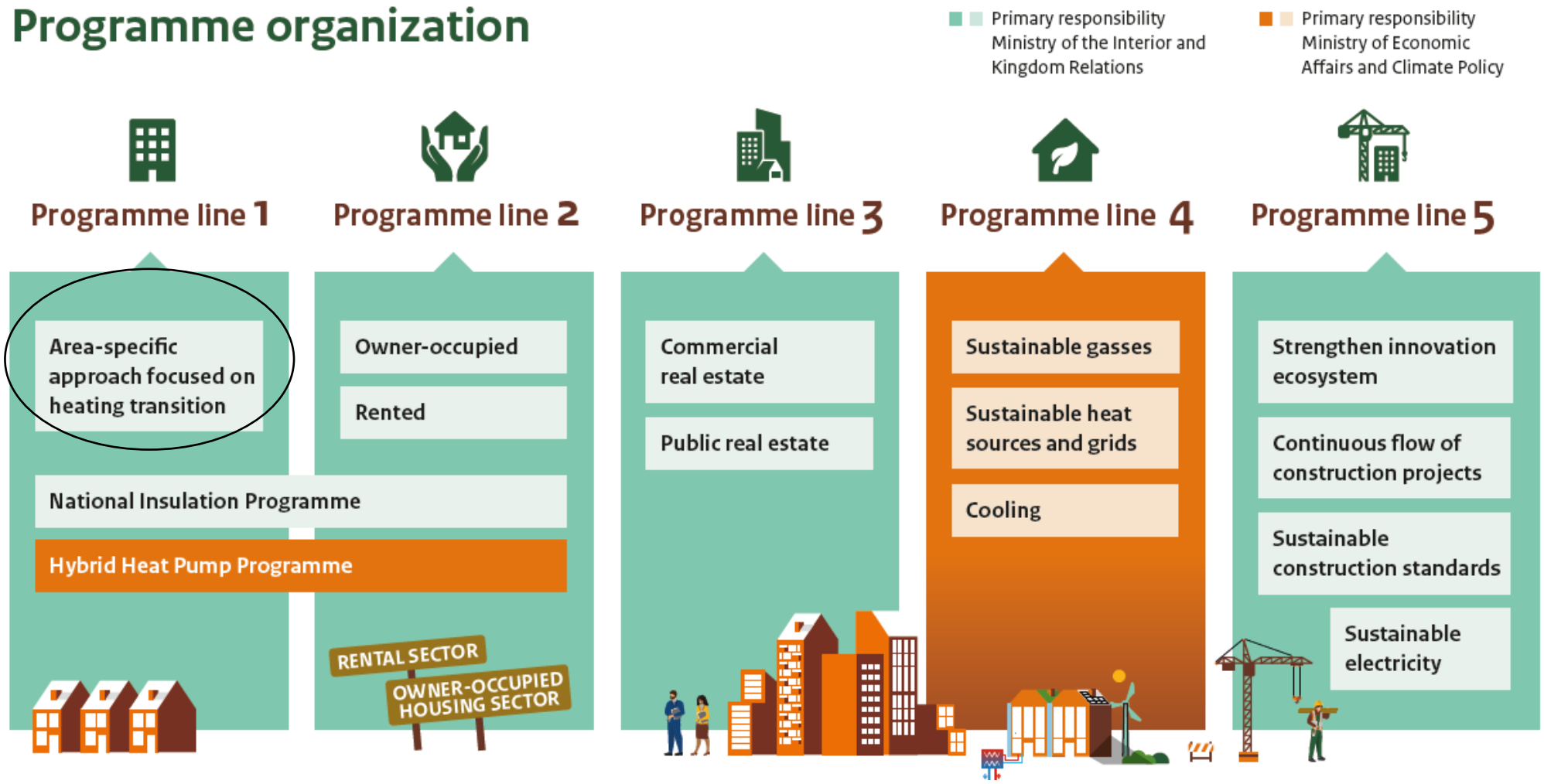


Challenges and Goals





The Dutch Approach



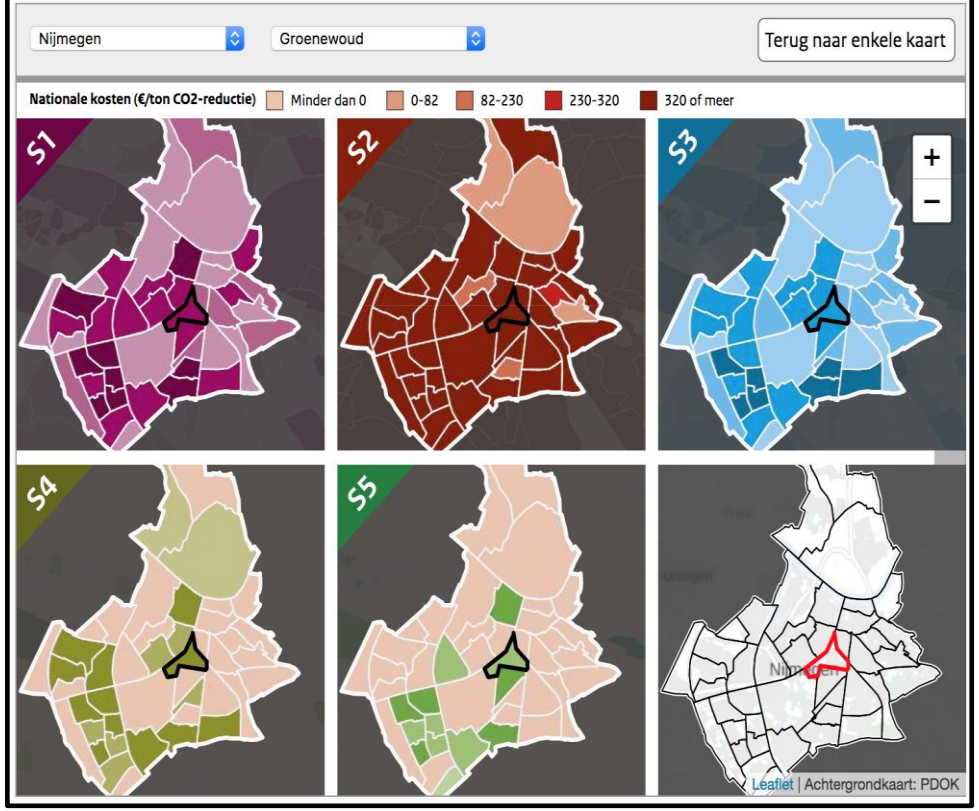
Multi-level governance
how do NL municipalities select the most suitable technology in the area –specific approach?

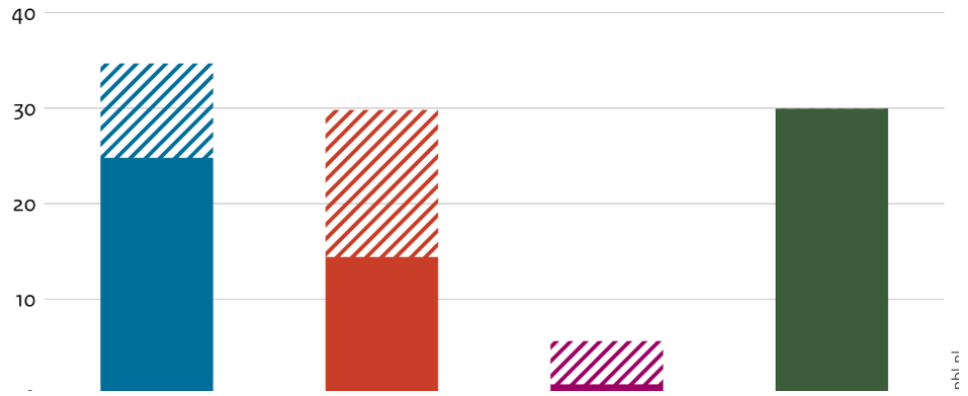
Locally-led Governance of Heat Transition

"Start analysis" an open access model by the Netherlands Environmental Assessment Agency (PBL) with RVO support.	Goal: preferred heat concept for all 342 NL municipalities based on lowest national costs	Result: 4or5 main options with variants for nearly 14.000 neighborhoods based on (national) data
Process	Validation enriched by local data and local stakeholder analysis	New insights (share of renewable gas, insulation rate, climate adaptation e.g. cooling demand);
National lowest costs <-> End user costs	Challenges (space utilisation, legislation, grid congestion).	Broader Focus -> Climate adaptation, resilience, circularity

-> Approved local implementation plan	Support by National local heat transition programme

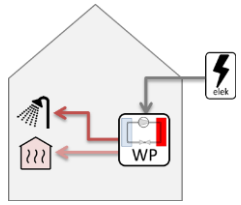
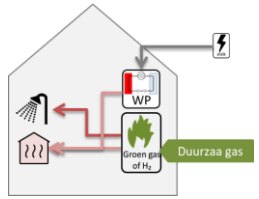
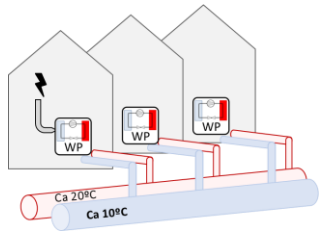
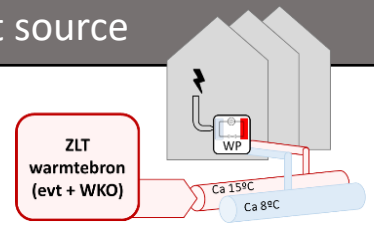
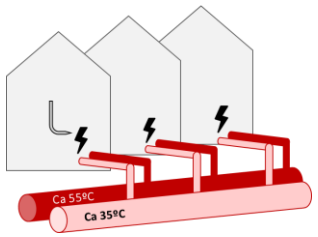
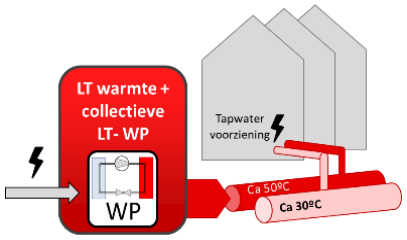
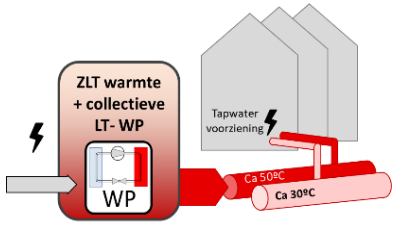
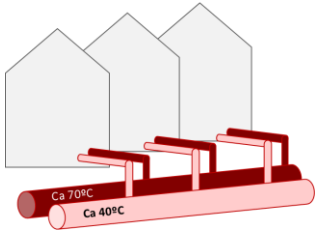
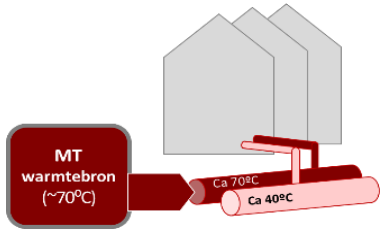
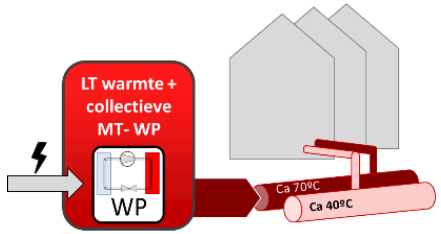
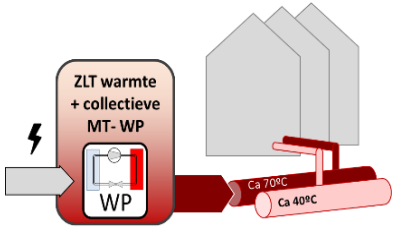
[Startanalyse aardgasvrije buurten 2020 | Planbureau voor de Leefomgeving (pbl.nl)]





EHP * L/MT * ULT * HHP

National assessment model -> local support (updated version 2025)

	Main options	Variants for individual heat pumps		
Individual	Individual heat pump with individual source		Air source	BTES (borehole thermal energy)	Solar thermal (PVT)
Individual	Hybrid heat pump with individual source + sustainable gas		**Sustainable gas:** By 2050 the gas will be either green gas or hydrogen, but currently this is not yet a question for municipalities, as green gas is fed into the grid and not specifically for 1 neighbourhood, and hydrogen is not yet available in general (only the two pilot neighbourhoods are working on this)		
		Variants for heat grids based on the heat source		
With collective heat grid	ULT heat grid with individual heat pumps			
With collective heat grid	LT heat grid with solution for hot water			
With collective heat grid	MT heat grid				

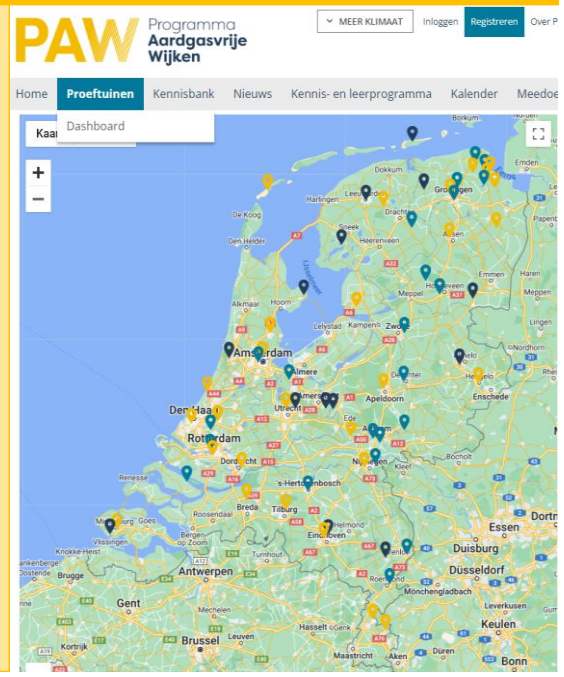
National programme Local *Heat* Transition
Interdepartmental learning programme:

- Ministries VRO, KGG & RVO
- 342 Municipalities (VNG) ; 3500 districts
- Program local heat transition (NPLW)
- Housing sector, industrial sector
- Knowledge institutes

- Grid operators
- Top sector urban energy (innovation)

64 natural gas free pilots
Learning by doing:

1. Organisation and the role of the municipality
2. Technology
3. Finance
4. Legal issues
5. Participation and cummunication



[Proeftuinen op de kaart - Programma Aardgasvrije Wijken]

Legal
Multi-level policy instruments regarding pricing, sustainability, security of supply and organisation of the heat market.
e.g. **New Heat Transition Act** whereby a *municipal authority has the right to designate areas with existing homes to be disconnected from the gas grid.*

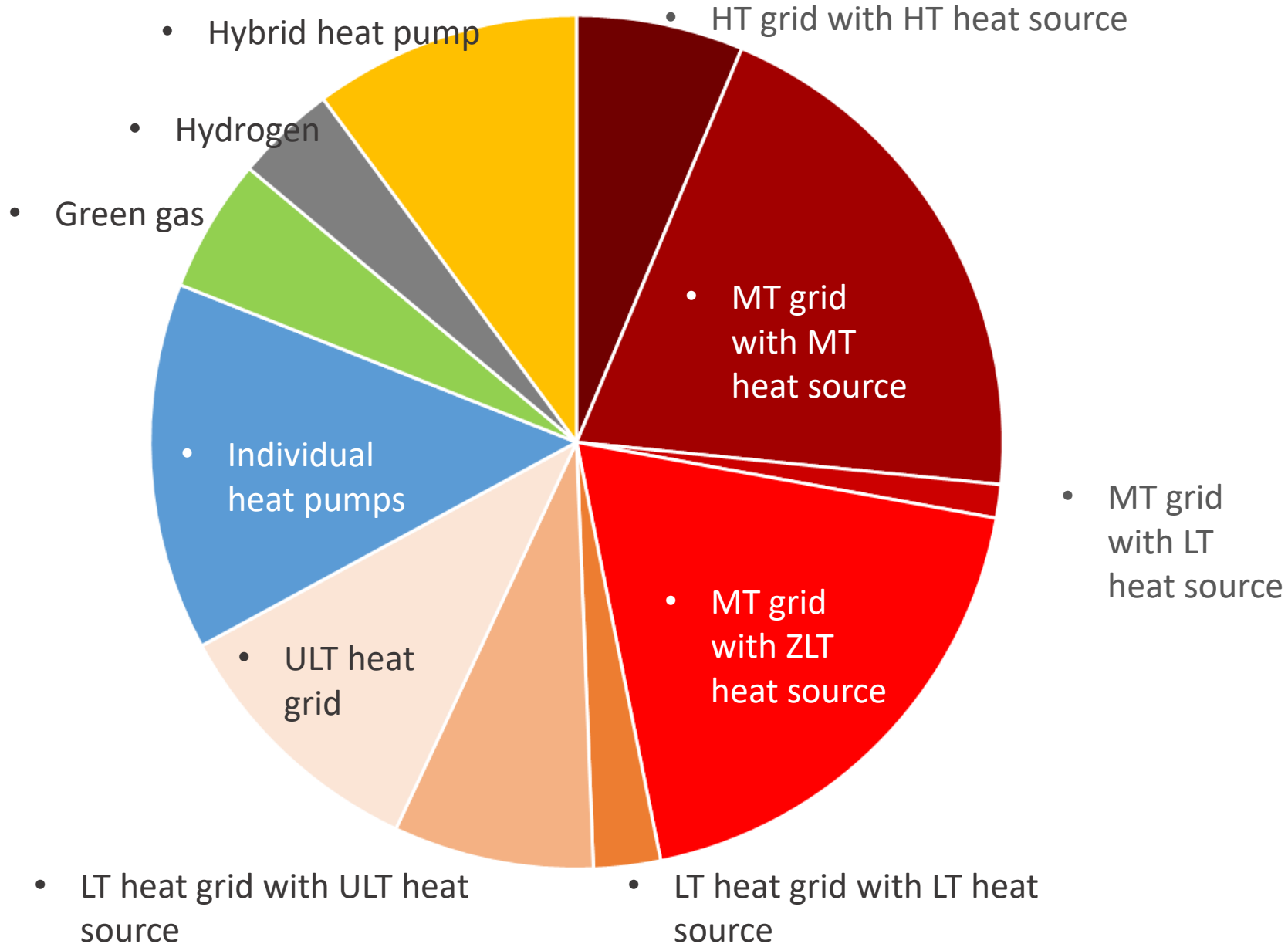
Finance
Subsidy scheme alignment: e.g. heat source – grid - costs within the building; pooling applications
New finance schemes (e.g. heat fund).

Organisation & participation
Municipal local heat (& cooling) plan -> approved implementation plan;
Bottom-up process; more essential role grid operator.

Technology
(Area-based) assessment technical options
Integral Knowledge & Innovation agenda.
Studies and innovation tenders.

64 Pilots in relation to National Energy System 2050

- Vision for the National Energy System in 2050
- Integration of all sectors: mobility, industry, built environment, agriculture
- Based on demand of resources per sector (year, month, hour, peak demand)
- Amount of heat, electricity and gas for Built Environment depends on chosen technologies



(Hybrid) Heat Pump Action Plan

Main goal

- Remove barriers for further increase of heat pumps

Main Action

- Communication and monitoring
- Facilitate more supply
- Facilitate more demand
- Collect, validate and sharing knowledge
- **The impact on the energy grid (monitoring and smart apply)**
- **->** enable heat pumps' flexible electricity demand
- **Dutch technical standardisation process**

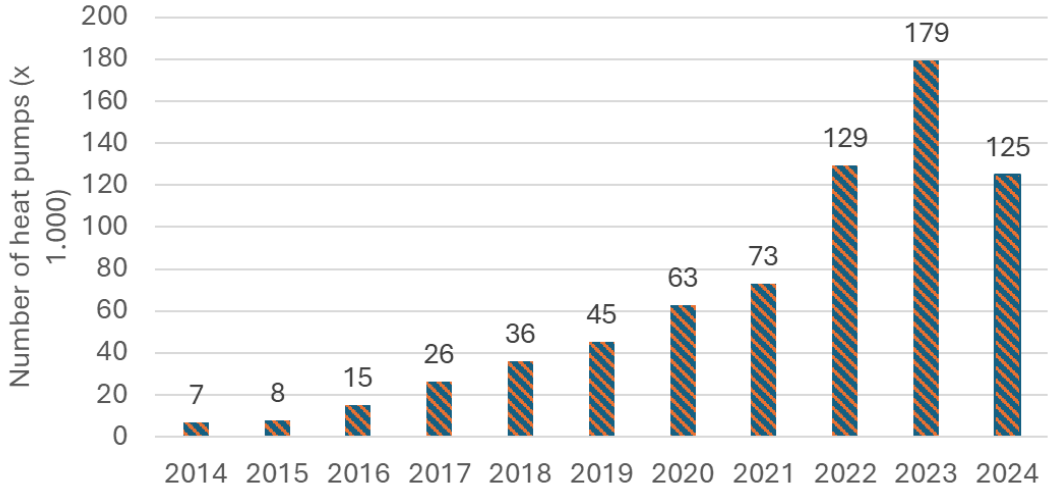
Sub Goals

- + 125.000 (Hybrid) Heat Pumps in 2022 – 2024 to appr. 1 mln. in 2030
- Broad monitoring
  - Number of (H)HP installed
  - Number of qualified professionals
  - Development of price/installation costs
- Decrease of costs
- More qualified professionals
- Scale-up of the production of HP
- Development of knowledge (data) platform

Partners

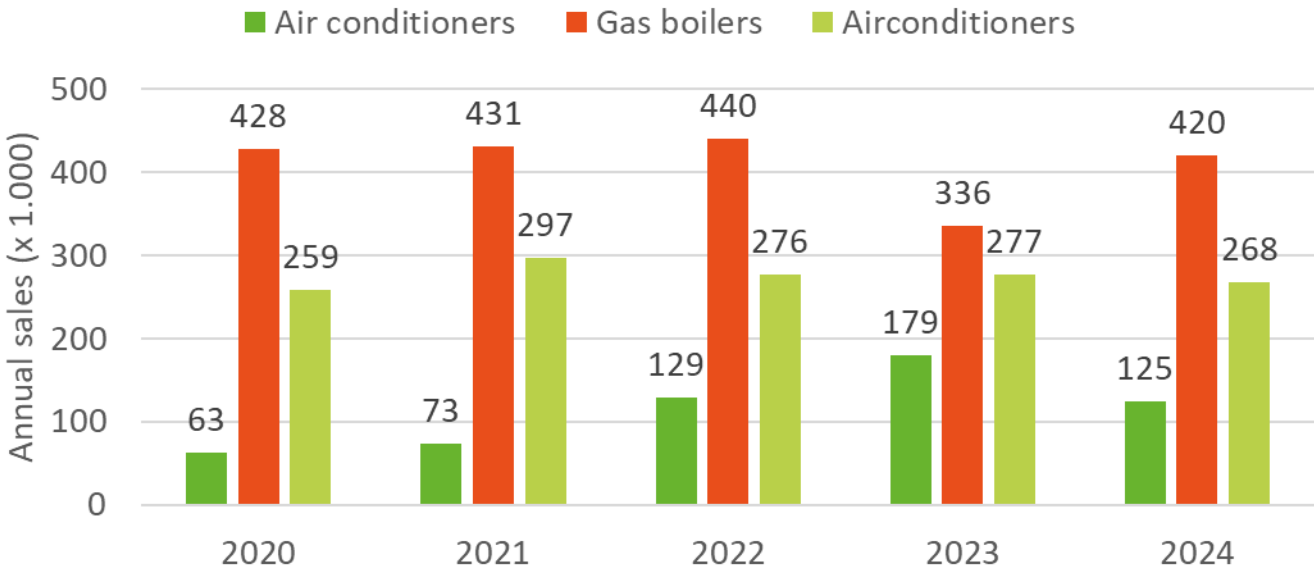
Techniek Nederland · De Nederlandse Verwarmingsindustrie · Vereniging Warmtepompen · Netbeheer Nederland · NATUUR & MILIEU · Ministerie van Economische Zaken en Klimaat · Ministerie van Binnenlandse Zaken en Koninkrijksrelaties · Rijksdienst voor Ondernemend Nederland

Heat Pump Sales



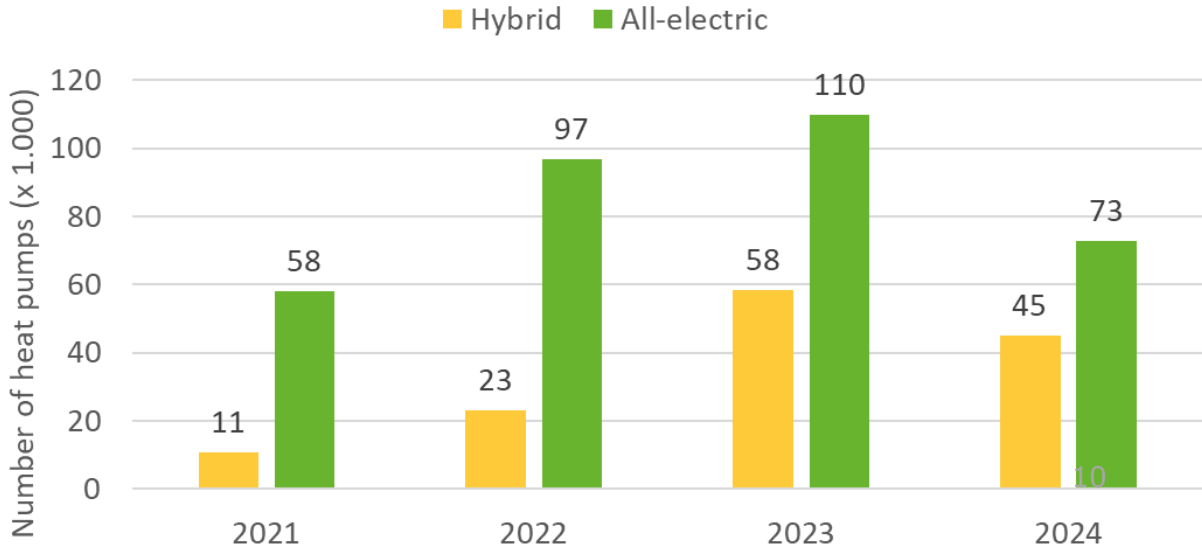
Appr. 1 in 12 dwellings in The Netherlands.

Inter-relation of sales of different heating devices in the Netherlands



The heat pump sector faces the following challenges:

- enabling heat pumps' flexible electricity demand to help shift demand peaks in order to reduce grid congestion as part of a public-private National Action Plan electricity grid management.
- Improvement of the quality of the installation (including hydraulic system).



Source: Nationaal Warmtepomp Trendrapport 24/25, DNE Research

Integral Knowledge & Innovation Agenda

RVO & Top sector Urban Energy

- **Mission- driven** tenders, pilots, public/private/knowledge consortia: 3 examples

DACS-HW: pilot of 100 heat pumps' flexible electricity demand to reduce grid congestion.

1. Open standard communication protocol heat pump (brand and type independent)
2. Interface between houseowner (app) and installation (firmware)
3. GOPACS algoritm, flexcapacity on low voltage grid level

TDI500: Chain approach **installers.**

Consortium of 9 installation companies (#2M) aim to *500* (hybrid) heat pump installations a day.

1. Intakeproces**.** Data driven tool to automate the intake and work preparation process
2. Installationprocess. Redesign of installation process, prefabricage, supply chain contracting, automatic commision
3. Datastore. Shared datastore for predictive maintenance and interface for house owners.
4. New installation concepts.
5. Chain approach. Chain approach e.g. functional requirements on components, asset registration, circularity.

CHILL: standardisation (U)LT heating/cooling grids.

1. standardized, affordable and future-proof solution for built environment.
2. Method development planning, design, development and construction
3. System component innovation.
4. Decision tool end user.

Summary of the **Dutch Approach**

- National Support Programme for all the 342 NL municipalities on area-based **heat** planning moves to bottom-up **energy** transition (including resilience, climate adaptation);
- Tension between municipal plans and existing policy and regulation. Preparation of Heat Transition Act with the potential municipal authority to designate areas to be disconnected from the gas grid; National Action Plan Electricity grid management;
- (Thematic) lessons learned from frontrunners on legal, finance, organisation (e.g. 64 pilot neighborhoods);
- Learning programme & studies e.g. Configurations of ULT, LT, MT heating (& cooling) grids - properties, pros and cons; **(U)LT heating**: insulation, emission system and thermal comfort, tap water options, space cooling**;**
- Subsidy scheme allignment e.g. joint application instead of individually (ISDE);
- (Individual) heat pumps sales -> enable heat pumps' flexible electricity demand to help shift demand peaks (Dutch technical standardisation process);
- Innovation (Integral Knowledge & Innovation agenda) – Mission-driven tenders, pilots, public/private/knowledge consortia;

Discussion

Country/context/locally specific or more general issue

- Financial resources,
- Knowledge and expertise,
- Legislation & pre standaardisation;

- How to accelerate bringing new insights/innovations into planning and decision-making models (and into the market);

Thank you!

Netherlands Enterprise Agency

Cities TCP
Decarbonising Cities & Communities