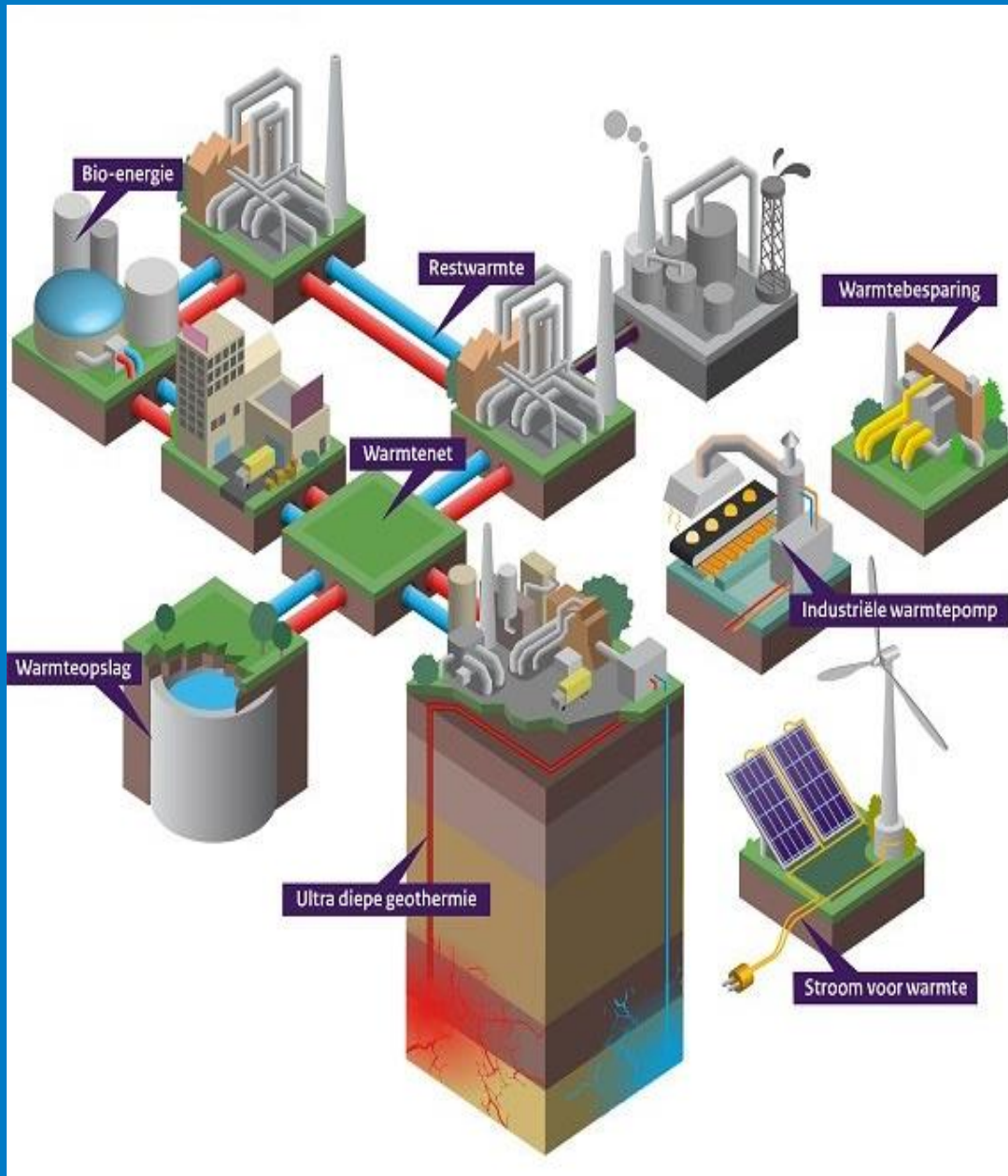




Ministry of Economic Affairs  
and Climate Policy

# Geothermal Energy in the Netherlands



Ruud Cino

Deputy Director,

Directorate Sustainable Heating and  
Subsurface Policy



# Outline of the presentation

- › Climate Agreement
- › Challenges for the built environment
- › Opportunities for geothermal energy
- › Innovation and International cooperation





## Guiding principles

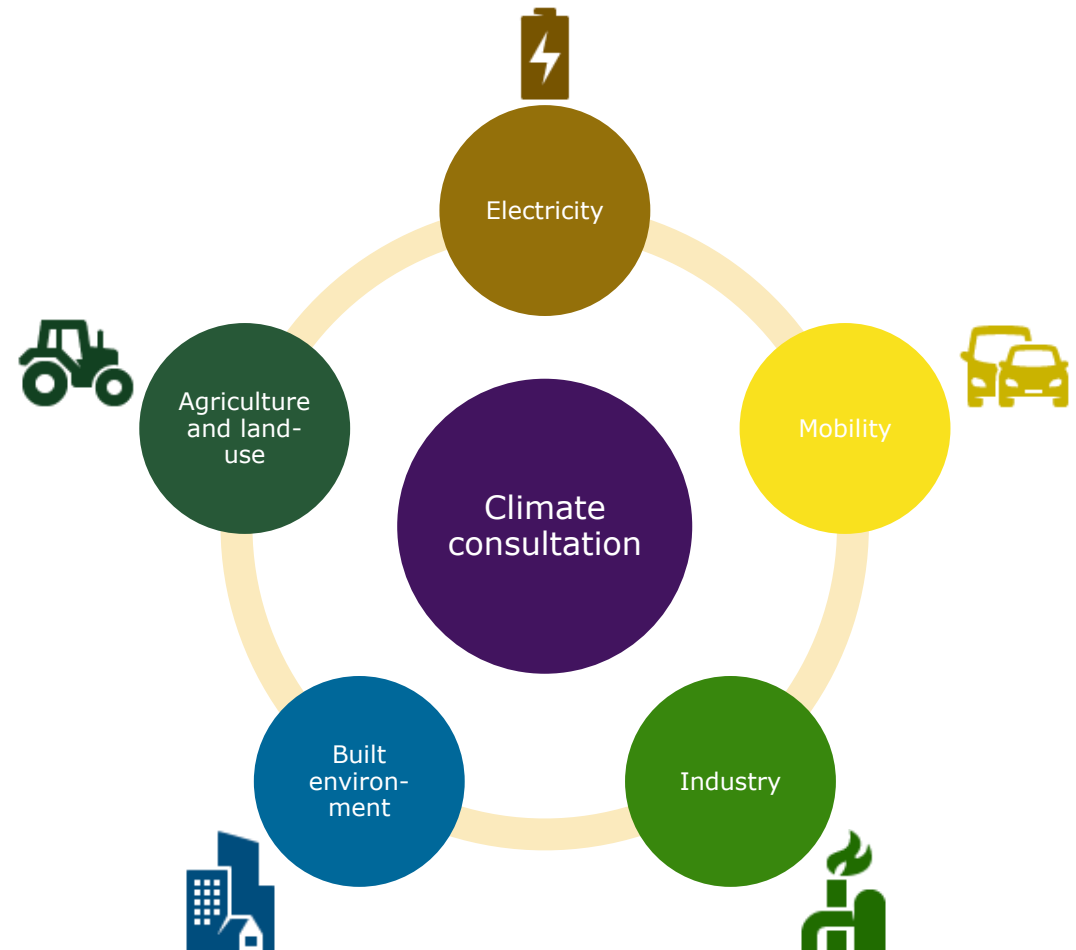
- **Single CO<sub>2</sub>-target, no sub-targets on renewables or energy efficiency** (49% CO<sub>2</sub>-reduction in 2030 relative to 1990)
- **Lowest cost solutions** (national costs limited to 0,5% GDP through tentative, cost-effective sectoral targets)
- **Just transition** (keeping energy bills for households in check)
- **Minimizing leakage for businesses** (safeguarding a level playing field)
- **Maximizing economic opportunities** (new export products and innovation)





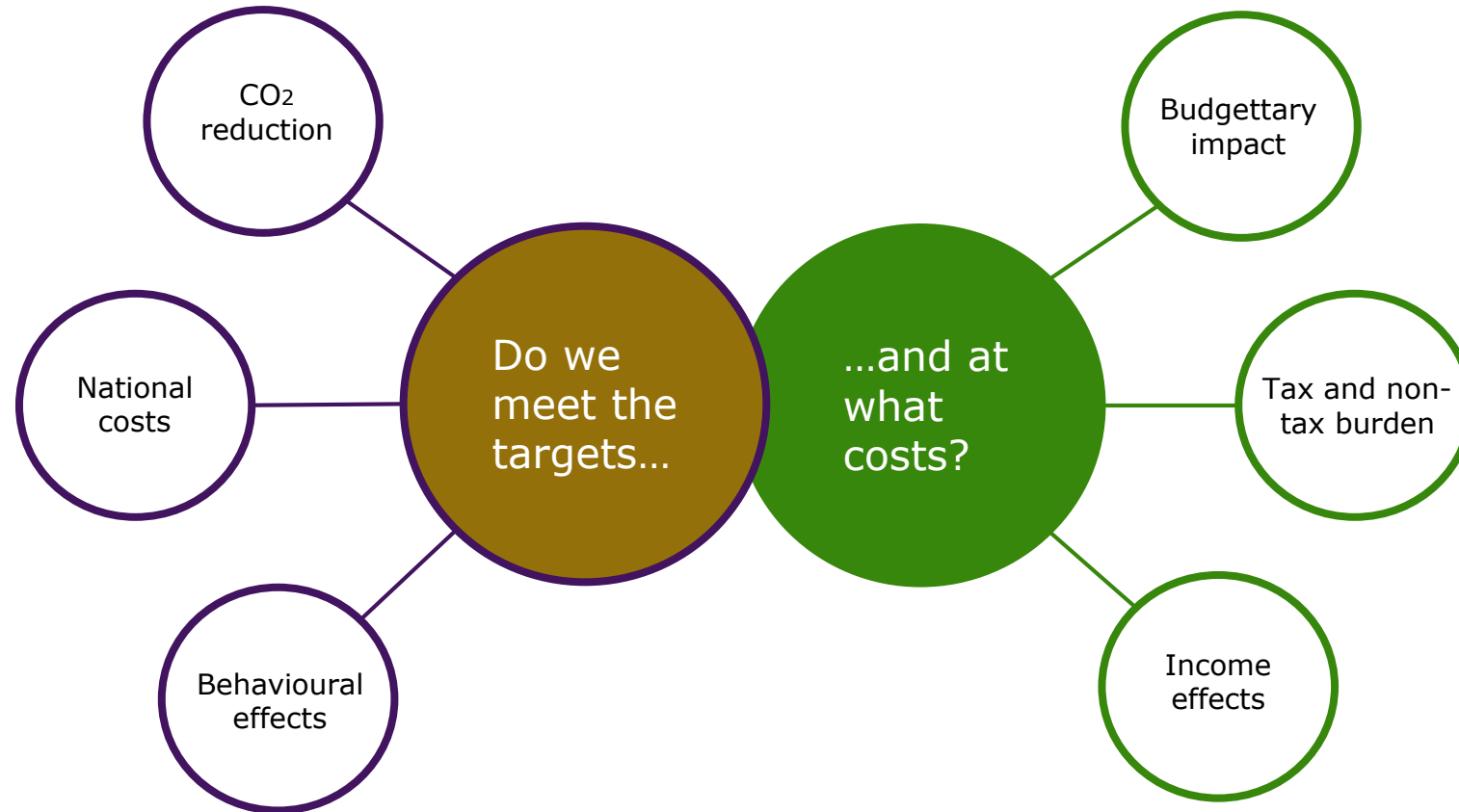
## Process

- **Broad societal support** (through intensive stakeholder process with over 100 involved parties, 1,5 year of talks)
- **Independently organized process** (facilitated by Social Economic Council and led by independent chairs)
- **Step-by-step process with several milestones** (each step followed by political debate)
- **Five (+ one) sectoral tables** (see figure)
- **Stakeholders were involved based on criteria:**
  - a) They can reduce emissions and/or enhance societal support
  - b) They can provide knowledge and expertise
  - c) They have a mandate to make deals





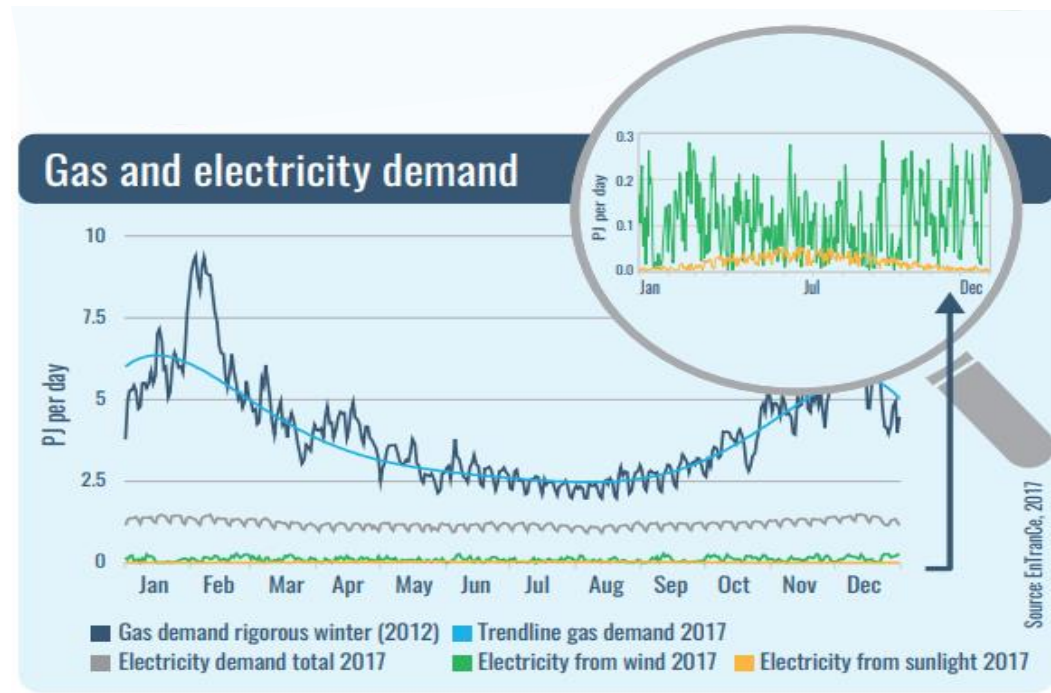
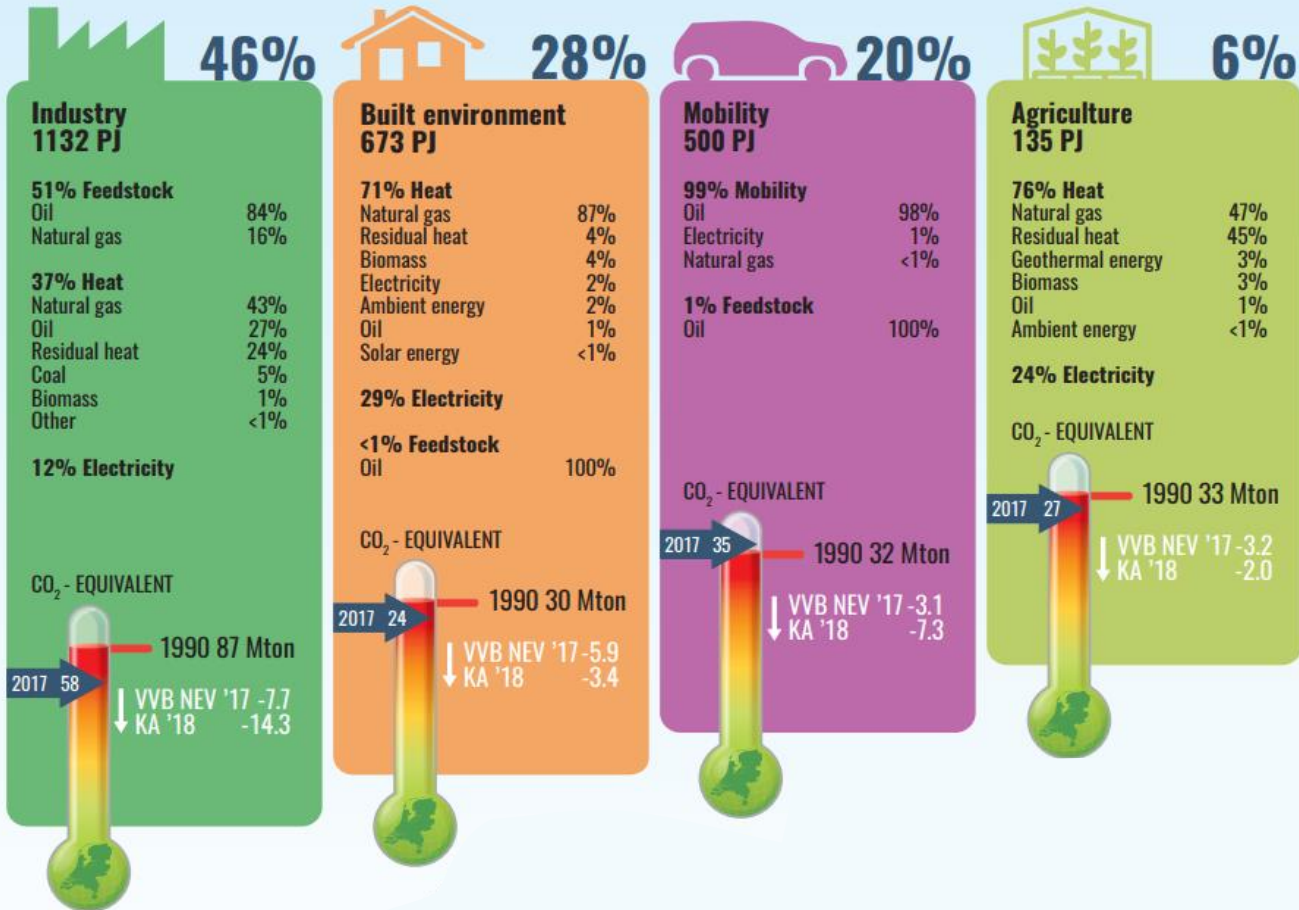
# Independent assessors







# Final demand 2440 PJ



Source: EnTraNDe, 2017



- Phasing out coal-fired electricity production by 2030
- Accelerating renewable energy (subsidized until 2025) to 70% in 2030
- CO<sub>2</sub>-minimum price for electricity-production



- Sustainable heating in greenhouse horticulture
- Improved processing of manure to reduce livestock-emissions
- Exploring storage of carbon in soil and vegetation through pilot programmes and increasing forested surface



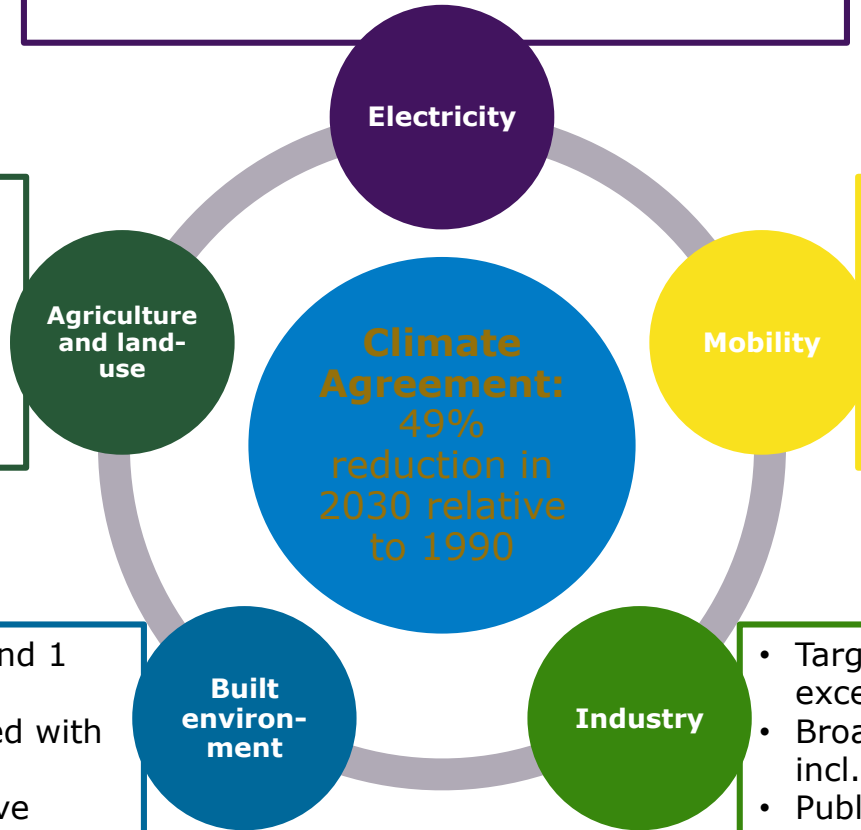
- 100% new-sold passenger cars zero-emission by 2030
- Promoting EV by taxation measures and 1,8 million charging points by 2030
- Modal shift to bicycle/public transport and smart logistics



- Enhancing EE of 1,5 million houses and 1 million utility buildings
- New buildings will no longer be heated with natural gas
- Municipalities lead a local, participative approach to make housing emission free, neighborhood by neighborhood



- Targeted carbon levy on every ton CO<sub>2</sub> emitted exceeding a fixed reduction path (push)
- Broadening the scope of subsidy scheme (SDE++) incl. limited subsidy for CCS (pull)
- Public-private innovation program for cost reduction in low carbon technologies
- Industrial cluster approach (incl. sector coupling)





# Agreements Built Environment Sector

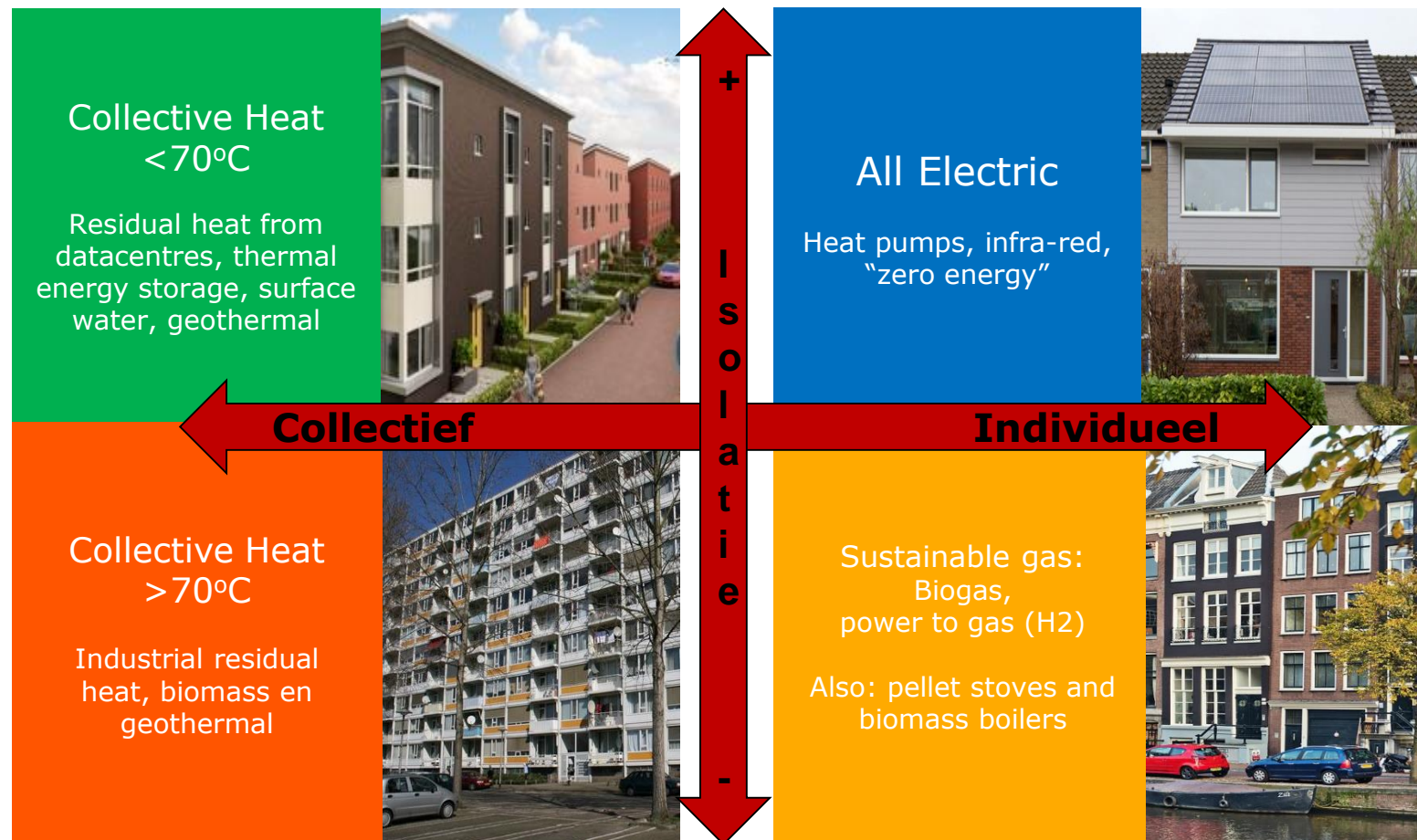
- Enhancing EE of 1,5 million houses and 1 million utility buildings
- District by district approach, municipalities are in charge, heat plans in 2021
- Geothermal energy as a source for district heating
- Switch from high temperature to low temperature (district heating) systems







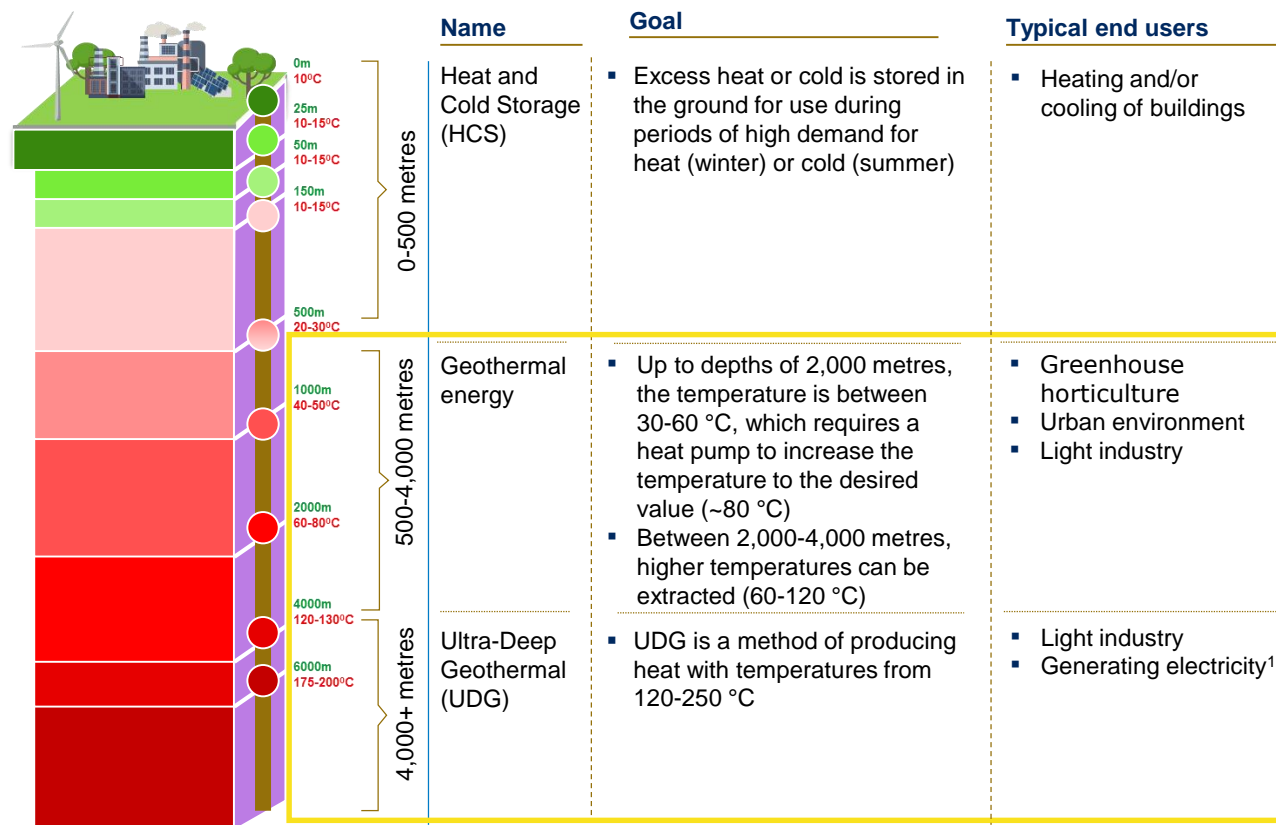
# Alternatives for heating with natural gas





# Geothermal energy in the Netherlands

- 22 projects in use ( $\approx 4$  PJ)
- 5 in test phase, 11 in preparation
- Current depth between 2000 and 3000 m
- Temperatures 70 – 90 graden C
- Projects becoming larger and larger:  $> 30$  MW



SOURCE: [www.hoewerkaardwarmte.nl](http://www.hoewerkaardwarmte.nl)



# Geothermal in de built environment

- Substantial *potential* share of district heating in 2050 (15 tot 45%)
- Geothermal: important source for district heating
- Without feed in district heating, little growth geothermal energy
- Currently only geothermal projects connected to greenhouses
- Still no district heating system connected to geothermal

	2030	2050
Letter to Parliament	15 PJ	110 PJ
Climate Agreement	20 PJ	135 PJ
Masterplan (sector)	50 PJ	200 PJ



- 30 PJ Industry
- 80 Built Environment & Horticultural Sector





# Policy: to strengthen and accelerate

Target: **20 PJ in 2030; 135 PJ in 2050**

- On top of regular subsidy and guarantee schemes
- Special legislation for geothermal (before equal to oil and gas)
- Exploration of subsurface: SCAN
- Innovation Roadmap
- Participation of EBN (state participation)





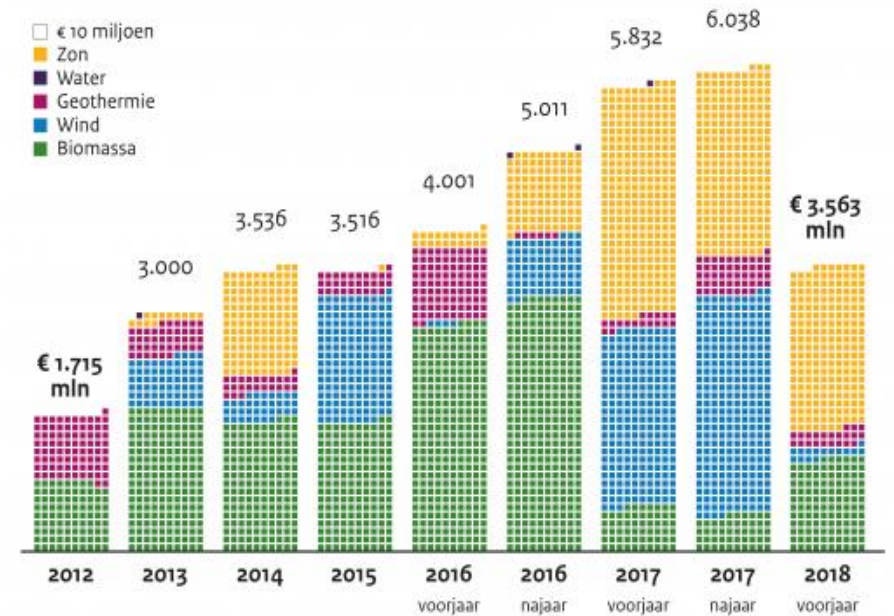
# Subsidy & guarantee schemes

## Guarantee Scheme

### To cover the geological risk (P90)

- 7 rounds, start in 2010
- 28 projects submitted, 11 realized
- **MC 147** cumulative reserve
- **4** claims

Verplichtingenbudget  
per technologie in de verschillende SDE+ -rondes



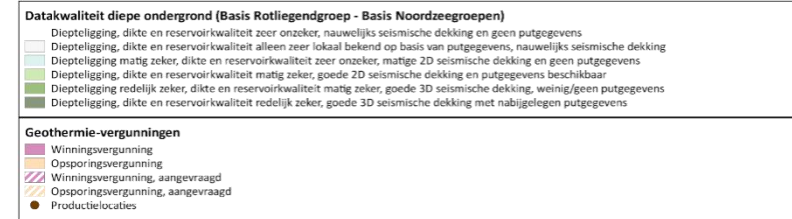
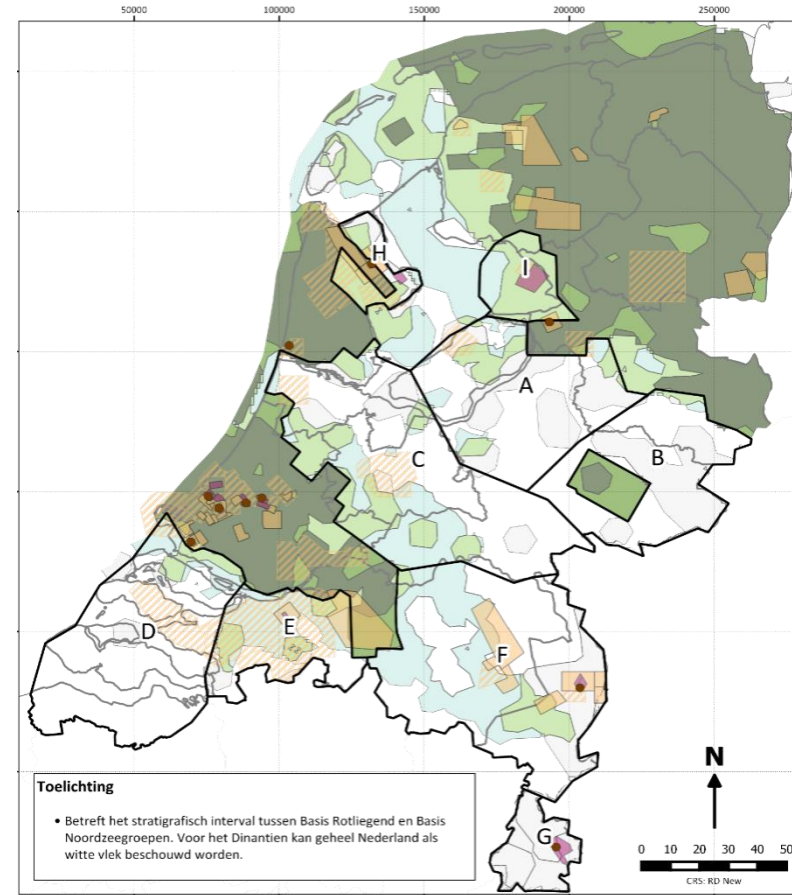
## SDE+/SDE++

- Subsidises production of renewable energy
- **27** projects, 770 MWth
- 21 projecten operational (2019)
- 0,033 euro/Kwh subsidy for geothermal



# Knowledge

- SCAN: Seismic Survey to increase knowledge of the subsurface
- Knowledge from oil and gas
- NLOG: central database







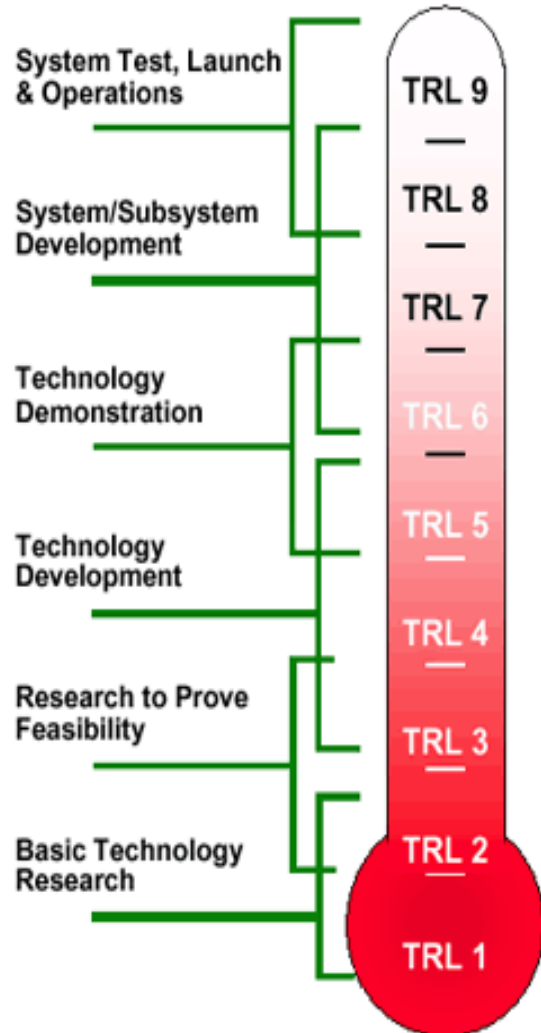
# Innovation

- OICW: Rijswijk Center of Sustainable Geo-Energy
- National Innovation Roadmap for geothermal energy
- National Innovation subsidies
- European Innovation programs
- Greenhouse as a source of energy





# Open Innovation Centre for Well Technology

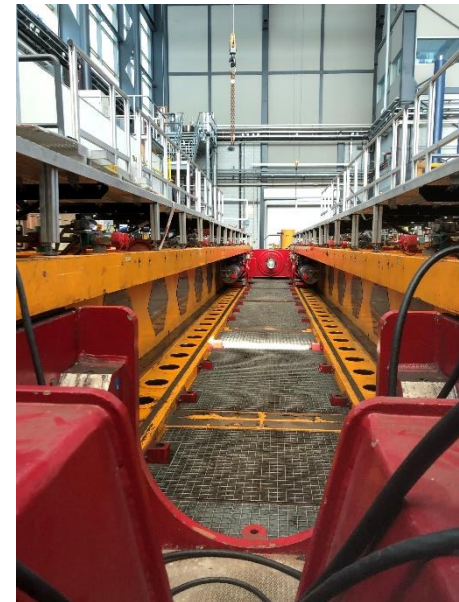


	Integrated drilling	Smart casing	Compliant sealing	Production optimization	Seismics
Geothermal production	■	■	■	■	■
Energy storage	■	■	■	■	■
CO2 storage	■	■	■	■	■
Hydrocarbon production	■	■	■	■	■

- > For industry and academia
- > Research and development
- > Test and qualification
- > Training and education

Focus on:

- > Geothermal, CCS / P&A, Reuse,
- > New well design





# Challenges

- Matching supply and demand, surface and subsurface
- Integrate greenhouses in district heating networks
- Scale up of heat networks, existing and new.
- Operating temperature of heat networks
- Rules and regulations



# Opportunities for international cooperation

- Horticultural sector: Knowledge and experience in the use of geothermal energy in greenhouses
- OICW: Rijswijk Centre of Sustainable Geo-Energy
- Knowledge regarding sedimentary systems and exploration
- Knowledge from oil and gas
- ?





Ministerie van Economische Zaken  
en Klimaat



Sustainable  
District  
Energy  
Conference  
October 23-25, 2019, Iceland

# HANDELSMISSIE IJSLAND

geothermie, warmtedistributie en glastuinbouw

22 - 25 oktober 2019

[www.hansagreentour.com](http://www.hansagreentour.com)