



Ministry of Economic Affairs

Geothermal Energy in the Netherlands

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Europe: 55% emisson reduction



- Within the EU, we are pushing for climate neutrality in 2050 and a 55% emission reduction in 2030 compared to 1990.
- Netherlands and Denmark both have high ambitions and should join forces
- Netherlands close to adopting a historic Climate Law: 95% emissions reduction by 2050.
- Emission reduction of 49% in 2030. Government, business and civil society are finalizing a joint action plan to realize this target.

Climate Agreement



The Netherlands: 49%





The Climate Agreement

- In 2050 8 mln buildings off natural gas (1,5 mln in 2030), CO2-reduction:
- Coalition Agreement: 50.000 newly built and 30.000-50.000 existing houses per year off natural gas.
- Afterwards 200.000 houses per year.
- RES: Regional Energy Strategies matching supply and demand
- Local governments are in the lead: heat transition plan (<2021)
- Towards sustainable heat in built environment: roll out per district
- Feed in of geothermal energy in district heating systems
- Future development: from middle temperature towards low temperature heating systems



Geothermal Energy in the Netherlands

- First well in 2007, now 22 projects
- 3 PJ production, +/- 150 MW_{th}
- Growing to 40 projects in next two years
- Depth 2000 3000 m, temp: 70-90 C
- Temperatures 70 90 degrees C
- Projects increasing in size: >30MW
- Mostly horticultural sector
- Target 15 PJ in 2030, 110 PJ in 2050
- Guarantee scheme and subsidy on production
- Exploration of subsurface: SCAN
- Innovation Roadmap
- Possible participation of EBN (state participation)



Licenses



Exploration and production





51 exploration licenses 16 production licenses

Temperature at 2000 m





Source: TNO, 2008



Challenges

- Technical (corrosion, blockages, seismic activity, permiability)
- Legal (licenses, regulations, etc.)
- Communication (social acceptance)
- Organisation (market model, professional operators, connection

to district heating)



2018: Strengthen and accelerate!

Target: 15 PJ in 2030; 110 PJ in 2050

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



Guarantee scheme

to address geological risk (at P90)

- 7 rounds, starting 2010
- 28 projects submitted
- M€ 147 cumulative reservation
- 4 claims



SDE+ (Stimulation Fund Renewable Energy)

Verplichtingenbudget

 Stimulates production of renewable energy

- 27 projects allocated, 770 MWth
- Currently 0,33 euro/Kwh subsidy for geothermal



per technologie in de verschillende SDE+ -rondes

Exploration



SCAN

'Colouring the white areas green'

- Areas that have not been explored before (no oil or gas exploration in the past)
- Impossible to make an estimated guess of the potential of the geothermal heat (P90).
- Reprocessing seismic data
- Acquiring new seismic data
- Pilot drillings

And:

Exploration program for **ultra deep** geothermal for process industry



Innovation Roadmap





Innovation Roadmap



Type Research	Research Program	Typical subsidy per project*
Assemble and share data	Knowledge Agenda geothermal energy: Kas als energiebron	€10-50k
Fundamental (TRL 1-3)	Netherlands organisation for Fundamental Research (NWO)	€300-1.000k
Applied (TRL4-6)	Topconsortia Knowledge and Innovation (TKI/RVO) TKI-Urban Energy TKI-Nieuw Gas (Geo-Energy) TKI-Energy en Industry	€100-300k
Applied (TRL4-6)	Knowledge Program Mining Effects (KEM)	500 k
Applied (TRL4-6)	Horizon2020 EU	€2-20M
Pilot-Demonstration (TRL6-9)	GEOTHERMICA EU+NL (RVO): cooperation with Danish projects	€1-10M
Applied & Demonstration (TRL7-9)	Demonstration EnergiyInnovation (DEI; RVO) (35 mln/year) Renewable Energy (HE; RVO) (50 mln/year)	€1-6M
Further roll out (TRL 9)	Possible via Subsidy Renewable Energy (SDE+; RVO)	>€10M

Future



Developments

- Increase of portfolio-operators
- Increasing role for EBN
- Projects in process industry in 3 5 year: higher temperatures (ultra deep)
- Also drilling to shallower depths for use in lower temperature district heating
- Potential of geothermal for `built environment' still to be developed



To conclude:

- Geothermal energy is important source for the transition to renewable heat in the Netherlands
- Challenges and risks for geothermal energy remain (leakages, corrosion, earth quakes and social acception)
- Developing infrastructure is key in the Netherlands
- Innovation is important in order to minimalize these risks and costs

Strong policy focus on geothermal energy:

Exploration Financial support Social acceptence Safety



What can we learn from each other?

Denmark: a lot of experience with district heating.Dutch debate on market regulation and financing infrastructure.

Netherlands: more geothermal but only in horticultural sector.District heating is very small in comparison to Denmark.

- Denmark: transition approach per district
- Netherlands also per region: Regional Energy Strategies (supply and demand)

Transition to lower temperature heating systems



Thank you for your attention

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