GeoENVI Webinar

Dutch Case study on integrating geothermal project development and water management issues

Ate Oosterhof, Vitens. March 18 2021

water voor nu en later

Vitens

OUTLINE

- Short introduction
- Vitens drinking water company and sources strategy
- Energy transition en geothermal projects in the Netherlands
- Where do they meet? A case study City of Utrecht
- Conclusions and recommendations

Vitens drinking water company

Characteristics:

- 5.8 million customers
- 5 provinces
- 370 million m³/Year

Source: 100% fresh ground water.

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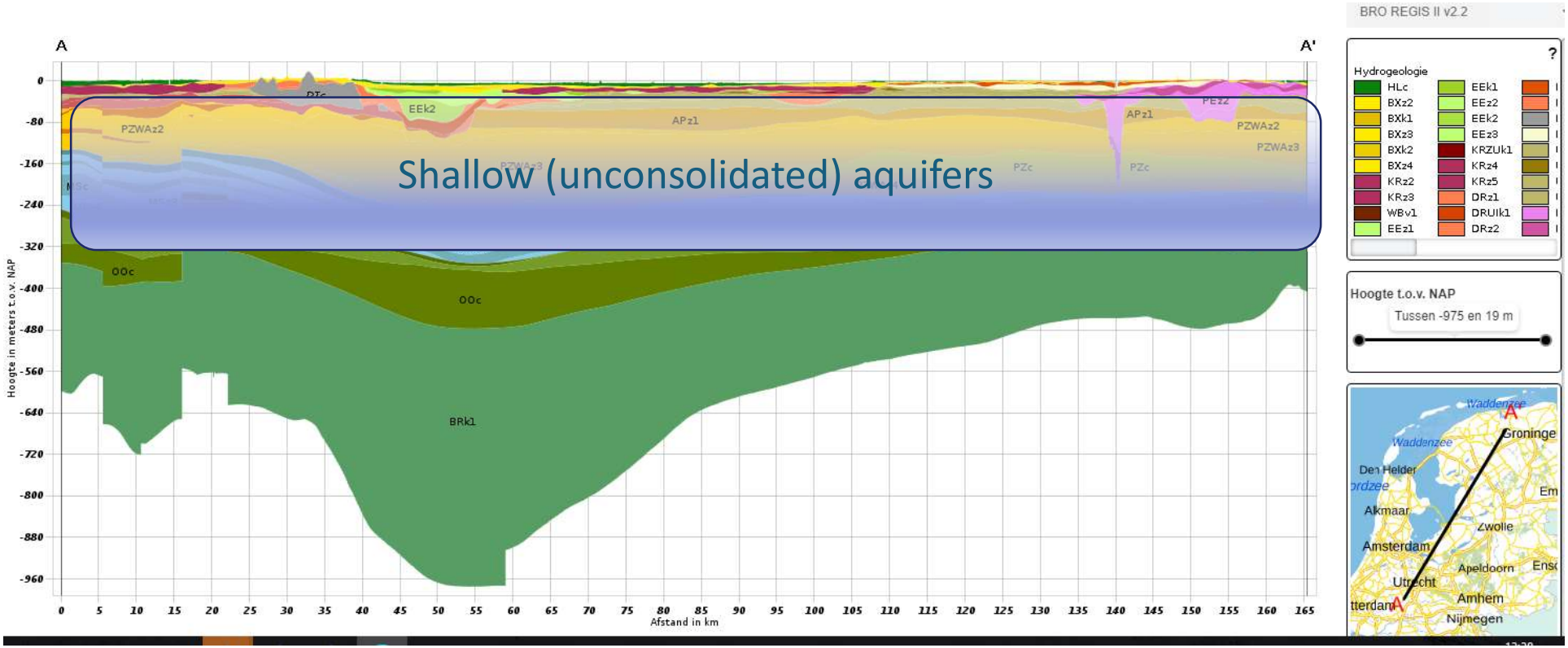
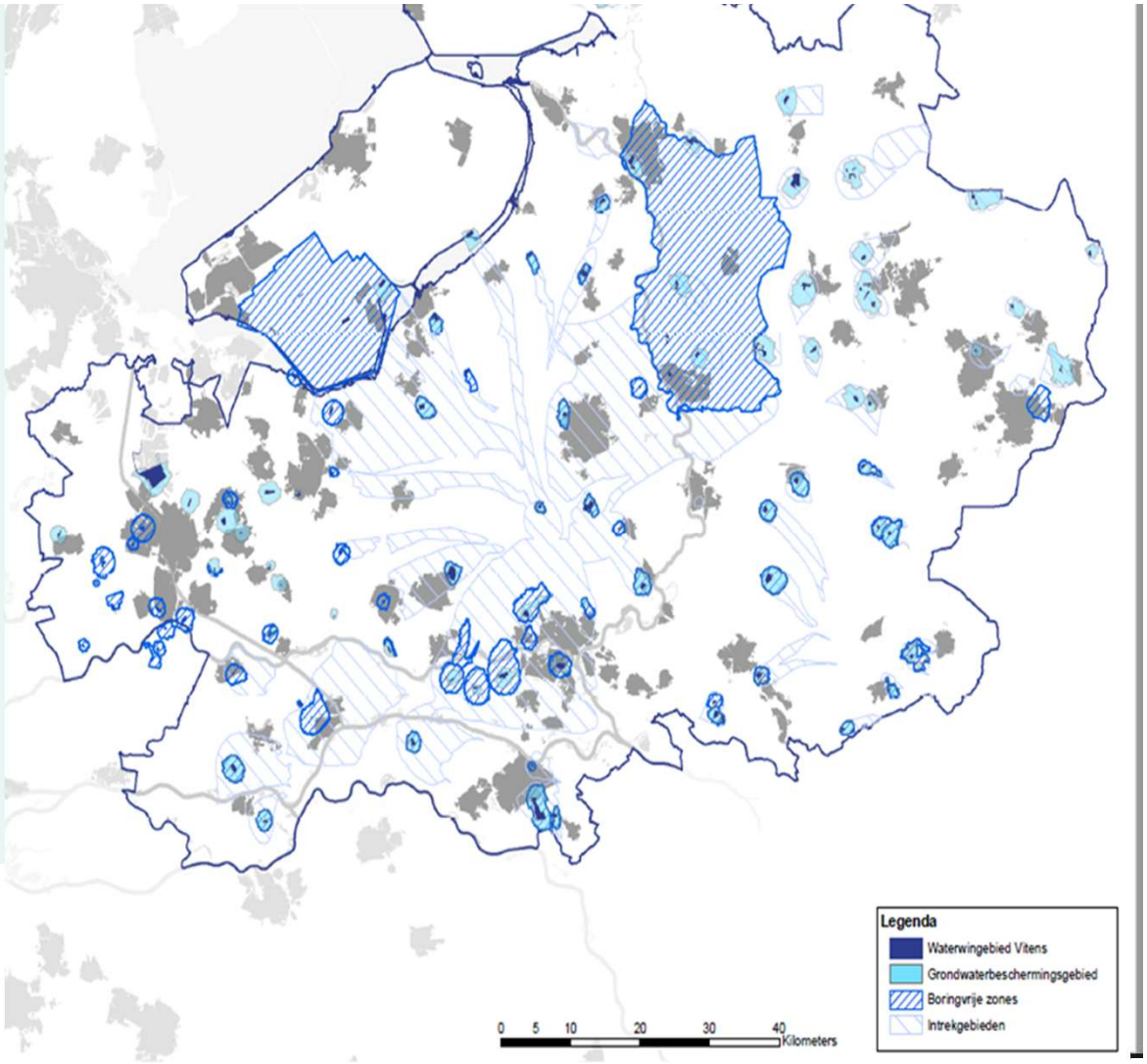
Geological cross section (SW-NE, Netherlands)

0- 1000 metres depth, geohydrological base (source: Dinoloket, TNO)



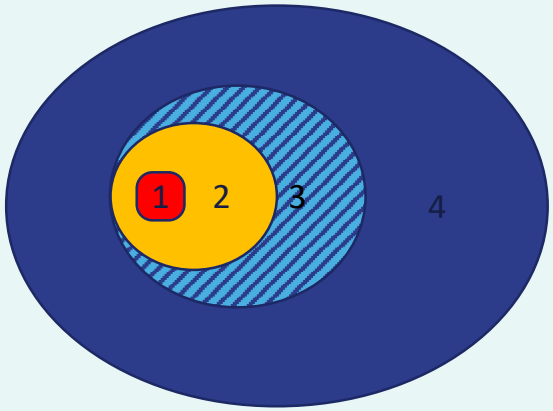
Vitens sources

- 110 well fields
- 1200 wells (10 – 300m³/hr)
- Shallow aquifers
- Stable quality and stable temperature
- Basic purification processes
- No large back up reservoirs or buffers
- Vulnerable to pollution



Different level of ground water protection zones

1. Ground water extraction sites; 1 year protection zone
2. Ground water protection area, 25 years zone
3. Drilling free zone. Drilling for other activities through protective clay layer is not allowed
4. Water extraction capture zone



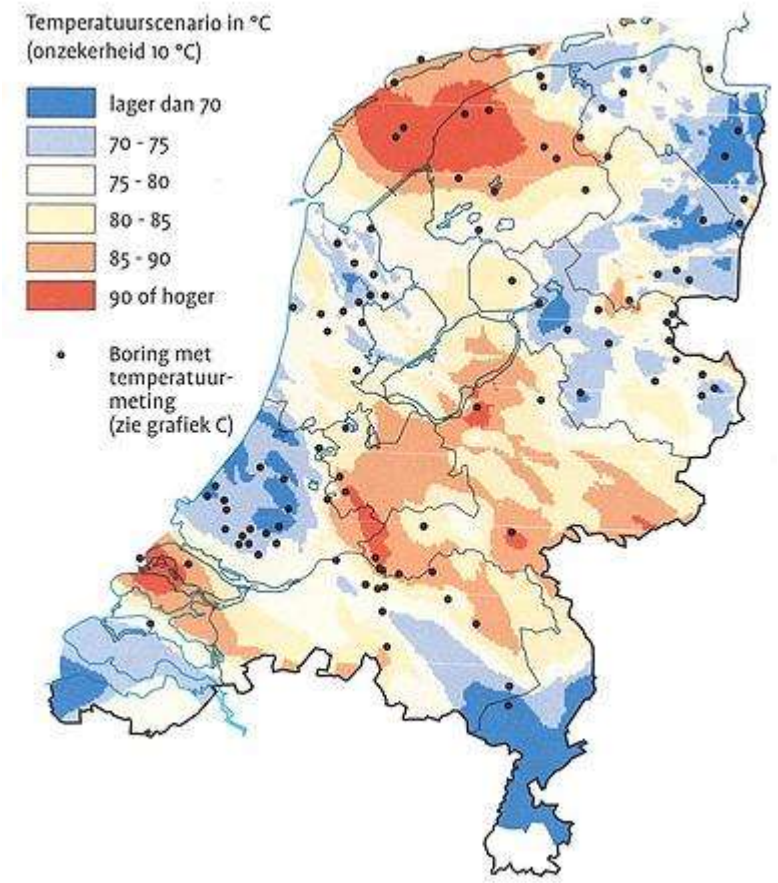
Vitens strategy

- Sustainable integration of water sources in the water system
- Ground water protection: risk-oriented approach
- Re-allocation and/or finding new sources will be very hard in future

"protect water sources to stay forever"

Geothermal potential in NL

- Potential area's
- Target zone 2000-4000 meter
- Challenges: still expensive and business case is difficult.
- Relative new business in the Netherlands



At 2000 meter depth.
Source: TNO, Utrecht

Geothermal projects

2021:

- Appr. 25 active doublets
- 60 exploration permits provided
- Large seismic research project SCAN started in 2020 (EBN)
- Grow potential: 700 in 2050?

Challenges:

- Cost effective projects
- Design of robust well systems
- Well integrity (for complete life cycle)
- Waste/test water disposal

Geothermal sector development in the Netherlands

- First generation doublets did not comply (single casings, vulnerable to corrosion and erosion)
- Professional sector is developing and organizing (Geothermie Nederland, 2021)
- Dutch government is participating in new projects (EBN)
- An industry standard was developed in 2020 (completed in 2021).

Result: New well designs must prescribe double barrier protection

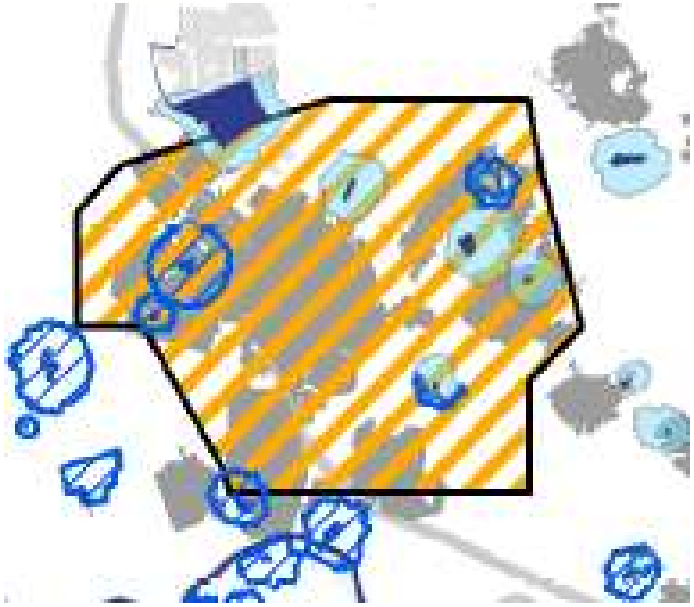
- Innovative research is carried out: Monitoring, temperature, leakage detection, etc.
- New mining law for geothermal activities in preparation

- Stakeholder management is professionalizing

(Environmental management, local residents, drinking water sector, etc.)

Case study city of Utrecht

- In 2018 an exploration permit has been requested (area of appr. 200km²)
- In the exploration area there are 7 groundwater wellfields situated
- Project partners are not allowed to take initiatives in legally protected zones

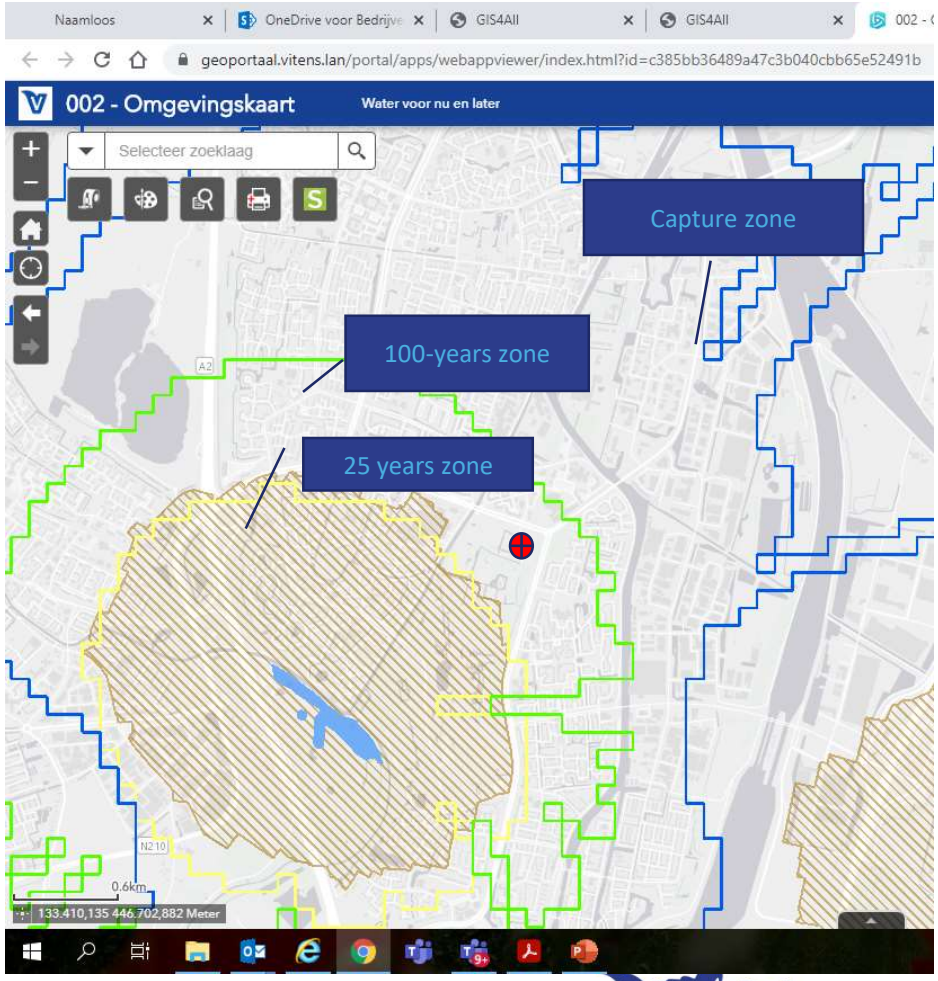


A multicriteria analyse was started to find best spot:

- Heat potential (seismic investigation)
- Best drilling site
- Optimal distance to the city heat network
- Neighbour interference
- Excluding the legal drinking water protection zones

Case Utrecht area

- Jan 2021: preferred location made public
- 400 meters away from legal protection area
- But still in capture zone (~50 years)
- Positive Stakeholder management still going on
- Issues: safe construction, borehole design and monitoring



Conclusions and recommendations

Conclusions

- The pressure on the Dutch underground is increasing
- This needs to be detailed
- Stakeholder issues must be discussed openly
- Use off the new industrial standard, new techniques and monitoring in vulnerable area's will be necessary (first step)

recommendations

- Segregation of different initiatives is preferable
- There is a need for cooperation (government and stakeholders) in finding solutions for supported Geothermal energy and sustainable drinking water production.

Thank you for your attention!

Questions?

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