The rise of ATES in the Netherlands

The Netherlands

- 16,000 square mile
- 16.8 million habitants

- Land reclamation
- Gateway to Europe
- Innovation and adaptation

- 3rd Foreign investor in U.S.
- 2nd Exporting country in agriculture


Present-day
shoreline

Sea Level Rise a threat to the U.S.

DUTCH ates

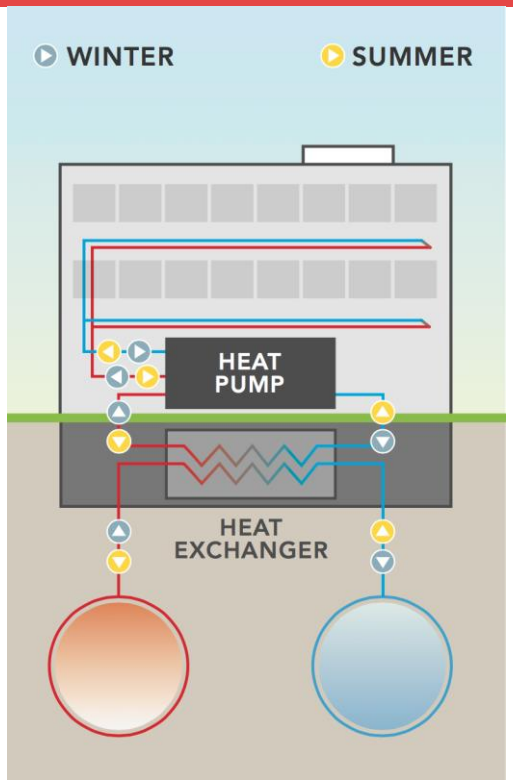
City Energy Problem

- 41% of electricity in the US is used for heating/cooling buildings
- 51% of all freshwater usage in the US is used for producing electricity
- Peak-power consumption accounts for 50% of the electricity bill for buildings

DUTCH ates

A commercial energy efficiency solution

Technology

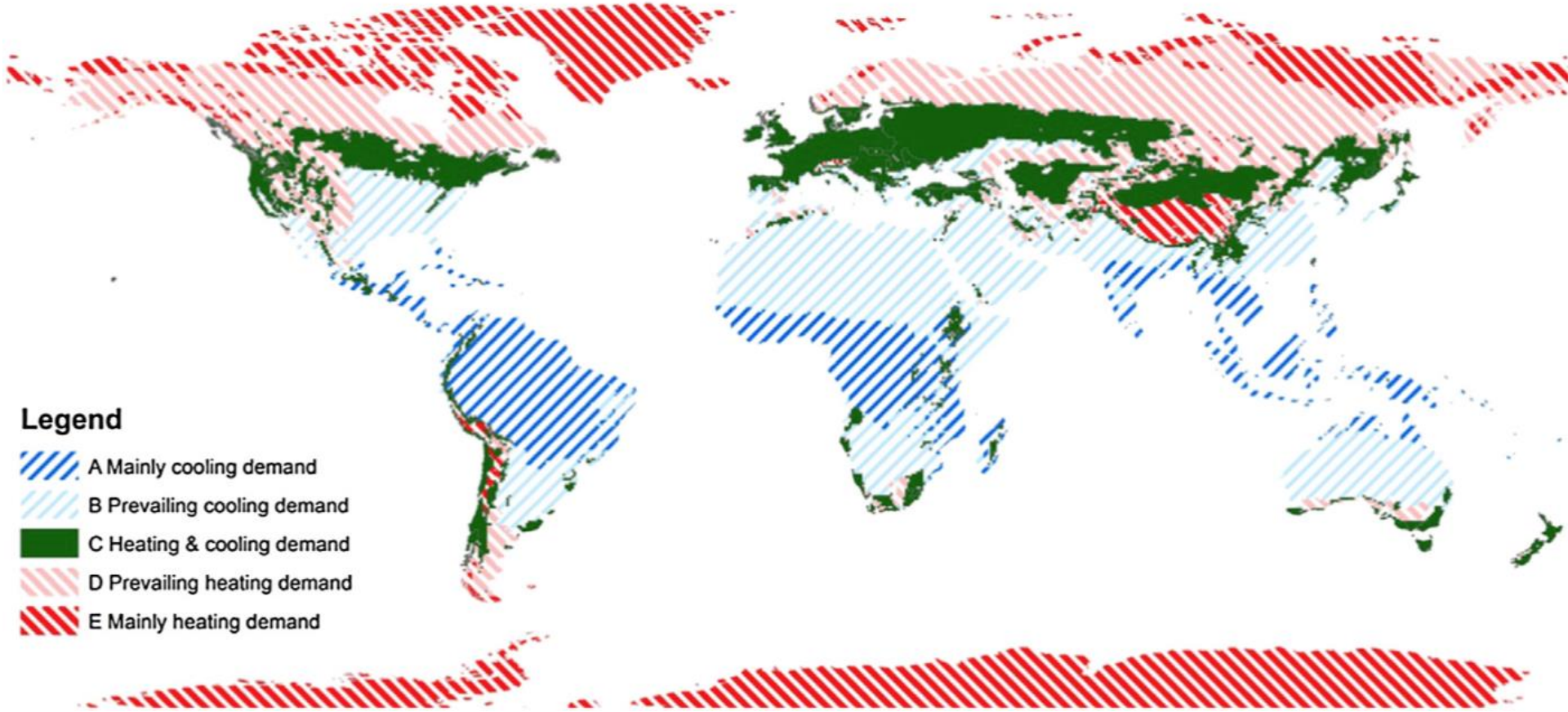


Benefits

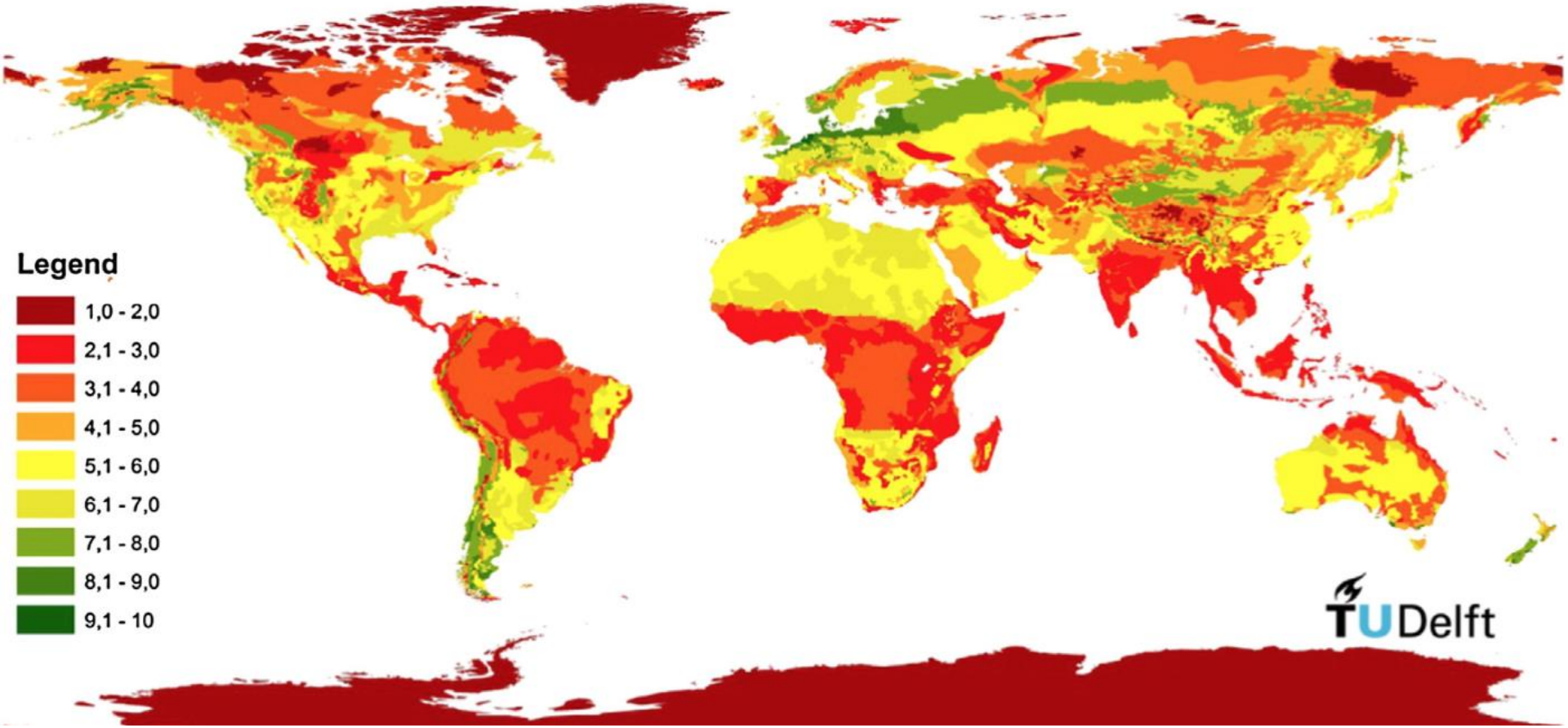
- 40% reduction of heating energy consumption
- 65% reduction of cooling energy consumption
- 90% of peak power reduction
- Pay-back is 4-8 years
- Proven technology 2500+ systems deployed

M. Bloemendal et al. / Science of the Total Environment 538 (2015) 621–633

Generalised building energy demand based on climatic data 1976-2000

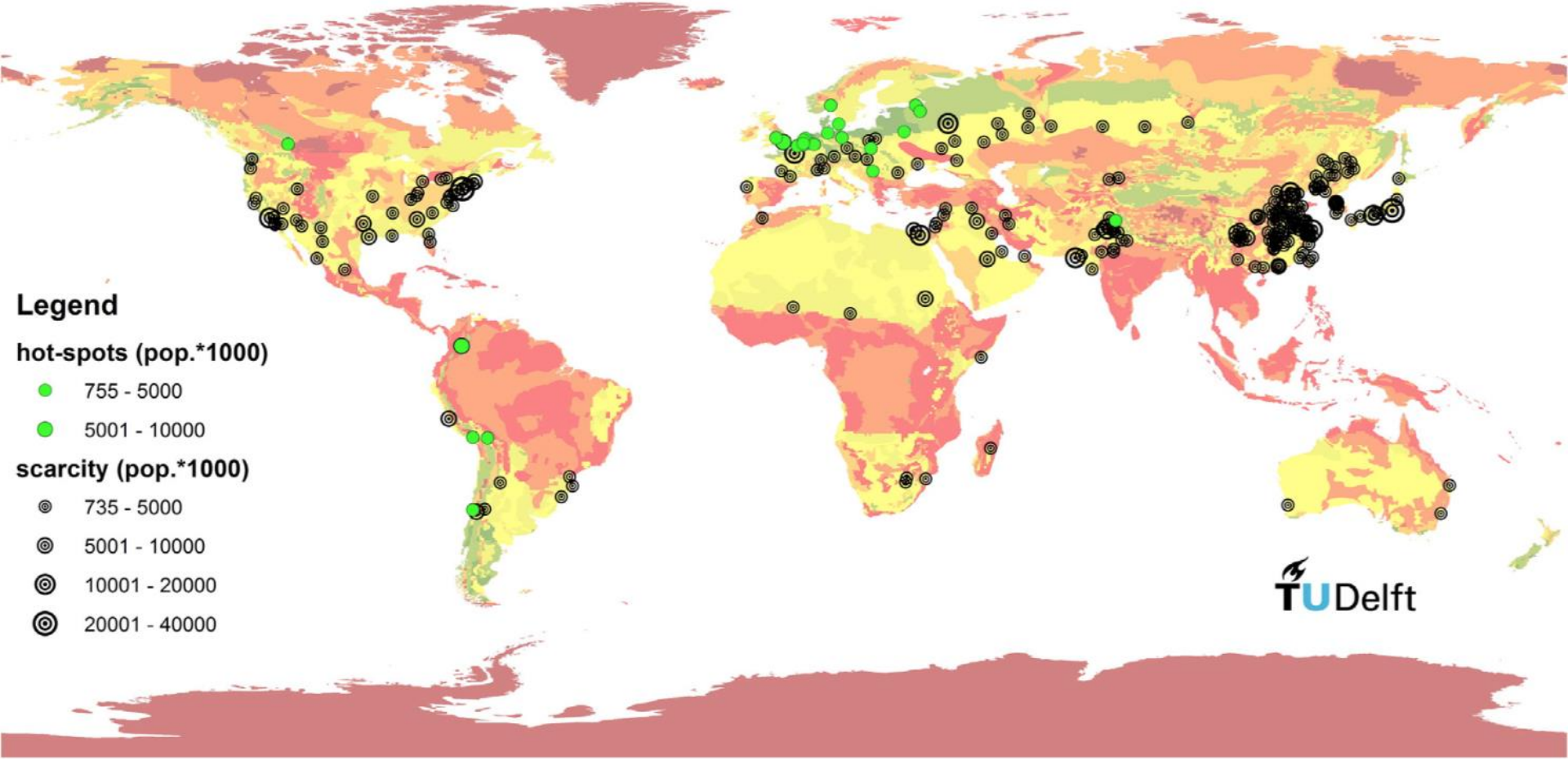


ATES Suitability 2051-2075

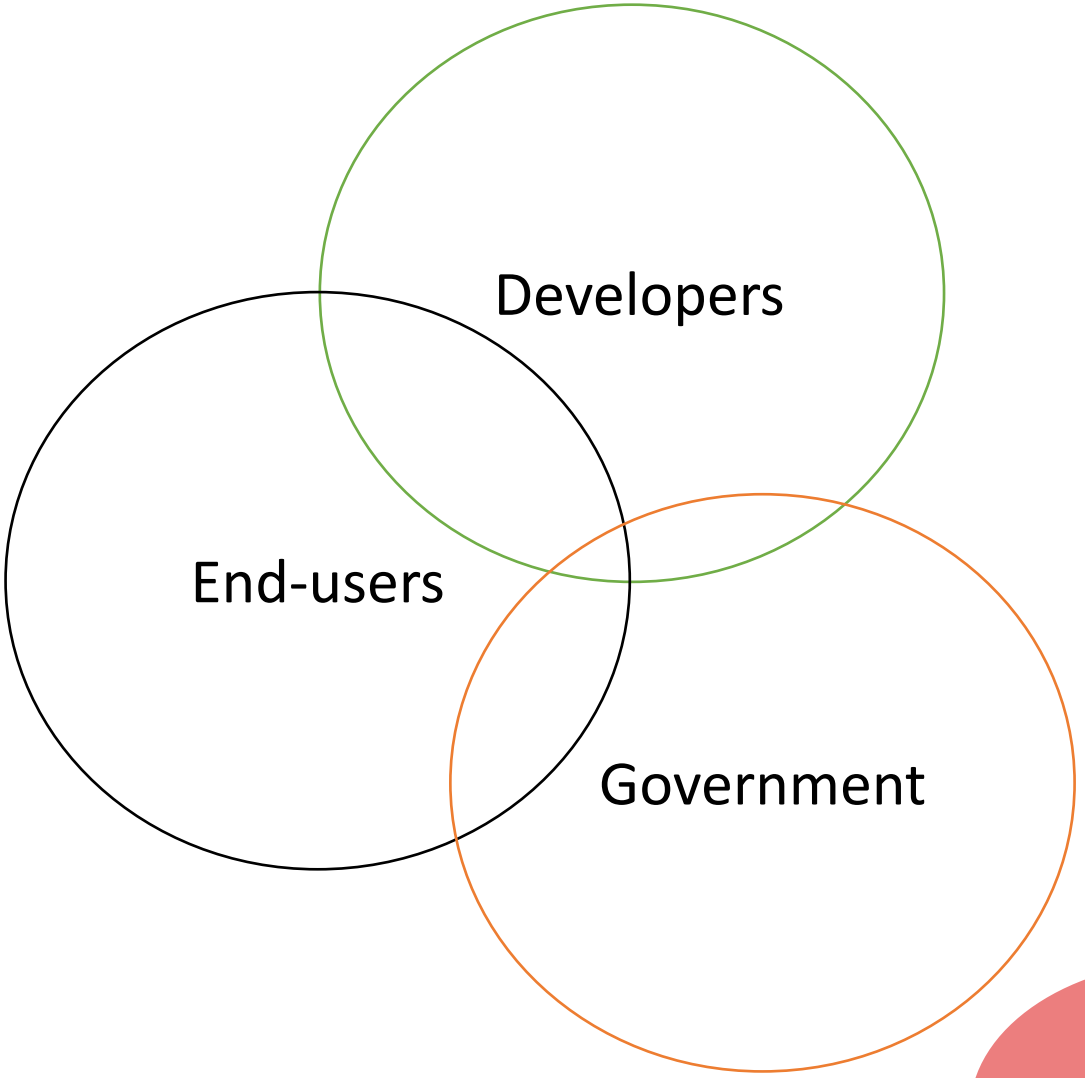


M. Bloemendal et al. / Science of the Total Environment 538 (2015) 621–633

ATES Possible scarcity of space and hot spots



90’s obstacles to implement ATES



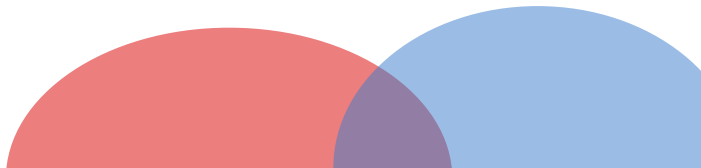
What has been done?

European Union Policy Instruments:

- Energy Performance of Buildings Directive (2002)
  Introduction energy certification schemes
- Renewable Energy Sources Directive (2009)
  State specific target on renewable energy
- Energy Efficiency Directive (2012)
  Remove barriers in supply and use of energy

Dutch Policy Instruments

- Promotion
- Protection



Dutch Government Structure

National level

Ministry of Internal Affairs and Kingdom Relations
Building regulations

Ministry of Infrastructure and the Environment
Soil, Water, spatial planning

Ministry of Economic Affairs
Climate change, sustainable energy

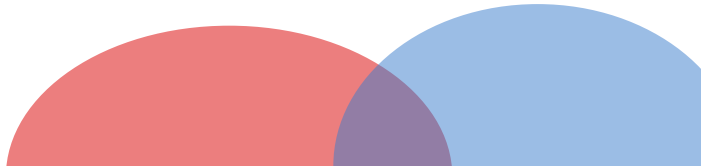
Provincial level

Provinces (12)
Integrated spatial and environmental planning
Supervision of regional water authorities (RWAs)
Groundwater regulation
Co-ordination with other regional policy areas

Municipal level

Municipalities (393)
Local spatial planining
Local permits

Regional Water Authorities (24)
Operation/management of regional water systems
Water quality & water quantity



Dutch Policy Instruments

Promotion

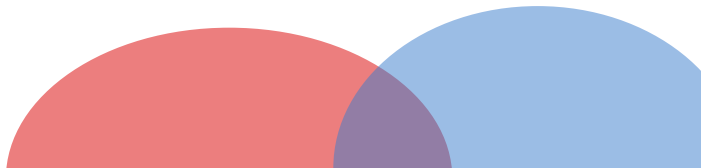
- Energy Performance Coefficient (EPC)

  Requirements for energy efficiency

- European Energy Performance of Buildings Directive (EPBD)

  Energy Performance Certificate when selling/renting

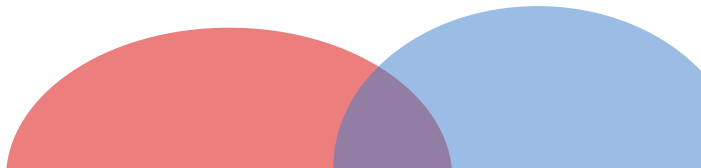
- Dutch Energy Performance Norm for Buildings (NEN 7120)



Dutch Policy Instruments

Protection to prevent negative effects

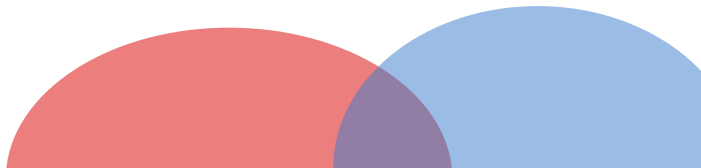
- On ecology
- On interest in the surroundings of an ATES system
- Due to interference with other geo-energy systems



Dutch Acts

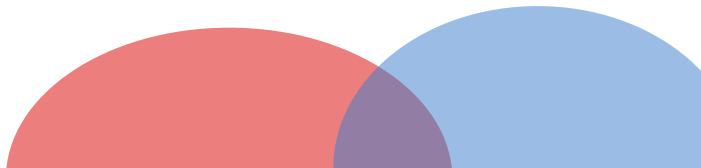
- National Water Act
- Soil Protection Act
- Environmental Management Act
- Environmental Licensing Act
- Provincial Environment Regulations

- Geo Energy Systems Amendment

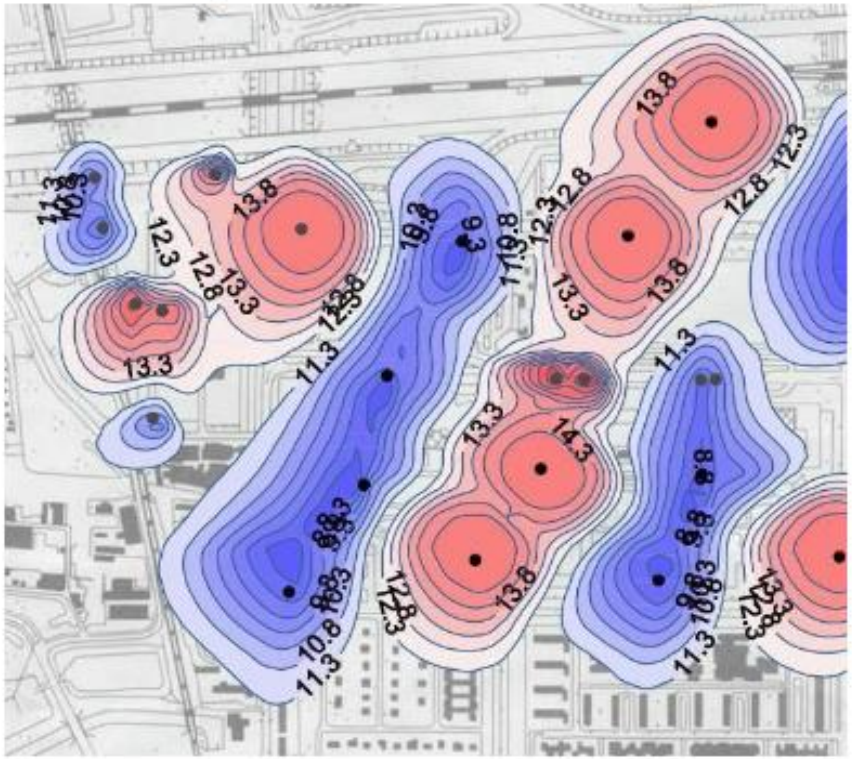


Geo Energy Systems Amendment

- Planning improvement
- Quality and Reliability
- Unifying permitting process
- Shorten procedures



Online ATES Tool

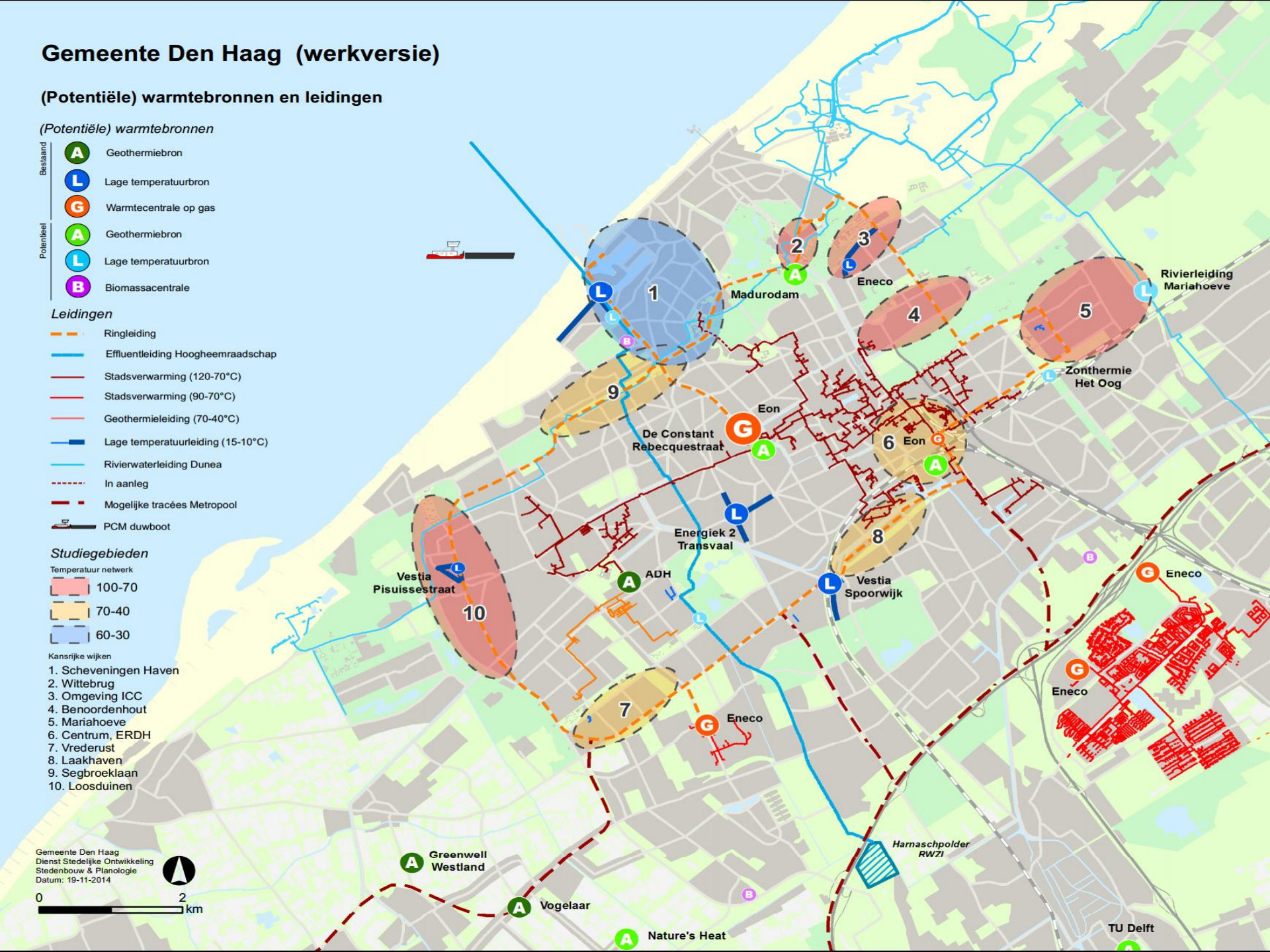


Features

- Online access
- Realized ATES systems
- ATES opportunities
  - Policy
  - Permitting
  - Expected investments
  - Pay-back times

Gemeente Den Haag (werkversie)

(Potentiële) warmtebronnen en leidingen



What are the results?

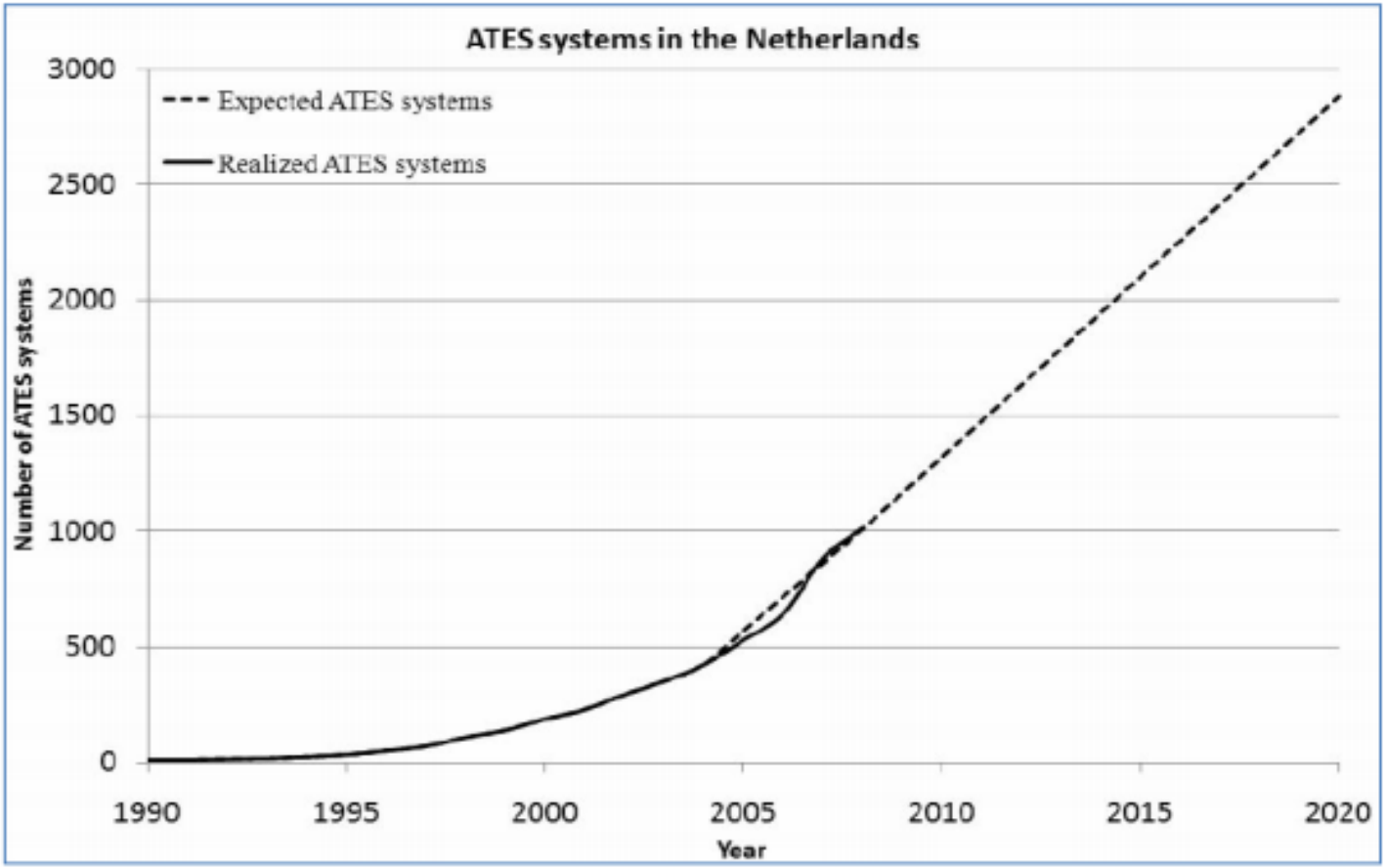


Figure 2-6 Number of energy storage projects in the Netherlands and prospects until 2020; prognoses based on yearly grow during the last five years [8]

Contact us

- If you are a developer

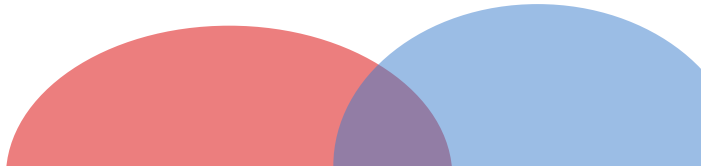
Share your plans/drawings and receive a business analyses comparing traditional and ATES set up

- If you are a policy maker

Join the G2G Program including site visit in NL

- If you a researcher

Join the Knowledge Exchange Program with Deltares, TNO, TU Delft




OVER
MORGEN


PRIVA


ENGIE


VREDE EN RECHT
Den Haag


Netherlands Enterprise Agency


ZON
energie.nu


Deltares
Enabling Delta Life


TNO innovation for life

Further reading

- www.dutch-ates.com
  - Dutch Policy on ATES systems
  - Combining climatic and geo-hydrological preconditions as a method to determine world potential for aquifer thermal energy storage

- http://www.nytimes.com/interactive/2015/10/27/world/greenland-is-melting-away.html?_r=0

ATES Integrated Approach

Single Building	Between Buildings	Area development