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Minewater 2.0

Development of a Hybrid Sustainable Energy Infrastructure in the Municipality Heerlen the Netherlands

Elianne Demollin-Schneiders
René Verhoeven

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Gemeente Heerlen

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Ides-edu
EURL3A
12/12/13 event sustainable monuments Ljubljana

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Supported by
INTELLIGENT ENERGY EUROPE

- Collaboration of 15 universities in Europe to develop educational material on **Nearly Zero Energy Buildings**
- www.ides-edu.eu

IDES-EDU
MASTER AND POST GRADUATE EDUCATION AND TRAINING IN MULTIDISCIPLINARY TEAMS

European Real Life Learning Lab Alliances

- *Knowledge alliances to develop Real Life Learning Labs, to broaden the knowledge in the realization of nearly zero energy buildings. Multidisciplinary educated engineers are important to speed up the transition to a Near Zero Emission Built Environment.*
- *www.eurl3A.eu*

Sustainable monuments event

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- International knowledge exchange on sustainable monuments with experts from Czech Republic, the Netherlands and Slovenia

- 12th December 2013, Ljubljana
- Main University Building (Kongresni trg 12 Ljubljana)

- To enlist please contact:
  - Jure.Vetrsek@iri.uni-lj.si or
  - Wendy.broers@zuyd.nl

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Content

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1. Goals Minewater 2.0
2. Concept Minewater 1.0 and history of the project
3. Concept Minewater 2.0
4. Working principles

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Goals

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1. Long term maximum use of geothermal underground for sustainable heating and cooling of buildings
2. Becoming an essential part of the Sustainable Energy Structure Plan 2040 municipality Heerlen
3. Minewater Corporation with a sound business case
4. Promotion of local employment
5. Involving local educational and research institutions

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HEERLEN

Minewater 1.0

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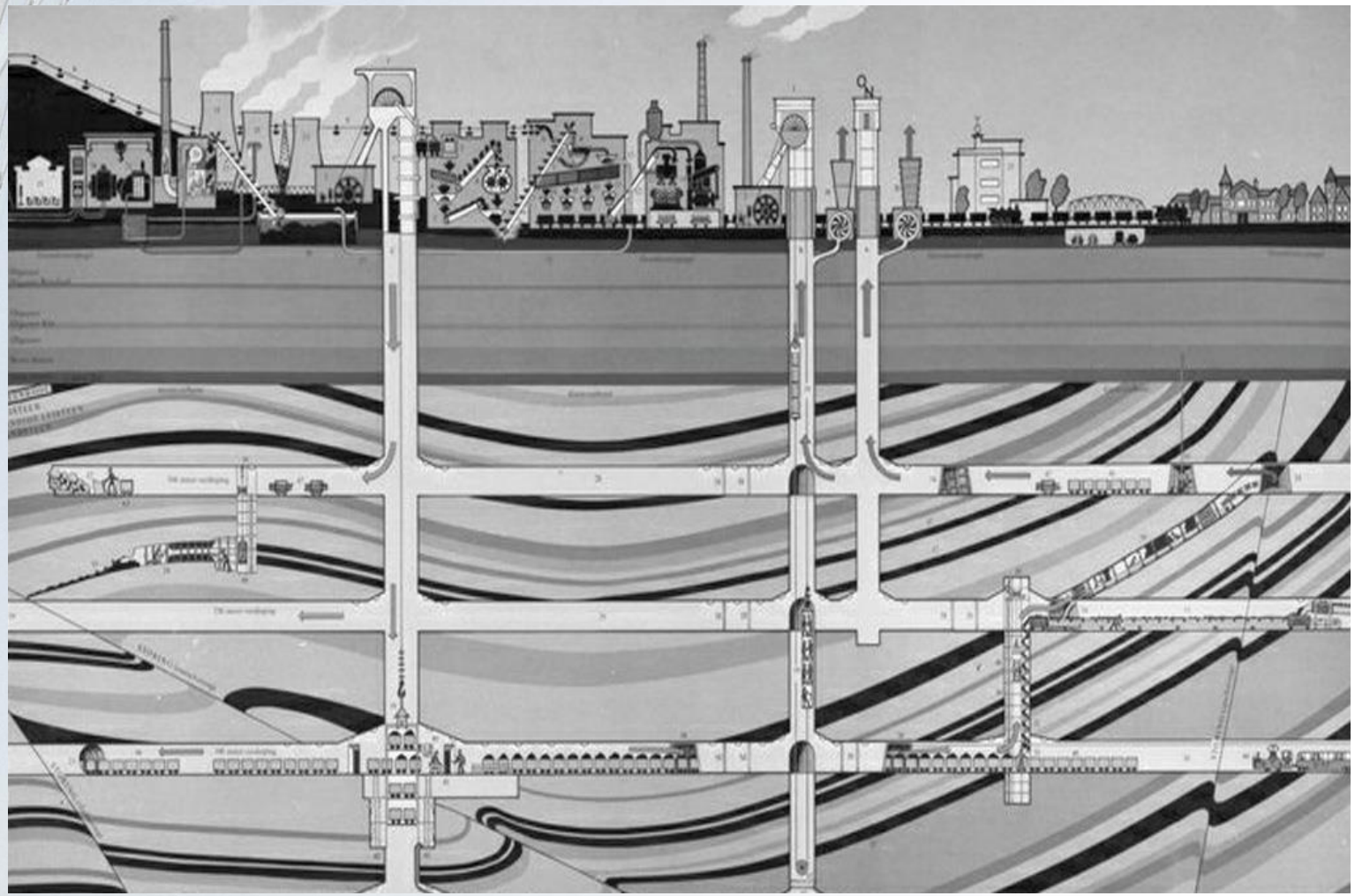

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Parkstad Limburg werkt aan Nieuwe Energie

Mijnwaterproject
Pilot Heerlen

www.mijnwaterproject.info

minewater project
mijnwaterproject

Is een project van:

Gemeente Heerlen
weller
bre
ROK
Midlothian

Dit project wordt financieel mogelijk gemaakt door het Interreg III B programma van de Europese Unie

This project has received European Regional Development Funding through the INTERREG III B Community Initiative

nwe eno INTERREG IIIB NORTH WEST EUROPE

Aan het mijnwaterproject werken ook nog mee: Provincie Limburg, Waterschap Roer en Overmaas, DSM NV, Cauberg-Huygen Raadgevende Ingenieurs BV, Petrogas Minerals International BV, VITO NV, Daldrup & Söhne AG

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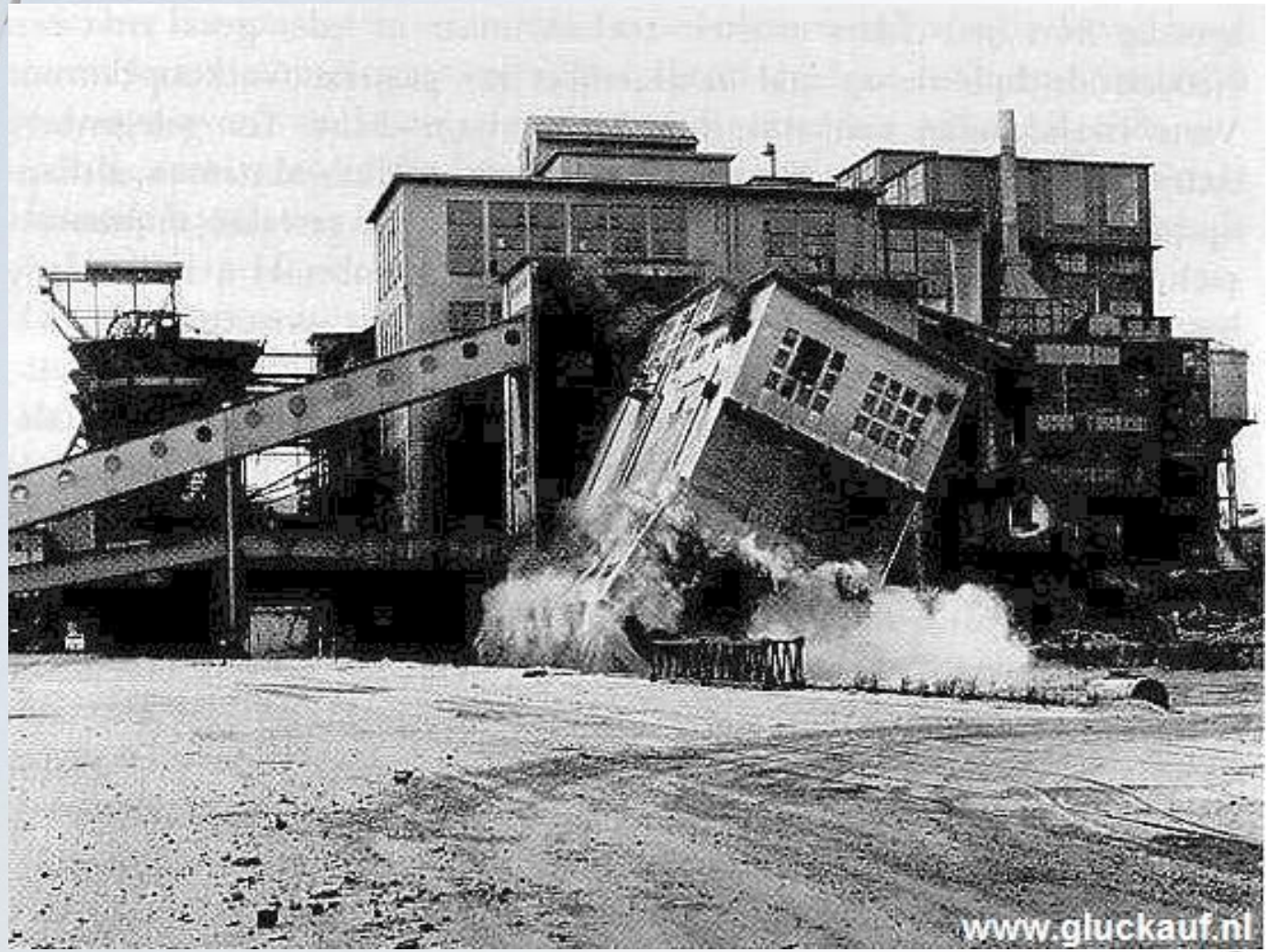

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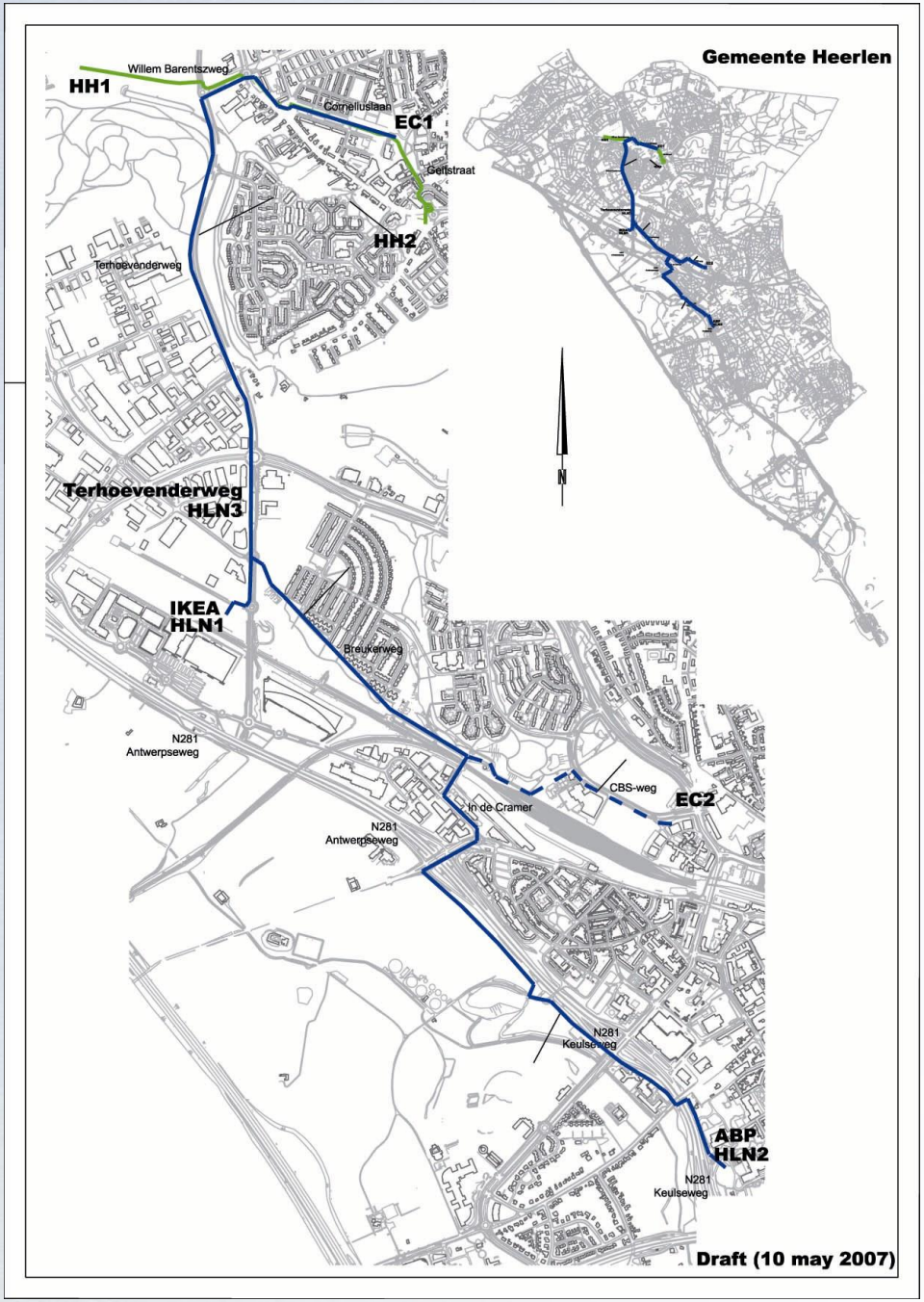

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Mijnwater

Naar aanleiding van het artikel over het mijnwaterproject (krant 11/3): uw verslaggeefster constateert dat er ondergronds onder meer mijnkarretjes (die heten overigens mijnwagens) zijn achtergelaten. Ik kan u verzekeren dat er op de Oranje Nassaumijn III, de plaats waar hoogstwaarschijnlijk geboord zal worden; géén mijnwagen is achtergebleven. Ik heb als laatste, na een intensieve controle, de schacht verlaten.

Heerlen, Tj. Corten LD

18-3-05

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Minewater conference 2008

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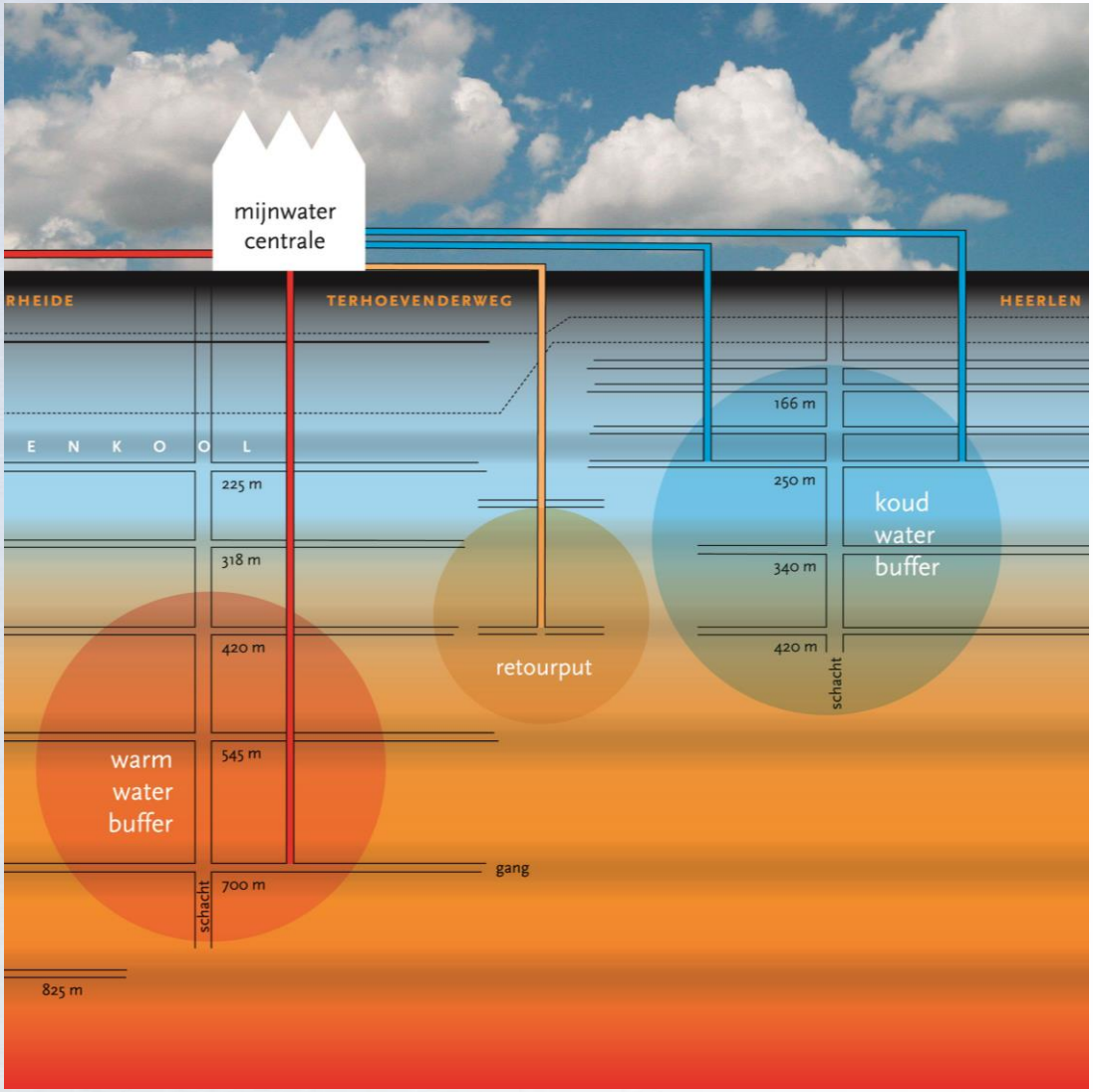

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2008 – May 2013

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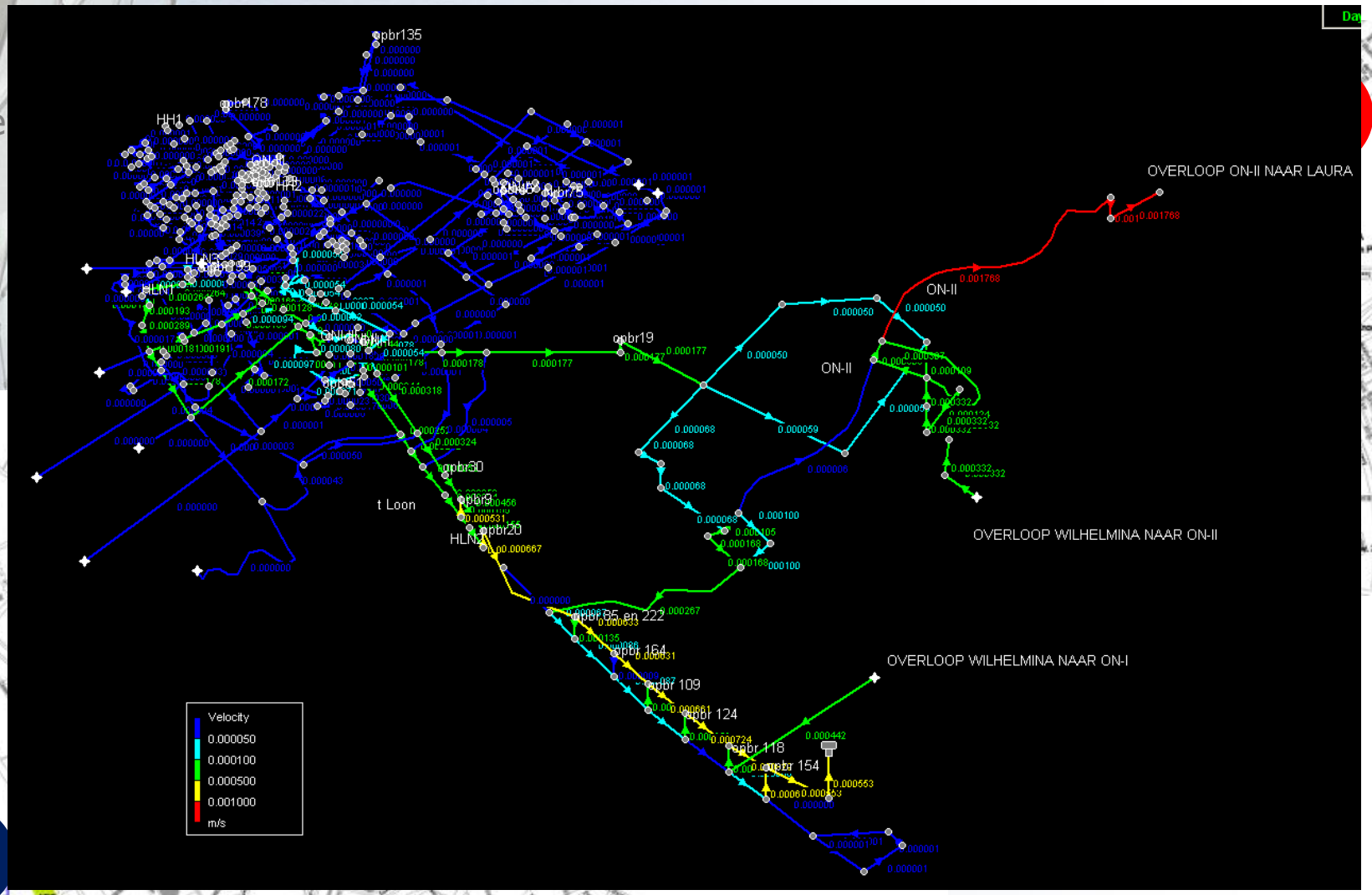

HLN2

3D model of the underground mine water network (VITO)

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Depletion mine water reservoir

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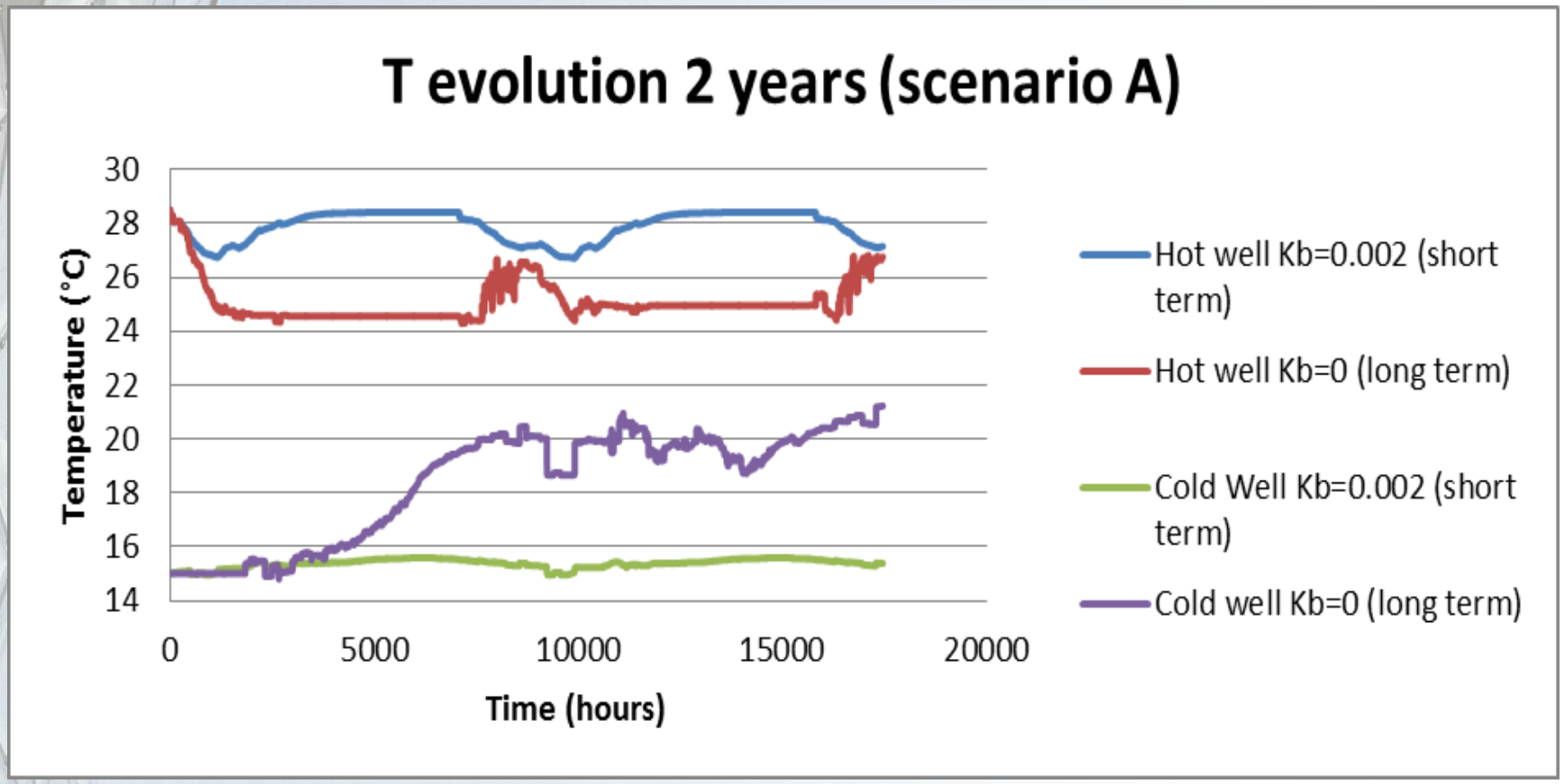

Temperature evolution of the hot (HH1) and cold (HLN1) production wells for different conduction factors (VITO).

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Other restrictions

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- Limited hydraulic and thermal capacity
- Not demand driven and single acting:
  - Summer April until September only cold supply
  - Winter October until March only heat supply
- No heat and cold exchange between buildings possible

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Minewater, under construction

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New Concept

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- Energy exchange instead of energy supply:
  - Between buildings by cluster grids
  - Between clusters by mine water grid

  => building also energy supplier
- Energy storage and regeneration of mine water reservoir instead of depletion:

  => no loss of energy anymore
- Enlargement hydraulic and thermal capacity mine water system
- Fully automatic control and demand driven:

  => heat and cold supply at any time
- Addition of poly generation like Bio CHP, reuse of waste heat (data center; industry), closed greenhouse, cooling towers etc.

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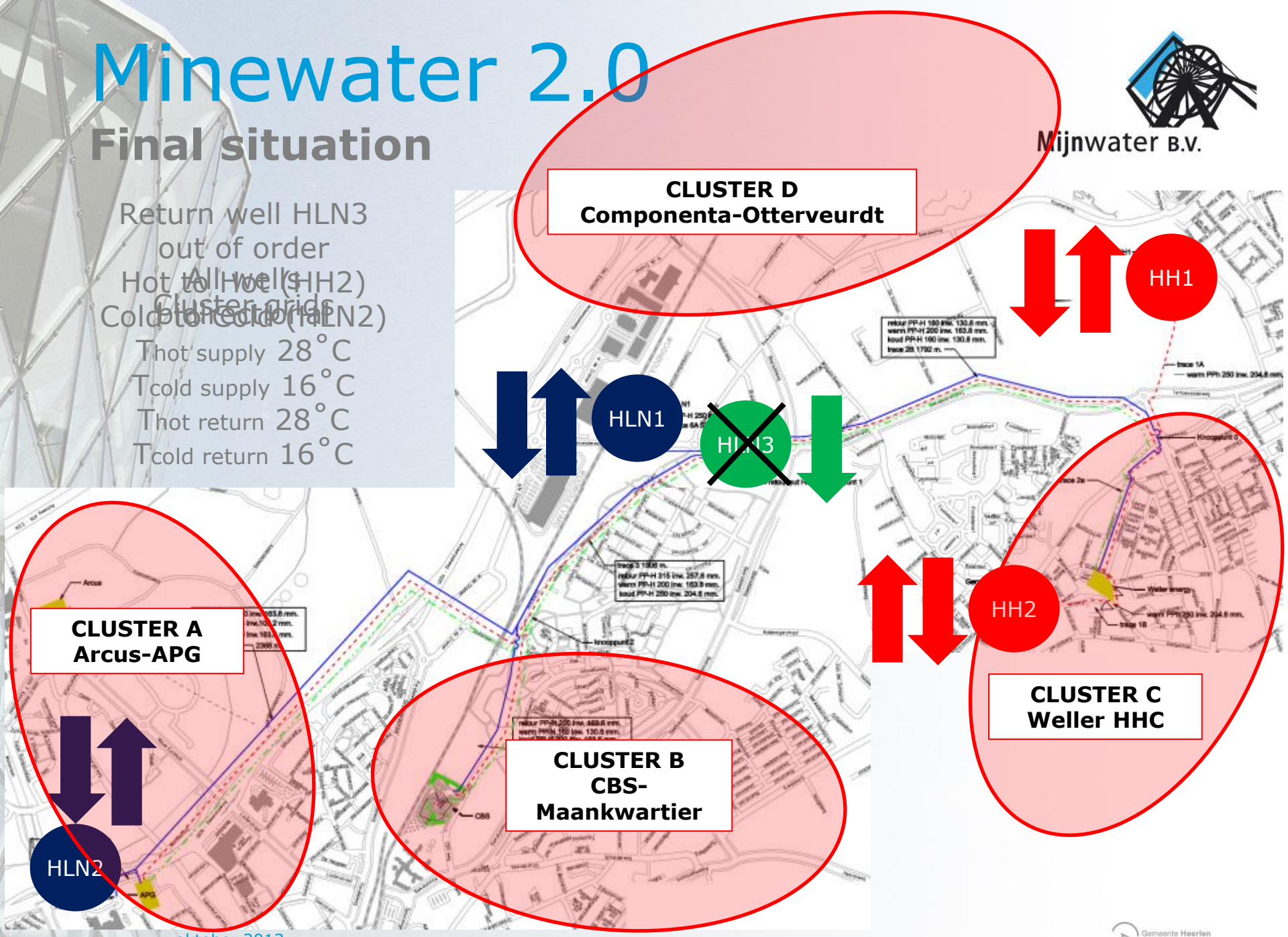
Final situation

Return well HLN3
out of order

All wells
Cluster grids

Hot to Hot (HH2)
Cold to Cold (HLN2)

$T_{hot\ supply}$ 28°C
$T_{cold\ supply}$ 16°C
$T_{hot\ return}$ 28°C
$T_{cold\ return}$ 16°C



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Enhanced flow pattern reservoirs

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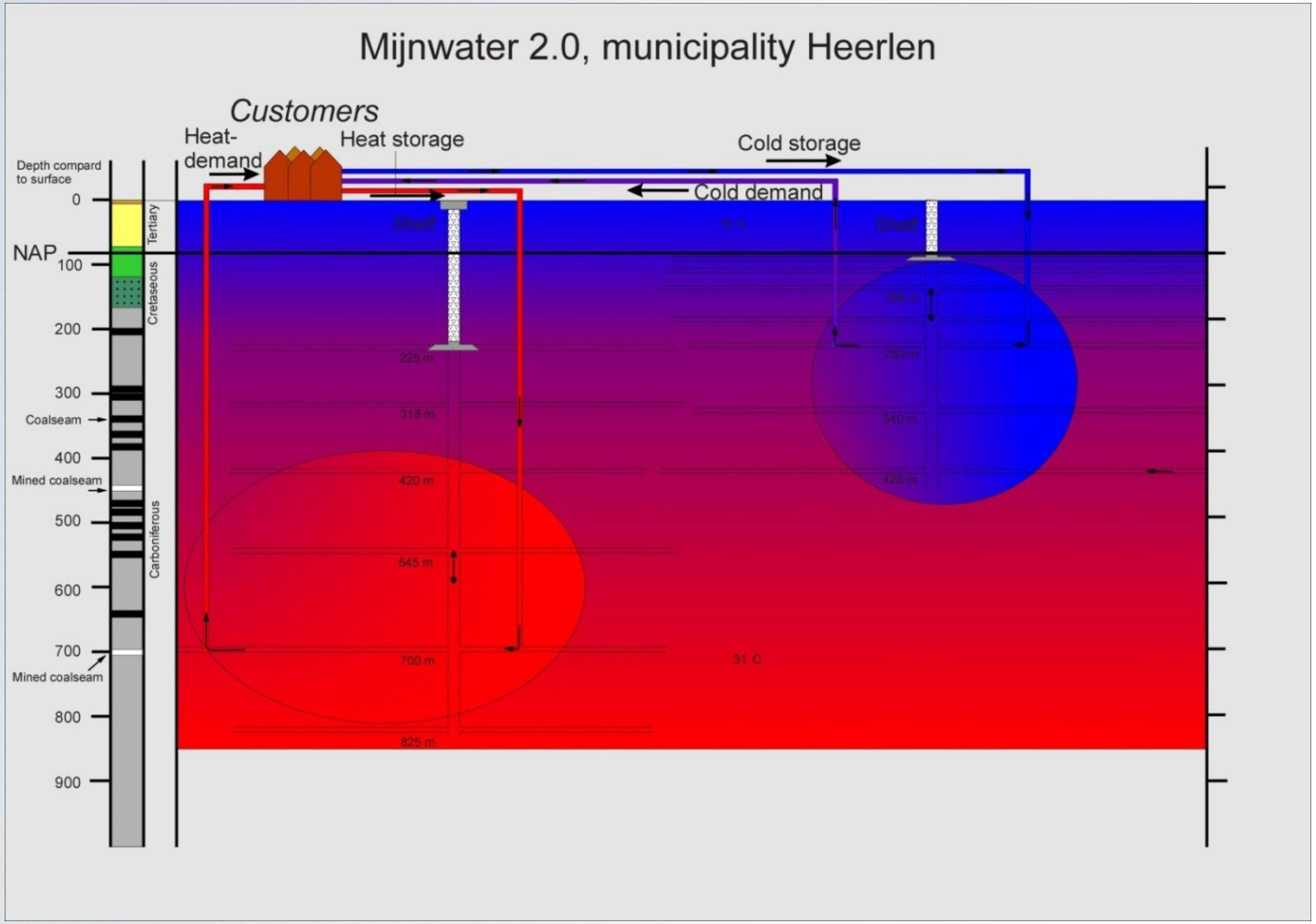

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Situation 2013

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Sophisticated injection valves in hot and cold injection wells

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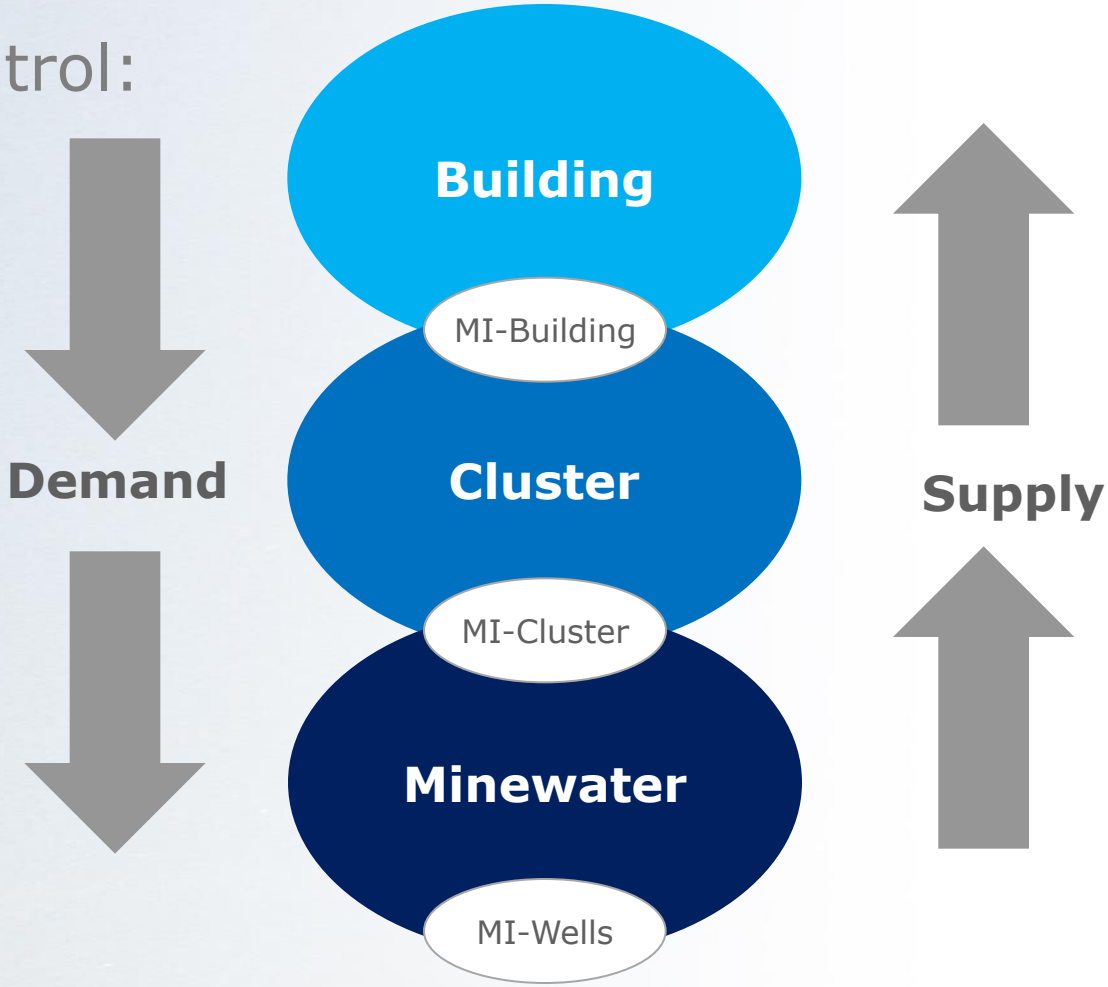
Working principles

3 Levels of control:

- Building:
  Temperature
- Cluster:
  Flow
- Minewater:
  Pressure



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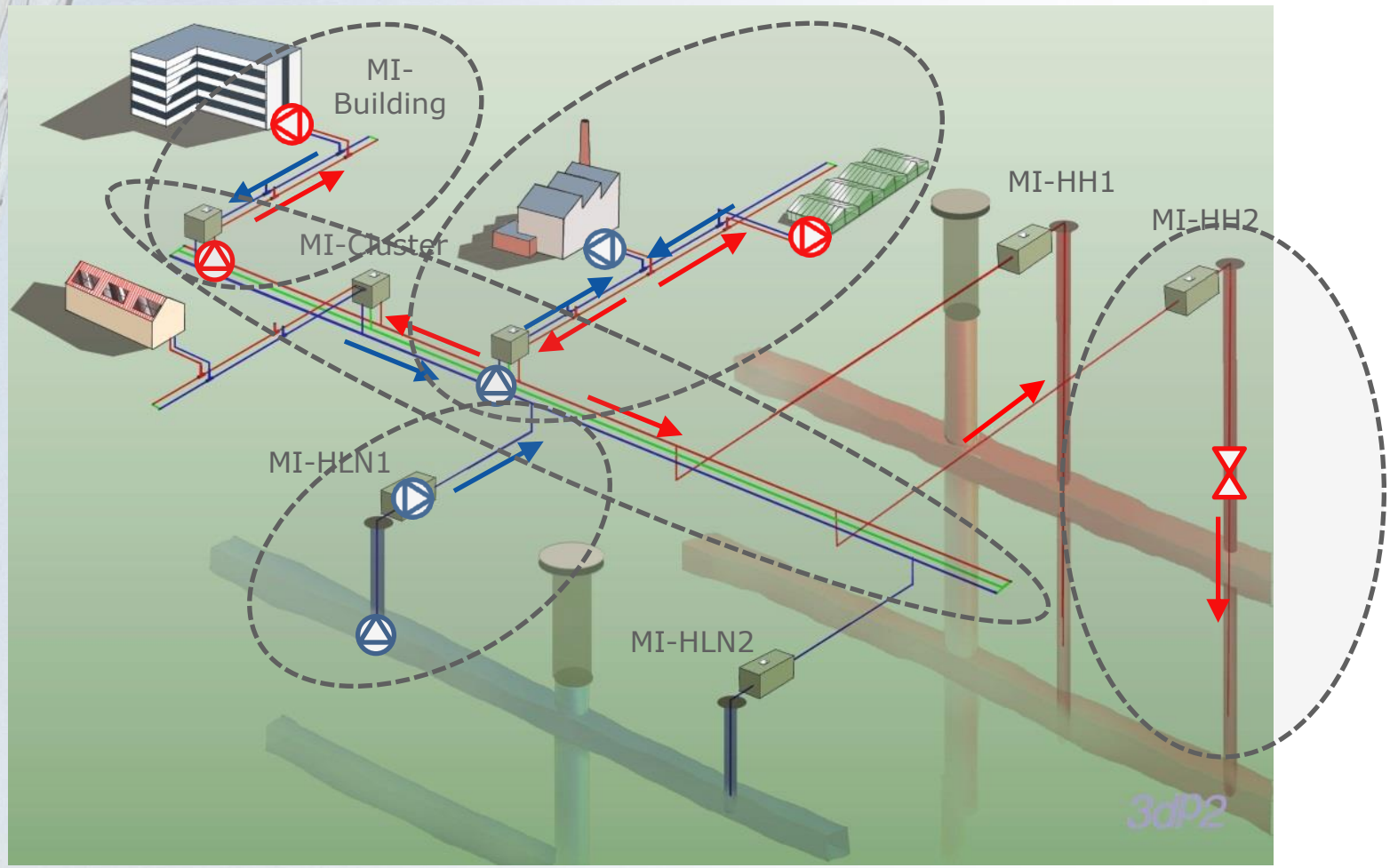
Working principles



Artist impression Minewater 2.0 with geographically dispersed mine water installations

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Working principles: CMS

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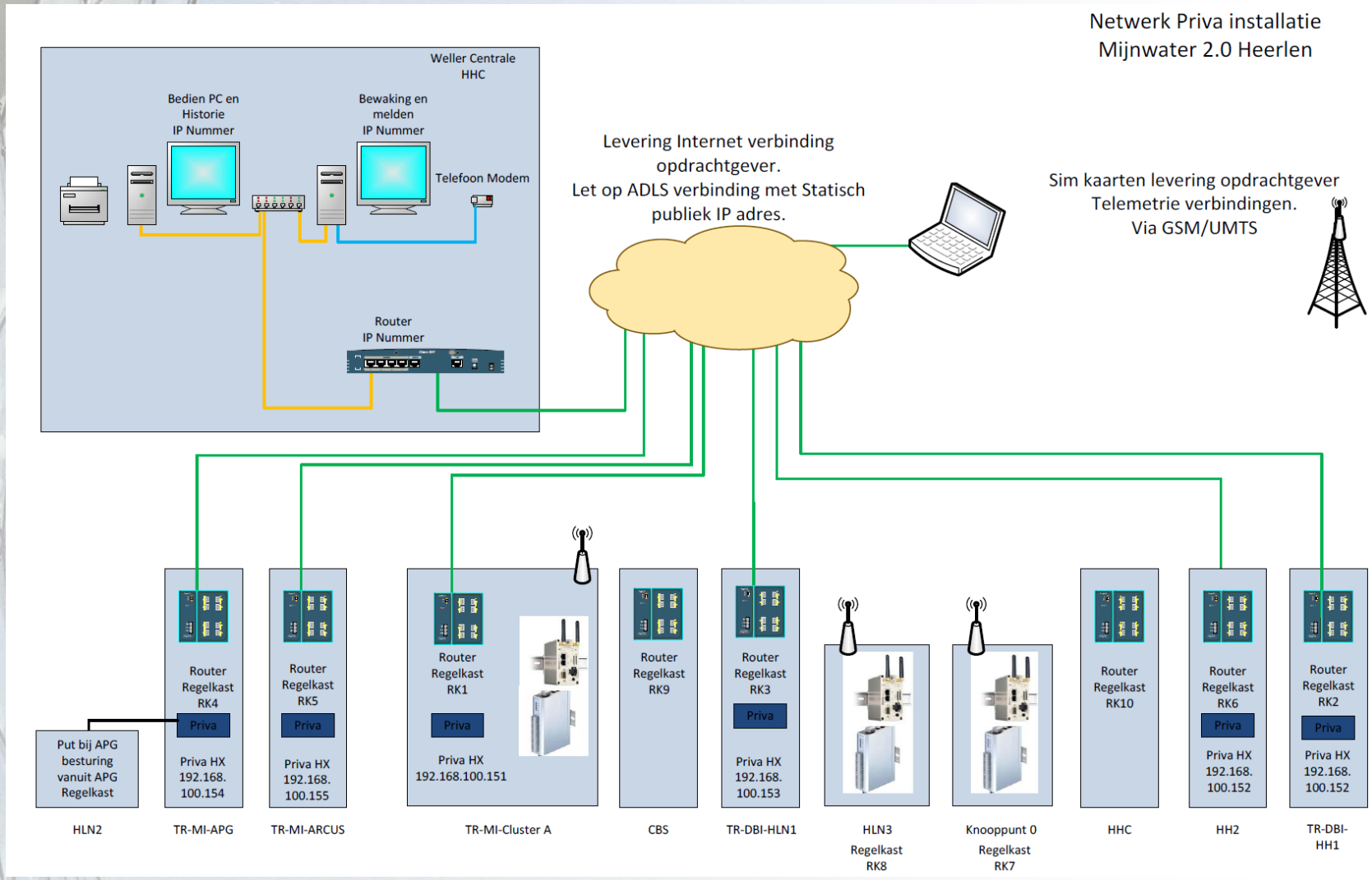

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Think out of the box

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Healthy portion of guts

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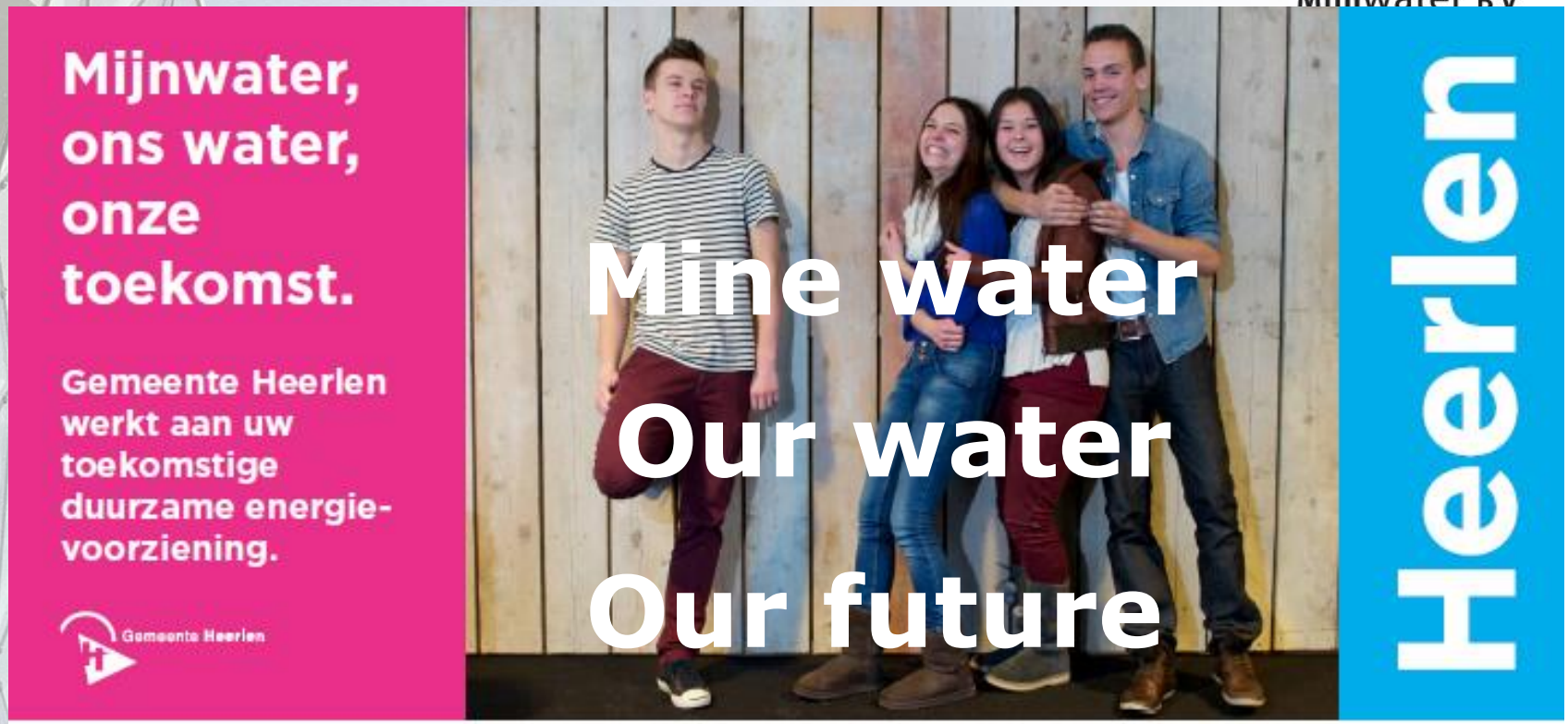

Dit project wordt mede mogelijk gemaakt door een bijdrage uit het Europees Fonds voor Regionale Ontwikkeling in het kader van structuurversterking stationsomgevingen Vlaanderen – Nederland

Europese Unie
Europees Fonds voor Regionale Ontwikkeling

CONCERTO

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Thank you for your attention

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