

# Open Innovatie WarmteNet

*Dé praktijkplek om warmte-innovaties te testen!*



**ENEXIS**  
GROEP

**THE  
GREEN  
VILLAGE**



**STEDIN**  
GROEP

# Innovatie in warmtenetten



*Ivo Pothof*  
*TU Delft*



*Roelof Potters*  
*Alliander*  
*Didam*



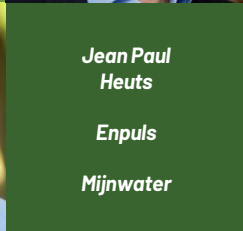
*Arnoud  
van der Zee*  
*The Green Village*



*Herve  
Huisman*  
*Gradyent*  
*Warmtenetten van de  
toekomst*

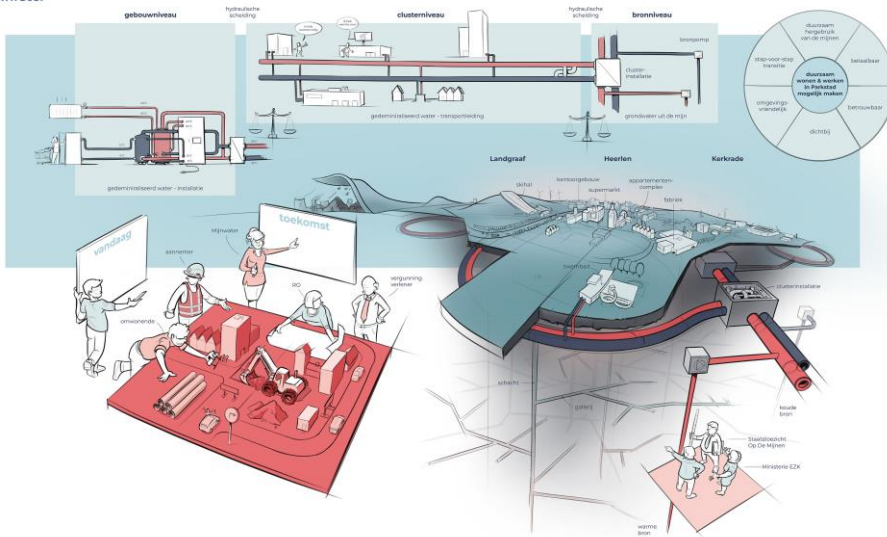


*Jean Paul  
Heuts*  
*Enpuls*  
*Mijnwater*



# Mijnwater een 5<sup>de</sup> generatie warmte/koude netwerk

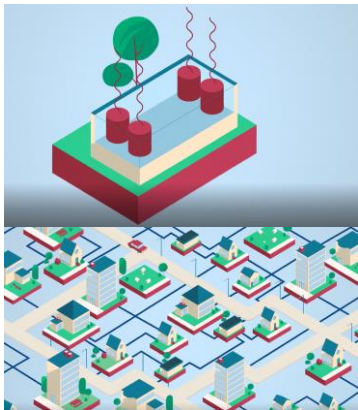
**mijnwater**



# Modulair Energie Stelsel

Toegepast in Didam

alliander



Kleinschalig warmtenet  
Start met 'lucht' als bron  
Collectieve hybride warmtepomp  
Koppelbaar → groei naar grote bron



Modulair  
Geschikt voor bestaande wijken  
Midden Temperatuur  
Goede prestaties



Goede inpassing  
Acceptabel voor de buurt  
Inpasbaar in coöperatieve aanpak  
Schaalbaar door standaardisatie

# Based on the interviews, we've compiled the 10 best practices on how to create a resilient district heating system

## What do we know about the future?

## Best -practice to build resilience

## # Mentions

A. There are no safe bets on fuels	1	 Build multi-fuel capability	
	2	 Reduce dependency on fuels altogether	
B. Electricity will become a crucial factor for heating	3	 Prepare for a more electric future with minimal risk and maximum benefit	
	4	 Break the silos and organize around a single integrated energy system	
C. Overall systems will be more complex to design, operate and maintain	5	 Create a next level of understanding of your current system	
	6	 Prevent system complexity driving costs	
	7	 Work towards full automation and autopilot in close collaboration with operators	
	8	 Prepare your data to aim for predictive maintenance to replace old networks	
D. Continued volatility	9	 Use scenarios to model high impact situations	
E. Increasing competition from heat pumps and e.g., shallow geothermal	10	 Smart differentiation of your customer offering	

### Education

- New Heat Track
- MOOCs

### Research

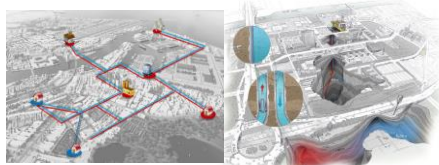
- Subsurface data mining
- Data-driven methods
- Model-predictive control

### TGV

- Warmtestraat
- GoZON/deZonnet

### Opschaal locaties

- DH-grid transformation
- Geothermal – HT-ATES
- 5GDHC-grid



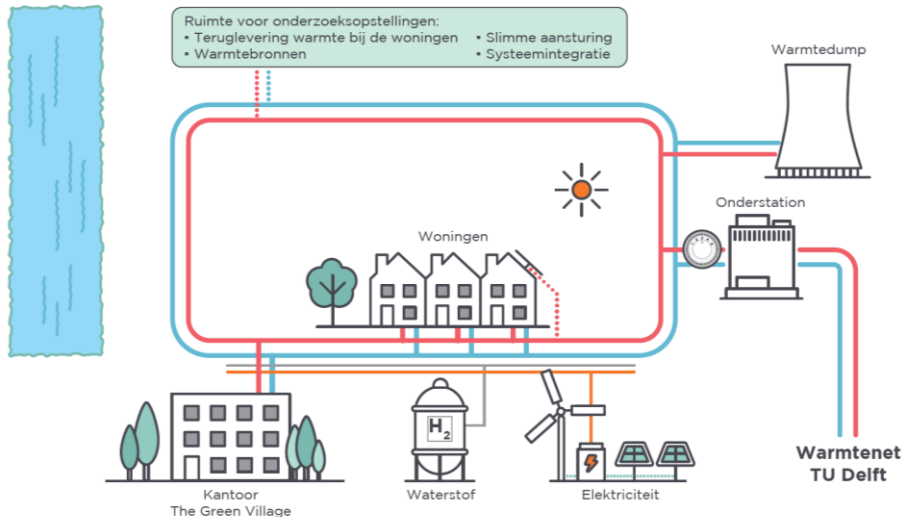
Research opportunities  
Open Innovatie Warmtenet:

- Innovative substations
- Decentralised controls – P2H-flexibility
- Heat exchange energy piles – DH-grid
- Subsurface temperature profiles around DH-pipes
- Detection methods for insulation leakage
- Cyclic loads of DH-pipes

# Open Innovatie WarmteNet



**Edwin van Vliet**  
**Netverder**



# Testen doen op het Open Innovatie Warmtenet

- Open voor iedereen en alles kan aangepast worden aan het Open Innovatie WarmteNet

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## Raad van Advies



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TU Delft en Deltares*



*David van Petersen  
TKI Urban Energy*



*Kees van Daalen  
Gebr. Van der Steen  
Bedrijven*



*Frits Verheij  
Greenvis en  
WarmingUp*





Dank voor jullie  
aanwezigheid!

THE  
**GREEN**  
**VILLAGE**

