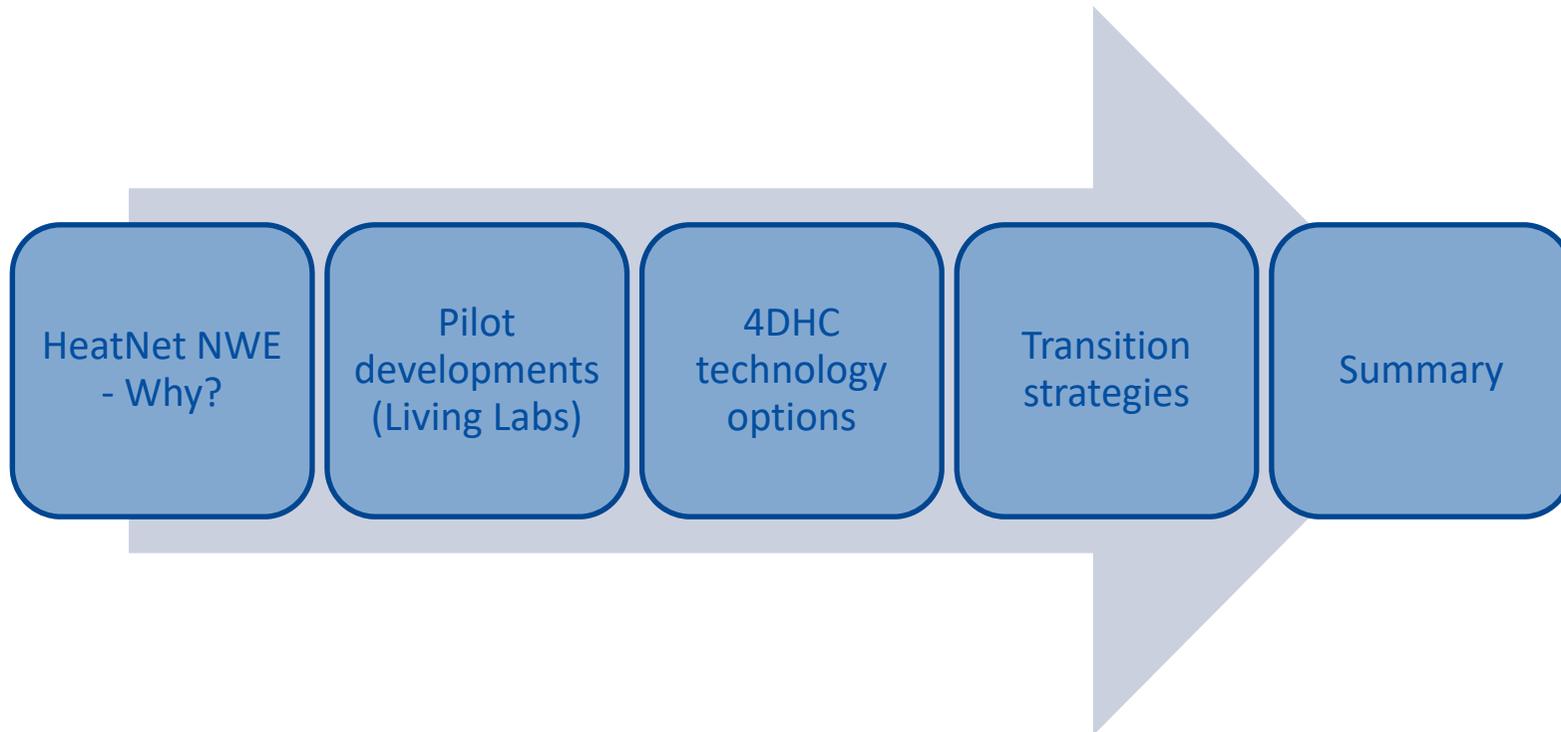




**HEATNET NWE - 4DHC technology
guidance and transition strategies for
Northwest Europe**

CONTENTS



DHC SYSTEMS IN NORTHWEST EUROPE

- Average share – **5 percent**

Northwest Europe

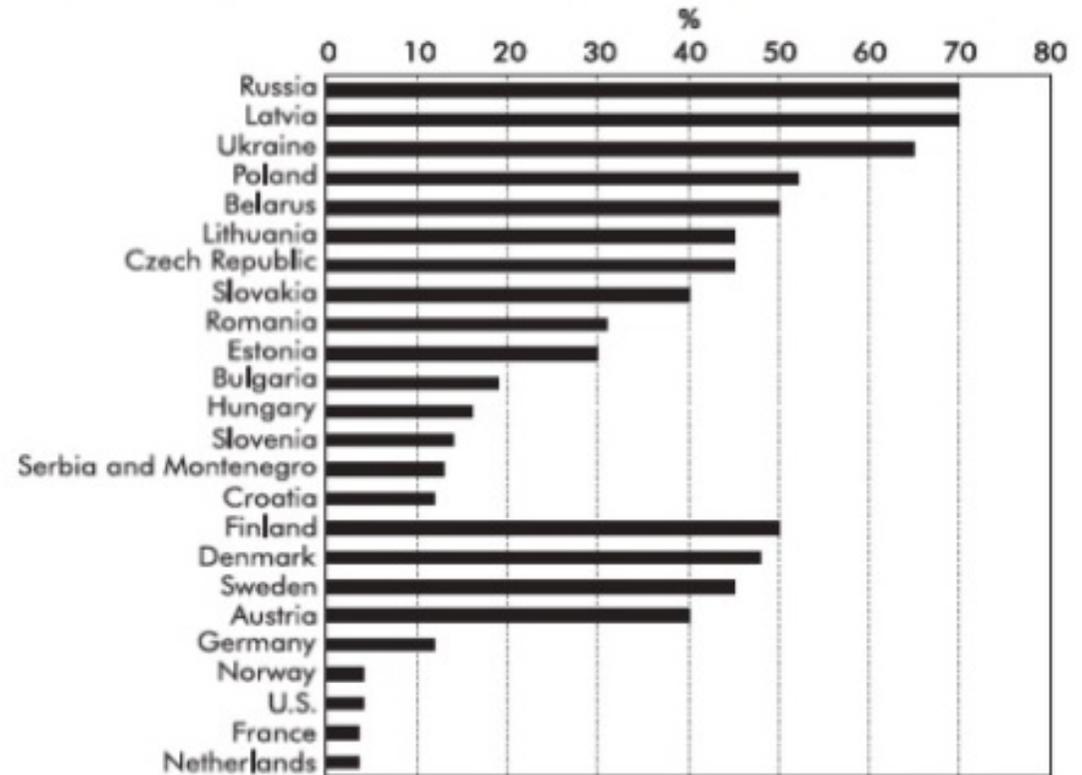


- Average share – **50 percent**

North, Central and Eastern Europe



District Heating's Share of the Residential Heating Market



Source: Advanced district heating and cooling systems by Robin Wiltshire

WHY THE SHARE OF DHC IS LOW IN NWE?



- Heat is not effectively targeted in national level policy but planning and strategies as it is inherently a local level issue
- At the local level, there are no knowledge or experience to plan for heat supply
- Local authorities in NWE are therefore not in a position to facilitate the development of DHC or include DHC policy into their energy strategies due to a lack of knowledge, experience and working examples
- DHC development requires long term vision and plan, therefore local authority involvement is key for DHC development

HEATNET NWE – WHY?



- Introduce and demonstrate 4DHC in NWE
- Develop LTDH to minimize heat losses and integrate storage
- A transferrable **heat net model** for the implementation of 4DHC schemes in NWE
- **Six living labs** test and demonstrate through investments and make the heat net model robust
- Transition roadmaps plan - New institutional and organizational framework

PLANNED OUTCOMES OF HEATNET NWE



- Pilot developments in NWE countries – UK, Ireland, Netherlands, Belgium and France
- Evaluation of stakeholder interviews and challenges that come out of pilot developments will be incorporated in the heat net model
 - ✓ Business model → Investors
 - ✓ Technical model → Engineers/Planners/Developers
 - ✓ Policy issues/challenges → Policy makers
- The project result in 15000t CO₂ saved per annum

PILOT DEVELOPMENTS

- 1) Heerlen, Netherlands
- 2) Boulogne sur mer, France
- 3) Plymouth, UK
- 4) Aberdeen, UK
- 5) Dublin, Ireland
- 6) Kortrijk, Belgium



PILOT – MIJNWATER, HEERLEN, NETHERLANDS

Low temperature district heating and cooling

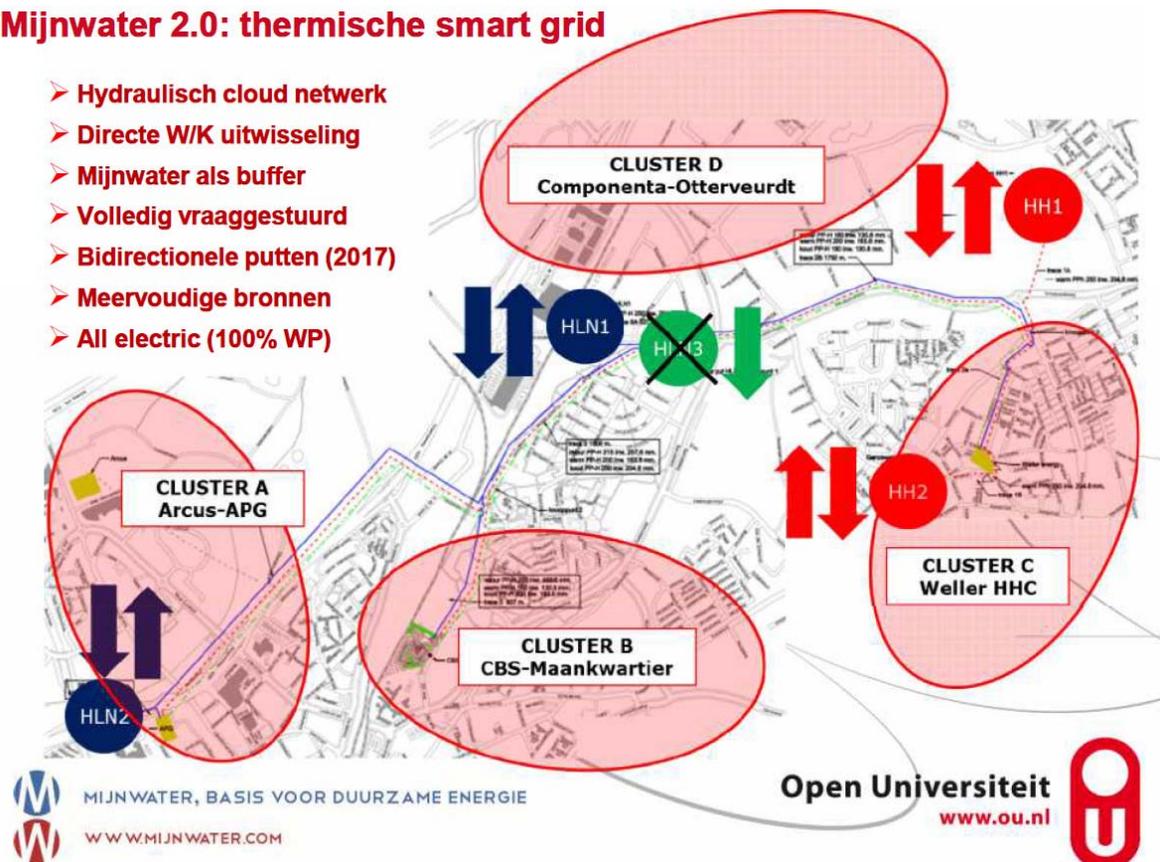
Coal mines used for seasonal storage

Clusters with different building mix

Heat balancing between clusters

Mijnwater 2.0: thermische smart grid

- Hydraulisch cloud netwerk
- Directe W/K uitwisseling
- Mijwater als buffer
- Volledig vraaggestuurd
- Bidirectionele putten (2017)
- Meervoudige bronnen
- All electric (100% WP)



Source: Mijnwater B.V

PILOT – MIJNWATER, HEERLEN, NETHERLANDS

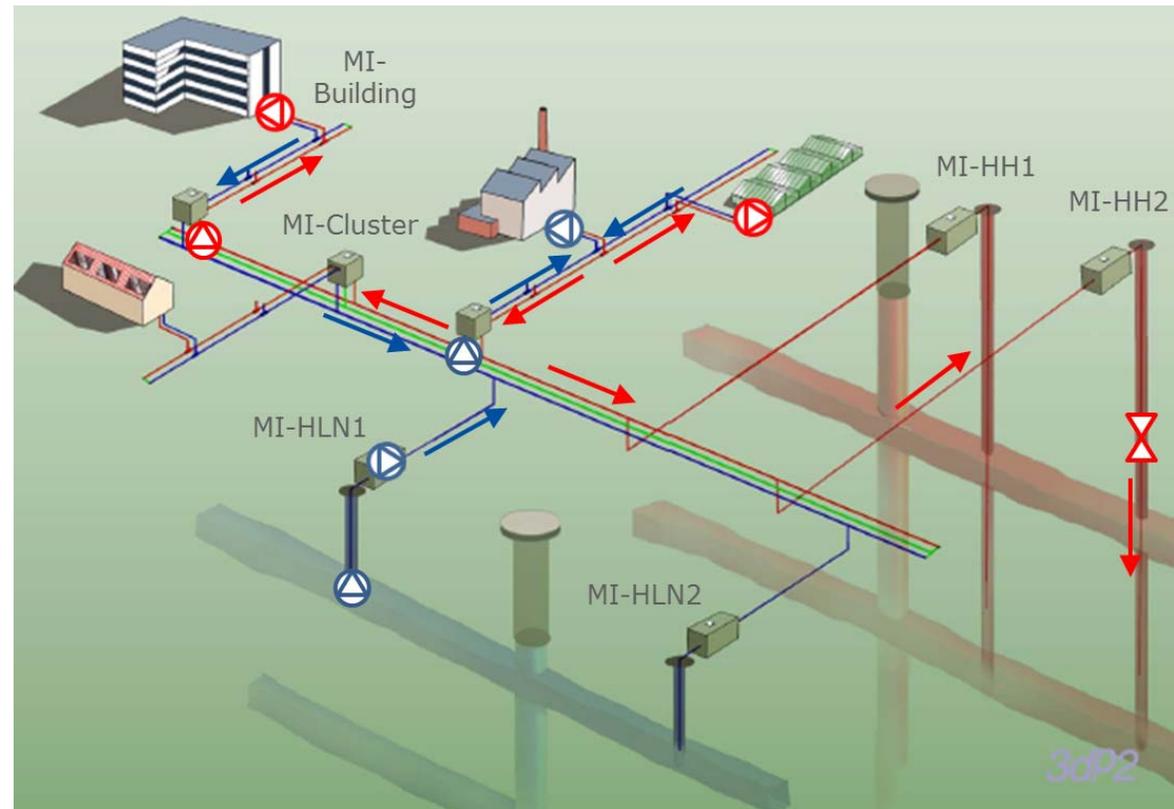
Heat pumps at building side

Prosumers

Short term buffers at building side

Medium term buffers at energy center

Developing intelligent control systems



Source: Mijnwater B.V

PILOT – KORTRIJK, BELGIUM



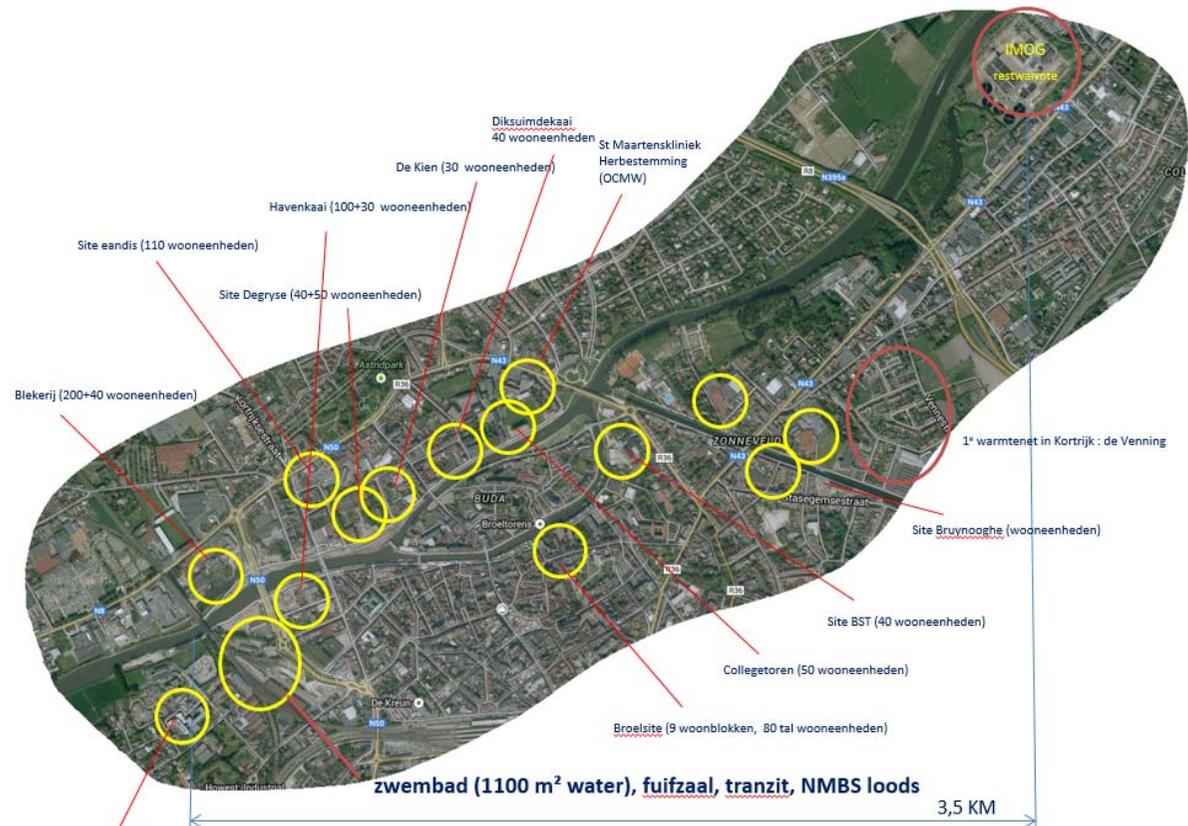
IMOG – Waste Incinerator

Clusters in the city

Low temperature DH system

Expansion to University buildings

Smart meters



Source: Stad Kortrijk

CHALLENGES OF DHC DEVELOPMENT IN BELGIUM



- Gas grid development – Strong concentration
- Low gas price – Heat price is related to gas price
- People mindset - likes to have individual heating systems
- Market monopoly
- Cities don't have knowledge to write tenders but have to obey procurement legislations
- Timeframe of heat net developments/to get buildings connected (too slow for the end-users and developers) – Roll out strategy

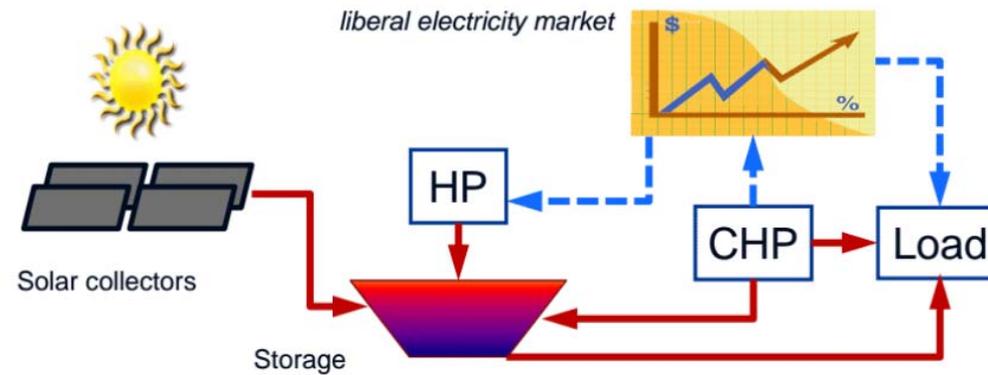
HEATNET MODEL



- 4DHC project tools
 - ✓ Heat demand and low grade waste heat mapping
 - ✓ CO2 emission calculator
- Integrating 4DHC with energy efficiency retrofitting guide
- 4DHC procurement guide
- 4DHC technology guide
- 4DHC guide to home and building energy management
- 4DHC guide to governance/business models
- Guide to financing 4DHC

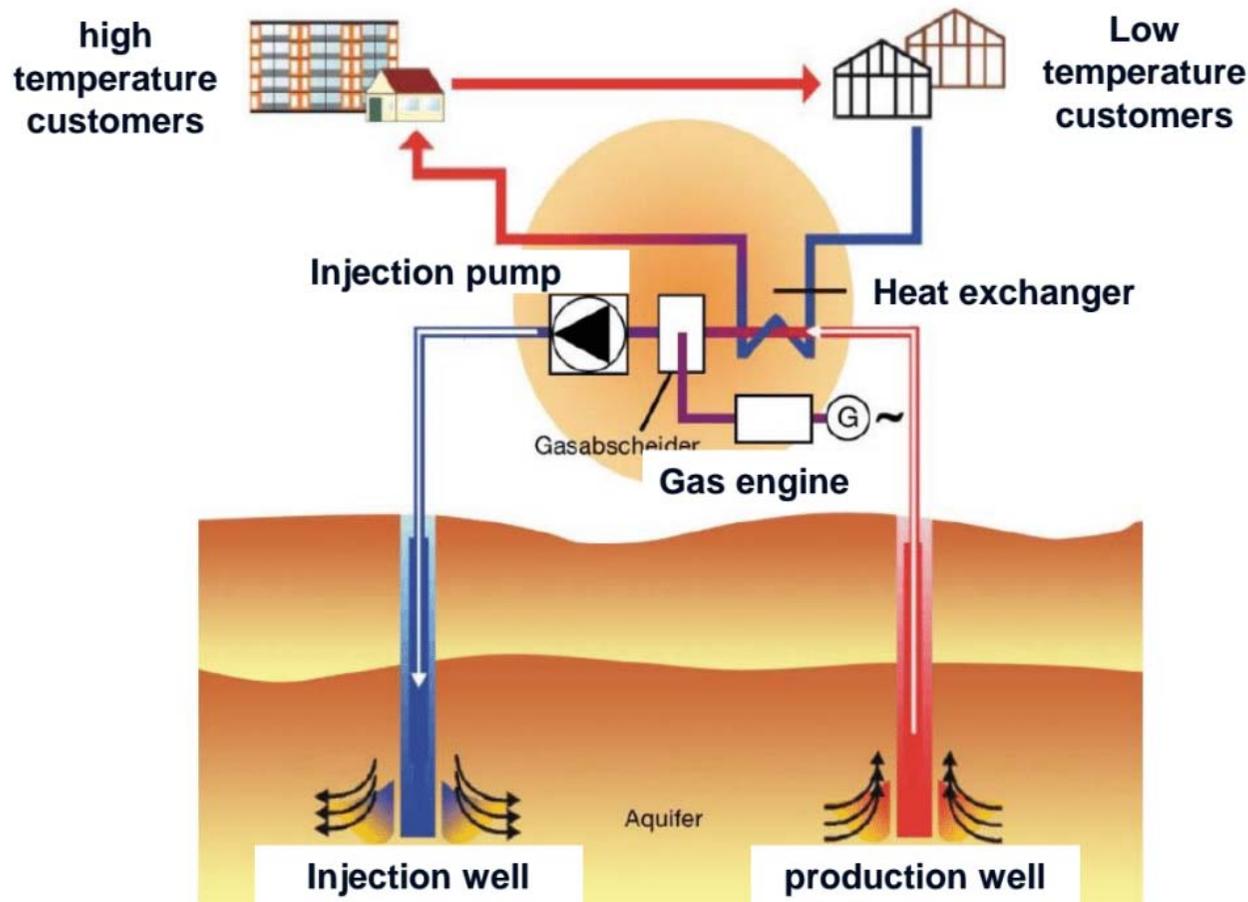
4DHC TECHNOLOGY OPTIONS – SOLAR COLLECTORS WITH PIT STORAGE

- Solar collectors
- Short term storage
- Pit heat storage
- Heat pump
- Boiler
(Gas/Woodchip)
- ORC



Source: Presentation by Ralf-Roman Schmidt, AIT Institute of Technology

4DHC TECHNOLOGY OPTIONS – GEOHERMAL HEATING



Source: Presentation by Ralf-Roman Schmidt, AIT Institute of Technology

4DHC TECHNOLOGY OPTIONS – CASCADING SYSTEM



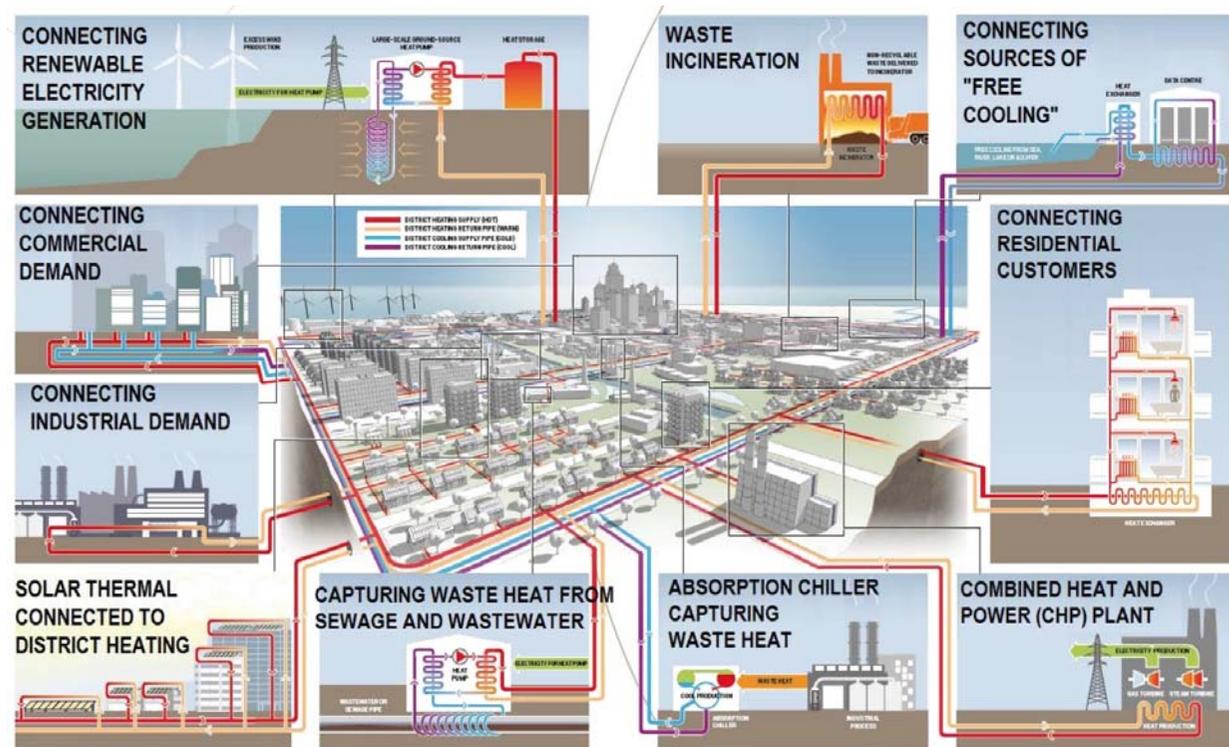
- **Secondary low temperature system from a primary high temperature system**
- The high temperature supply can be waste2heat incinerator, biomass power plant, CHP plants
- Low temperature supply can be boosted with solar collectors
- Can be coupled with storage options
 - Short term – Storage tanks
 - Seasonal storage
 - Pit storage
 - Coal mine storage

4DHC TECHNOLOGY OPTIONS – DISTRICT HEATING AND COOLING SYSTEM

Heat balancing
between buildings

Inclusion of heat
pumps, absorption
machines, cooling
towers within the
system

Capture waste
heat and free
cooling



Source: Rapidshift.net/district-energy-in-cities/

4DHC TECHNOLOGY OPTIONS – SMART GRID SYSTEM

- Smart grid – Coupled energy system for electricity, heat and transportation
- Smart control system – Load balancing between electricity and heat
- Heat storage and renewable gas storage



Source: Smart grid interactive tool by European commission

TRANSITION STRATEGIES



- Belgium energy mix – Natural gas and Fuel oil
- 50 percent of electricity production comes from Nuclear power
- Government wants to phase out nuclear power slowly by increasing solar and wind share
- There is huge potential for coupling district heating systems with electricity grids
- They are in the initial stage of their district heating development – Legislations and policies should be properly put in place for the positive development

SUMMARY



- Green heat for the green future
- Six living labs in Northwest Europe
- Heat net model
 - Guide to 4DHC technology
 - Transition roadmap plan for roll out of new technical, institutional and organizational framework in 6 living labs
- The project will result in 15000t CO₂ saved per annum

Interreg



EUROPEAN UNION

North-West Europe

HeatNet NWE

European Regional Development Fund

Thank you!