Transition roadmaps for cities: how to scale up DHC pilots?

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Final HeatNet conference, 15-9-2020

Transition roadmaps for cities: how to scale up DHC pilots?

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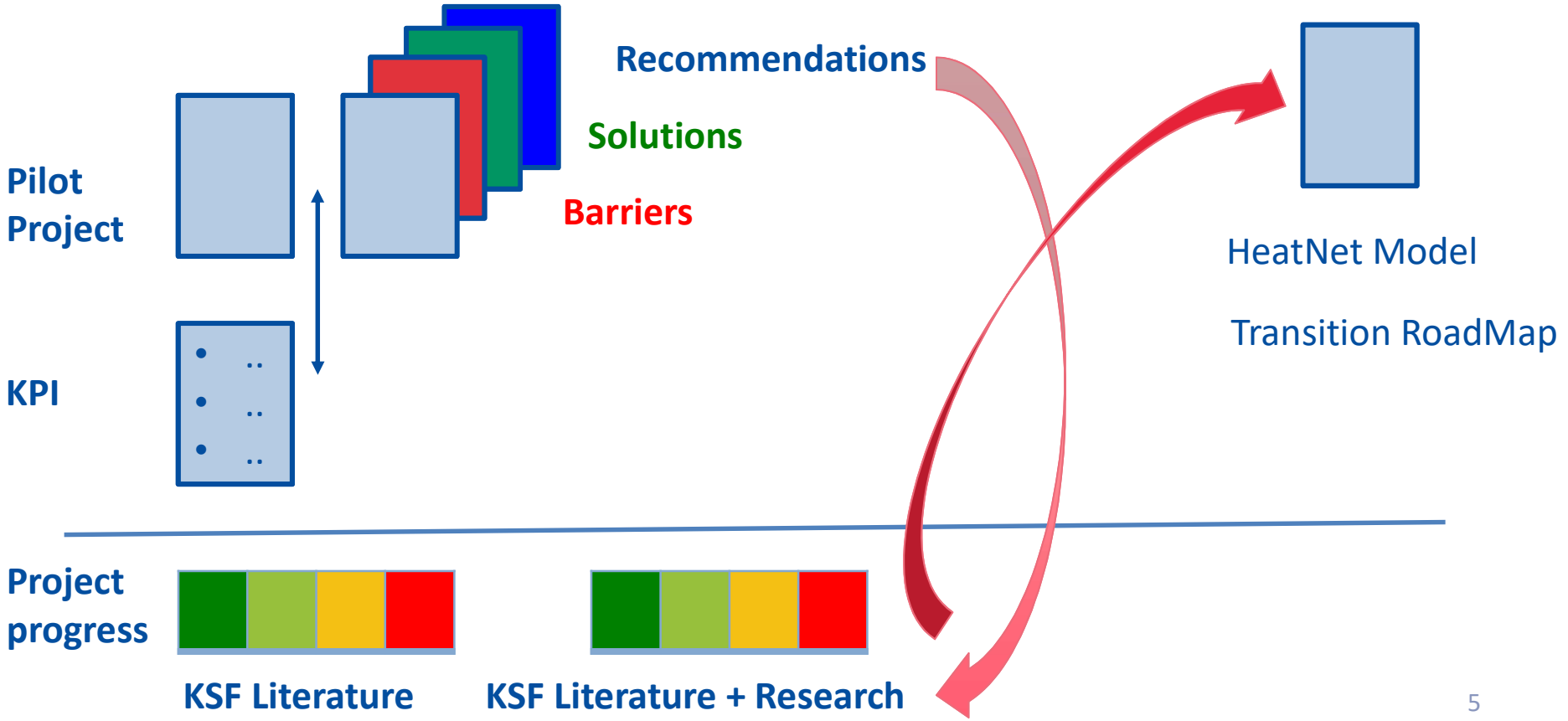
Content:

- HeatNet project evaluation
- Regional and national context
- Key success factors
- Transition roadmaps
- Lessons

HeatNet : evaluation via action research

Before Heerlen	Heerlen	Boulogne sur Mer	Kortrijk	Aberdeen	Plymouth	S-Dublin
2016-2017	02-2017	09-2017	03-2018	09-2018	03-2019	09-2019



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Regional and national context - Influences on HeatNet

Had to be managed:

- Aberdeen: downturn of oil & gas industry
- Brexit discussion dominates UK
- Belgium political standstill in election time
- No heat policy experience in Ireland

Positive:

- Scottish obligation to use heat from power plant
- Mandatory cost benefit analyses of waste heat use from industry
- Dutch climate-agreement on heat

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Key Succes Factors (based on Galindo e.a. 2016)

Examples of barriers seen in HeatNet

Adequate national policy and regulation	Obligation to connect buildings to gas grid ; no heat grid allowed crossing borders
Direct / indirect financial support	Investment in grid is high
Focused local policy and urban planning	A lot of different authorities involved in planning of network; change of politicians
Alignment of interests	Building owners not local, end user not know
Availability of relevant local resources	No renewable heat sources available
Continuous and comprehensive project development	Roll out dependent on financing
Price competitiveness against alternative energy solutions	Gas is too cheap
Flexible heat and cold production	Waste heat not always available / needed
Technical and non-technical innovation	Innovation in one country not allowed in other

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Key Succes Factors (Galindo 2016)

2017 2019 Examples in HeatNet

- Adequate national policy and regulation — f.e. climate agreement NL
- Direct / indirect financial support — Additional subsidy found
- Focused local policy and urban planning — Agreement on project from local government
- Alignment of interests — More insight in stakeholders
- Availability of relevant local resources — New sources secured
- Continuous and comprehensive project development — Capacity building in local autority
- Price competitiveness against alternative energy solutions — Discount of 10%
- Flexible heat and cold production — Waste heat of datacenter
- Technical and non-technical innovation

System innovation needed

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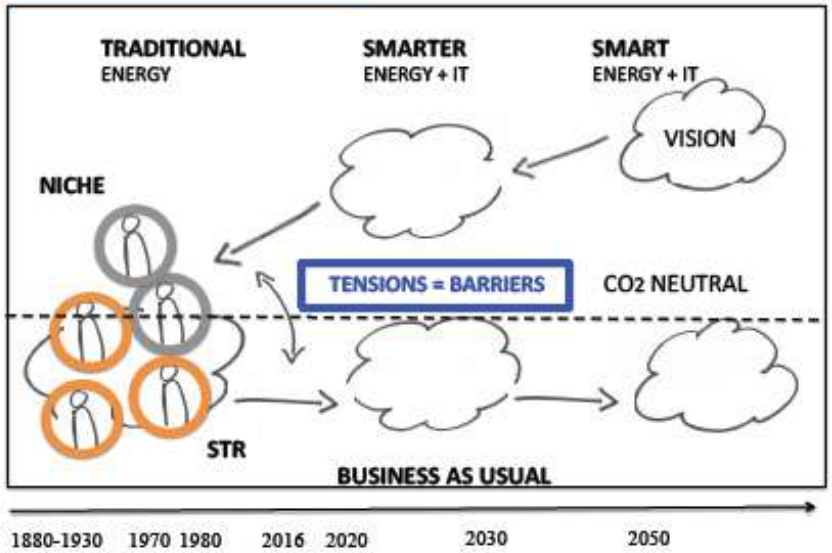
3 PERSPECTIVES ON 4DHC PROJECTS

1. PILOT

BARRIERS
1. COLLABORATION
2. FUNDING
3. COMPETENTIES
4. TARIFF GAPS
5. LEGISLATION
6. COMMUNICATION
7. TASK ALLOCATION
8. ECONOMIC
9. ADOPTION
10. EMERGING TECH

2. STAKEHOLDERS



3. SYSTEM INNOVATOR

RECOMMENDATIONS
1. SYSTEM THINKING
2. TRANSITION=CHANGE
3. EDUCATION
4. SHARED VALUE
5. IMPACT MANAGEMENT
6. TBL ACCOUNTING
7. POLITICAL INNOVATION
8. STAKEHOLDER ANALYSIS
9. AWARENESS
10. BEST PRACTICES

3 PERSPECTIVES ON BARRIERS

1. Large engineering project
'Common' barriers
2. Standard renovation project

2. 'CO2 Reduction' project
'Expected' barriers
e.g. ROI to low, mismatch, a lack of consistency.

3. Sustainability Transition project
'Transition' barriers
e.g. different values, other standards,

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Transition Roadmaps

- Every city in HeatNet now has a road map
- As shown both a vision and a path towards it with stakeholders engaged to that path is one of the pre-requisites for roll-out

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Conclusions

- Pilots have been able to improve on KSF
- They also developed road maps for roll-out
- National policy got more supportive
- Barriers are general, solutions need both national and local (stakeholders) support

- So: pilot cities are ready for roll-out, bus as long as long term visions are not supported by system change and legislative / financial structures 4DHC will stay a niche


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Greening our cities with district energy

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Welcome.

Transition roadmaps for cities: how to scale up DHC pilots?

Leiedal – Transition roadmap for Kortrijk & South West Flanders

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Veerle Cox
Urban designer
Intercommunale Leiedal

Transition Roadmaps

- Transition roadmaps to scale up pilot projects

- **Aberdeen**: expansive citywide district heat network & action plan
- **Heerlen**: how to finance the scaling of the Mijnwater grid?
- **Plymouth**: technical compliance
- **Leiedal**: regional DH network & coproduction through workshops
- **South Dublin:** procurement options, business models, planning permission requirements, …

- Can be downloaded: https://www.nweurope.eu/projects/project-search/heatnet-transition-strategies-for-delivering-low-carbon-district-heat/#tab-4

Leiedal

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Leiedal & climate crisis

- The covenant of mayors:
  40% CO_2-reduction by 2030 + climate adaptation
- ZEROregio: Climate neutrality by 2050
- HeatNet NWE: roll out of 4DHC in South-West-Flanders

Evolutions of CO_2 emissions 2005-2017: -11%

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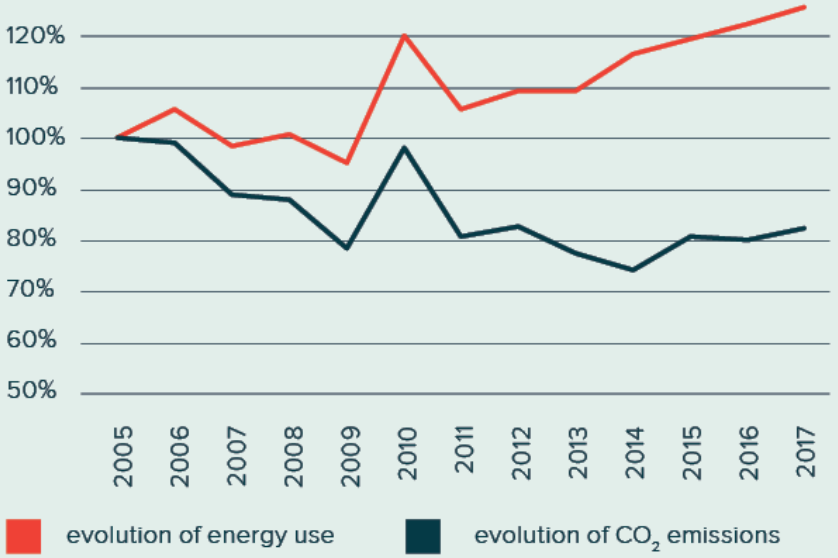
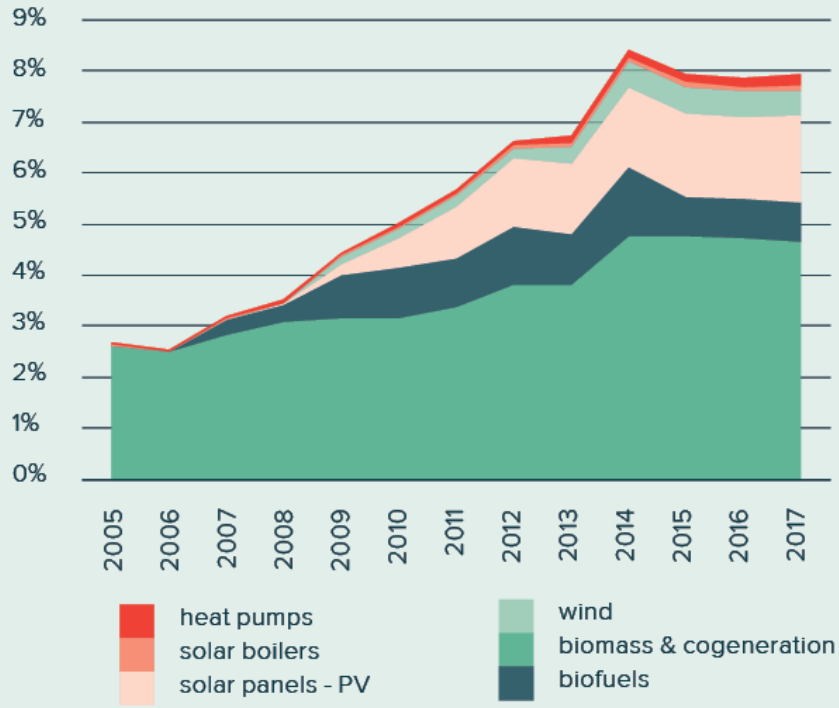
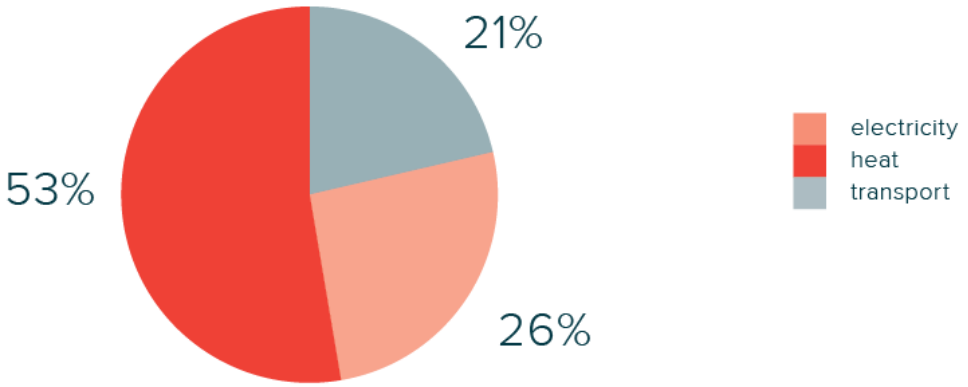
Evolution of CO_2-emissions in South West Flanders: since 2005 a reduction was achieved of 11%. By 2030 this should be 40%.



Evolution of renewable energy in South West Flanders. In 2017 the region achieved a share of ± 8%.



CO_2 emissions South-West-Flanders



Focus on

1) Energy efficiency
2) Re-use of waste heat through district heating
3) Shift from fossil fuels to electricity
4) Local Production of renewable energy

South West Flanders

40% less CO_2 by 2030

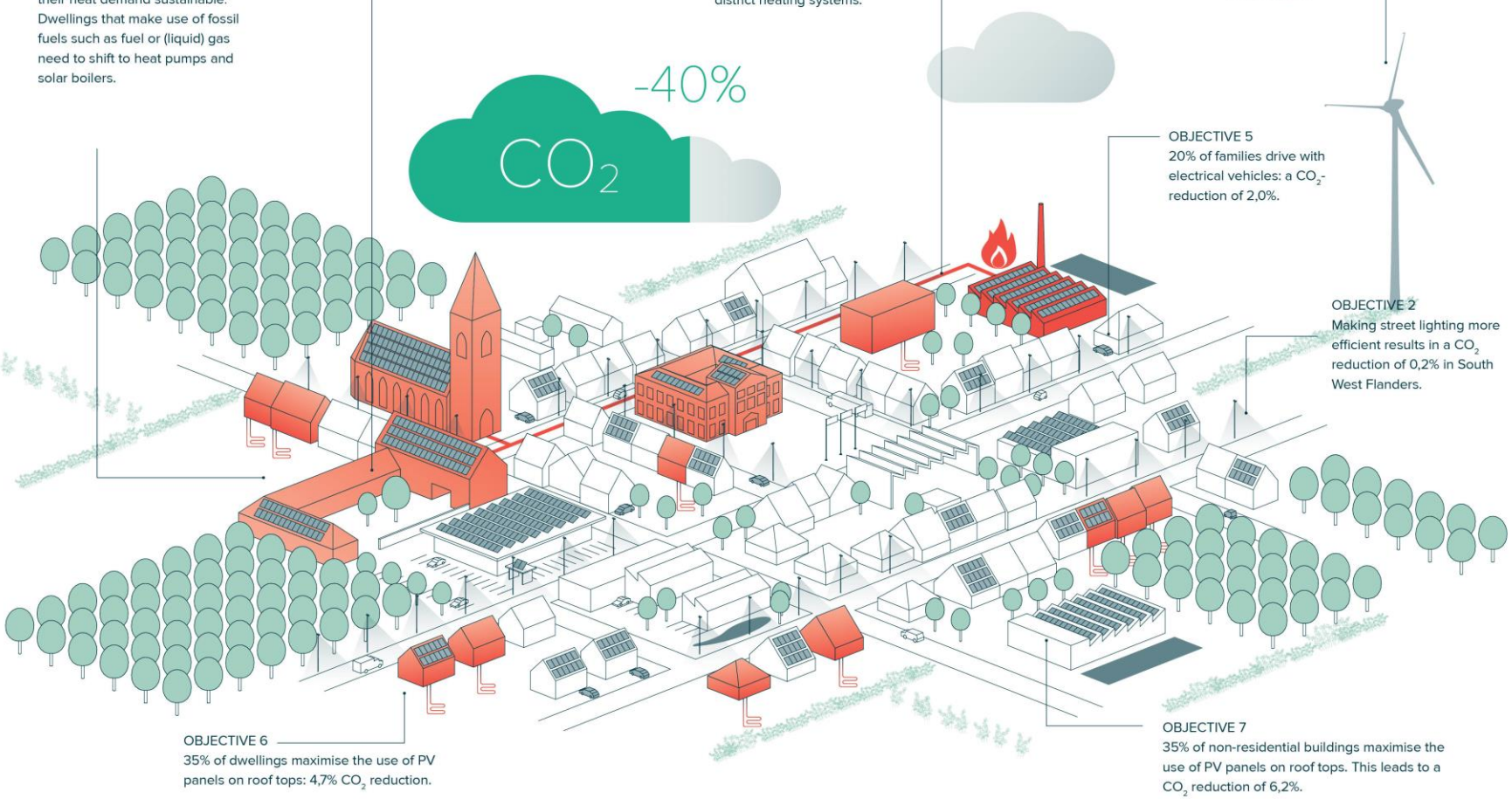
In South West Flanders 11,2% CO_2 was reduced between 2005 and 2017.

OBJECTIVE 1
25% of dwellings reduce their heat demand with 60% by making use of insulation, ventilation and better devices.

OBJECTIVE 3
Using waste heat through district heating systems.

OBJECTIVE 8
The Flemish government wants to double its wind- and solar energy by 2030. For South West Flanders an extra 15 windturbines would be needed, reducing CO_2 emissions with 1,6%. The turbines need to be clustered along the linear infrastructures (highways) of the region.

OBJECTIVE 4
6% of dwellings need to make their heat demand sustainable. Dwellings that make use of fossil fuels such as fuel or (liquid) gas need to shift to heat pumps and solar boilers.



OBJECTIVE 5
20% of families drive with electrical vehicles: a CO_2-reduction of 2,0%.

OBJECTIVE 2
Making street lighting more efficient results in a CO_2 reduction of 0,2% in South West Flanders.

OBJECTIVE 6
35% of dwellings maximise the use of PV panels on roof tops: 4,7% CO_2 reduction.

OBJECTIVE 7
35% of non-residential buildings maximise the use of PV panels on roof tops. This leads to a CO_2 reduction of 6,2%.

Green heat: district heating

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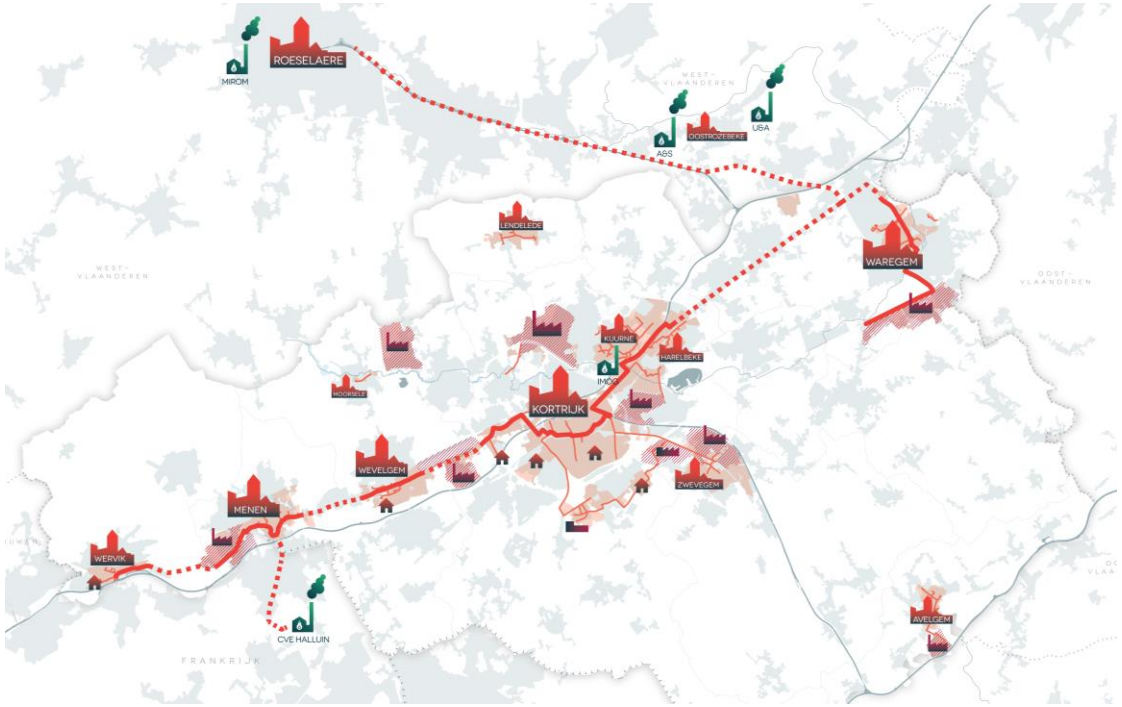

Greening our cities and municipalities with district heating.

Leiedal in HeatNet NWE

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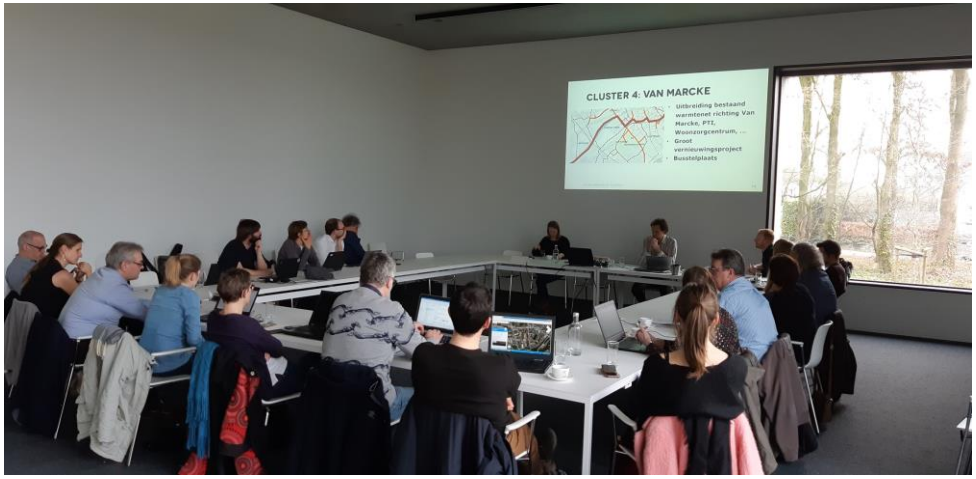
7 capacity building workshops

Kortrijk: 18-22 Feb
Harelbeke and Kuurne: 26-28 March
Spiere-Helkijn and Avelgem: 24-26 April
Menen and Wervik: 6-8 May
Wevelgem and Zwevegem: 14-16 May
Deerlijk and Waregem: 11-13 June
Anzegem and Lendelede: 24-26 June



DH possible in 10 out of 13 municipalities

- Avelgem
- Harelbeke
- Kuurne
- Kortrijk
- Lendelede
- Menen
- Waregem
- Wervik
- Wevelgem
- Zwevegem

Possibilities for district heating in SWVL

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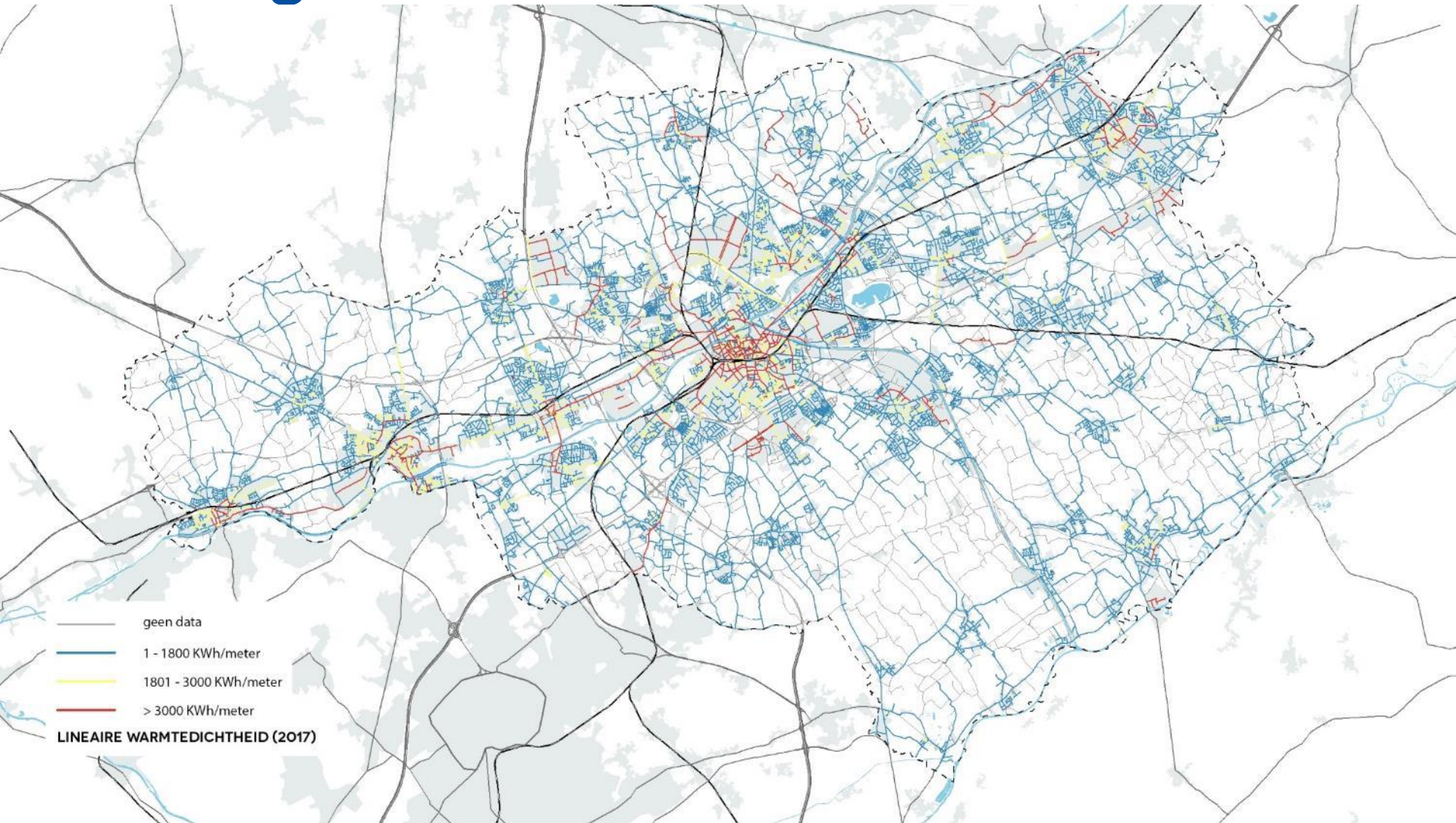

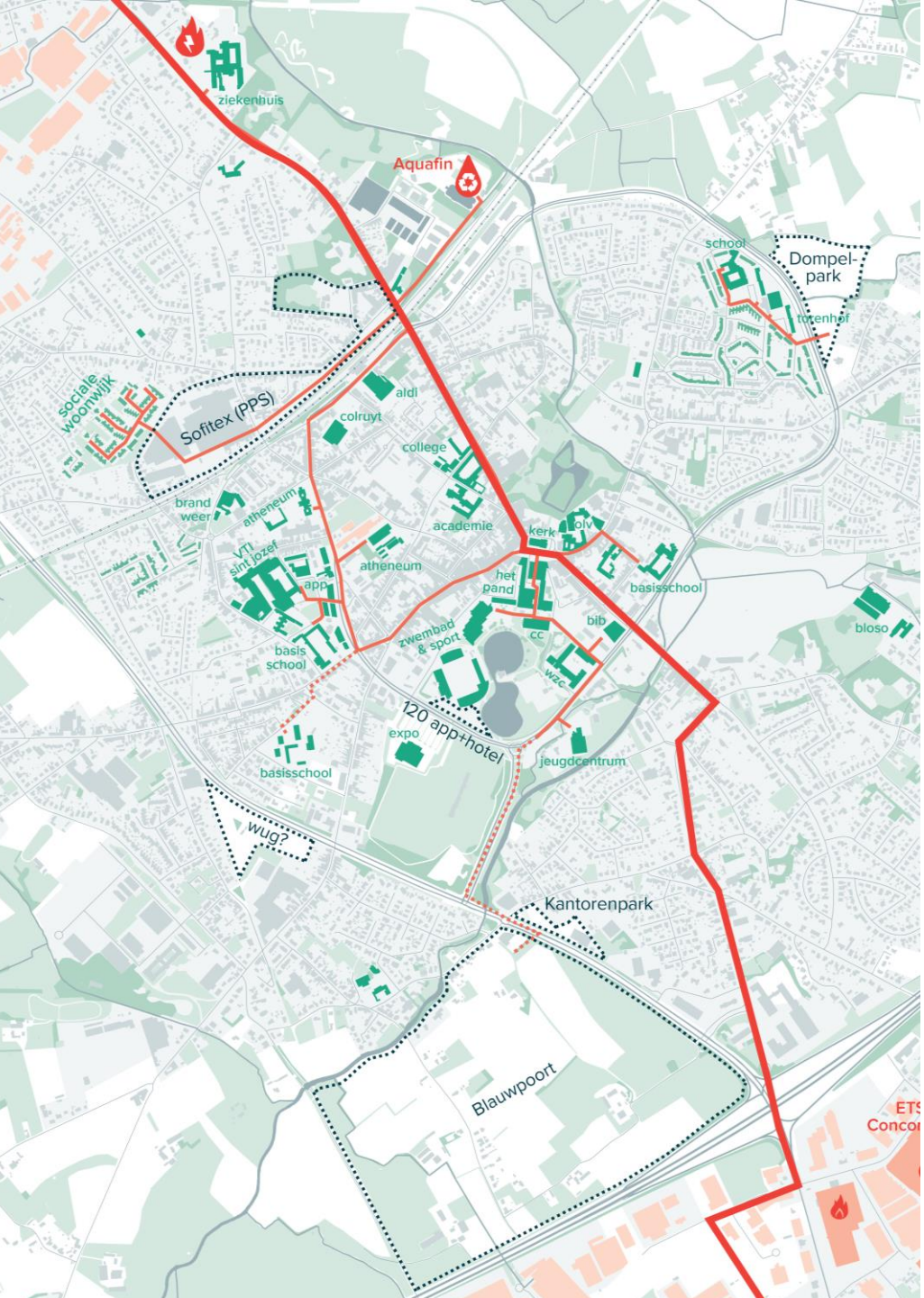

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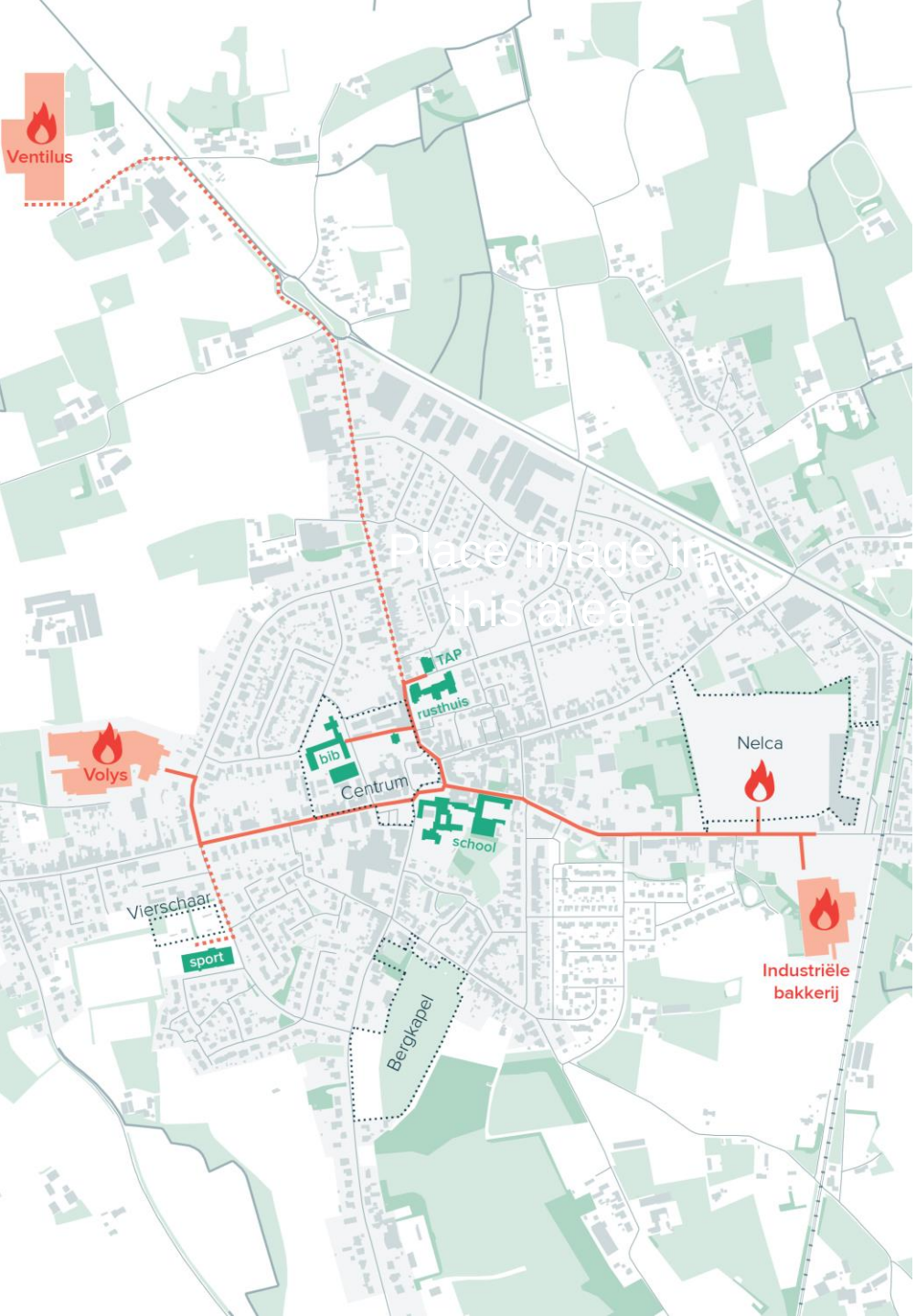
Waregem

Water purification plant as low temperature heat source.



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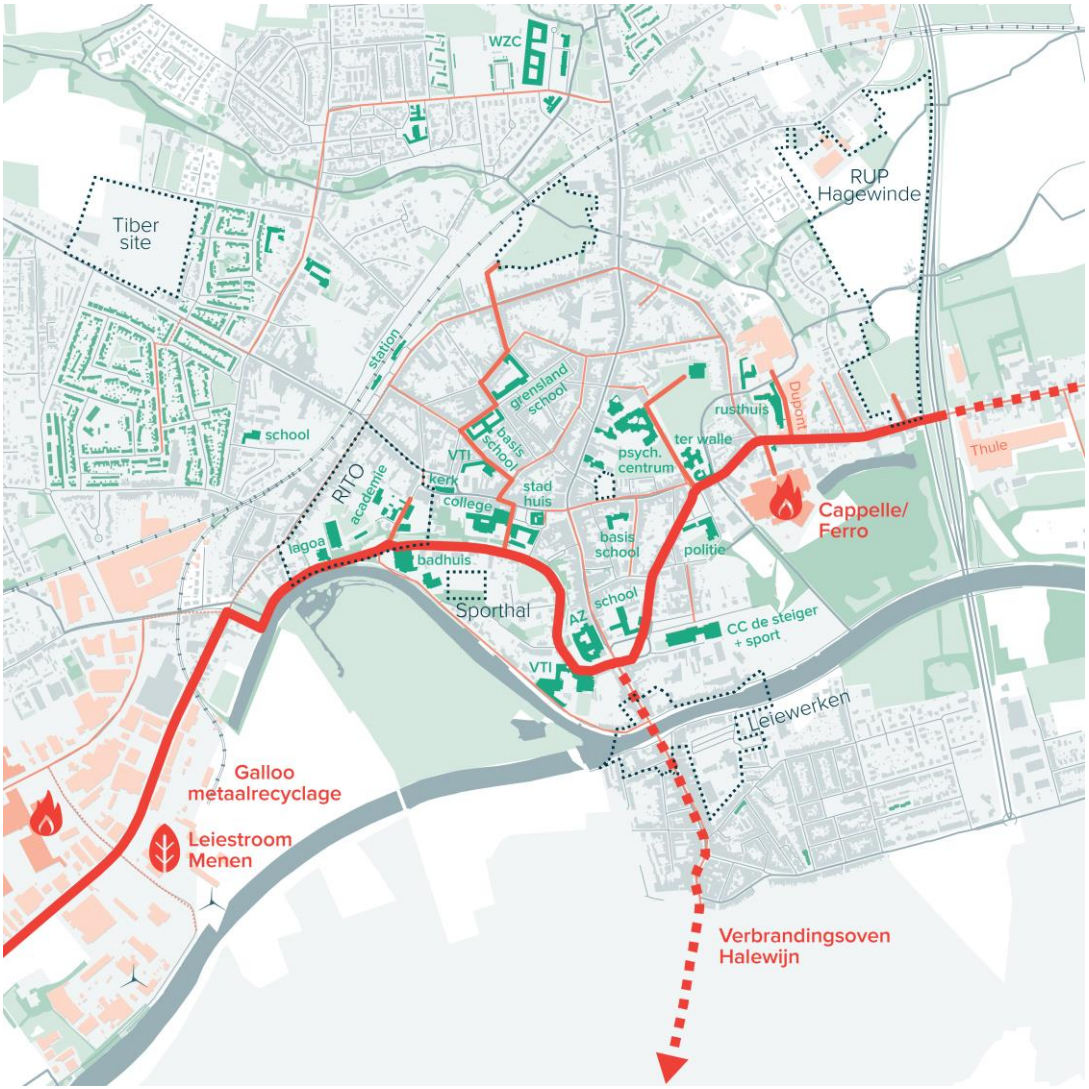
Lendelede

Interesting mix of opportunities:
1) renewal of town hall and municipal grounds, 2) brewery, 3) Ventilus: strengthening the electricity grid and construction of transformer station in Lendelede



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Menen

Making the connection with the district heating system in Halluin, France.

Green heat: district heating

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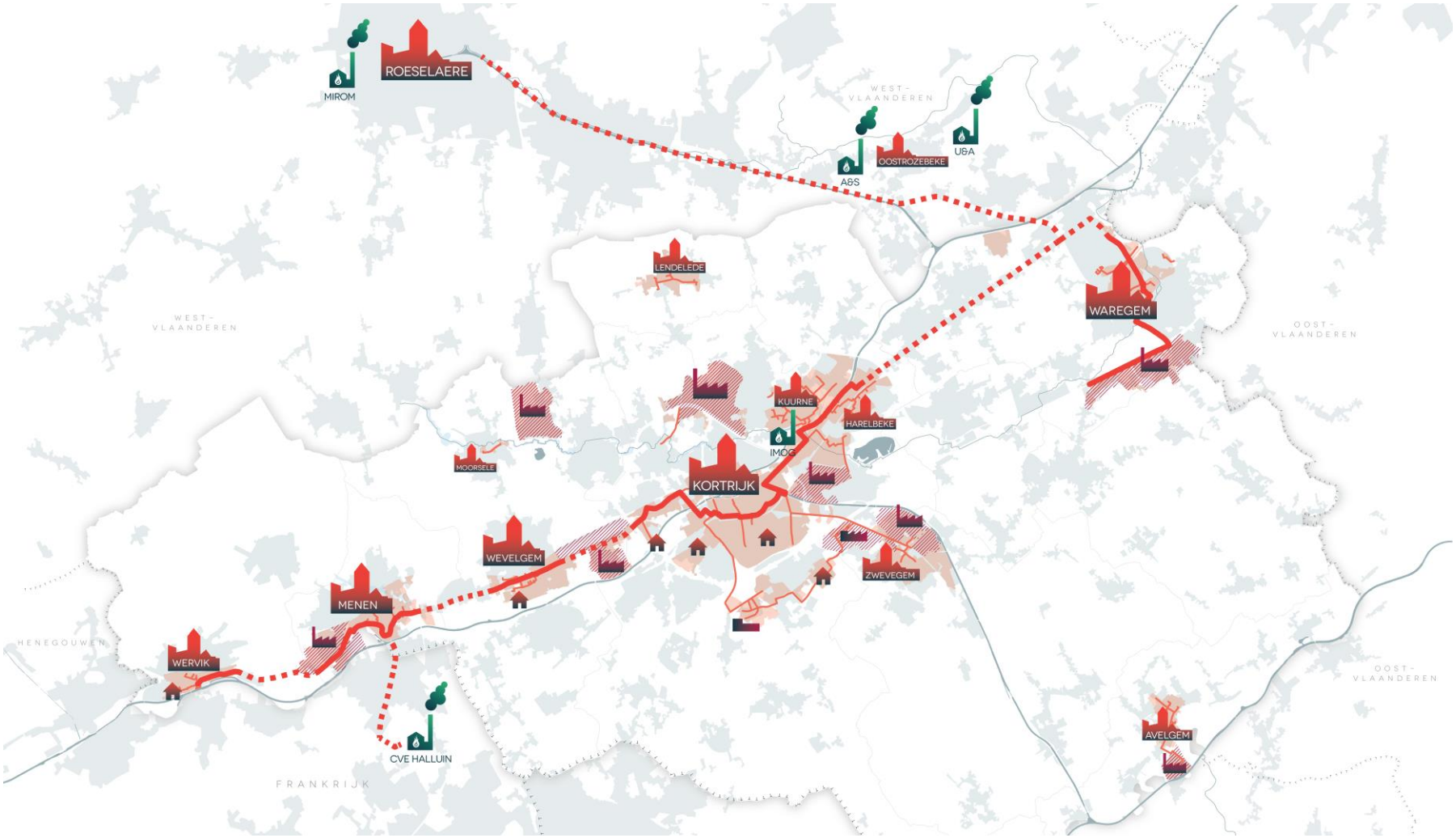

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How the transition roadmap influences development and policy in (SW)Flanders

1. Sept-Dec 2020: Transition roadmap or “regional energy strategy” signed and approved by 13 cities and municipalities
2. Not wasting any opportunities & kick-start local actions: f.e. negotiations with heat suppliers
3. Since September 2019: extra employees to develop and realize DH projects such as Menen and Wevelgem on a short term
4. The Flemish Government is making a roadmap on regional energy planning: SWFL serves as an exemplary case
5. Launching a regional energy company: Leiedal-Kortrijk-IMOG

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Transition roadmaps for cities: how to scale up DHC pilots? Ideas from the Life4HeatRecovery project

Greening our cities with district energy – HeatNet NWE final event

Marco Cozzini – EURAC Research

15th September 2020

LIFE 4 HEAT RECOVERY

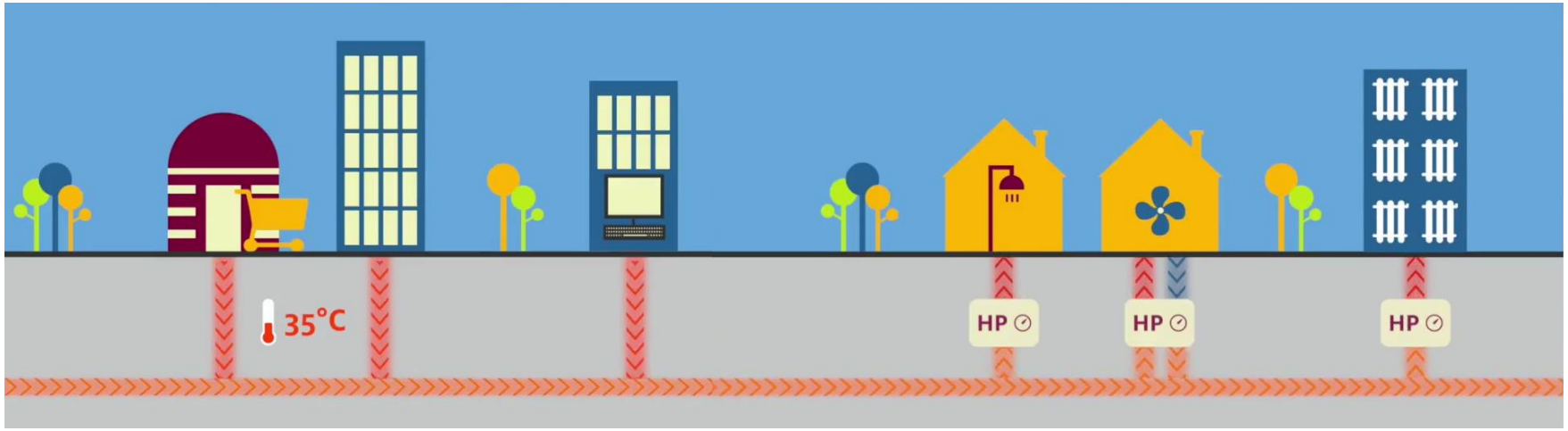
General info

PROJECT LOCATION: Italy, Germany, Netherlands
BUDGET INFO:
- Total amount: € 5.612.877
- % EU Co-funding: 60 %

DURATION: Start: 15/06/18 - End: 14/06/22
COORDINATING BENEFICIARY: Eurac Research
- Roberto Fedrizzi, roberto.fedrizzi@eurac.edu)

Objectives & Scope

LIFE4HeatRecovery demonstrates the recovery of **urban waste heat** available **at low temperature** (< 40 °C) in highly efficient **district heating and cooling networks** operated at conventional or low temperature.
This is done by means of **heat pumps** used either at heat recovery or heat utilization sites, with a focus on **prefabricated** solutions.



Examples of waste heat cases

Low-temperature heat can be found at:

- Cooling towers and dry coolers (from industries, hospitals, …)
- Chillers (from industries, supermarkets, …)
- Wastewater (from treatment plant affluent and effluent channels…)
- Water wells (open loop ground source energy)
- Agro-thermal fields (closed loop shallow ground source energy)
- Datacenters (liquid or air cooling)
- …

Demonstration sites ready to start

Waste heat recovered and used:

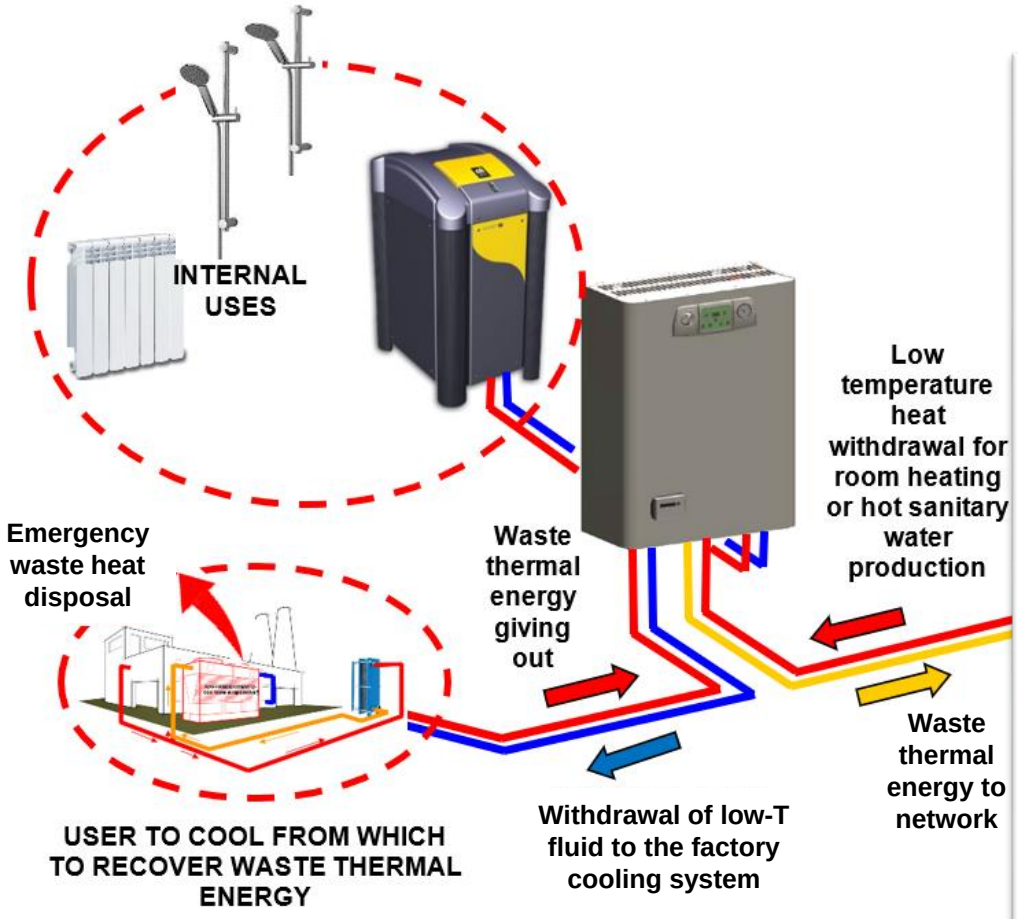
- **Ospitaletto, Italy**: about 230 MWh/y of heat recovery
- **Heerlen, the Netherlands**: about 1140 MWh/y of heat recovery

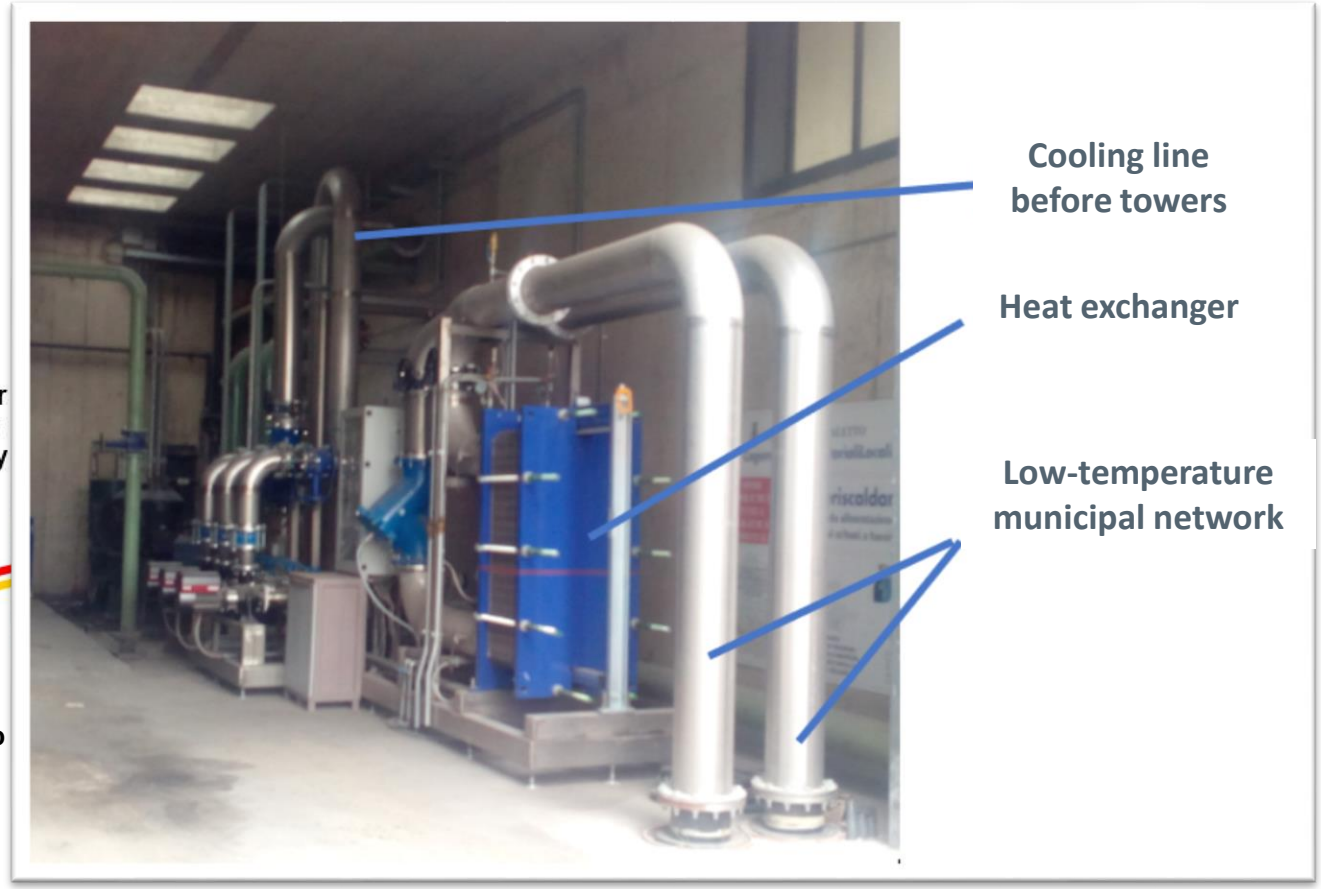
→ Innovative **prefabricated** skids including HPs
→ **Financing** schemes
→ **Business** models

Prefabrication is expected to be crucial to lower costs and installation times, while at the same time increasing replicability and trust form involved companies

Ospitaletto, cooling towers

Steel foundry

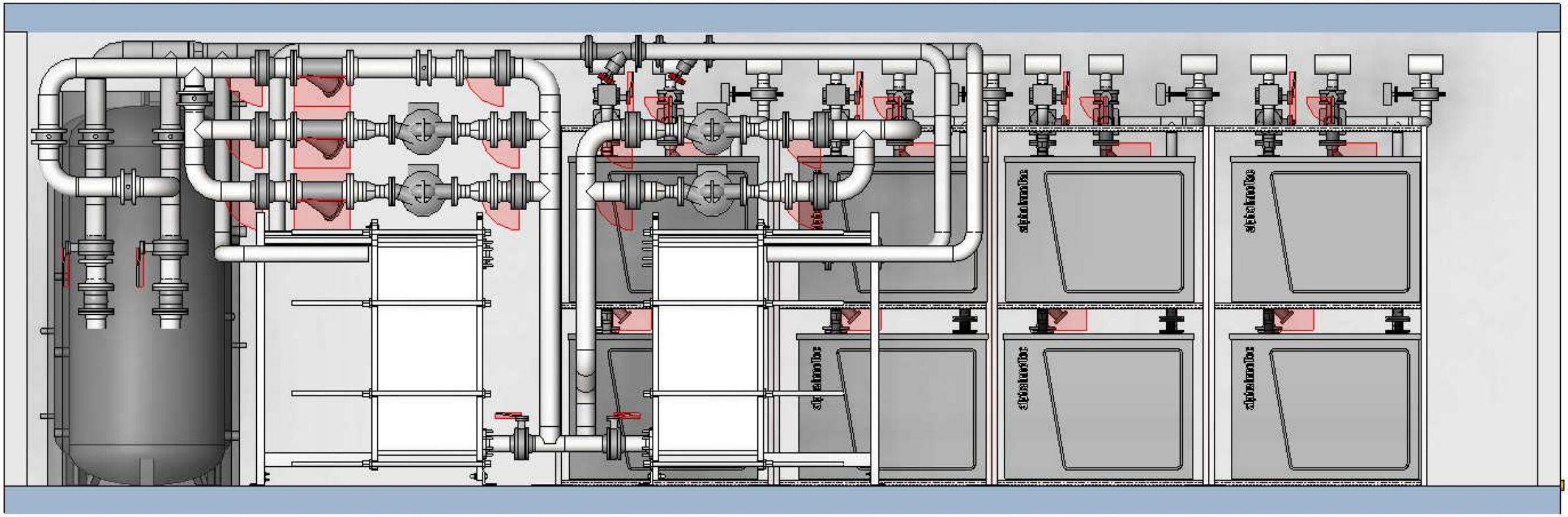




Heerlen, chillers

Detergent factory

LIFE 4 HEAT RECOVERY



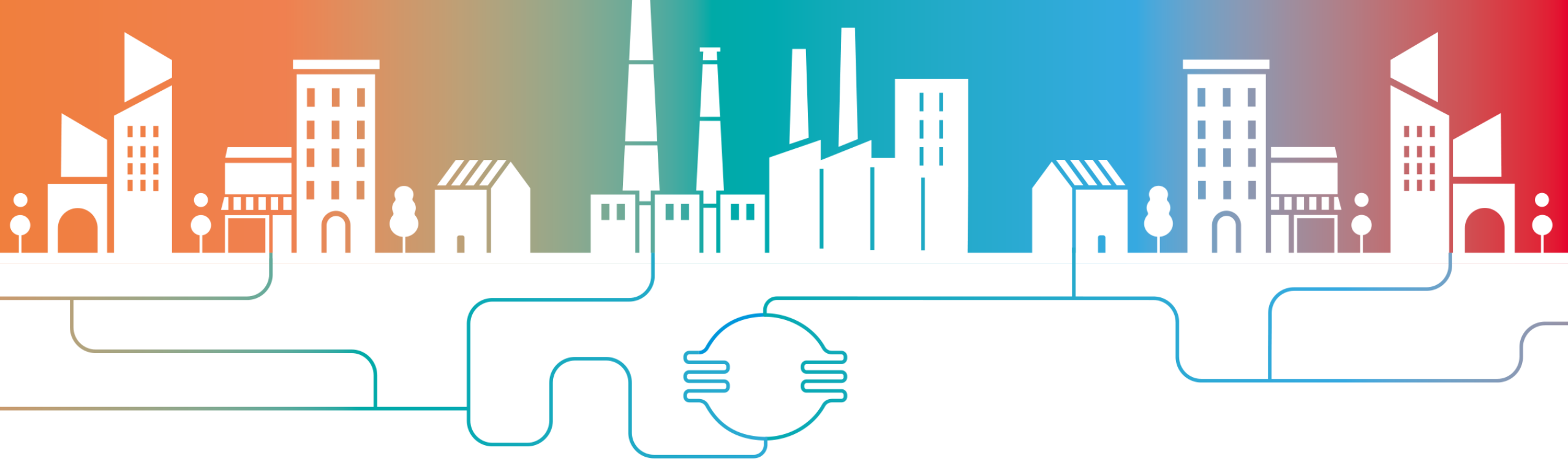
Beyond equipment

While technology (heat pumps, prefabrication) has a key-role, in order to widely spread this approach the project aims to consolidate:

- → **Business** models and trading schemes (multiple renewable sources can make pricing more complex); hence also…
- → **Financing** schemes (investment needs support); which in turn calls for…
- → **Risk** analysis (to increase investor and operator confidence).

The project also pursues **simulations** and **advanced control** solutions, as means to support the design of these strongly flexible and dynamic systems.

Finally, **GIS-based databases** will be built, in order to foster the efficient realization of feasibility studies in the sector, with a quick identification of potential sources.



Marco Cozzini, EURAC Research – marco.cozzini@eurac.edu

The LIFE4HeatRecovery project has received funding from the LIFE programme of the European Union under contract number LIFE17 CCM/IT/000085

LIFE 4 HEAT RECOVERY