Urban waste heat recovery investment
November 14, 2018
The urban waste heat recovery investment

- Barriers to stakeholders – preliminary results
- Important aspects of contracts – first ideas
- The business model – first ideas
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Interviews with stakeholders (8 countries: SE, DK, ITA, BE, GE, RO, FR, ES)
- DH operators
- Policy makers
- Investors
- Customers
- Owners of urban waste heat
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Focus areas of the interviews
1. Technical knowledge
2. Maturity
3. Replicability potential
4. Legal framework in place
5. Permit procedure for UWHR
6. Do existing DH networks allow UWHR?
7. Incentives to other energy solutions?
8. Legionella legislation
9. Other

1. The technology is there: it is not an issue
2. Little empirical evidence
   - “how”
   - “where”
3. HIGH!
4. No legal framework in place
   - Municipal legislation can hinder (Fra, Esp)
5. No standardized permit process
6. Yes but the supply temperature determines how efficient the recovery will be
7. YES! RES! And efficient CHP
8. Not an issue
9. No standardized contracts
   No taxes/ incentives
   Low awareness about the possibility
   Heat deliveries must be guaranteed
   Find a convenient (physical) place is hard
   Difficult to estimate the payback
   DH operators are not interested in Winter
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Important factors for efficient contracts

1. Risk transfer components
   - Heat demand
   - Price of electricity
   - Other

2. Contractual components of relevance
   - Supply
   - Construction
   - Operation
   - Maintenance
   - Pricing
   - Insurance
   - Mitigation and compensation
   - Quality assurance
   - Monitoring
   - Billing
   - Change of roles
   - Renegotiation
   - Disputes

3. Ownership choices
   - Public
   - Private
   - Public-Private

4. Input from stakeholder interviews
   - Seasonality of heat demand
   - Information asymmetry
   - Legal & regulatory issues
   - Renegotiation
   - Long-term contracts

We find that standardized contracts could support the implementation...
What level of detail is needed?
What components are critical?

Next step: identify how the demosites account for this
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A comparison to industrial waste heat recovery

Important factors
- Long term contract (for payoff and stable relationship)  Similar
- Continuity in the heat delivery  Less important
- The value of the heat  Similar
- Renegotiation clause  More important
- Understanding of each other’s processes  Less important
- The risk of becoming dependent  Less important
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The point of departure is the conventional 3rd generation business model

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<th>Key partnership</th>
<th>Key activities</th>
<th>Value proposition</th>
<th>Customer relationship</th>
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GREEN has a value!

New equipment

Waste heat provider dialogue

Additional fuel provider (prosumer?)

Fuel price

Operational cost (low temp)

Ownership

Source: Ostwalder & Pigneur (2010)
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- Questions arise...
- How are the business model components impacted under different contractual models?

- When is the urban waste heat recovery most efficient to the conventional business?

- How should it be implemented? In islands? In the main network?

- Does the urban heat source need to have a safety line (from the conventional DH system)?