Third party access for district heating: first steps to unbundling the heating sector?

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Background

- Article 24 of the proposed revised RES-Directive provides that MS adopt measures to ensure non-discriminatory access to DHC systems for heat or cold produced from renewable energy sources and for waste heat or cold.

“Member States shall lay down the necessary measures to ensure non-discriminatory access to district heating or cooling systems for heat or cold produced from renewable energy sources and for waste heat or cold. This non-discriminatory access shall enable direct supply of heating or cooling from such sources to customers connected to the district heating or cooling system by suppliers other than the operator of the district heating or cooling system.”

- Based on the proposal unbundling is not explicitly required!

- At the same time, the Commission of the European Communities (2007) concludes that ownership unbundling is necessary to ensure that operation of essential facilities is truly non-discriminatory, as emphasized by the European Commission in the conclusions of its recent market investigation.
Questions

- How to systematically describe different third party grid access models?
- What is meant by the proposed Art 24, how can the proposed provision in the RED be classified?
- What are implications of the proposed Art 24 on unbundling?
- What are differences between electricity, gas and district heating and what are the implications of these differences to third party access?
- Will third party grid access of independent heat/cold producers alone be sufficient to stimulate the uptake of renewables in DHC systems or are additional or other regulations required?
Design features for district heating grid access models

**DH retail market**
- Open retail market with competing suppliers yes/no
- Price regulation yes/no

**DH grid**
- Grid access and grid access conditions
- Open producer market vs. producers supply own customers
- Mandatory vs voluntary grid access
- Negotiated vs regulated grid access
- Regulated grid fees yes/no

**Unbundling:**
- Generation, retail, full
  - Mandatory transparency regarding: prices, transactions, system costs etc
- Yes/no

**Heat generation**
What is meant by the draft Art. 24 RED?

- DH retail market
  - Open retail market with competing suppliers yes/no
  - Price regulation yes/no

- DH grid (grid access and grid access conditions)
  - Open producer market vs. producers supply own costumers
  - Mandatory vs voluntary grid access
  - Negotiated vs regulated grid access
  - Regulated grid fees yes/no

- Heat generation

Unbundling: ?

- generation, retail, full

Mandatory transparency regarding: ?

- prices, transactions, system costs etc

yes/no
Liberalization of other markets in the European Union

- Electricity:
  - **Unbundling** of Production and Wholesale and Retail from Distribution and Transmission (System operation)
  - TPA and liberalization on the demand side

- Natural Gas:
  - **Unbundling** of production, imports, wholesale and retail sale of gas) from transmission, storage and distribution networks
  - TPA and liberalization on the demand side

- Telecommunication:
  - TPA and Liberalization on the demand / consumer side
  - Strong regulation of networks and service operations
  - Development of parallel infrastructure

- Railway transport
  - TPA
  - **Unbundling** (although not necessarily ownership unbundling)
Selected differences and challenges of district heating compared to gas and electricity grids

- Properties of the energy-carrier changes dynamically (temperature level)
  Exergy content of the return line is relevant

- Exergy content of energy carrier in the grid diminishes over time

- Limitation of regional scale
Selected differences between DH and gas/electricity:

(1): Exergy content of the return line

Exergy flow

Electricity

Gas

District heating

Exergy flow

Exergy flow > 0
Implication of (return line) temperature on TPA

\[ T_{Return} = f(\Delta T_{ProA}, \Delta T_{ProB}, \Delta T_{ConA}, \Delta T_{ConB}, other) \]

\[ Efficiency\ of\ Producers = f(T_{Return}) \]

- Additional producers and consumers will directly create costs and benefits for other producers and consumers
- How to allocate these costs and benefits?
- Substantial difference to gas and electricity markets
Selected differences and challenges of district heating compared to gas and electricity grids

- Properties of the energy-carrier changes dynamically (temperature level)
  Exergy content of the return line is relevant

- Exergy content of energy carrier in the grid diminishes over time

- Limitation of regional scale
Selected differences between DH and gas/electricity: (2): Exergy content in the grid diminishes over time

**Electricity**
- Generation
- Transmission & distribution
- Retail / Consumer

**Gas**
- Generation
- Transmission & distribution
- Retail / Consumer

*Grid losses are low and correspond to level of transmitted energy*

**District heating**
- Generation
- Transmission & distribution
- Retail / Consumer

*Grid losses are (partly) substantial, in particular in periods with low consumption*
Implication of grid losses on TPA

Grid losses = \( f(\dot{Q}, T, \text{other}) \)

\( \dot{Q} \) ... Mass flow
\( T \) ... Grid temperature

- Additional heat producers and consumers have an impact on \( \dot{Q} \) and \( T \) in different parts of the grid.
- How to allocate these costs? Fair cost allocation would require grid modelling.
Power of vertically integrated district heating companies

Due to these challenges regarding transparent and fair cost allocation and technical restrictions of TPA, the vertically integrated district heating companies have strong market power to restrict the access of third parties by setting either restrictive technical requirements or unfavourable cost allocation mechanisms.

Thus, it is required
  • Either to fully unbundle generation, transmission & distribution and retail.
  • Or strongly regulate the vertically integrated grid operator (which would lead to substantially higher regulation effort compared to the electricity and gas sector).
Selected differences and challenges of district heating compared to gas and electricity grids

- Properties of the energy-carrier changes dynamically (temperature level)
  Exergy content of the return line is relevant

- Exergy content of energy carrier in the grid diminishes over time

- Limitation of regional scale
Selected differences between DH and gas/electricity: (3): Regional limitations

Electricity, gas: large, connected markets

District heating: smaller, separated markets
Implication of limitation of regional scale on TPA

- In order to guarantee stable heat supply to all consumers also in periods when the supplied heat of producers deviates from demand, the independent grid operator would have to either hold substantial backup capacities or would need to order costly „control energy“ from producers (who have a strong market power due to their oligopolistic market structure).

- Each producer would need backup capacities for the own supply portfolio. This would lead to additional macro-economic costs due to higher overall backup capacities.

- Is there a reasonable minimum regional scale for TPA in heat grids?
What is meant by the draft Art. 24 RED?

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- Price regulation yes/no?

DH grid
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- Mandatory vs voluntary grid access
- Negotiated vs regulated grid access
- Regulated grid fees yes/no?

Heat generation

Unbundling: ? generation, retail, full
Mandatory transparency regarding: ? prices, transactions, system costs etc yes/no

Energy Economics Group
What are implications of the draft Art. 24 RED?

**DH retail market**
- Open retail market with competing suppliers yes/no
- Price regulation yes/no

**DH grid**
- Open producer market vs. producers supply own costumers
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Unbundling: generation, retail, full.
Mandatory transparency regarding: prices, transactions, system costs etc yes/no

Art 24
Is third party grid access as foreseen by Art. 24 an appropriate instrument to stimulate the uptake of RES in DH systems?

Tinbergen rule: For each and every policy target there must be at least one policy instrument. If there are fewer instruments than targets, then some policy goals will not be achieved.

Art. 24 mainly aiming at strengthening competition in the DH sector (which is an important target!)

If lack of competition is one of the reasons for low RES uptake in DH, Art 24 might help.

But: TPA alone will not be sufficient.

Additional/alternative policy instruments required to support RES market penetration in DH sector

Additional/alternative measure would e.g. be a RES quota for DH operator
Conclusions

- Clarification would be important: What is the aim of the Art. 24?
  - Increase the share of renewable energy carriers / waste heat
  - Or: to increase the consumers’ freedom of choice

- Opening of DH systems in the sense of Art. 24 strongly increases level of required regulation and/or full unbundling.

- Does objective to increase competition in the DH sector justify increasing regulatory complexity considering the physical/geographical restrictions of DH systems?

- While Art. 24 is mainly aiming at increasing competition in the DH sector other political instruments seem more appropriate to stimulate uptake of RES in this sector.
Thank you for your attention!

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