



# Energy efficiency in the district heating sector – an analysis of the Renewable Energy Directive regarding alternative feed-in options

***ECEEE 2019 Summer Study***

*Belambra Presqu'île de Giens, 07th of June 2019*

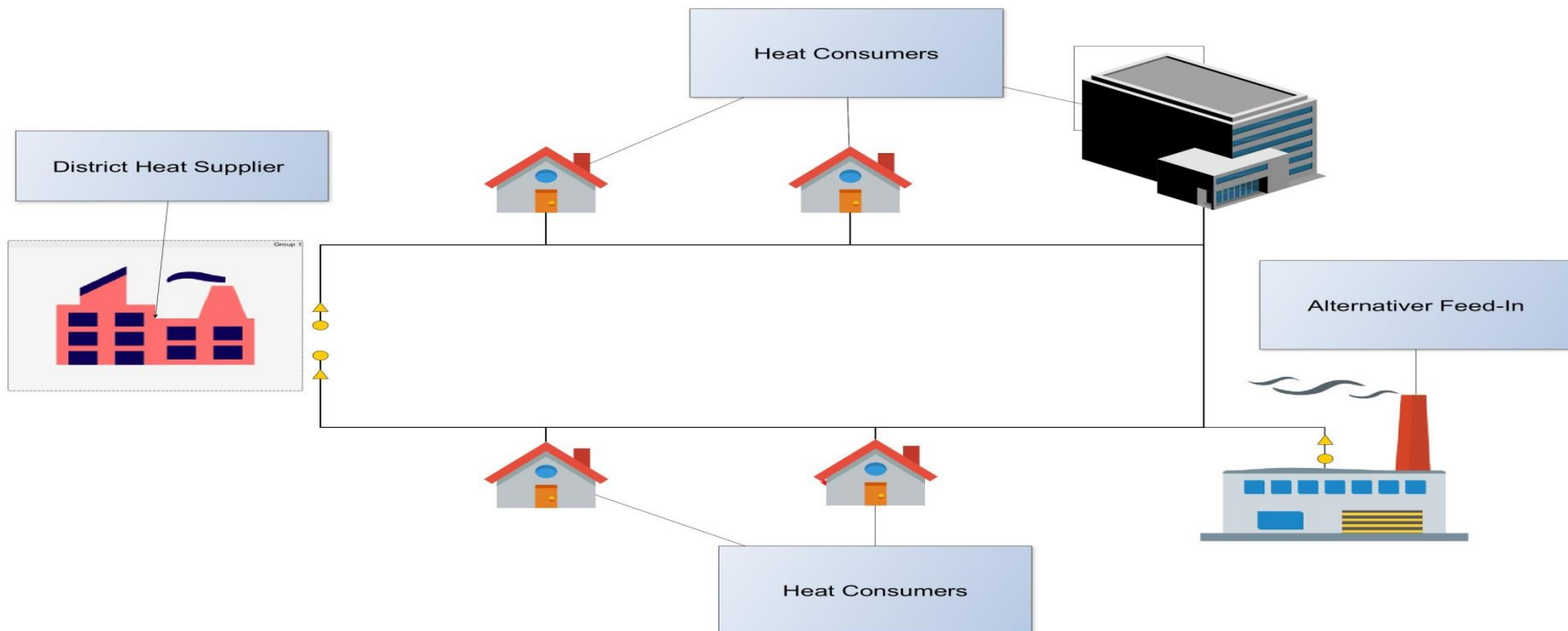
**Marie Holzleitner**

## Agenda

1. Introduction
2. Waste heat, heating and cooling in EU legislation
3. General challenges and opportunities for waste heat
4. “Clean energy package” - Energy Efficiency Directive
5. “Clean energy package” - Renewable Energy Directive II
6. Third party access to existing DH networks
7. Conclusion

## Introduction: Feeding-in external heat

- the third party alternative feed-in wants to feed in heat and the district heating (DH) network operator acts as the buyer.



## Introduction

- Already existing various technical options for feeding-in third-party heat sources based on renewable energy or industrial waste heat into heating networks
- *So far*: Lacking of legal prerequisite for the realisation of such alternative feed-ins
- New Regulation within RED II
  - effective and efficient regulatory framework for cost-efficient integration of renewables and waste heat into existing district heating systems?

# Waste heat, heating and cooling in EU legislation

**Art. 194 of the Treaty on the Functioning of the EU:** EU is entitled to promote energy from renewable sources

## **Strategy for heating and cooling (EU COM, 2016):**

- Heating and cooling will account for the biggest share of energy demand in 2050
- Current reliance on 'obsolete fossil-fuel boilers' is unsustainable
- A shift to reliance on renewable energy sources and surplus heat is possible and necessary
- District heating will have a vital role in supplying green heat and enabling further integration of the energy system
- Combined Heat and Power (CHP) as corner stone to increase generation efficiency, linking heating and cooling with electricity
- Potential of thermal storage, waste heat and cold.

# General challenges and opportunities for waste heat

## Article 2 (9) of RED II

*“waste heat or cold means unavoidable heat or cold which is generated as by-product in industrial or power generation installations, or in tertiary sector, which would be dissipated unused in air or water without access to a district heating or cooling system, where cogeneration process has been used or will be used or where cogeneration is not feasible.”*

- companies could make use of waste heat internally or outside the company
- significantly reduce their net energy costs
- strengthen their own competitiveness
- make an important contribution to the transformation towards a carbon-neutral energy system
- Potential in EU estimated at **300 TWh/a**

## General challenges and opportunities for waste heat

- Internal reuse: The waste heat is returned to the production process in which it was generated.
- Space heating and hot water: offices or production halls can be heated with waste heat. It can also be used for heat water generation. Large quantities of waste heat can also be used outside the company and fed into district heating networks.
- Cold: Thermal energy can also be used for cooling. So-called sorption chillers use the waste heat to evaporate a refrigerant.
- Electricity: Waste heat can also be converted into electricity and thus used in a variety of ways, for example to cover a company's own electricity requirements in production

## **“Clean energy package” - Energy Efficiency Directive**

- Article 2 (41) EED: Efficient District heating” means a district heating system using at least:
  - 50 percent renewable energy,
  - 50 percent waste heat,
  - 75 percent cogenerated heat or
  - 50 percent of a combination of such energy and heat
- Annex VIII of the EED: key topics of the obligatory comprehensive assessment of the national heating and cooling potentials
  - Development of the district heating infrastructure
  - Location of the waste heat generation close to the demand
  - Location of the heat demand close to the waste heat sources
  - Connection of waste heat and RES sources to the district heating network
  - Connection of consumers to the district heating network.



## “Clean energy package” - Renewable Energy Directive II

- Art. 23 (1): increase the share of renewable energies within heating sector by at least 1.3 percentage points per year.
  - reduced to 1.1 percentage points for member states where no waste heat or cooling is used
- Art. 23 (3): increase of RES can be achieved by
  - physical admixture of RES or waste heat and cold
  - the use of renewable energy or waste heat and cooling for heating and cooling in buildings or for industrial heating and cooling processes
  - indirect reduction measures subject to tradable allowances.
- Art. 24 (1): Providers of district heating or cooling must provide end customers with information on the share of renewable energy in their networks in an easily accessible form - e.g. the website

## **“Clean energy package” - Renewable Energy Directive II**

- Art. 24 (2): Right for customers to disconnect from non-efficient district heating to produce renewable heat themselves
- Art. 24 (4): District heating and cooling systems must contribute to achieving the one-percentage point target. The member states must
  - either take measures to increase the share of renewable energy in district heating and cooling systems by at least one percentage point per year from 2020,
  - or take measures that operators of district heating or cooling systems have to connect third party RES generators (if technically feasible).

## Third party access to existing DH networks

Member States can

- set out a target to increase the share of RES and waste heat in district heating systems according to Article 24 (4) litera a OR
- implement access for third parties according to Article 24 (4) litera b.

→ MS can decide whether they want to implement policies to increase the share of energy from RES and waste heat in district heating by at least one percentage point, or make any arrangements for “opening up” the district heating networks

## Third party access to existing DH networks

DH network operators are obliged to provide access to the network of suppliers of energy from renewable sources and waste heat if they:

- meet the demand from new customers or
- replace existing heating or cooling capacity or
- need to expand existing heating or cooling capacity

Exception DH network operators from opening-up their networks if:

- Efficient district heating supply;
- Efficient district heating supply using high-efficiency cogeneration;
- DH for which, on the basis of a plan approved by the competent authority, it is envisaged that it will develop into efficient district heating and cooling by 31 December 2025;
- DH systems with a total rated thermal input below 20 MW.

## Third party access to existing DH networks

DH operators can refuse to buy heat from third party RES or waste heat generators if

- it is not technically feasible
- it will lead to increased heat prices (compared to the cost of using the main local heat or cold supply with which the renewable source or waste heat and cold would compete)
- the network does not have further capacity due to existing RES and/or waste heat.

Technical feasibility? → *Impossibility or unreasonableness?*

## Third party access to existing DH networks

### Impossibility of feeding-in

- Different feed-in temperatures
- Missing capacities
- Local limitation
- Different pressure, temperature or aggregate state of heat (does not correspond to the condition of the conduit pipe of the DH network)
- Necessary network extension fails due to lack of space or high investment costs
  - necessary financial effort, a technical disability can be solved in many cases and then a lack of technical possibility is difficult to be argued
  - Unreasonableness?

## Third party access to existing DH networks

### Unreasonableness of feeding-in

- Amortization interest
- Reduction of own use to raise capacity – throttle down its own generation plants
- possible threat to the supply of the own customers through the opening of the DH network
- sudden need to buy heat from elsewhere because of an unexpected missing or reduced heat feed-in by the third party
- Operator would have to provide backup capacities (by other TPHG)
- Resettlement of industrial waste heat generator

## Third party access to existing DH networks

- many arguments which are likely to justify the denial of a district heating operator.
- Based on the findings presented above, it is obvious that third party network access will not be sufficient to stimulate the feed-in of waste heat as the operator can easily rule out any access claim.
- Implementation of the RED II in the Member States shall deal with those arguments and clarify the situation which will not be easy due to the individuality of the district heating systems.
- However: seeking consent of both parties is a good choice
  - it requires a longer-term and clear agreement in order to ensure investment security.
  - Consent creates acceptance, being a prerequisite for a positive and longer-term cooperation and gives contractors maximum flexibility in financing and determining the technical parameters of the feed-in.



## Conclusion

If

- these minor improvements of the third parties' position and
- the general requirement to increase the share of renewables and waste heat

do not lead to the desired utilization of waste heat, further regulations, incentives or obligations are necessary.

- Necessary to **define rules for both alternatives**, i.e. granting specific rights to third parties and introducing general incentives to motivate the operators
- Any policy will need to consider **cost-effectiveness for both actors**, the DH company and the third party generator, in order to feed in waste heat and maintain competitiveness of district heating

## THANK YOU FOR THE DISCUSSION

**Mag. Marie Holzleitner**

Energieinstitut an der Johannes  
Kepler Universität Linz

Altenberger Straße 69

4040 Linz, AUSTRIA

Tel: +43 723 2468 5675

Fax: + 43 723 2468 5651

e-mail: **[holzleitner@energieinstitut-linz.at](mailto:holzleitner@energieinstitut-linz.at)**

**IndustrialMicroGrid**  
FFG-Nr. 868708