

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

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Abstract

The recovery and utilization of waste heat increases primary energy efficiency, decreases emissions and can contribute to cost savings. The opportunity to feed the recovered waste heat into a district heating network may be essential for its utilization. However, technical, economic and legal barriers often hamper the feed-in. The Renewable Energy Directive 2018/2010 (RED II) intends to create a legal framework that should support / enable third party renewable or waste heat generators to feed their heat into an existing network (see Article 24 (4)).

This paper provides an overview of the changes for the heat sector due to the new EU legislation. Therefore, first, the legal situation before RED II is described. Then, the new opportunities for third party renewable or waste heat generators resulting from the RED II are analysed. In addition, the decrease in the Directive's stringency during the policy making process is observed. While the European Commission's original proposal of the RED II had foreseen mandatory uptake of heat from renewable energy sources (RES) and waste heat, the final version of the Directive requires opening of the district heating networks for third party RES or waste heat generators only if it is technically feasible for the district heating network operator. This milder version of opening district heating networks third party RES or waste heat generators was a precondition for achieving political agreement in June 2018. Hereof, it is analysed if

the RED II in its current form goes far enough to unleash the economic and environmental potential of opening the district heating networks to renewable and waste heat from third parties. The authors conclude that the new legislation does not fundamentally change the situation of third party generators intending to feed-in. As before the RED II, economic and technical unreasonability lead to the exclusion of a feed-in claim. Due to the manifold special features of the individual district heating networks, a legal "one-size-fits-all" obligation to accept feed-in from third party renewable or waste heat generators is complex to regulate.

Introduction

This introduction starts with the aim of the paper, which is primarily an initial analysis of the new regulations for waste heat in RED II and a comparison with the situation before RED II. It is then briefly outlined how the Commission has recognised the importance of integrating waste heat and has developed a strategy for heating and cooling. The introduction also outlines the general challenges and opportunities that waste heat usage can present. Last part of the introduction will be the description of our methodology.

AIM OF THE PAPER

In this paper, we address the research question whether the new versions of the Energy Efficiency Directive (EED) and the Renewable Energy Directive (RED II) provide an effective and efficient regulatory framework for cost-efficient integration of renewables and waste heat into existing district heating systems.

As of today, in many countries, feed-in of RES and waste heat into district heating systems through third parties requires private-law agreements between the feed-in company and the district heating network operator. Opening the district heating network would mean that the first and/or third stage of the value chain of district heating, i.e. production (upstream market), trade and distribution (downstream market) are subject to free competition. The second stage of the value chain, the network itself, would be preserved as a natural monopoly.

While the European Commission's original proposal (see COM (2016) 767 final) of the RED II had foreseen mandatory feed-in acceptance of heat from renewable sources and waste heat, the final version of the Directive requires network operators to open their district heating networks for third party RES or waste heat generators only if it is technically feasible. This milder version of opening district heating networks to third party RES or waste heat generators was a precondition for achieving political agreement in June 2018.

Hereof, questions arise if the RED II in its current form goes far enough to substantially enforce the economic and environmental potential of (partly) opening the district heating networks to RES and waste heat from third parties, or if a substantial enforcement would need a more ambitious regulation?

WASTE HEAT, HEATING AND COOLING IN EU LEGISLATION

In accordance with Article 194 of the Treaty on the Functioning of the European Union (EU), the Union is entitled to promote energy from renewable sources. Given that heating and cooling accounts for around half of the final EU energy consumption and that the share of energy from renewable sources in the heating and cooling sector increased by only three percentage points between 2009 and 2015, while the electricity sector increased by almost eight percentage points over the same period, an ambitious measure was needed in this sector (European Commission, 2016).

District heating and cooling currently account for around ten percent of the Union's heating needs, although there are major differences between the member states. In its strategy for heating and cooling, the Commission recognises the decarbonisation potential of district heating through increased energy efficiency and the use of renewable energy. In this strategy the Commission has already stated some important facts in 2016 (European Commission, 2016a, p. 3f):

- 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

Whether motors run, metals are melted at high temperature, compressed air is generated or factory buildings and warehouses are cooled - in many industrial sectors heat is generated that is ultimately lost. This energy is called waste heat. A more formal description can be found in the legal definition for waste heat in the new RED II. According to 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."

By definition, industrial waste heat is not recovered and re-used. (For the manifold and varying definitions of waste heat (or "excess heat") see the reports of the IEA IETS Annex 15.) However, companies could make use of waste heat internally or outside the company and significantly reduce their net energy costs. In this way, they strengthen their own competitiveness and make an important contribution to the transformation towards a carbon-neutral energy system. Waste heat is available in large quantities at different temperature levels: worldwide, the largest waste heat potential is the combustion of primary energy sources for electricity production (Forman et al. 2016). Industrial waste heat is also available to a large extent: the industrial waste heat potential in the EU is estimated at 300 TWh/a (Papapetrou et al. 2018).

Depending on the temperature of the waste heat, it can be used for very different purposes; some examples are listed in the following:

- 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 be 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 (Bundesministerium für Wirtschaft und Energie 2017).

METHODOLOGY

As part of the legal analyses, the EU law requirements are generally presented first, (current) judicature and literature are examined. However, as energy law is a complex cross-cutting issue affecting both public and private law, the analysis is limited to the legal norms that exclusively apply for the area of energy. In this paper, a comparative analysis highlights the changes in course of the policy making process and finally examines the impact of the new EED and the RED II on existing national frameworks with regard to a substantial enforcement of RES and waste heat feed-in. The analysis and methodologies applied are based on the publically funded Austrian pro-

ject Open Heat Grid which examined the feasibility of various economic/regulatory approaches to enforce waste heat feed-in (see Moser et al. (2018) for further details).

Data analysis and discussion

The Commission's strategy on heating and cooling was followed by a series of new legislative proposals in the field of energy. This package of new and recasted directives and regulations is known as the "clean energy package" or the "Winter Package". The following section deals with this new EU legislation.

This article focuses on the new Renewable Energies Directive. However, at the beginning, the importance of the heating sector within the Energy Efficiency Directive is briefly presented as there are some interactions between the Directives. The most important new aspects are described and then the changes regarding possibilities for alternative heat feed-in are analysed.

"CLEAN ENERGY PACKAGE" - ENERGY EFFICIENCY DIRECTIVE

According to the new EU legislation "Clean energy package – clean energy for all European", district heating will have an important role in making the heating sector more efficient, more environmentally friendly and in increasing the integration of RES and waste heat in this sector. An explanation of how this shall work may refer to Article 2 (41) of the Energy Efficiency Directive (EED, Directive 2018/2002/EU) which states that "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

Efficient heating measurably reduces the input of primary energy needed to supply one unit of delivered energy in a cost effective way, taking into account the energy required for extraction, conversion, transport and distribution. Article 14 EED deals with district heating and cooling and is one tool of the European Commission to promote efficiency in heating and cooling.

In principle, in the context of district heating, the EED mainly deals with regulation for heat consumption metering, distribution of costs for heating and billing information. However, the obligatory cost-benefit-analysis for the potentials of district heating networks acc. to Article 14 EED was one important tool to emphasize the importance of district heating. According to Annex VIII of the EED, the five key topics of the obligatory comprehensive assessment of the national heating and cooling potentials shall be:

- 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
- Waste heat and RES sources connection to the district heating network
- Consumer connection to the district heating network.

"CLEAN ENERGY PACKAGE" - RENEWABLE ENERGY DIRECTIVE II

Heating is not only a focus of the EED, but also within the recast of the Renewable Energy Directive (RED II, Directive 2018/2001/EU). This Directive stipulates that by 2030 at least 32 percent of energy consumption (electricity, heat and transport) in the EU shall come from renewable sources. The EU is well on track to reach its current target of 20 percent by 2020. The new 32 percent target is much more ambitious than the 27 percent originally proposed by the Commission. Moreover and more specifically, for the heating sector the RED II foresees member states to increase the share of renewable energies by at least 1.1 percentage points per year.

Already the Commission's first proposal (COM (2016) 767 final) of the RED II stated in recital 61 that "in the area of district heating, it is therefore crucial to enable the fuel-switching to renewables and prevent regulatory and technology lock-in and technology lock-out through reinforced rights for renewable energy producers and final consumers, and bring the tools to end-consumers to facilitate their choice between the highest energy performance solution that take into account future heating and cooling needs in line with expected building performance criteria."

Moreover, the RED II contains very detailed specifications for heating and cooling networks. For example, new information obligations for heat network operators are installed. Furthermore, access to and transit within the network of heating and cooling from RES and waste heat shall be made possible. The possibility for customers to disconnect from district heating supply is granted if the connected district heating network is not efficient in accordance with the EED. Despite of these detailed specifications by the EU, the member states still have the necessary flexibility to implement their own instruments and measures to achieve their individual climate protection targets, taking into account national conditions and requirements

Legislation in the EU is the task of the "institutional triangle" – the triad. These are the European Commission and the European Parliament (EP), and the Council of Ministers (European Council), in which the governing ministers of the Member States decide. For most policy areas, the codecision procedure is prescribed. That means that the proposals are usually drafted by the Commission and then the Parliament and the Council discuss the laws and find a consensus (European Union, 2019). This procedure usually entails significant changes. This also applies to the recast of the RED.

Table 1 shows the process, changes and weight shifts of the different RED-versions since 2016. As described in Table 1, the new RED II brings some changes, like Article 24, – a whole new article on district heating and cooling. This article regulates:

- Information for customers on fuel mix in and energy performance of district heating
- Right for customers to disconnect from non-efficient district heating to produce renewable heat themselves
- Right of third-party producers to supply their own customers via the district heating network (Article 24 (4, 5 and 6))

In order to facilitate the penetration of renewable energy in the heating and cooling sector, each Member State shall endeavour to increase the share of renewable energy supplied for heating and cooling by an indicative 1.3 percentage points as a yearly

Table 1. Changes and focus shifts of the different versions of RED II (Centre for European Policy, 2018).

30.11.2016 Proposal for a Directive COM(2016) 767	18.12.2017 Council: General approach	17.01.2018 EP: 1st reading	27.06.2018 Commission, EP and Council: Trialogue outcome
Member states shall have the indicative target of increasing the share of RES in the heating and cooling sector by at least one percentage point per year (Article 23(1)).	Member states shall have an indicative target to increase the share of RES in the heating and cooling sector by at least one percentage point per year. They may deviate from the annual one-percent target if an increase in the share of renewables is not cost-effective. (Article 23 (1)).	Member states shall have an indicative target to increase the share of RES in the heating and cooling sector by at least two percentage points per year. In particular, they must use the best available technologies. If a member state is not in a position to achieve the objective, it must justify its failure. (Article 23 (1)).	Member states shall have an indicative target to increase the share of RES in the heating and cooling sector by at least 1,3 percentage points per year. The target is reduced to 1.1 percentage points for member states where no waste heat or cooling is used. (Article 23 (1)).
The increase of RES can be achieved by (Article 23 (3)) <ul style="list-style-type: none"> • physical admixture of RES; • the use of renewable energy for heating and cooling in buildings or for industrial heating and cooling processes; • indirect reduction measures subject to tradable allowances. 	Like Commission.	The increase of RES can be achieved by (Article 23 (3)) <ul style="list-style-type: none"> • 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. 	Like EP.
Providers of district heating or cooling must provide end customers with information on the share of renewable energy in their systems (Article 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 (Article 24 (1)).	Providers of district heating or cooling must provide end customers with information on the share of renewable energy in their systems on an annual basis or on request (Article 24 (1)).	Like Council.

average. This percentage shall be calculated for the periods of 2021–2025 and 2026–2030 starting from the level achieved in 2020, expressed in terms of national share of final energy consumption and calculated according to the methodology set out in Article 7. This increase shall be limited to an indicative 1.1 percentage points for those Member States where waste heat and cold is not used.

THIRD PARTY ACCESS TO EXISTING DISTRICT HEATING NETWORKS

In the following, it is described how waste heat can be used for space heating if the waste heat must be fed into a district heating network in order to be transported to the consumers. First, the legal situation of feeding in third party RES or waste heat into existing DH networks at time before the RED II will be briefly analysed based on the Austrian case. Then, Article 24 of RED II which includes new options to feed-in for third party RES or waste heat generators and its practical effects will be analysed and compared to the . It will be seen that the situation for feeding-in RES and waste heat into an existing district heating network did not change much for third party generators.

Situation before the RED II

Until now, there has been no legal standard which obliges the district heating network operator to accept the feed-in of third party RES or waste heat generators into its network. There has been, of course, the option of a bilateral private agreement (between the district heating network operator and the third party) as was already done in Germany and Austria. From a legal theory perspective, this implies the unequivocal consent of the network operator. If this consent was not given, the only option available has been an antitrust approach. Therefore, it had to be clarified whether the operator of the respective geographically limited district heating network has a dominant market position. If there is a district heating network in a certain area, there is usually only one, which is run by a single operator. Unlike the electricity and gas networks, district heating networks are not interconnected supra-regionally. The operator is a vertically integrated company that does not only operate the district heating network, but delivers heat to consumers and mostly also generates the heat. However, consumers are not able to switch the district heating operator easily. Consequently, in the absence of district heating competition, this operator is

a monopolist holding a dominant position in its network operation, especially as the creation of competition through the establishment of parallel district heating networks is likely to be economically infeasible. In principle, there is no obligation to contract even for dominant companies. In spite of that, under certain circumstances, a monopolist may be required to open its facilities to competitors. (Holzleitner & Moser, 2018).

However, the antitrust law prohibits the abuse of a dominant position. A company acts abusively when it refuses access to products or services that are indispensable and that are in demand. Dominant position is abused if there is no justification for refusal of access. In any case, the refusal of access is abusive only if the abusive behaviour leads to excluding any competition in the relevant product market without justification. For analysing possible justification for the refusal of access the different interests of the parties must be considered. The district heating network operator is only obliged to open its network to other market participants if that is technically possible. It does not have to promote another competitor to his own disadvantage (Säcker & Wolf, 2011). In addition, technical or economic reasons regarding the “impossibility” or “unreasonableness” of the feed-in of third parties are to be investigated individually.

Changes according to Article 24 (4) of RED II

If the new RED II in the Commission’s first proposal (see COM(2016) 767) is compared to the final version, it can be seen that its ambition was decreased considerably. Thus, the newly created rights for third party RES or waste heat generators were significantly stronger at the beginning of the policy making process than they are to be found in the final version.

The Commission’s proposal from 2016 allows third party RES or waste heat generators to provide heat directly to customers through the district heating network which means that local district heating systems would have been opened for pro-

ducers of RES heat and waste heat and third parties acting on their behalf. However, the final version follows the single-buyer approach. All heat suppliers can operate in the market without distorting the functioning of the network. Table 2 illustrates the softening of Article 24 (4) of RED II.

Finally compromise was reached through an Alternative. 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.

This means that Member States can decide whether they want to take implement policies to increase the share of energy from RES and waste heat in district heating by at least one percentage point or they want to make any arrangements for “opening up” the district heating networks or. If a Member States decides to take the first option and sets out a target for the RES increase, there may not be any rules for third party RES or waste heat generators in this Member States. However, the question arises if third party network access of independent RES generators alone will be sufficient to stimulate the uptake of renewables in district heating systems or if additional or other regulations are required. It will therefore in any case be advisable for the Member States to define rules for both alternatives.

If Member States choose the second alternative according to Article 24 (4) litera b, Member States must ensure that district heating network operators are obliged to provide access to the network to suppliers of energy from renewable sources and waste heat if they (i) meet the demand from new customers; or (ii) replace existing heating or cooling capacity; or (iii) need to expand existing heating or cooling capacity.

Table 2. comparison of different versions of RED II (Centre for European Policy, 2018).

30.11.2016 Proposal for a Directive COM(2016) 767	18.12.2017 Council: General approach	17.01.2018 EP: 1st reading	27.06.2018 Commission, EP and Council: Trialogue outcome
Member states must ensure that third party RES generators are not disadvantaged in terms of access to district heating and cooling networks (Article 24(4)).	District heating and cooling systems must contribute to achieving the one-percentage point target. The member states must (Article24 (4)) <ul style="list-style-type: none"> • 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). 	Member states must ensure, where economically and technically feasible, that third party RES generators are not disadvantaged in terms of access to district heating and cooling networks (Article 24(4)).	Like Council.

However, according to Article 24 (5) district heating 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.

In addition, Article 24 (6) provides that the implementation of RED II in each Member State may be used to exempt specific district heating network operators from opening-up their networks. This provision applies for the following district heating systems:

- Efficient district heating supply;
- Efficient district heating supply using high-efficiency cogeneration;
- District heating 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;
- District heating systems with a total rated thermal input below 20 MW.

EU legislation is normally further specified and detailed regulations are made within each individual Member State. But in this case, already at the level of EU legislation many reasons for exceptions are listed, which already severely restricts the opening of the district heating market for third party heat feed-in.

There are still many open questions with regard to these provisions. One important issue is what technical feasibility means? Does it mean the impossibility or the unreasonableness of feeding-in RES or waste heat?

Impossibility of feeding-in

The technical feasibility is defined contradictory in the literature. One part of the literature (for example, Säcker & Wolf, 2011) considers the connection of third party RES or waste heat generators to an existing district heating network as technically possible if the necessary financial effort is done. Different feed-in temperatures as well as missing capacities do not represent a reason for a technical impossibility. The district heating network operator is to be expected to reduce its own use or to raise capacity by efficiency increase.

Another part of the literature (Greb & Böcker, 2013; Körber, 2012) sees the technical impossibility as given if the third party RES or waste heat generators wants to feed in a pressure, temperature or aggregate state which does not correspond to the condition of the conduit pipe of the district heating network. It may also be “impossible” if the access to the district heating network is not technically possible at the desired local site. In terms of lack of capacity, there is a technical impossibility if all objectively available capacity has already been allocated to third parties in order to supply their own customers and if capacity cannot easily be expanded (Körber, 2012). In the district heating sector an increase in efficiency is not possible simply by

temperature monitoring or anything similar. Usually network extension is necessary, which often fails due to lack of space or high investment costs (Greb & Böcker, 2013).

Due to the strong necessary conjunction of the heat generation and the district heating network, technical impossibility for the operator may also be given if the third party RES or waste heat cannot go along with the heat already in the network because of different pressure, temperature or aggregate state. Impossibility is given if this obstacle cannot be overcome with an economically feasible effort (Greb & Böcker, 2013). Geographical limitations and the lack of space for a further expansion of the district heating pipes also lead to technical impossibility. However, this decision on the technical possibility must be considered individually for each district heating network and must be decided on a case-by-case basis.

With the necessary financial effort, a technical disability can be solved in many cases and then a lack of technical feasibility is difficult to argue. In any case, the effort needed for the implementation of technical solutions to grant access must be assessed. This effort is to be included in the economic feasibility and subsequently the reasonableness of these changes for the district heating network operator is to be evaluated (Greb & Böcker, 2013).

Unreasonableness of the feed-in

It should also be taken into account that the district heating network operator, who also acts as a supplier for its own customers, must secure his long-term relationship and for that reason has already created or contracted the corresponding generation capacities himself. Due to the closed heat cycle, the additional heat would mean that the own generation of the district heating network operator would have to be throttled in order to balance out the total quantity. Other conceivable reasons of unreasonableness would be, for example, the amortization interest (Säcker & Wolf, 2011) (elimination of customers limits calculated revenues, endangering the profitability of the supply), a possible threat to the supply of the own customers through the opening of the district heating network or even ecological reasons (Schett, 2014).

Due to the strong connection between heat generation and the district heating network, it is also unreasonable for the district heating network operator to throttle its own generating plants for the purpose of “heat transit” by third parties. It may also not be reasonable for the operator having the sudden need to buy heat from elsewhere because of an unexpected missing or reduced heat feed-in by the third party (e.g. production downtime in industry or low production of a solar thermal system due to unpredicted bad weather). The reason that the operator would incur massive customer losses as a result of a new entrant will not be an objectively justified reason for excluding the feed-in request. In addition, due to further feed-in from third party RES or waste heat generators, efficient district heating network control and system operation could be required – that would also be a justified reason for the refusal of network access.

Heat generation systems which rely on weather or production circumstances cannot provide reliable supply and thus cannot cover the entire or agreed heat demand of the customer. This would mean that the district heating network operator or another third party would need to provide backup, meaning

that the operator has another “additional” district heating network user. However, it is not reasonable for the district heating network operator to reserve capacity for third parties or to buy missing heat from elsewhere spontaneously. At this point, it can be assumed that it is not easily economically justifiable for the district heating network operator to provide reserve capacity (Holzleitner & Moser, 2018).

This shows that there are many arguments which are likely to justify the denial of a district heating operator. 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.

These results leave doubts that third party network access as foreseen by Article 24 really is an appropriate instrument to stimulate the feed-in of RES or waste heat in district heating systems or that it actually is strengthening competition in the district heating sector. If lack of competition is one of the reasons for low RES feed-in in district heating, Article 24 in the final version will not be sufficient due to the large number of reasons for district heating network access denial (which, in the authors’ opinion, are easily arguable and hard to be proven wrong). Alternative policy instruments will be required to support the RES and waste heat market penetration in the district heating sector.

Conclusion

This paper assesses the RED II with regard to third party feed-in of waste heat and heat from RES into existing district heating networks. The obligations to increase the share of RES or waste heat by 1.3 percentage points will definitely increase the incentives for district heating operators to seek and contract third party RES or waste heat. However, based on the legal analysis it can be concluded that the RED II will hardly contribute to strengthen the position of third party RES or waste heat generators or provide additional rights to them. With the new legislation, little will change about the fact that the third party RES or waste heat generators must seek the consent of the network operator in order to feed its RES or waste heat into the district heating network.

Due to the conceptual unity of heat generation and the district heating network, the local boundaries and closed nature of the district heating network, there is no interconnected system such as electricity and gas. Therefore, it is questionable whether an obligation for the district heating network operator to accept and remunerate a feed-in is technically possible. In any case, it would be useful if some legal rules were adopted when implementing an “accept-to-feed-in” obligation for district heating networks operators:

- Acceptance obligation for the district heating network operator
- Obligation to expand the district heating network, if required (and clarification who has to pay therefore)
- Clear (individual) specifications for each district heating network operator regarding the status, quantity, time, location, etc. of the heat to be fed in
- Establishment of a kind of supervisory authority (Holzleitner & Moser, 2018).

Generally, and probably due to the policy making process, the Directives leave unaddressed the issues beyond the basic legal aspects, for example who has to pay for the third party’s excess to the district heating network. If elaborated in more detail, the obligation to grant access for feed-in raises further questions which remain unanswered at the moment; for example, who is granted access first and who is remunerated if more than one third party seeks access. Without defining a more detailed market framework, seeking consent between the third party and the network operator remains the only feasible solution.

Certainly, seeking consent of both parties is to be regarded as an appropriate choice, since 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. In the context of the new legislation, the economic efficiency of the heating networks for the operators and the customer’s wishes (e.g. inexpensive heat supply) are not very closely involved. The network-bounded heat supply is in fierce competition with numerous other heat generation technologies. Unilateral burdens and regulations solely for district heating systems would significantly weaken the competitive situation of network-bounded heat supply, although incentives to integrate renewable energies are to be welcomed. The heat network infrastructure is indispensable for the absorption, cost-effective transport and distribution of heat from low-CO₂ and CO₂-neutral energy sources such as RES and waste heat.

Summing up, if these – as described – minor improvements of the third parties’ position do not lead to the desired increase in the integration of RES or waste heat, further regulations, incentives or obligations may be necessary.

However, possible incentives and obligations have to be viewed from two angles. On the one hand, it is important to secure the investments of industrial companies and to bind them to the district heating network operator in the long term. On the other hand, the district heating network operator needs security with regard to a consistent feed-in of third parties. (More) fair and reliable framework conditions could be necessary to ensure these securities for both sides.

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