

# Agenda

## Advancing economics in business

### Regulated third-party access in heat markets: policy and stakeholder expectations

**Heat markets across Europe are legislated and regulated in a wide variety of ways. EU energy legislation provides limited guidance on preferred market rules. Instead, developments in district heat (DH) are driven mainly by national policy and regulation, with country-specific historical and political foundations. In the first of two articles, Harri-Pekka Korhonen, Head of Heat Policies and Regulation at Fortum Corporation, discusses the potential for encouraging competition in heat markets**

The EU's competition and energy policies aim to promote effective competition in all sectors where it is considered purposeful and useful. Thus the Third Energy Package is currently imposing the unbundling of electricity and gas sectors to foster competition in the production (wholesale) and retail parts of the value chain.<sup>1</sup> The question of imposing more competition in DH systems arises regularly in both national and European debates. However, the concept of competition in DH systems is not commonly well defined, and the expectations and ideas behind it vary widely depending on the background, experience and interests of the stakeholder proposing it.

DH represents about 10–15% of space heating across Europe. In Germany, the Nordic countries and Eastern Europe, however, it typically represents 30–70%, and the DH market share in urban areas is substantially higher, at 60–90%.<sup>2</sup>

In Directive 2012/27/EU on Energy Efficiency (EED), which is currently being implemented across Europe, the EU is promoting the development of efficient district heating and cooling (DHC) and co-generation. The EED requires that member states should explore and, if feasible, enhance the opportunities for efficient DHC, including deployment of co-generation options.

In several countries that mostly use DH systems, governments, regulators and DH operators are discussing how to make DH systems more effective, and prices more competitive and affordable for end-customers. A general conclusion, often following the electricity and gas sectors, seems to be to encourage more competition in DH retail and production. The main underlying question for stakeholders in DH systems is: can regulated and mandatory competition

in DH systems bring more benefits than the increasing costs of more complex DH systems and competing capacities that are more difficult to optimise?

#### How do current stakeholder expectations diverge?

In theory, at least, there is a prospect for effective competition in DH retail and production, while DH networks are generally deemed to exhibit natural monopoly characteristics. A DH system can be split into three types of operations.

Heat supply to DH networks (generation of heat and electricity in combined heat and power (CHP) or geothermal plants; generation of heat only; supply of heat as industrial waste heat). The question is whether more competition in wholesale heat production can bring benefits for end-customers.

Distribution and transmission of hot water (heat) via DH networks.

Heat retail to end-customers, where DH can be provided by a single buyer who competes with alternative space heating sources such as heat pumps or gas boilers. Alternatively, DH can be sold to end-customers by all DH producers/distributors (horizontal DH retail competition, in addition to competition against alternatives).

In many cases, DH systems are integrated such that all three operations are owned and managed by an integrated affiliate. Alternatively, the heat supply to DH networks may be fully or partially owned and operated by an independent heat producer. The main historical reason for this is that the ownership of DH networks has been allocated to the

local municipality, and that of heat production has been allocated to the state or directly to private companies. While governments have privatised their energy assets, these assets have often been acquired by private enterprises. The three operations require different assets and resources. By their nature, heat markets are typically local only because heat cannot be economically transferred across long distances in the same way as electricity and gas can.

Often, country-specific proposals for increasing competition within DH systems have been justified using the following reasons.

- **The overall energy policy objective is often simply to increase competition in heat production** where, theoretically, this can be deemed sensible. There are examples of providing different access rules for 'independent heat producers' and specific regulation for mandatory tendering for new heat production capacity.<sup>3</sup> Put simply, politically driven conclusions are drawn that strong competition between heat producers will substantially reduce DH prices to end-customers. This is because DH tariffs are often set in a strong local market position and are therefore deemed to include inefficiencies and unjustified price increases (whether or not they are subject to ex ante cost-plus regulation by independent regulators).
- **Another energy policy objective is to increase the share of renewable fuels in heat production** (e.g. biomass, biogas and waste fuels). In some countries this has led to a preference for small-scale heat sources such as small biomass boilers, by providing prioritised heat supply access to DH networks.
- **There is mistrust towards 'monopolistic' DH pricing and operations**, and the criticism that they should be treated as a public service obligation on a zero-profit basis, instead of being allowed to make reasonable returns. The main argument has been that even one competitor of sufficient size can ensure a competitive situation in the heat wholesale market and reduce prices for end-customers.
- **Existing overcapacity in heat production** due to a previous reduction in DH demand has led to a call for mechanisms to put existing producers in competition. This has been raised especially in some Eastern European countries, where heat production capacities were previously based on erroneous expectations of central planning for higher industrial and residential heat demand.
- **In some countries, the heat market model has been copied directly from the 'network access' model of the electricity and gas sectors.** Under this model, if an individual heat producer persuades a customer to purchase its heat directly, the producer would have the right to deliver heat using a DH network owned and

operated by a third party. This may have implications in terms of increased investments and higher operation costs, which would need to be distributed among all connected end-customers. This is one example of the challenges that regulators are now expected to resolve. In electricity and gas systems, such problems have been solved in the network codes.

- **Small-scale independent heat producers** based on renewable or fossil fuels may seek ways of benefiting from the existing DH network infrastructure without the risk of investing in their own infrastructure. Industrial surplus heat suppliers also want the highest possible valuation for their surplus heat, and smooth access to DH networks.<sup>4</sup>
- **Customers** may feel that they have limited freedom to express their disapproval or leave a supplier if they are dissatisfied with the service quality or prices set by dominant DH operators—even though these prices are usually approved by regulators or monitored by competition authorities.

## What are the particular features of DH systems?

Heating markets, and DH systems, are diversified and local by nature, as they are based on the location of end-customers and local demographic features. Transferring heat over long distances is less economically viable than transferring electricity. Space heating demands in Europe have been met in a variety of ways, usually driven by political preferences, and vary between centralised DH systems and building specific heat boilers. In some countries natural gas dominates, and in other countries DH systems dominate the low-temperature heat market.

Stable, predictable and justified determination of market rules is important in any industry, including the DH sector. It is even more important when new productivity investments, continuous performance improvements and increased customer engagement are of significant importance. Such rules will help to prioritise those investments that are of most benefit to society—i.e. better use of waste heat sources and resource-efficient co-generation.

Certain features of DH systems need to be acknowledged when considering improvements to the prevailing market rules. These features apply to many European cities that have a substantial share of space heating supplied by locally integrated DH systems.

- **Space heating demand** is declining, while climate change, urbanisation, tighter building regulations, energy efficiency improvements and economic development are the key drivers affecting the increase in building stock, specific energy consumption, and space heating demand. National policy steering and promotion will have a key role if efficient DH is able to gain market

share from other, less resource-efficient space heating solutions, or if DH becomes the ‘market loser’ due to fossil fuel remaining the dominant heating form.

- **The emergence of new technologies**—i.e. heat pumps and solar thermal solutions—will increasingly challenge the market position of DH and bring tougher competition between alternatives. The overall trend is towards de-centralised heating solutions, except for countries with a strong political agenda for DH. It is widely expected that demand for district heating will stabilise and, perhaps, gradually decline, except in growing urban areas.
- **Seasonal demand.** The annual DH demand curve is largely driven by the outside temperature and is thus seasonal, which means that there is a constant need to optimise heat production capacity.<sup>5</sup> Heat production unit costs are typically different for base, middle and peak loads due to different hours of operation, and production capacity is usually increased stepwise by replacing some of the existing capacities.
- **DH system balancing and optimisation** include more variables (pressure, temperature and flow rates) than electricity (voltage and current), and are therefore more challenging than electricity systems. As a result, the technical performance of DH systems vary significantly—for example, heat losses in DH networks vary between 8% and around 30% across Europe.<sup>6</sup>
- A DH system is also highly **capital-intensive** and has a relatively high share of fixed costs. Replacement costs can be high if the CAPEX cycle is not well planned. New production investments are substantial and require long payback periods in order to avoid sudden price spikes for end-customers.
- This capital intensity adds **long-term risk** to new investments in terms of DH demand, political steering through taxation, replacement risk by new heat sources, changes in the regulatory regime, and trends in the electricity and fuel markets. Short-term profit variability depends on outside temperature, fuel availability and prices, and the availability of production and network assets.
- **Overlaps between competition and regulation.** In many countries, typically in Eastern Europe, heat legislation provides outright ex ante heat price regulation through a cost-based method. While regulators are introducing new competitive mechanisms (i.e. auctioning to supply heat to DH networks or tendering for new capacity), they do not seem to be abandoning the prevailing burdensome price regulation. This may result in a combination of competition and price regulation.

These features, as well as country-specific aspects, need to be recognised and accounted for when substantiating and introducing new mechanisms for competition in DH retail and/or DH production.

## What are the competition law concerns for third-party access?

From a European competition law perspective, independent energy suppliers can have a legally enforceable right to access an energy network facility owned by a dominant energy system operator.<sup>7</sup> Discrimination between integrated affiliates and independent third-party undertakings is considered a common risk in energy markets, including the DH sector.

Third-party access (TPA) is essentially the right to access and use infrastructure developed by another company, even against that company’s will and business interests, and has emerged at European level in the context of Community competition law. However, the law does not provide a clear definition of the TPA right. This right corresponds to an obligation to contract and a duty to perform on behalf of an undertaking in control of the energy distribution/transmission system. Legally, the TPA right is not a self-given right; it is related to, and results from, an underlying energy supply contract.

The different types of TPA can be classified as follows. Their main applications will be discussed in more detail in a future Agenda article.

- **Negotiated (voluntary) network access.** The DH network operator and supplier determines, on a voluntary basis, how to set up the heat dispatch order to the DH network, and chooses between available heat sources from its own sources and external sources based on short- or long-term contracts. These are prioritised on a commercial basis, taking into account the benefits to the whole DH system (e.g. price, sustainability, network optimisation, and how economical it is to connect to heat networks).
- **Negotiated (mandatory) network access.** In this model, the conditions for access to the network may be stipulated in legislation, but are ultimately negotiated between the network owner and the company requesting access.
- **Fully regulated network access.** Here, ex ante access provisions have been determined by the legislator or the regulator. If these preconditions are met by the acquiring heat source, the network owner is obliged to provide access to the network.

When assessing the competitive constraints faced by a company, it is necessary to identify the markets in which the energy undertaking operates and may exercise market power. In the DH sector, control over distribution/transmission DH networks may imply a potentially high degree of market power towards formally separate but closely related DH production and retail markets. This market power can be seen from several angles: strong market power against DH networks due to having a dominant position as a single heat producer, or strong market power

against several heat suppliers due to having a dominant position as a single buyer.<sup>8</sup>

The dominant position may be granted by a stipulation in national legislation, or as a result of private arrangements and historical market structure. How can competitive use of DH networks be regulated and promoted without going against the legitimate business interests of their owners? In the context of vertically integrated systems, one objective of introducing competition is to ensure that the risks of potential discrimination are being addressed.

In principle, a DH network company is free to contract, which is a fundamental right for the free market, and must be able to choose for whom and on what conditions to provide a DH network service. Refusal to give access to a DH network can take several forms and is seldom expressed as an explicit denial; it often takes the form of restricted access only under sufficiently advantageous conditions—either to itself as a DH network operator, or to end-customers. The most common forms involve offering unjustified legal, economic or technical access terms, other unfair trading conditions, delaying negotiation tactics, or imposing onerous terms and conditions.

Discriminatory treatment, which does not result from objectively justified circumstances, can more easily be classed as abusive when it restricts competition in the downstream supply market—i.e. in DH retail. In many countries, this risk is limited because the single-buyer model is covered in legislation. Thus the key question is under what conditions the refusal to grant access to supply heat to DH networks can be deemed as non-justified and in breach of competition law. The main criterion should be whether the TPA can be seen as beneficial to the whole DH system and the end-customer.

## What could be the relevant rationale for more competition?

Certain political and legislative enablers need to be in place for more competitive DH systems and detailed competitive mechanisms to be established. Some examples are discussed below.

The DH sector has both monopolistic and competitive characteristics, and should be treated as a normal utility business that needs to be increasingly customer-oriented and efficient. Both sunk and new economic CAPEX in DH operations should be recouped and eligible for risk-adjusted profits. Risks and complexity in a DH system seem to be higher than for other network-only businesses such as water, electricity and gas networks due to higher seasonality, input volatility and need for more optimisation.

The local DH network operator should have the exclusive duty and ability to focus on end-customer satisfaction, long-term DH competitiveness and system optimisation. To enable this, a single-buyer model (where competition can take place at the heat production level) should be determined

(or, at least, preferred) by the prevailing DH-specific legislation. The network operator should also be responsible for optimising the heat production capacity based on own or external sources, which naturally increases the requirements for transparent and non-discriminatory decision-making.

The main energy policy steering mechanisms—energy taxation and emission trading schemes—should drive behaviour towards resource efficiency and combating climate change (i.e. sustainable development). Heat markets should not be unnecessarily complicated and burdened by other steering mechanisms such as negotiable, ex ante price regulation or wide-scale mandatory access provisions, unless market failures occur that cannot be solved in any other way.

Competing heat production, such as from industrial waste heat sources and new entrants, needs to enter the heat market on its commercial and sustainable merits. The DH network operator could publish access prices which the entrants would need to beat. Public price-monitoring could focus on mitigating the risks of misuse of a strong market position under competition law, and thus help to create trust between customers, society and DH companies.

For the benefit of DH competitiveness, end-customers and the whole DH system, the economic rationale for organising competition should be based on the following policy objectives and regulatory methods that aim to resolve significant heat market inefficiencies.

- Tailored mechanisms for **replacing outdated fossil fuel-based heat production** by more efficient, renewable fuel-based heat production, which would enable stability of heat prices and lower emissions in the long run. This should include a mechanism to increase the use of local industrial waste heat sources.
- Mandated, **prioritised access for renewable energy heat sources** should be carefully planned and directed to focus on those locations where outdated fossil fuel-based heat production is being replaced. For example, it would be better not to replace resource-efficient co-generation that can more effectively use local, solid renewable fuels on a larger scale by giving priority access to several small biomass boilers that are not producing electricity. Furthermore, the access price of such renewable heat sources should be set such that the overall DH tariffs remain competitive or, preferably, decrease.
- If the DH system needs to replace existing capacity or build new capacity due to anticipated DH demand growth, there might be a reason to impose certain **mandatory and non-discriminatory open tendering for new capacity** to enable efficient new CAPEX to be undertaken. However, in practice there are always limitations due to the DH network point where such capacity can be located and connected to the network, and whether exactly the same access conditions can be offered equally to all potential bidders. There is limited

precedent of such procedures in the DH sector, but in these the cost-based heat price regulation overlaps with the mandatory tendering procedure, which is likely to make the scheme less attractive to new entrants.<sup>9</sup>

- There is **no economic rationale for establishing alternative base load capacities that could compete with each other**. Because the fixed OPEX and sunk CAPEX typically comprise over 60% of the total renewable heat production costs, there is a question of whether the economic benefits of competition would exceed the fixed OPEX and capital costs. Furthermore, the return and payback expectations for the investor would increase if there is a short- or long-term risk of investments being stranded. It has been shown that, under such competition pressure, expectations of CAPEX recovery are no more than three to four years, which respects the minimum planning and construction time of new capacity.<sup>10</sup>

Table 1 details the prevailing access rules in a selection of countries.

### Figure 1 Payment products, schemes and infrastructures in the UK

	Sweden	Finland	Estonia	Latvia	Lithuania	Poland
Main access principle (network operator view)	Voluntary	Voluntary	Mandatory tendering for new capacity	Mandatory if access price below existing cost	Mandatory if access price below existing cost	Mandatory if access price below existing cost, or to allow heat supply to own end-customers
Access price determination	Commercial negotiation	Commercial negotiation	Open tendering and price regulation	Commercial negotiation and price regulation	If price below access price cap(s). Priority according to production mode and fuel. Regulated and non-regulated prices	If price below access price cap(s). Preferred access of renewable sources. Regulated prices
Agreement with external heat producers	Long-term contracts	Long-term contracts	Long-term contracts	Short-term contracts	Monthly auctioning and contracts	Short-term contracts
Share of outsourced heat production (estimate)	5%	33%	10%	2%	21%	50% <sup>1</sup>
Share of renewable heat production (renewable, industrial waste heat and waste fuels)	73%	27%	37%	45%	23%	7%
Nominal (incl. VAT) and relative (PPP-adjusted) heat prices	€93/MWh (140%)	€65/MWh (100%)	€67/MWh (160%)	€67/MWh (175%)	€73/MWh (210%)	€48/MWh (150%)

Note: PPP, purchasing power parity. 1 In Poland, the high share of outsourced heat production is due to past state ownership of all CHP plants, which have now been almost fully privatised to national and multinational utilities.

Source: Euroheat & Power (2013), 'District Heating and Cooling country by country Survey 2013'; Fortum surveys and analysis.

Governments and regulators may simply aim to solve market failures (i.e. solving inefficiencies by increasing competition). In our opinion, they should instead concentrate on how, where and when to incentivise new CAPEX for lower-cost heat production; when and how to penalise for higher-than-average OPEX levels due to underperformance; and how to incentivise overperformance of the existing DH operators. When introducing competition in DH production, the potential to put security of supply at risk and raise DH system costs

will increase. In our experience, establishing competitive mechanisms on top of historical, heavily ex ante-regulated DH systems will not bring the positive outcomes desired in long run, and is more likely to increase the legal complexity and unpredictability of the DH sector.

## Conclusions

The EU does not impose rules for competition in DH systems. DH usually competes, to a certain degree, with alternative space-heating solutions. In many countries, national competition authorities have concluded that such competition is efficient, thereby justifying the non-regulation of DH systems. In Eastern Europe, and in some Western European countries, the DH sector has typically remained regulated under close scrutiny by the authorities. Due to a lack of heating and DH sector-specific guidelines from the EU, the DH sector has developed under national legislative circumstances over time, which has resulted in significantly different degrees of regulatory involvement in the DH sector across Europe.

Stakeholders regularly suggest that more competition should be introduced in the DH sector, mostly between heat producers. Examples of such new legislation can be found in Poland, the Baltic countries and Romania. In the Nordic countries, heat production sources are usually selected based on voluntary negotiations and two-party long-term agreements.

The rationale for increasing competition in the DH sector is often driven by a relatively unrealistic expectation—i.e. to substantially lower DH prices to end-customers. Our recommendation would therefore be to enhance the competitive conditions in the DH sector, but to treat implementation carefully and to avoid over-expectations. Several detailed rules need to be considered and determined, and sufficient consequence analysis conducted.

DH systems do not easily attract newcomers: they have stable or reducing long-term demand expectations, seasonal demand, capital intensity and related risks. The relevant questions are therefore: does the market attract new investors that will compete with current DH operators with depreciated assets? How can equal competitive conditions be created for such a situation? There should also be a willingness to reduce the burden of regulation while introducing effective competition, otherwise the risks and unpredictability will mainly increase and the prevailing regulations remain as a barrier for new entrants.

A forthcoming *Agenda* article will address how competition in DH retail to end-customers can be enhanced; how priorities can be set in heat supply; precedence of third-party access in heat networks; and how to organise competition in heat markets and networks.

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The views are those of the author and do not necessarily represent those of Fortum.

<sup>1</sup> Directorate General Energy of the European Commission. Since March 2011, the Gas and Electricity Directives of the third package for an internal EU gas and electricity market have been transposed into national law by Member States. Directive 2009/72/EC concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC. Directive 2009/73/EC concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC.

<sup>2</sup> Euroheat & Power (2013), 'District Heating and Cooling country by country Survey 2013'. Fortum, a listed Nordic-based energy company, is a major owner and operator of DHC systems (networks, co-generation assets and heat-only boilers) in the Nordic countries, Baltic countries, Poland and Russia.

<sup>3</sup> Laws on the heat sector and subsequent secondary legislation in Lithuania and Estonia.

<sup>4</sup> Here there are many similarities with small wind and solar producers seeking preferred access to electricity networks.

<sup>5</sup> Summer capacity needs are typically substantially less than peak capacities.

<sup>6</sup> Most efficient heat networks are in the Nordic countries. Highest losses can be found in some Eastern European countries that have not been able to maintain heat networks and have suffered from over-dimensioning of the pipes in the past.

<sup>7</sup> This section is based on the following articles and further applied to the DH sector: Kotlowski, A. (2007), 'Third-Party Access Rights in the Energy Sector: A Competition Law Perspective' *Utilities Law Review*, 16:3, and Wårell, L. and Sundqvist, T. (2006), 'Market Opening in Local District heating Systems', working paper, Economics Unit, Luleå University of Technology, and Swedish Competition Authority.

<sup>8</sup> Dominance indicates a position of economic strength which enables the operator to restrict effective competition in the relevant market by allowing it to behave largely independent of its competitors, customers and, ultimately, consumers. At a minimum, the dominant undertaking is able to have appreciable influence on the conditions under which competition will develop.

<sup>9</sup> Mandatory tendering for new capacity is stipulated in heat regulation in Estonia but has very limited precedent.

<sup>10</sup> In Lithuania, small renewable sources can access and supply heat to networks as long as they are able to offer heat below the set monthly price cap. Due to high competition risks and the ability to set non-regulated prices, the expectations for short-term paybacks and high returns are leading to a minimisation of CAPEX, which is short-sighted and perhaps not optimal from the point of view of the system.

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