Osborne Clarke

District Heating Consultation
Energy Divisions
Department of Communications, Climate Action and Environment
29-31 Adelaide Road
Dublin 2
D02 X285

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Dear Sir/Madam

District Heating: Consultation to Inform a Policy Framework for the Development of District Heating in Ireland

We are responding to the consultation published by the Department of Communications, Climate Action and Environment (the **"Department"**) in December 2019: District Heating: Consultation to Inform a Policy Framework for the Development of District Heating in Ireland published (the **"Consultation"**).

We have not sought to respond to the specific questions raised but rather have sought to highlight a number of underlying structural and commercial factors (and legal implications) drawn from experience of actively participating in the heat sector for approximately 15 years. We consider that these underlying structural and commercial factors (and legal implications) will assist the Department in its consideration of how best to address and encourage the growth of district heating within the Republic of Ireland drawing on international lessons but with, of course, a focussed solution that works for the particular circumstances and environment of the Republic of Ireland.

While not responding to the specific questions raised, we have broadly followed the overall structure of the Consultation and have therefore grouped our thoughts under the headings used by the Department.

1. **Technical proposals**

Having worked on numerous different schemes, we have found that those which are successful reflect the nature of the underlying assets in terms of both operating parameters but also life cycle.

District heating systems essentially can be viewed as two core asset sets. The first is the heat distribution network which has a design life of 40-50 years and often have a working life

significantly beyond that. The second set comprise the energy centre assets (heat generation) which typically have a much shorter operating life and replacement cycle. In the case of CHP systems this is often in the region of 14 or 15 years while other plant (such as anaerobic digestion or waste for energy plant) may have an operating life of 20 to 25 years. In addition, the opex cost profile of maintaining the distribution network itself is likely to differ significantly from the opex cost profile of the energy production assts. In other energy sectors, production and distribution/transmission have revenue models which reflect these differences. We recommend that the financial model underpinning a heat project or scheme should reflect also this underlying difference in life cycle and opex costs and be aligned with the functionality of the underlying assets.

An alternative approach to a dedicated heat source is the capture of "waste heat" to be utilised as the primary heat source for a district heating system. Such waste heat may be captured from a number of sources such as existing industrial and commercial process facilities and electricity generation plants including waste for energy plants and data centres. Such heat is often characterised as being free. While this approach does utilise a product (heat) which is otherwise being vented to the atmosphere, that does not mean that it is without cost for it to be captured and made available for a heat scheme. Costs which are often associated with the capture of the waste heat include:

(a) the equipment required in order to divert heat from the current exhaust systems to an offtake point: as well as the capital costs of purchasing and installing the equipment (which may well require modifications to an existing facility or process), pipework, metering and other associated equipment will take up space in the facility and may sterilise or restrict alternative uses of land on which the plant is situated. The installation and maintenance of the equipment will usually also require parts of the industrial facility to shut down both at the time of initial installation and periodically thereafter – such downtime has a cost for the facility which would otherwise be operating and generating revenue (and hence profit) for its owner;

(b) operational impacts: in many processes, electricity generation being one, there is trade-off between the optimisation of a plant for one purpose (such as generating power) and the optimisation of the same plant for the production of heat. Such trade-offs by their very nature involve a balance not just of the output of a quantity of one product verses the other, but the value of (or more accurately the profit from) the respective outputs and impacts on wear and tear on the facility's plant equipment which may increase the costs of operating the facility as compared to 'no heat' operations;

(c) back-up heat provision: industrial and commercial process facilities and electricity generation plants require from time to time maintenance or suffer breakdowns which interrupt the production of heat. If the heat off-taker is looking at the heat provider to provide a constant 24/7 supply then the costs of alternative heat provision (capital and operating) for these outage periods will also need to be recovered by the operator of the facility. Back-up or diverse heat supply will be required for any system, the issue in essence is one of who bears the risk and therefore cost of ensuring the overall availability of heat for delivery to end customers.

Biomass is often viewed as a low carbon approach for the production of heat. While, this may be the case, we would recommend that consideration is given not just to the carbon impact but to the wider environmental and societal impacts of, not just biomass, but any chosen heat production method. In the case of biomass, there are a number of elements which we believe should be considered alongside the low carbon aspect of the fuel itself, including:

(a) the impact of transporting biomass to the plant: this is often by heavy vehicle which itself has carbon emissions as well as PM2.5 and other particulate emissions. The vehicular traffic required for heat driven biomass schemes also adds to the number of road movements which can detrimentally impact quality of life in more rural areas and can add to congestion in urban areas. Consideration also needs to be given to the space

requirements for storage of sufficient buffer stock at the heat production site to provide continuity of heat provision should there be an interruption in supply with attendant issues around ensuring the condition of the biomass fuel stock does not deteriorate so that it cannot be used or combustion is less efficient or has higher emissions than would otherwise be the case.

District heating systems are most efficient (that is cost effective) where there is a relatively steady heat demand. This can be through an anchor load such as a hotel or leisure centre with residential uses or a mix of commercial and residential. The structure packaging should reflect such diversity of user and where it is absent or something which will evolve over time, enable risk allocation or management so that the entity concerned can managing any downside, but also potentially be incentivesed to actively seek a wider customer mix or faster take up of heat. The density of heat loads is also a key factor in cost efficiency. Where density is low, or areas of density are separated by areas of low density this should be clearly factored into the financial models and structures adopted.

Finally, primary energy savings should, in our view, be taken into account in any opportunity cost evaluation of a scheme. Fuelled power generation without heat captured has an overall efficiency of around 40-45% (ie conversion of the calorific value of the primary fuel into a used product). Heat production through individual (or indeed centralised) boilers utilises fuel with attendant carbon and other emissions. If heat production is combined with power generation then fuel only needs to be consumed once to meet both requirements, driving efficiency or fuel usage closer to 90% of the fuel that is combusted and saves both fuel and carbon impacts from the fuel usage which is saved.

2. Planning and Building Regulations

There is an inherent dilemma surrounding building efficiency and heat load. When buildings are made more efficient they require less heat which reduces the need for heat to be used. The starting point in terms of sustainability is to minimise the overall heat (or cooling) demand through the building fabric and design and then to only provide such heat (or cooling) as is required for that thermally efficient building. However, such an approach may compromise the financial model of a heat scheme. Counter-balancing that is the limited impact planning and building regulations have on existing building stock and the difficulties associated with retrofitting energy efficiency measures, particularly with residential building stock. Schemes may therefore require a balance to be struck between building efficiency and heat load, a balance which is likely to involve a number of stakeholders including central and local government, planning departments, residential and commercial building owners and/or occupiers and service providers – whether of energy efficiency services or heat.

Looking specifically at planning and building regulations they may serve either as a permissive tool (that is facilitative) or an activist tool (that is driving deployment).

Used permissively, planning and building regulations can set policies to lower carbon emissions associated by a building or development by a specific percentage from the base line (that is business as usual from say the date of implementation of the requirement). Such an approach often leaves it up to the developer or building owner to decide how best to achieve the carbon reduction – or to put it another way, the approach drives carbon reduction but is technology neutral as to how that carbon reduction is achieved.

Used actively, planning and building regulations can specify that district heating or combined heat and power systems be used to deliver decarbonisation. They could also be used to specify in a particular geographical area mandatory connection to a specific district heating network.

Experience in the United Kingdom has shown that local authorities which have used local planning requirements to drive decarbonisation have seen a higher deployment of district heating in their area than those which have been more permissive or which have not opted to use these tools. Informative examples including the Greater London Authority's planning

requirements which have focussed on significant carbon reduction and the approach being adopted by Bristol City Council which is using planning as part of its tool kit for the deployment of district heating within Bristol, linked to its municipally owned distribution network.

However, where regulatory tools such as planning and building regulations are being used to drive the deployment of a particular solution (in essence connection to a particular heat network), that leaves the building owner or developer with limited negotiating power compared to the network owner; or to put things more starkly, the building owner/developer will be faced with a regulatory requirement to contract with a monopoly provider. In such circumstances, it is important that there is independent regulatory oversight to ensure that terms of connection, standards and performance and pricing are fair and not unduly favourable to one party or the other.

3. Regulation

Heat production and supply as well as heat distribution are traditionally viewed as monopolistic and many schemes operate on that basis. However, while distribution of heat is naturally a monopolistic activity, heat production and supply can competitive. For this to happen there is a need for some form of disaggregation of network operation or third party access. Various countries are making tentative steps to facilitate such market opening (Sweden is one example and another is the approach being adopted by Bristol City Council in the United Kingdom). However, disaggregation and/or third party access is still in its infancy in heat and the nature and size of the potential market in the Republic of Ireland realistically may make such an approach difficult outside of the Dublin area.

In the absence of a robust competitive environment, end-users, particularly residential customers have no choice over who they acquire their heat from once connected to a heat network. Perceived poor customer standards and an absence of an opportunity to switch provider inhibits customer adoption of heat. Instances of actual poor service or high pricing can easily lead to negative press coverage which tends to taint not just the scheme or provider in question but the wider heat industry.

It is therefore, in our view, important in the absence of competition to have regulation of the sector. This should ideally include price controls (whether through specific tariff setting or by a measure of equivalency to costs of other systems – ie compared to using a gas fired combination boiler), customer standards (including issues such as continuity of supply, compensation for loss of service in certain circumstances and compensation for missed appointments) as well specific additional protection for vulnerable consumers.

Underlying this is the question of how to ensure efficient business practices by heat providers (including the public sector) whilst achieving acceptable standards of service and ultimately value for money for consumers and/or tax payers.

Consideration should also be given as to how in the longer term individual systems connect together to form a wider network, or discrete systems connect to say a larger local authority owned and run network. Issues that would need to be addressed include approaches to balancing heat, temperature (both flow and return between networks, or parts of networks), water quality across the integrated network as well as rights to interconnect networks. This could be achieved through a series of ad-hoc contractual arrangements, but it may well be more efficient for there to be a publically available single source of such arrangements through perhaps a heat network code.

The Commission for Regulation of Utilities has good knowledge of energy industry structures and regulation including networks and energy supply as well as power generation. It therefore would be in a strong place for its remit to be expanded to include the regulation of heat. However, such an extension would require amendment to the Electricity Regulation Act 1999. Amendments to legislation always raise issues of legislative time and agenda. An interim solution could be to establish a voluntary form of regulation under which participants in the

provision of heat sign up to comply with specific standards and abide by certain rules and guidelines. The scheme operated by the Independent Heat Customer Protection Limited, known as the Heat Trust[1] and the CIBSE Code of Practice CP1 : Heat Networks: Code of Practice for the UK[2] are examples of non-legislative approaches to voluntary regulation.

4. Financing

The consultation captures the breadth of potential models for the deployment of heat spanning various forms of public sector approaches and private sector involvement. However, the structural options are somewhat weighted towards a public sector solution for heat provision. There are a number of approaches to private sector provision of heat which include block or development focussed concessions (with or without a special purpose vehicle), outsourcing or all or part of the heat production, supply, metering and/or billing functions, and AssetCo/ServiceCo models. But whether private or public, there is no one specific correct approach – the solution for any particular project should draw on best practice from elsewhere but be moulded and appropriate to the technical and financial realities of the scheme in question.

The financing cannot be looked at in isolation from the elements considered above as a scheme is delivered as a whole and therefore must be considered as a whole. There are however a number of lessons which we draw from experience of both public sector led and private sector led schemes of which our team have direct experience:

(a) Have a robust business case/financial model and understanding the gaps. It may be trite to so comment, but if costs are inherent in a scheme they should be clearly identified, scoped and allocated as should revenues.

If there is a shortfall between the capital required to develop a scheme and the revenue arising from that scheme this should be identified upfront along with the reason for the shortfall to enable an informed decision to made about the viability of the scheme. If the shortfall is due for example to the cost of 3km stretch of distribution pipe, then an injection of public grant or subsidy to cover the cost of that particular stretch of pipework could enable the scheme to operate once built on a financially stable basis. However, if the shortfall is due to a fundamental lack of income ignoring sunk costs, then there is a different decision to be taken as to viability of the scheme and whether the other benefits justify an on-going subsidy.

A robust business case/financial model is also important in schemes which do not require subsidy. If all the costs are not clearly identified and properly accounted for then at some stage it is likely that a critical issue will arise. Examples of this include how bad debt is recovered or socialised and how to manage changes in input fuel prices where there is no linkage between end user prices and the input price (for example a heat price that is linked to gas pricing, but the fuel is biomass with no long term price fix under the fuel supply arrangements).

The need for a clear robust business case/financial model arises whether the project is public or private.

(b) One of the biggest barriers to private sector heat provision is uncertainty around demand risk and the ability of the private sector to bear that risk where initial investment is capital intensive. The scale of many opportunities also presents issues as the transaction costs of small schemes often makes it prohibitive to transact and even where it is possible to transact a scheme the scale of the schemes are such that they are too small for external debt financing which in turn limits the number and size of schemes which providers are able invest in and develop. The particular issues around

[1] https://www.heattrust.org/
[2] Produced as a joint project between CIBSE and the Association for Decentralised Energy (ADE) – see https://www.theade.co.uk/resources/guidance/ade-cibse-code-of-practice-for-heat-networks

the external financing of heat was considered in depth over several months by a task force in the UK including representatives of industry, government, consumer bodies and funders (see Heat Network Task Force: Shared Warmth | Industry Heat Network Task Force Report[3]). While elements of this consideration naturally relate to the heat market in the United Kingdom, many of the issues facing funders and therefore learning highlighted in this report will we be believe be informative for development of the appropriate solution for the Republic of Ireland.

(c) Where there is a mixed approach, that is, where both private and public sector funding is being used, consideration will also need to be given to compliance with state aid and competition issues but that is not an issue particular to the heat market.

Concluding comments

In looking at developing an approach to the development of heat we strongly recommend that the financing (whether public or private) are looked at simultaneously with and alongside regulation and practical approaches to delivery models to ensure appropriate identification and allocation of risks and financial risks and rewards.

We also recommend the adoption of a long term plan with a clear goal and clear overarching economic model. This should have defined steps and stages of development even if the timeline is flexible and details of particular stages is yet to be developed. Once that is established abiding by the plan in order to give certainty of the direction of travel will be critical in our view to give organisations, whether public or private, the confidence to investigate, develop, invest and fund the growth of district heating in the Republic of Ireland.

If there are particular elements arising from this letter which you would like to discuss further, please do not hesitate to contact me.

Yours sincerely

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Partner
for Osborne Clarke LLP
[redacted]

Note about the author: Simon Hobday (Energy Partner at Osborne Clarke LLP)

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[3] https://www.theade.co.uk/news/ade-news/heat-network-industry-says-investment-risk-can-be-reduced-and-customer-bene and https://www.theade.co.uk/assets/docs/nws/Task_force_report_v7_pipes.pdf

Osborne Clarke

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