



Rialtas na hÉireann
Government of Ireland

District Heating

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

December 2019

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1 Introduction

1.1 Background

The Climate Action Plan, published in June 2019, sets out a range of actions necessary to reduce greenhouse gas emissions. Action 70 sets out the need to develop a policy framework for the development of district heating in Ireland. The Department is seeking views to inform this policy framework.

The public consultation will focus on four key areas – namely:

- research;
- regulation;
- planning; and
- financing.

The following sections examine each of these key areas in turn, posing a number of questions at the end of each section. The remainder of this section provides an overview of district heating and related policy at EU and national level.

Development of the consultation has been informed by a working group, which is chaired by the Department for Communications, Climate Action and Environment and includes relevant Government departments, agencies, State bodies and key stakeholders.

1.2 Responding to the Consultation

Submissions may be made in writing to:

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

Or by email to: DistrictHeating@dccae.gov.ie

The public consultation will close at **5pm on Friday, 28 February 2020.**

It is not necessary to provide responses to all the questions in this consultation. Respondents are invited to supplement their comments with additional relevant information, reports and/or analysis. Respondents are also invited to include relevant information beyond the questions posed, should they so wish.

Responses to this consultation will be subject to the provisions of the Freedom of Information Act 2014 and Access to Information on the Environment Regulations 2007-2014. Confidential, or commercially sensitive, information contained in your submission should be clearly identified as such. However, parties should also note that any or all responses to the consultation are subject in their entirety to the provisions of the FOI Acts and are likely to be published on the website of the Department of Communications, Climate Action and Environment.

1.3 District Heating

What is District Heating?

District Heating involves delivering *heat* rather than fuel to buildings.

In a District Heating system, hot water is pumped from a centralised heat source (or sources) through a network of highly insulated pipes to a number of different buildings.

The centralised heat source can be a boiler used specifically for this purpose. However, District Heating can also use the heat produced by electricity generation or other commercial or industrial processes. District Heating can make use of this "waste heat".

The recast Renewable Energy Directive¹ defines district heating and cooling as the following: *“‘district heating’ or ‘district cooling’ means the distribution of thermal energy in the form of steam, hot water or chilled liquids, from central or decentralised sources of production through a network to multiple buildings or sites, for the use of space or process heating or cooling.”*

Regulation of district heating, in terms of metering and billing, is currently provided for by the European Union (Energy Efficiency) Regulations 2014 (S.I. No. 426/2014),² which transpose the 2012 Energy Efficiency Directive.³

District heating can play a key role in improving energy efficiency and reducing emissions. Given that end-users are supplied with heat rather than fuel, district heating networks can

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1574956252261&uri=CELEX:32018L2001>

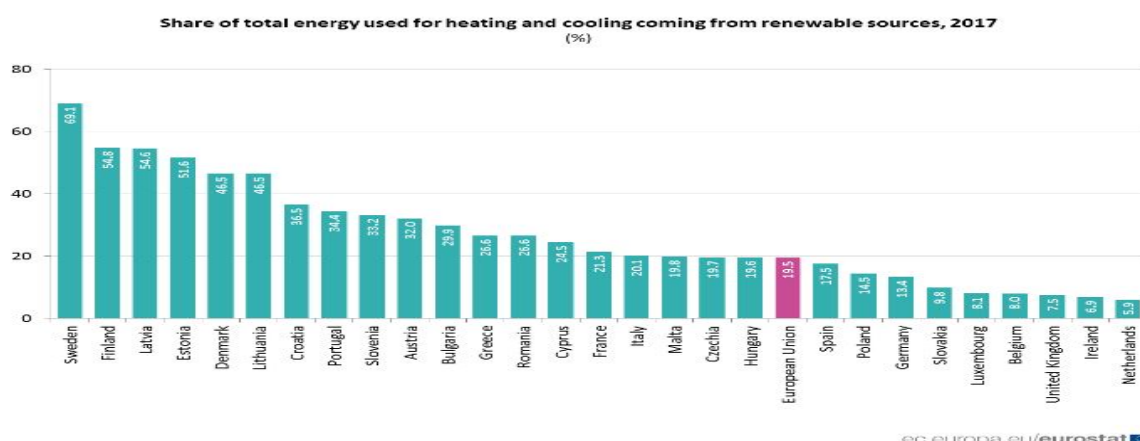
² <http://www.irishstatutebook.ie/eli/2014/si/426/made/en/print?q=energy&years=2014>

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1574956743815&uri=CELEX:32012L0027>

offer flexibility in fuel choice, and the ability to adapt to changes in the economic and policy landscape that may see different combinations of energy resources used at different times over the lifetime of a district heating network. District heating systems may vary in size, have different types and numbers of customers, and utilise a variety of supply sources. This diversity in terms of systems gives rise to different barriers, opportunities and levels of difficulty with regards to implementation. In Europe, the term district heating is generally only used for networks serving neighbourhoods, towns or cities. Currently, there are only a handful of communal or localised district heating systems in active use in Ireland.

1.4 District Heating in Ireland

The level of renewable energy in the heating sector in Ireland has increased in recent years, rising from 2.4% in 2000 to 6.9% in 2017. However, this is still low when compared with other European countries as shown below.



Source: Energy for heating/cooling from renewable sources, Eurostat

District heating currently accounts for a very small share of the Irish heating sector; estimated to be significantly less than 1%, representing one of the lowest shares of district heating in Europe. An examination of the heat sectors in other EU Member States reveals that countries with the highest shares of renewable heat also have high levels of district heating. District heating allows a relatively low resistance path to decarbonisation without relying on large volumes of individual heat consumer decisions.

1.4.1 Dublin District Heating System

Dublin City Council is currently developing the Dublin District Heating System. This project will capture waste heat generated at industrial facilities, in particular the Dublin Waste to Energy Plant in Ringsend, and pipe it into homes and businesses in the Poolbeg, Ringsend and docklands areas of Dublin city.

1.4.2 South Dublin County Council Tallaght District Heating Scheme

South Dublin County Council is currently developing a district heating network in the Tallaght area using waste heat from a local data centre. The Tallaght District Heating Scheme will provide low carbon heat to public sector, residential and commercial customers with the objective of decreasing the level of emissions associated with the use of fossil fuels for heating.

The delivery of these two, large scale (in the Irish context) schemes will, in addition to fulfilling a commitment given in the Climate Action Plan, help to develop experience and knowledge that can promote and inform further schemes nationwide to make district heating more mainstream and facilitate enhanced uptake in the State.

Perhaps the closest example of a true district heating system, in the Irish context, is the Mitchels/Boherbee scheme in Tralee. There are in addition a handful of communal or localised district heating systems in active use in Ireland. The table below details some examples of existing heating schemes around Ireland.

<p>Tralee</p> <ul style="list-style-type: none"> •Where: Mitchels/Boherbee, Tralee •How long in operation: 8 years •Energy source: Two 500 kW wood chip boilers •Types of buildings: 100 residential units, a convent-day care centre, county library, a primary school •Area covered: •Expansion/Development: Phase II is envisaged to provide a 15MW heat and power plant & associated district heat pipe network fuelled by locally produced biomass 	<p>Leinster House</p> <ul style="list-style-type: none"> •Where: Leinster House •How long in operation: 10 years •Energy source: 2MW wood pellet boiler •Types of building: Public Sector Offices •Area covered: Approximately 24,000m² of building space •Expansion/Development: Currently no plans for expansion.
<p>The Glen</p> <ul style="list-style-type: none"> •Where: Cork City •How long in operation: 6 years •Energy source: 500 kW biomass boilers using wood pellets •Types of buildings: Residential housing and a community centre •Area covered: 59 houses and an 1800m² community centre 	<p>Gweedore</p> <ul style="list-style-type: none"> •Where: Udarás na Gaeltachta-Gweedore Business Park, Derrybeg •How long in operation: 8 years •Energy source: 2 x 150 kW KWB wood pellet boilers. •Types of buildings: Office block •Area covered: 5,100m² when completed •Expansion/Development: Plans to expand delivery of renewable heat via a district heat network across the business park

1.5 EU Policy

The Clean Energy for All Europeans package of November 2016 consists of eight legislative acts relating to the Energy Union and is a key contributor to the European Commission's

strategic goal of a climate-neutral economy by 2050. It includes, inter alia, the following Directives, which are perhaps the most relevant in terms of district heating.

- The recast **Renewable Energy Directive**⁴ - which sets out the regulatory framework for the promotion of the use of energy from renewable sources.
- The amended **Energy Efficiency Directive**⁵ - which sets a revised headline energy efficiency target for 2030.
- The new **Energy Performance of Buildings Directive**⁶ - which maximises the energy saving potential of smarter and greener buildings.

The recast Renewable Energy Directive recognises that the heating and cooling sector, which accounts for approximately 50% of the Union's final energy consumption, has an important role to play in decarbonising the energy system.

However, due to a number of factors, including the fragmented nature of the sector, progress towards decarbonisation has, to date, been slow.

To address this issue, the recast Renewable Energy Directive requires each Member State to endeavour to increase the share of renewable energy in the heat sector by an indicative 1.3 percentage points as a yearly average calculated for the periods 2021-2025 and 2026-2030 (limited to 1.1 percentage points where waste heat and cold are not used).

Acknowledging that district heating can make a key contribution to increasing the level of renewable energy in the heat sector, the recast Renewable Energy Directive sets out provisions to promote transparency for district heating consumers and to facilitate fuel-switching to renewable sources.

The recent update of the Energy Efficiency Directive sets a new, higher target for energy efficiency. The updated Directive lays down specific requirements on metering and billing for energy users in the context of district heating, and a range of requirements in relation to the promotion of energy efficiency in the Combined Heat and Power (CHP) and district heating sectors. It also requires a cost-benefit analysis to be carried out where, inter alia, new large (over 20 MW) electricity generation or industrial installations are planned or existing

⁴ Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)

⁵ Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 on energy efficiency

⁶ Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May on the energy performance of buildings

installations are being substantially refurbished, in order to assess the costs and benefits of employing High Efficiency-CHP and/or connecting to a district heating and cooling network.

In addition, Article 14(1) of the 2012 Energy Efficiency Directive requires Member States to carry out a Comprehensive Assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling. Ireland submitted its first Comprehensive Assessment to the Commission in 2015.⁷

The assessment found that a large portion of heat demand in Ireland is generally low density in nature and not suitable for district heating. However, potential exists for certain scale projects and further analysis could potentially identify more localised opportunities. In April 2019 the Commission requested an updated Comprehensive Assessment from Member States. This assessment is required to be notified to the Commission by December 2020.

The new Energy Performance of Buildings Directive requires that EU Member States strengthen their building regulations and introduce energy performance certification of buildings. The Department of Housing, Planning and Local Government are the policy lead on this Directive.

1.6 National Policy

National policy recognises the contribution that district heating can make to Ireland's energy and climate goals.

1.6.1 Climate Action Plan

The Government's Climate Action Plan 2019 to Tackle Climate Breakdown⁸ reaffirms the significant contribution district heating can make to increasing the level of renewable energy in the heat sector and reducing emissions.

The Climate Action Plan sets out over 180 actions to ensure Ireland achieves its 2030 targets for carbon emissions, putting us on a trajectory to achieve net zero emissions by 2050. Action 70 deals specifically with district heating.

⁷ <https://ec.europa.eu/energy/sites/ener/files/documents/20151221%20SEAI%20EED%20ART14%20-%20Final.pdf>

⁸ <https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx>

Action 70: Develop a policy framework for the development of district heating in Ireland and support the delivery of two district heating projects under the Climate Action Fund			
Steps Necessary for Delivery	Timeline by Quarter	Lead	Other Key Stakeholders
Commence the South Dublin County Council Tallaght District Heating Scheme project, supported by the Climate Action Fund, which will provide low-carbon heat to buildings in Tallaght	Q4 2019	DCCAE	SDCC
Publish a draft Policy Framework for District Heating in Ireland, for public consultation. Framework to focus on the key areas of regulation, planning, funding and research	Q4 2019	DCCAE	District Heating Working Group
Commence the Dublin District Heating System project, supported by the Climate Action Fund, which will provide low-carbon heat to businesses and homes in Dublin city	Q2 2020	DCCAE	DCC
Finalise the Policy Framework for District Heating in Ireland and implement	Q4 2020	DCCAE	
Develop a technical manual to assist in the preparation and development of local energy masterplans, particularly for urban areas. Assessments should include local heat maps and spatial analytics, outlining of options, identification of clusters of mixed-use development particularly commercial industrial uses, least cost options and steps for project implementation	Q4 2020	SEAI	LAs, DPHLG
Examine potential of Geothermal to contribute to District Heating in Ireland and develop Roadmap	Q4 2020	DCCAE	GSI

Source: Climate Action Plan 2019 to tackle climate breakdown

In addition to the actions identified under Action 70, there are a number of other actions committed to in the plan where district heating is seen as a key component. These include:

- **Action 53:** Identify additional options for targeted financing for energy efficiency retrofits in the domestic and commercial sectors. Identifying and assessing additional options for financing of biomass, CHP, district heating and renewable heat projects is seen as one of the steps necessary for the delivery of this action.
- **Action 151:** Implement an enhanced approach to energy performance and renewable energy capability in school buildings. The steps identified as being necessary for implementation of this action include developing a renewables plan for the third level education sector to promote the installation of renewables and campus district heating systems from 2020.

The development of district heating projects could also positively impact on several other actions contained in the plan, for example:

- Action 64 which seeks to introduce minimum BER standards in the local authority social housing stock as part of retrofit works being carried out on older stock or refurbishment of vacant dwellings

- Action 65 which aims to develop and establish a climate-action toolkit and audit framework for local authority development planning to drive the adoption of stronger climate action policies in relation to the patterns and forms of future development; and,
- Action 148, which mandates the inclusion of green criteria in all procurements using public funds.

1.6.2 Project Ireland 2040

Project Ireland 2040, incorporating the National Planning Framework and the National Development Plan, is the Government's long-term overarching strategy to ensure that future growth is compact, connected, regionally balanced and sustainable.

The National Planning Framework supports the development of district heating networks in Dublin, Cork, Galway, Waterford and Kilkenny, where technically feasible and cost effective, to assist in meeting renewable heat targets and reduce Ireland's greenhouse gas emissions. The compact and sustainable pattern of development envisaged by the National Planning Framework requires less energy and makes renewables-based systems of energy distribution, such as district heating, more feasible.

1.6.3 Energy White Paper

The 2015 Energy White Paper – Ireland's Transition to a Low Carbon Energy Future – provides a framework to guide Irish energy policy during the period up to 2030. The White Paper recognises the benefits of district heating in terms of sustainability and efficiency and the contribution it can make to meeting renewable energy and emission reduction targets.

In light of this, the Energy White Paper commits to developing *“a policy framework to encourage the development of district heating”* as one of the actions to increase the level of renewable energy in the heating sector.

The Energy White Paper also highlights the important role of citizen and community engagement in the energy transition process and identifies district heating as a means to facilitate such engagement.

It commits to engaging with local government on advising consumers on energy efficiency initiatives and clean energy options, scoping the opportunities for demand and supply, integrating energy issues into local area planning, and bringing stakeholders together to find locally appropriate solutions such as district heating.

1.7 Funding

The Climate Action Fund is one of four funds established under the NDP as part of Project Ireland 2040. The fund will support initiatives that contribute to the achievement of Ireland's climate and energy targets in a cost effective manner. It offers the potential for innovative interventions which, in the absence of support from the Fund, would not otherwise be developed.

Two of the successful projects from the first Call for Applications under the Climate Action Fund are district heating projects – Dublin District Heating System and Tallaght District Heating Scheme.

The NDP commits to supporting new initiatives in district heating in cities and large towns, with a leading role for State bodies and local authorities. In addition, the NDP commits to funding of almost €22 billion for the delivery of National Strategic Outcome 8 – Transition to a Low-Carbon and Climate Resilient Society. However, there is no indication currently that any of this funding will be directed specifically towards district heating.

2 Research

2.1 Research Overview

Internationally, district heating is a well-researched area of the energy sector. Given the increasing interest in heating technology that can be made to utilise renewable energy, a growing number of related studies have more recently become available. One such example is 'Efficient district heating and cooling systems in the EU',⁹ which was commissioned by the European Commission's Joint Research Centre.

There is also a body of research into district heating in the Irish context, examining its suitability and feasibility for use in Ireland. Most notable, perhaps, of the studies in this regard is 'A guide to district heating in Ireland',¹⁰ which is covered in more depth later in this section.

2.2 Existing Research

2.2.1 Comprehensive Assessment

Article 14(1) of the 2012 Energy Efficiency Directive requires each Member State to conduct a Comprehensive Assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling. In order to fulfil Ireland's obligations under Article 14, the Sustainable Energy Authority of Ireland (SEAI) commissioned AECOM to prepare this report, which was submitted to the European Commission in December 2015.

2.2.2 Dublin Spatial Energy Demand Analyses

In 2015 and 2016, Codema, Dublin's energy agency, produced Spatial Energy Demand Analyses (SEDA) for the Dublin area local authorities: Dublin City, South Dublin, Fingal and Dun Laoghaire-Rathdown.

The Dublin City Council study was funded by the ACE project, which is an EU funded initiative, while the other three SEDAs were funded by SEAI's Research, Development and Demonstration programme.

The SEDAs were designed to provide local authorities with the information required to increase the uptake of renewable energy through planning, policy and raising awareness.

⁹ Galindo Fernández, M., Roger-Lacan, C., Gähns, U., Aumaitre, V., Efficient district heating and cooling systems in the EU - Case studies analysis, replicable key success factors and potential policy implications, EUR 28418 EN, doi: 10.2760/371045

¹⁰ Gartland, D., Bruton T., A guide to district heating in Ireland

They were intended to provide evidence-based tools for planning for sustainable energy solutions, and to bridge the gap between energy planning and traditional urban planning within local authorities, enabling planners to build meaningful energy policy and effectively shape the energy future of the relevant local authority areas.

The analyses focussed on existing levels of energy demand and the fuels used to provide such energy within the local authority areas and placed that data within a spatial context. Creating these maps helped to identify opportunities, synergies and constraints in different districts. The detailed mapping process provided a visualisation of many aspects of energy use and its effects such as:

- Information required to target areas most in need of, and most suitable for, renewable energy solutions. In particular, areas with high heat demand density that were deemed most suitable for large scale district heating schemes were identified.
- Location of electricity and heat demands throughout the local authority area, giving planners the tools to become involved in how the authorities might use energy in the future and begin to integrate energy planning and spatial planning practices. The SEDAs were able to identify specific priority locations for energy efficiency and sustainable energy solutions, thus enabling a more efficient and direct approach to implementing energy action plans.
- In the residential sector, areas with the highest energy use were identified, and also, areas most at risk of energy poverty. These areas were targeted in order to facilitate the local authorities on the path to effectively reducing the energy demand in the residential sector, which is the largest energy consuming sector as identified in all four SEDAs. Identifying residential areas that have high levels of electricity and electrical heating consumption allows for those areas to be targeted for upgrades to high-efficiency electrical heating systems and renewable electricity sources to offset their use.
- Areas that were an ideal match for district heating systems were highlighted through the mapping of heat demand densities. These areas of highest heat densities were seen to be the strongest candidates for first phase development of district heating systems, which could effectively lower energy demand and fossil fuel use in the heating sector. Potential anchor loads and sources that could be key stakeholders in the development of such systems were also identified.
- Clusters of large commercial sector energy users that could work together to reduce their energy demands and costs through projects, that could capitalise on economies

of scale. Creation of commercial sector energy groups or cooperatives can create knowledge sharing and help realise ambitious energy projects which may not be as economical or practical on an individual SME level.

It was proposed that the SEDAs could be built on, to create a strategic, evidence-based energy plan for the local authority areas, outlining a number of energy mix scenarios for those areas based on evidence gathered on demand and resources. Among the recommendations arising from the SEDAs was that further analysis of potential local sustainable resources should be conducted so these resources would begin to be quantified and located, and then best matched with the demands already identified.

They also recommended that quantifying large sources of industrial waste heat should be prioritised as part of that resource analysis, given its potential as a very low cost heat source, which was, and still is, going to waste. In addition, they suggested that planned future developments and their estimated energy use should be analysed further as these developments could be used to influence the energy use of existing surrounding buildings, particularly through shared heating systems.

2.2.3 Dublin Region Energy Master Plan

The 2015 AECOM Comprehensive Assessment contained a number of recommendations including one that called for a detailed energy master-planning assessment of Dublin to be undertaken. Codema is currently developing the Dublin Region Energy Master Plan, which will create evidence-based, realistic, and costed pathways for the Dublin region to achieve its carbon emission reduction targets to 2030 and 2050.

The scenario analyses will include all areas of energy use in the Dublin region, and will be evaluated based on the socio, economic and environmental impacts. The resulting scenarios will give local authority and regional level planners, architects, engineers and other policy-makers the tools to create effective, low carbon policies and make strategic decisions to influence the use of energy in Dublin.

The plan will focus on areas where actions can be taken to introduce energy efficiency measures, and reduce greenhouse gas emissions, such as district energy systems and renewable energy technologies; it will build on the energy areas identified in the SEDAs for the four Dublin local authority areas, and will suggest different scenarios and actions that could be taken to reduce emissions further. The project, which is supported by the SEAI's Research, Development and Demonstration programme, will run for over two years.

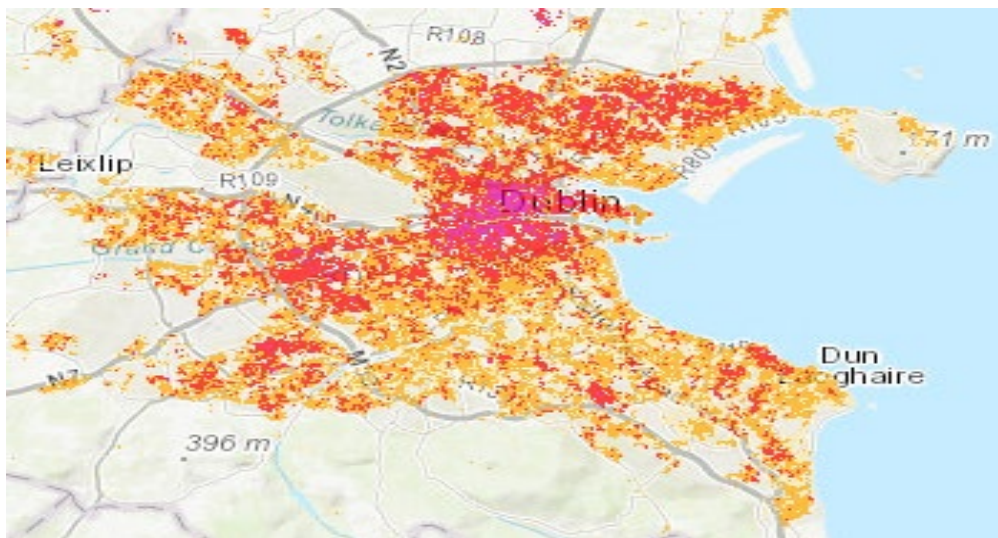
2.2.4 Heat Atlas for Advanced Heat Supply Planning for Ireland

The Irish District Energy Association (IrDEA), together with the ESB, commissioned a study to examine the potential for developing district heating networks across Ireland. The study was carried out by Dr. Bernd Moeller and his research team at the Centre for Sustainable Energy Systems at the Europa-Universität Flensburg.

Geographical and quantitative representations of heat demand and supply can be useful tools in the development of heat supply strategies. Under the Heat Roadmap Europe research initiative, researchers from Aalborg, Halmstad and Flensburg universities have developed heat atlases for European Member States using geographical information systems and quantitative mapping. This led to the development of PETA, the Pan-European Thermal Atlas, which is currently available for 14 EU Member States, not including Ireland, as a deliverable of the Heat Roadmap Europe project under the Horizon 2020 framework.

PETA includes heat demands, a zoning of urban and rural areas into prospective heat supply districts, cost-supply relationships for district heating, and an allocation of potential excess heat to prospective district heating systems.

The objective of the IrDEA/ESB project was to develop a similar heat atlas for Ireland, adapted to local conditions and needs. Based on the modelling framework developed for PETA at the University of Flensburg, the heat atlas was designed to be used as a tool when undertaking regional planning.



Source: Irish Heat Atlas Version 2.1

The Comprehensive Assessment carried out in 2015 used linear heat density as a guide for the viability of district heating (heat per km), whereas this heat atlas uses the area heat density (i.e., heat per km²). Using the PETA approach, heat density is obtained by

distributing the heat demand based on the location of people and buildings, which then results in a heat density based on area (i.e., Terajoules/km²). Using heat density based on area as a measure, the PETA approach identified a much higher potential for district heating in Ireland as outlined in the Heat Atlas and the table below.

The PETA tool includes potential heat sources such as power plants, waste incinerators and excess heat from industry so that ‘hot spots’ can be created, which are locations with a suitable demand but also a suitable source of heat. It includes ‘potential district heating zones’ which combines areas together if they are located close enough to one another to show how a district heating network could evolve over time into a larger network.

The heat atlas was provided on an ‘All-Island’ basis to include Ireland and Northern Ireland, while any totals were provided for each jurisdiction separately e.g. total head demand, total district heating potential, etc. The completed Irish heat atlas is available online at the following link: <https://www.districtenergy.ie/heat-atlas>

Potential for District Heating in Ireland based on the Irish Heat Atlas (Version 2.1)

Suitability for District Heating (DH)	Heat Density	Sum of heat demand with this Heat Density	Share of total heat demand (residential & commercial)
Very High DH potential	> 300 TJ/km ²	8.7 PJ	8.3 %
Feasible for DH	120 – 300 TJ/km ²	28.7 PJ	27.2 %
Feasible Subject to Policy/Regulation	50 – 120 TJ/km ²	22.5 PJ	21.3 %
Future potential (e.g. 4DH)	20 – 50 TJ/km ²	8.9 PJ	8.4 %

Up to **35%** of the total heat demand in cities, towns and villages in Ireland has a heat density which is high enough for district heating.

If government regulations (fuel taxes, grants, organisation) exist, up to **57%** of all heat demand could be covered by district heating. That is the same share as in Denmark today.

Source: Irish District Energy Association

2.2.5 A Guide to District Heating in Ireland

This guide was produced by Codema and BioXL on behalf of the Irish Bioenergy Association (IrBEA). The objective of the guide was to look at the potential benefits of district heating and to use case studies of existing systems and techno-economic analyses of planned systems to present learnings that could be applied in the Irish context.

The guide identifies public bodies as key enablers of district heating, particularly where larger scale co-ordination of projects is required among diverse stakeholders. The guide

outlines the key steps required for district heating growth and draws on international best practice to provide useful information on planning and designing district heating networks.

In addition, the guide also outlines some of the barriers to the development of district heating. One of the most common barriers is the absence of guidelines, regulations, policies, frameworks or standards for district heating, which creates high risk and uncertainty when planning district heating systems in Ireland.

The findings also highlight the many societal benefits of utilising high efficiency technologies and renewable energy sources in district heating systems, such as security and flexibility of supply, reduced carbon emissions, decrease in fossil fuel imports and greater use of local heat resources, which boosts the local economy.

2.3 Future Research

2.3.1 Role of Future Research

Research will continue to play an important part in determining the actions necessary to further develop district heating as a heating option in Ireland.

This is particularly relevant given the regulatory requirement, laid down in the updated 2018 Energy Efficiency Directive, for Member States to conduct a cost benefit analysis when planning new district heating networks or replacing, or refurbishing energy production installations in existing district heating or cooling networks.

2.3.2 Updated Comprehensive Assessment

The Energy Efficiency Directive requires the Comprehensive Assessment to be updated every five years. In April 2019, the Commission requested an updated Comprehensive Assessment, to be notified by December 2020. Annexes VIII and IX of the Energy Efficiency Directive, which set out the content and methodology of the Comprehensive Assessment, have been updated.¹¹

¹¹ Commission Delegated Regulation (EU) 2019/826 of 4 March 2019 amending Annexes VIII and IX to Directive 2012/27/EU of the European Parliament and of the Council on the contents of comprehensive assessments of the potential for efficient heating and cooling.

Outline Questions on Research

Q1: What additional research do you think needs to be carried out to support the development of district heating in Ireland?

Q2: How should research (including the upcoming comprehensive assessment) be used to inform/support the development of district heating in Ireland?

Q3: Are there relevant existing research projects into district heating, in the Irish context, which are not referenced in this document?

Q4: Can further research contribute to encouraging areas of compact urban growth to develop district heating projects?

3 Regulation

3.1 Regulation Overview

This section looks at the regulation aspect of district heating. EU policy is of particular relevance given that both the Renewable Energy Directive and the Energy Efficiency Directive have recently been updated and include a range of new requirements in relation to district heating, which are binding on Member States.

3.2 Energy Efficiency Directive

Regulation of district heating, in terms of metering and billing, is currently provided for by the European Union (Energy Efficiency) Regulations 2014 (S.I. No. 426/2014), which transpose the Energy Efficiency Directive of 2012.

The 2014 Regulations set the requirements for the installation of meters and advanced meters for heating, cooling and domestic hot water supplied to buildings from a district heating network or from a central source servicing multiple buildings.

Companies retailing district heating to consumers are subject to the market regulations of the general energy industry. There are some additional regulatory roles, specific to district heating, which, under SI 426/2014, are currently assigned to the SEAI. Under this legislation, it is also the role of the SEAI to monitor the commercial provision of domestic hot water and district heating by retail energy sales companies, and to advise the Minister for Communications, Climate Action and Environment (MCCA) if any retail energy sales company is likely to come within the scope of SI 426/2014.

The legislation assigns three main areas of additional regulatory responsibility to the SEAI in relation to district heating: metering, billing and heat mapping.

3.2.1 Metering (SI 426/2014, Paragraph 21 (16-23))

‘Retail energy sales company’ as defined in SI No 426/2014 means any person that sells energy to final customers and includes an energy supplier. Such companies must install a heat or hot water meter where heating or hot water are supplied to a building from a district heating network, or from a central source servicing multiple buildings, and for each individual unit in multi-apartment and multi-purpose buildings with a central heating source or supplied from a district heating network.

Where a retail energy sales company determines that it is not technically possible or cost-efficient to comply with the above provision, that company is required to submit a proposal to

the SEAI detailing the results of its assessment and offering an assessment of alternative cost-efficient methods of heat consumption measurement.

Based on this proposal, the SEAI will then conduct its own assessment and produce a report for the consideration of the MCCAIE, who will decide if the company should provide to each unit meters, individual heat cost allocators or an alternative cost-efficient method.

3.2.2 Advanced Metering (SI 426/2014, Paragraph 21 (1-15))

The provision of advanced meters is mandatory when a new connection is made in a new building, a building undergoing major renovation or when an existing meter is being replaced and it is technically feasible and cost-effective relative to the potential long-term savings. In circumstances where a retail energy sales company determines that it is not technically feasible or cost-effective to provide advanced meters, the process to be applied will be similar to that in relation to metering (above) i.e., a report is submitted to the SEAI for review and ultimate decision taken by the MCCAIE.

Further, where directed by the MCCAIE, the SEAI shall assess the feasibility of requiring a particular retail energy sales company to provide all of its final customers with meters that accurately reflect consumption and provide effective information on time of use of energy, i.e., advanced meters. This feasibility assessment will consider whether it is technically possible, financially reasonable and proportionate in relation to the potential energy savings for the final customers concerned. Following receipt of the SEAI assessment report, the MCCAIE is responsible for determining whether a particular energy sales company should provide advanced meters.

3.2.3 Billing (SI 426/2014, Paragraph 21 (24-32))

Retail energy sales companies must ensure that all final customers receive all bills and billing information for energy consumption, without charge, and that final consumers have access to their consumption data in an appropriate way and without charge.

The distribution of costs of billing information for the individual consumption of heating in multi-unit buildings must be carried out on a non-profit basis. Costs resulting from the assignment of this task to a third party, covering the measuring, allocation and accounting for actual individual consumption may be passed onto the final customers to the extent that such costs are reasonable. The SEAI may undertake an assessment of compliance in this regard, reporting to the MCCAIE, who is responsible for determining compliance.

There are a number of other requirements related to district heating under the 2014 Regulations:

- Under the 2014 Regulations responsibility for compliance with Article 14(1) of the Energy Efficiency Directive is allocated to the SEAI. This requires the SEAI to carry out a comprehensive assessment of the potential for the application of district heating. (Requirements Annex VIII) to include a cost-benefit analysis based on climate conditions, economic feasibility and technical suitability in accordance with (Annex IX – Part 1).
- SI 426/2014 also required a spatial representation of Ireland's heat demand to be developed. This heat map is available on the SEAI website at:
<http://maps.seai.ie/heatdemand/>
- The SEAI is required to promote the availability of and benefits of high-quality energy audits under the energy audit scheme. SI 426/2014 14. (4) states, *"The SEAI may require that an assessment of the technical and economic feasibility of connection to an existing or planned district heating or cooling network shall be part of the energy audit."*
- Where required to support an application to the EPA under the Environmental Protection Agency Act 1992 (No. 7 of 1992); an economic operator must conduct a cost-benefit analysis to construct a new district heating network or to install a new 20MW+ energy production unit in an existing district heating network or to substantially refurbish an existing such installation and waste heat is not being used from nearby industrial installations.

The Energy Efficiency Directive has been updated as part of the Clean Energy Package. New requirements, in terms of district heating, are contained in Article 9a Metering for heating, cooling and domestic hot water and in Article 9b Sub-metering and cost allocation for heating, cooling and domestic hot water.

3.3 Renewable Energy Directive

In addition to providing a definition of district heating (see Section 1), the recast Renewable Energy Directive also recognises the contribution district heating can make to decarbonisation and increased energy efficiency:

- Article 15 includes provisions for renewable energy and use of unavoidable waste heat when planning, including district heating.
- Article 15 also requires Member States to encourage local and regional administrative bodies to include renewable heating and cooling when planning city infrastructure.

- Article 18 lays down provisions in relation to information and training and includes elements related to district heating.
- Article 20 lays down provisions relating to access to and operation of the grids and includes a provision that requires Member States to take steps to advance district heating infrastructure in order to facilitate the development of heating and cooling derived from renewable sources.
- Article 24 of the recast Renewable Energy Directive also sets out a number of provisions in relation to consumer protection.

These provisions include the requirement for Member States to ensure that final consumers of district heating are provided access to information on the energy performance and share of renewable energy in their district heating system. There are also a number of provisions aimed at facilitating consumers to move away from district heating and cooling systems that are not efficient to allow them to produce renewable heating with better energy performance.

Summary of recast Renewable Energy Directive Article 24 requirements (1) to (9)

1. Access to information on energy performance and the share of renewable electricity.
2. Measures and conditions to allow customers to disconnect from DISTRICT HEATING systems which are not efficient DISTRICT HEATING systems in order to produce their own renewable heat.
3. Restrictions on the conditions detailed in paragraph 2.
4. Measures to ensure that DISTRICT HEATING contributes to the overall renewable energy target in the heat and cooling sector.
5. Conditions under which the operator of a DISTRICT HEATING system can refuse to connect or purchase heat from a third party supplier.
6. Conditions for exempting operators of certain DISTRICT HEATING systems from having to apply point (b) of paragraph 4.
7. Identifies who may exercise the right to disconnect.
8. Requirement for electricity distribution system operators to assess potential for DISTRICT HEATING systems to provide balancing and other system services.
9. Requirement to ensure that the competent authority defines and enforces consumer rights and rules for operating DISTRICT HEATING systems.

However, the recast Renewable Energy Directive provides that under specific conditions, a Member State is not required to apply paragraphs 2 to 9 above. These conditions include Member States, such as Ireland, where district heating and cooling accounts for less than or equal to 2% (in energy terms) of their heating and cooling sectors.

This provision recognises that district heating is not uniformly developed across Member States and overly complex regulatory requirements, which are appropriate in a mature market, may not be appropriate in the early stages of development of a district heating sector.

3.4 Ownership

The 2015 Energy White Paper highlights the importance of regulatory stability, certainty and independence as critical to achieving competitive energy outcomes, and a cornerstone of energy policy in the EU.

The Energy White Paper looks at the structure of Ireland's electricity and natural gas networks, which are regulated by the Commission for Regulation of Utilities (CRU), and commits to retaining these assets in State ownership.

These factors are relevant to the development of district heating as a heating option and prompt the question as to who should own the transmission network. Specifically, should ownership of the network fall to the State, and if not, then what is/are the most appropriate entity/entities to have ownership of the network?

Consideration must also be given to the possible regulatory changes necessary to provide clarity in relation to what entities may have ownership of the district heating network. Should it be decided that the State retain ownership of the network, appropriate regulatory changes would need to be outlined to ensure the certainty of that outcome.

3.5 Market Regulator

Responsibility for existing energy utilities in the State falls under the remit of the CRU, which is Ireland's independent energy and water regulator. The CRU has a wide range of economic, customer protection and safety responsibilities in energy and water. Its mission is to protect the public interest in Water, Energy and Energy Safety. Consideration needs to be given to whether, similar to those existing utilities, a market regulator should be appointed to oversee district heating, and if so, what would be the most appropriate entity to fulfil that role? This is particularly relevant given the range of new requirements around consumer protection, and information to be provided to consumers, that are contained in the recast Renewable Energy Directive and the new Energy Efficiency Directive.

Outline Questions on Regulation

Q5: What elements of Article 24 of the recast Renewable Energy Directive should be implemented in the near term (i.e. by the mid-2021 transposition deadline)?

Q6: What elements of the Article 24 of the recast Renewable Energy Directive should be implemented in the medium term (i.e., by 2025)?

Q7: Who should have the right to own the district heating networks?

Q8: Should there be a district heating market regulator?

Q9: Should there be guidelines/Code of Practice around district heating and if so, who should be responsible for their development and implementation?

4 Planning

4.1 Planning Overview

In the UK, and the Scandinavian countries, district heating systems are generally owned by local authorities on behalf of the local community. The development of district heating in Ireland has also followed this model, with the majority of district heating systems to date having been developed by local authorities.

The National Planning Framework and National Development Plan envision a leading role for local authorities in the development of district heating. Given their responsibility for sustainable planning, local authorities have the potential to be key enablers in any rollout of district heating. The following elements need to be in place so that local authorities can deliver on this goal:

- A planning framework, which facilitates district heating in appropriate locations.
- The necessary legal powers (vires) to operate in the area of district heating.

4.2 National Planning Framework

Project Ireland 2040 - National Planning Framework directs a significant proportion of envisaged population growth to within the built-up envelope of large urban settlements, particularly our main cities, to achieve critical mass in optimising existing and proposed investment in key infrastructure, sustainable and convenient mobility, innovation and job-creation, educational opportunities and good overall quality of life.

In short, while promoting appropriate efficiency of land use, the NPF also supports energy and environmental efficiency. This is best exemplified by Section 9.2, and in National Policy Objectives 53 and 54, which promote the idea of compact urban growth and the development of the circular and bio economy:

“Support the circular and bio economy including in particular through greater efficiency in land management, greater use of renewable resources and by reducing the rate of land use change from urban sprawl and new development.”

“Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions.”

4.2.1.1 Development Plans

The above National Policy Objectives, particularly NPO 54 are being integrated into City and County Development plans. Under the Planning and Development Act 2010, (Section 10 (2) (n)) it is a mandatory objective for development plans to include promotion of measures to:

- Reduce energy demand;
- Reduce greenhouse emissions, and;
- Address adaption to climate change.

Development plans have advanced a range of policy objectives and programmes to address the above complex issues. These are being further developed in response to the evolving policy in this space including the National Mitigation Plan and the National Climate Change Adaptation Framework. Emerging from these policy objectives are a series of programmes and projects that deal with energy and environmental efficiency. This includes district heating projects that make use of waste heat to support appropriate residential development in central urban locations.

In essence, planning policy is supportive of district heating as a means of promoting energy and environmental efficiency once the location of such development is one that meets with broader national objectives of compact urban growth. For example, in April 2019, An Bord Pleanála approved the Planning Scheme for the Poolbeg West SDZ. One of the provisions included in the approval is the requirement that all the developments “...*shall be district heating enabled*...”

4.2.1.2 Building Regulations

The Energy Performance of Buildings Directive (EPBD Directive 2010/31/EU), Article 3, requires that each Member State adopts a methodology for the calculation of building energy usage. Article 12 of the EPBD requires that energy performance certificates are made available by building owners when the building is constructed, sold or rented. S.I. 243 of 2012 transposes the EPBD into Irish Legislation, specifically referencing the requirement for a calculation methodology and software from the Issuing Authority (SEAI).

The Dwelling Energy Assessment Procedure (DEAP) is the official Irish methodology for calculating the energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting in dwellings.

The EPBD requires that a number of building categories are catered for via a national methodology. The DEAP is the methodology for “*single family houses of different types*” and also assesses individual apartments.

The EPBD states that, when calculating the energy performance of buildings:

“The positive influence of the following aspects shall, where relevant in the calculation, be taken into account:

(c) district or block heating and cooling systems”

In terms of district heating, the DEAP accounts for thermal energy supplied by group heating systems allowing for various types of systems and distribution networks.

4.3 Vires

The 2015 AECOM Comprehensive Assessment concluded that, in terms of heat networks, *“appropriate programmes and support mechanisms will need to be put in place at a national or local level if specific opportunities are to be realised.”* The report further highlighted the importance *“for the public sector to take a lead if any of the schemes are likely to succeed.”* Given that context, it is important to confirm that local authorities have the necessary legal vires to operate in the area of district heating, including the laying of piping connected with a district heating project, and the company structures necessary to deliver these as municipal services. In terms of a legislative context for the involvement of local authorities in the development and running of heat and energy networks, the following examples would suggest a firm legal structure:

- A local authority can do anything necessary (unless expressly prohibited) to give full effect to or facilitate the performance of a function conferred on it by the Local Government Acts or other enactments (Cl. 8, Local Government Act 1991)
- A local authority may take measures or engage in activities in accordance with law (including incurring expenditure) as it considers necessary to promote the interests of the local community. These interests are defined as promoting the social, economic and environmental development of the administrative area or the local community concerned. Promotion may include:
 - Carrying out and maintaining works of any kind.
 - Fitting out a building/structure for particular purposes.
 - Providing utilities, or equipment for particular purposes.

- Providing any service that in the opinion of the authority is likely to benefit the local community (Local Government Act 2001, cl. 66 (3) a and b., (4) a, c, e and f.
- Under the Local Government Reform Act 2014 the provisions of Cl. 66 of the 2001 Act are upgraded to extend these interests to also include general development including enterprise and economic development. The Local Economic and Community Plan of the local authority allows for the identification of local attributes essential to enhancing economic performance and be supported by investment decisions relating to economic infrastructure including energy. This will also include enhancing local innovation, technology transfer, up-skilling and re-skilling. (Local Government Reform Act 2014 cl. 43 b, ii, and cl. 44 2c/d).

4.3.1 Local Authority General Consent to Run Pipes

Another important aspect of the ability of local authorities to develop district heating systems is the power to lay and maintain the related pipe network.

General authority to lay water services and sewers through land is provided for as long ago as the 1878 Public Health (Ireland) Act. Traditionally, sections 202/203/274 of this Act permit the acquiring of way-leaves/easements across private property. Section 271 provides a mechanism to enforce powers of entry including court order.

Subsequent acquisition powers are included in the Planning and Development Act, which provides general authority for local authorities to acquire land, way-leaves, or other rights for the purposes of any of their functions, either by agreement or compulsorily. Under Section 182 of this Act, a local authority is authorised “*to lay cables, wires or pipelines (including water-pipes, sewers or drains)*” through any land and to access them for maintenance and renewal. Such action is subject to the consent of the owner and occupier of the land.

Consent shall not be unreasonably withheld and the local authority can appeal a refusal to An Bord Pleanála for determination. This section confers only the power to run a pipe through a stretch of private land, and does not confer any rights to acquire a way-leave or land. Section 199 provides for compensation for access, and restitution for disturbance if established. (Planning and Development Act 2000, sections 182,199; DOE Circular L15/03-WSP.)

4.3.2 Local authority Planning Approval

A Part 8 planning application is the method a county council uses to apply for planning permission for a development such as social housing or a Strategic Development zone.

Permission is applied for under Part 8 of the Planning and Development Regulations, 2001-2015.

Developments by a local authority are subject to a public consultation process as set out in the Planning and Development Regulations, 2001-2015. This procedure requires that notice of the proposed development be given in the public press and that a site notice be erected. On completion of the display period and if any submissions or observations are received, a report is presented to the members of the Council.

This report contains a list of the submissions along with a summary of the points raised and the local authority's response. This report outlines whether or not it is proposed to proceed as originally planned, or to proceed with a modified proposal.

The low cost threshold for planning approval for local authority works (€127,000.00) means that Part 8 approval will generally be required for laying of pipe networks. However, there is a case to be made for exemption under the Planning and Development Act.

The following two categories of work are currently deemed Exempt under the Act:

- Development carried out on behalf of or jointly in a partnership with, a local authority that is a planning authority pursuant to a contract entered into by the local authority concerned whether in its capacity as a planning authority or in any other capacity.
- Development consisting of the carrying out by any local authority or statutory undertaker of any works for the purpose of inspecting, repairing, rewiring, altering or removing any sewers, mains, pipes, cables, overhead wires or other apparatus including the excavation of any street or other land for the purpose. (Planning and Development Act 2000 section 4, f, g.)

It would be the expectation that district heating pipes should be considered and treated the same as any other underground infrastructural pipe or cable and be exempt from planning permission in most circumstances under the Planning and Development Act (section 5).

Outline Questions on Planning

Q10: What changes, if any, are required to existing planning and building regulations in order to support the development of district heating? In particular what changes might be required in order to promote the type of high density development that is seen as providing the most suitable conditions for development of district heating?

Q11: Is there potential for the revised building Regulations to act as a driver for district heating?

Q12: Given the importance of the public sector taking a lead role in developing district heating in Ireland, as highlighted in the 2015 Comprehensive Assessment, what, if any, additional powers are required by local authorities in order to ensure they have the necessary vires to develop and operate district heating networks?

5 Financing

When designing a business model for a new district heating system, it is important to consider site-specific circumstances, including the type of project finance that is available. The majority of business models for district heating involve the public sector to some degree, whether as a local policymaker, planner, regulator or consumer, or more directly through partial or full ownership of projects. Public sector involvement can be critical in coordinating multiple, diverse projects around a broader citywide vision. Even projects with a high degree of private sector control are often still facilitated or supported in some way by the public sector. In the Irish context, the 2015 Comprehensive Assessment highlighted the importance of the public sector taking a lead role in developing district heating in the State. Although the business models and ownership structures described here vary significantly, they can be grouped along a continuum from public to private. The relative involvement of the public or private sector depends broadly on two factors: (1) the risk adjusted return on investment for project investors, and (2) the degree of control and risk appetite of the public sector. The business models described here provide examples of the variety of potential models available when considering district heating projects. However, it should be noted that some models may be less appropriate in the current Irish district heating landscape.

5.1 The ‘Wholly Public’ Business Model

Of the various ownership models for district heating systems, the ‘wholly public’ business model is the most common globally. Here, the public sector, in its role as local authority or public utility, has full ownership of the system giving it complete control of the project and making it possible to deliver broader social objectives, such as environmental outcomes and the alleviation of fuel poverty through tariff control. The public sector can achieve these objectives by assessing a potential project based on its economic returns.

5.2 ‘Hybrid Public/Private’ Models

If a district heating system’s technical feasibility study and financial modelling indicate that the project has a return on investment that will attract the private sector, it may be desirable to adopt a ‘hybrid public/private’ model. Here, the local authority is willing to carry some risk and has a desire to exercise some control, but it also wants private sector participation to bring in expertise and/or private capital. A challenge with such projects is ensuring that all parties have a clear, agreed vision of what the objectives are and how they will be achieved.

Under the hybrid approach, the local authority has a wider range of options for business models. Three options discussed here are the public and private joint venture, the concession contract, and the community owned not-for-profit or cooperative.

5.2.1 Public and Private Joint Venture

The joint-venture model typically involves the creation of an SPV, with ownership split between the public and private sector. Risk can be shared between partners, each of which may have a skillset related to that risk.

The public sector (i.e., local authority) can underwrite the sales risk, guaranteeing to commit to long-term heat/cool off-take contracts, and can deal with regulatory barriers to project development. The private sector party, meanwhile, can take on the design, construction and operation risk, transferring this risk away from the public sector and on to private sector equity holders. The private party can also benefit from connecting to the network, providing the project with guaranteed demand and potentially granting itself preferential rates.

5.2.2 Concession Contract

Under the concession contract model for the private sector, the local authority typically develops a feasibility study of the district energy project and then tenders it to the private sector (usually an energy services company (ESCo)) as a concession that runs for a specified term. Similarly, the concession contract model for the hybrid public/private sector involves the creation of a utility that is a mixture of public and private ownership (although it can just be public). This utility is then given the concession for the district energy development for a specified time period.

A concession model is particularly applicable for retrofit projects in towns and cities where public streets are used for network routes and where residential, institutional and commercial buildings are connected. The concession provides the option of the local authority buying back a project after the concession period. The local authority then has the choice of placing the assets in municipal or community ownership or issuing a fresh concession. In this model, the ESCo or utility with the concession (private sector or public-private) bears completely the risks of designing, building and operating the district energy system. The presence of the local authority as designer of the concession contract is likely to mitigate many of the risks associated with gaining project approvals. The ESCo may be limited in the tariffs it can charge due to local competition or by contractual levels set to avoid monopolization of energy distribution.

The fact that the local authority ultimately may own the system, as well as the contracting/financing complexities associated with a concession model, means that the local authority still takes on significant risk. Additionally, the ESCo may transfer risk to the local authority by requiring guaranteed revenues (via a connection policy). The local authority may have limited control of the concession during the concession period.

5.2.3 Community Owned Not-for-Profit or Co-Operative

As another option, a local authority may wish to establish a district energy system as a mutual, community-owned not-for-profit or cooperative. In Copenhagen, for instance, all retailers of heat are required to be not-for-profit mutuals, co-operatives, or municipally owned.

In the not-for-profit or cooperative model, the local authority initially takes on a large share of the risk. Once the mutual is well established, risks to the local authority decrease. Some risks can be passed through to contractors for design and construction.

In this model, the local authority may need to underwrite the risk, as start-up entities will not have the same covenant strength as the municipality to secure low-cost finance. Once the mutual has paid off this lower-rate finance, the risk on the local authority is lowered significantly. The presence of the local authority can leverage low-cost funds for the project, as occurred in Aberdeen – see below. The governance structure is via representatives elected by the members. In return for debt underwriting, the local authority may require or be offered representation on the board.

Aberdeen City Council: A not-for-profit model

In 1999, Aberdeen City Council adopted an Affordable Warmth Strategy to tackle fuel poverty in the city. The Council commissioned a study to identify the technical solution best able to deliver low-cost heating to residents; this identified water-based communal heating systems connected to Combined Heat and Power. Although the Council could afford to install this technology in one cluster of blocks, it could do so only at the rate of one project every 12 years due to capital constraints. Commercial energy service companies could access third-party investment to accelerate deployment, but the returns required would result in high heating charges to residents, undermining the objective of reducing fuel poverty. The Council therefore established an arms length not-for-profit company, limited by guarantee based on membership. Members were drawn from the local community, including residents, who nominated board directors, with two seats reserved on the board for the Council.

For the first project, serving 289 apartments in four blocks at Stockethill, the Council entered into a contract with the company to deliver the project based on an annual payment of £219,000 (€254,000) over a 10-year term. Based on the security provided by this contract, the company was able to take out a capital loan of £1 million (€1,159,000) to deliver the project at a rate of return similar to that available to the City Council.

Source: District energy in cities, Unlocking the Potential of Energy Efficiency and Renewable Energy

5.3 The ‘Private’ Business model

If a local authority has a proposed district energy project with a high return on investment, but the local authority has a low risk tolerance and a relatively low desire for control, it may be able to attract interest from private sector companies.

This does not mean that the local authority is removed from the project; many successful privately owned district energy systems still have arms-length local authority involvement. For example, the local authority may have been the original project proponent and/or it could still attract financing and grants for the project. The local authority may help with any connections deemed socially optimal that are too high risk for the private sector. It could also develop initiatives that encourage social or environmental objectives, such as mechanisms that support low-carbon generation.

5.4 Wholly Privately Owned SPV

In this model, risk is carried by the private company, although the company could enter into a Joint Cooperation Agreement (JCA) with the local authority to mitigate risks in planning or expansion, or to encourage connection of demand through planning policies. This is often called a Strategic Partnership Model. In return, the local authority may benefit from reduced

tariffs, profit sharing, connection of customers with higher credit risk (who are more likely to be in fuel poverty), and other social or environmental objectives.

Financing is provided by the private sector company, through a mix of equity and debt. The private sector company may require a capital contribution in the form of a connection charge for any public buildings connected to the network. Subject to vires, local or national authorities may be able to attract international loans or grants for the project.

The private sector company determines the governance structure, since the project is wholly owned by the company. The governance structure may include offering the local authority a minor representation on the board of an SPV or on a local project board if the company has entered into a JCA with the local authority.

5.5 Barriers to Raising Third Party Funding

District heating infrastructure is a long-term investment, with a lifetime of around 50 years. Due to the high capital costs, district heating systems have longer payback timeframes as against other more established heating systems, but the network has a much longer lifetime. There are a number of other barriers to raising third party funding in the Irish district heating market, which are limiting availability of funds to the market and some of these are outlined below:

- **Revenue risk/Ramp up of connections:** Each project has a different risk profile with a significant concern for the third-party funding market centring on the source of revenues.
- **Limited district heating development expertise:** The market is new and developer expertise at a national level is limited.
- **Regulatory regime:** The regulatory regime is evolving but until established with policy and regulation supporting the development of district heating schemes it will be challenging to attract third party funding.
- **Lack of Market expertise:** There is limited expertise in the advisory and contractor market in Ireland. There is a lack of reference district heating networks of scale in Ireland with proven performance data to underpin financing assumptions.
- **Heat source:** The terms of the heat supply arrangement and covenant of the heat supplier vary from project to project.

Outline Questions on Financing

Q13: What sources of financing are currently available to the Irish district heating market?

Q14: What are the most appropriate financing mechanisms for developing district heating in Ireland?

Q15: What are the most appropriate business delivery models for the Irish context?

Q16: In addition to those listed above, what are the other main challenges to raising non exchequer financing for district heating projects in Ireland? What measures should Government consider putting in place in order to mitigate these challenges?

Q17: Other than providing direct exchequer funding, what incentives might Government consider implementing in order to drive the development of district heating? For example, should major energy users be allowed to offset their carbon taxes on energy demand by supplying waste heat to local communities?