Codema
Dublin's Energy Agency

Naas District Heating Feasibility Study

Summary brochure

Comhairle Contae Chill Dara
Kildare County Council

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Main message

With the right support, funding and engagement in place, this study highlights that **district heating is technically and economically feasible for Naas.**

Preferred route

A preferred route for the district heating network has been chosen to **reduce disruption and costs while allowing for future growth.** It starts at the energy centre, follows the **ring road**, and ends at the **library**, serving Áras Chill Dara, the hospital and others.

Phase 1

Planned data centre is the most viable heat source.

2030 connections

- Áras Chill Dara
- Healthcare facilities
- Hotels
- Schools
- Leisure centre
- Community spaces

Phase 2

Switching to district heating will save the equivalent heat energy consumption of 1,200 households per year.

2032 connections

- Additional schools
- Additional hotel
- Additional community space

Phase 3

Switching to district heating will reduce emissions equivalent to removing 2,000 diesel cars from the road each year.

2034+ connections

- North West Quadrant development

Introduction to district heating

District heating is an innovative and efficient way to supply heat to buildings from a centralised source. Instead of each building using its own boiler or heat pump, a network of insulated underground pipes distributes hot water or steam from a central plant to multiple buildings.

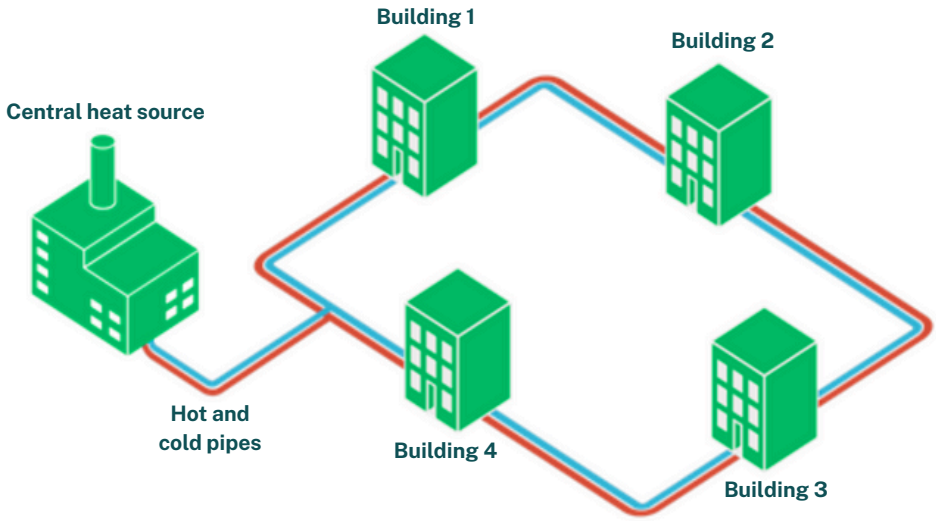


Figure 1: District heating diagram

Key advantages of district heating

Flexibility: District heating can use heat from many different sources. It can combine various renewable and low-carbon heat sources, including biomass, geothermal and waste heat from industrial processes or data centres.

Environment and climate: District heating is a vital tool in reducing greenhouse gas emissions and enhancing local air quality.

Legislation: District heating also aligns with local, national and EU-level climate goals; the European Union recognises district heating and cooling as critical components of its Energy Efficiency and Renewable Energy directives, while the Heat (Networks and Miscellaneous Provisions) Bill 2024 is in development to provide a legislative and regulatory plan for the district heating sector in Ireland.

Other benefits of district heating

Rolling out district heating in Ireland

While district heating offers many environmental and efficiency advantages, it is a relatively new concept in Ireland and its use has been limited for a number of reasons. It requires **strategic, long-term planning and coordination** across local authorities, developers and utility providers. The initial infrastructure investments (such as underground insulated pipe networks and centralised energy hubs) are substantial but they lay the foundation for a clean, scalable heating solution.

Success also relies on connecting a sufficient number of users to achieve **optimal performance and cost-effectiveness**. In areas where heat demand is spread out or where shared heating systems weren't planned before, rollout may take longer. However, as policy, public awareness and technical experience grows, **district heating is well-positioned to become a central part of Ireland's low-carbon energy transition**.

What makes district heating feasible?

District heating is most effective in areas with **high building density**, where many heat users can be connected within a local network. In low-density or dispersed communities, the cost of laying extensive pipework relative to the heat demand makes the system less economically viable. These areas are often better suited to individual, low-carbon solutions, such as heat pumps, which require less infrastructure and can be tailored to single-building needs.

High-density areas

District heating is effective in areas of high building density where mutliple users can connect to a local network.

Low-density areas

Low-density and dispersed communities are better suited to individual, low-carbon solutions such as heat pumps.

Examples of district heating in Ireland

Although district heating is still in its early stages in Ireland, progress has been made. The Tallaght District Heating Scheme[1], developed by South Dublin County Council in close partnership with Dublin's Energy Agency, Codema, became operational in 2023 and is Ireland's first large-scale district heating network. It captures waste heat from an Amazon Web Services data centre and supplies South Dublin County Council buildings, a number of Technological University Dublin's Tallaght campus buildings and local affordable housing. The network is set to expand even further in future phases.

The Dublin District Heating System is also being developed to use waste heat from the Dublin Waste-to-Energy Plant in Poolbeg to supply homes, businesses and public buildings in the surrounding area. Several other local authorities are actively developing feasibility studies and pilot projects for district heating networks, with the goal of rolling out sustainable heating solutions in their regions.

[1] https://heatworks.ie/

Image: Tallaght District Heating Scheme

The potential for district heating in Naas

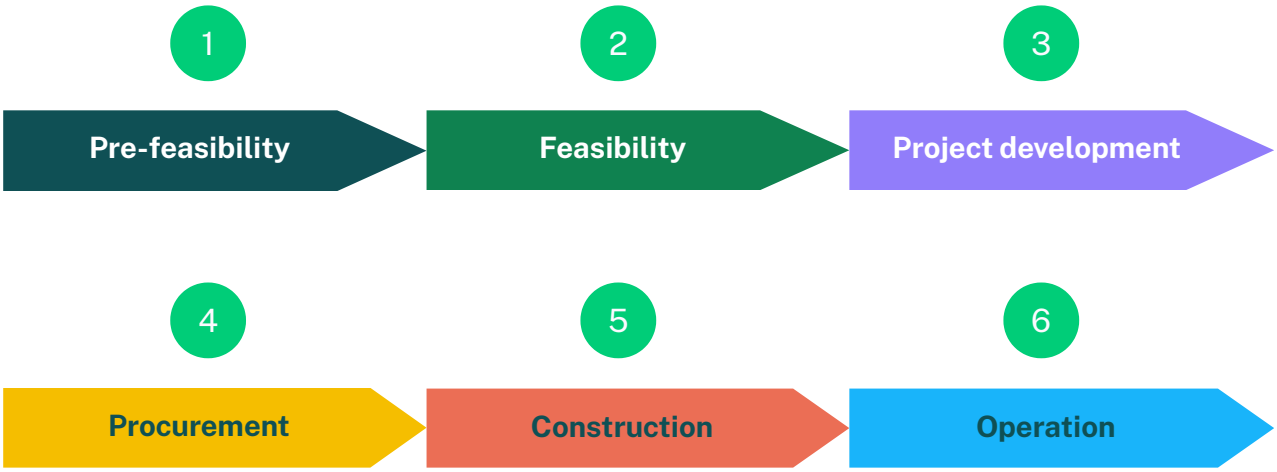
Naas has emerged as an ideal area for a district heating scheme for a number of key reasons. As a growing town with a dense concentration of public, commercial and residential buildings, it presents a valuable opportunity to put in place an efficient, low-carbon heating system that can grow as the town expands.

The decision to carry out a feasibility study is also driven by the town's alignment with Kildare County Council's climate action ambitions as set out in their Climate Action Plan[2]. By examining the technical, economic and environmental potential of district heating, the study provides a roadmap for using waste heat sources, reducing carbon emissions and improving energy resilience in the urban centre of Naas.

[2] Kildare County Council Climate Action Plan 2024-2029. Link to Climate Action Plan

District heating development process

The development of a district heating system typically follows a structured process, beginning with a **conceptual exploration and pre-feasibility stage**, progressing through detailed **feasibility assessment** and ultimately leading to **design, financing, procurement and implementation**.

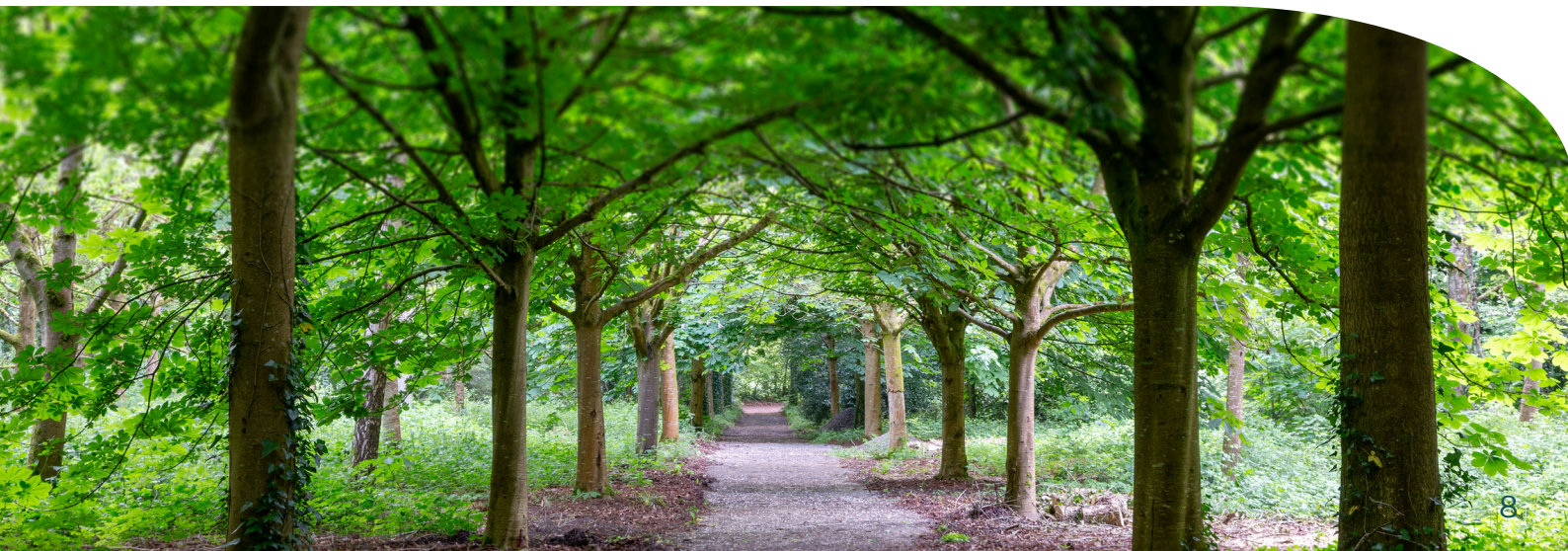


Current study

The current study for Naas represents the **feasibility stage** of this process and follows on from an initial pre-feasibility assessment carried out in February 2024. The pre-feasibility study involved high-level mapping and stakeholder identification.

The feasibility study aims to assess whether a district heating scheme is technically, financially and environmentally viable within the town. This includes a **heat demand analysis**, a **route analysis** and a **financial assessment.** As part of this work, identifying suitable heat sources, mapping potential demand, evaluating network routes and estimating capital and operational costs.

The study provides a solid evidence base to inform decision-makers, helping them determine whether to proceed to the next stages — namely detailed design, stakeholder engagement, business planning and ultimately, infrastructure development. It also aligns with broader national goals under the District Heating Steering Group and supports the advancement of low-carbon heat networks as part of Ireland's climate commitments.



Heat demand analysis

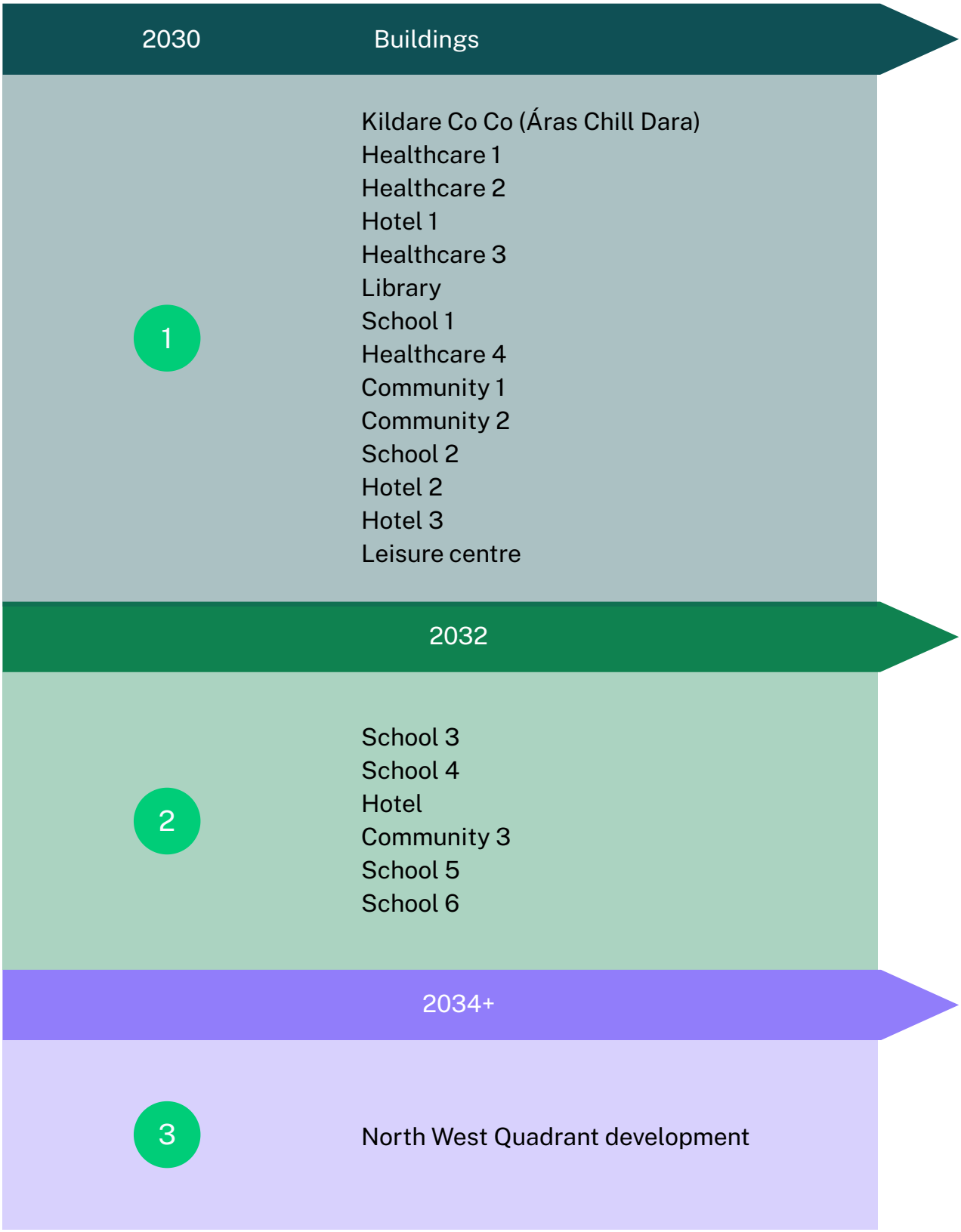
The heating network has been designed to serve a wide range of customers, including schools, hospitals, government buildings and commercial premises. In the early stages of implementation, some potential customers will be more hesitant to connect until they can see the success and benefits of the scheme, particularly private customers. For this reason, public sector buildings with decarbonisation targets and buildings with large heat demands are considered for early engagement.

Buildings with large demands could offer a strong, steady base load, which improves the operation of the network. These buildings are also known as “anchor loads”, due to how central they are to the running of the network. These anchor loads - along with reliable public sector connections - are then prioritised for the initial phases. When the network is running, new customers may be more eager to join when pipes are in the ground. For this reason, a phased rollout was considered, as seen in the table below, to facilitate a smooth rollout and ensure early returns from anchor clients while enabling future growth. The third phase consists entirely of the future planned North West Quarter development of the town.

Anchor load

Buildings with large heat demands that can offer a strong, steady demand on the network. These buildings are considered crucial to the running of the network due to their heat demand.

Phased rollout



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Route analysis

As part of the feasibility study, Codema explored three potential routes. To best link these key demand zones, the second route assessed was selected as the optimal pathway for the network. This route:

1) Supports **immediate connection to major users** such as the hospital and Kildare County Council's main headquarters at Áras Cill Dara.
2) Provides a **foundation for extending the network** to new developments.
3) Follows accessible corridors through the town, **minimising disruption and infrastructure costs** while supporting long-term, strategic expansion.

Other factors that determined the selection of this route were the location of the final heat source selected and being able to maximise space alongside the road, which would allow the trenching installation to avoid digging up tarmac.

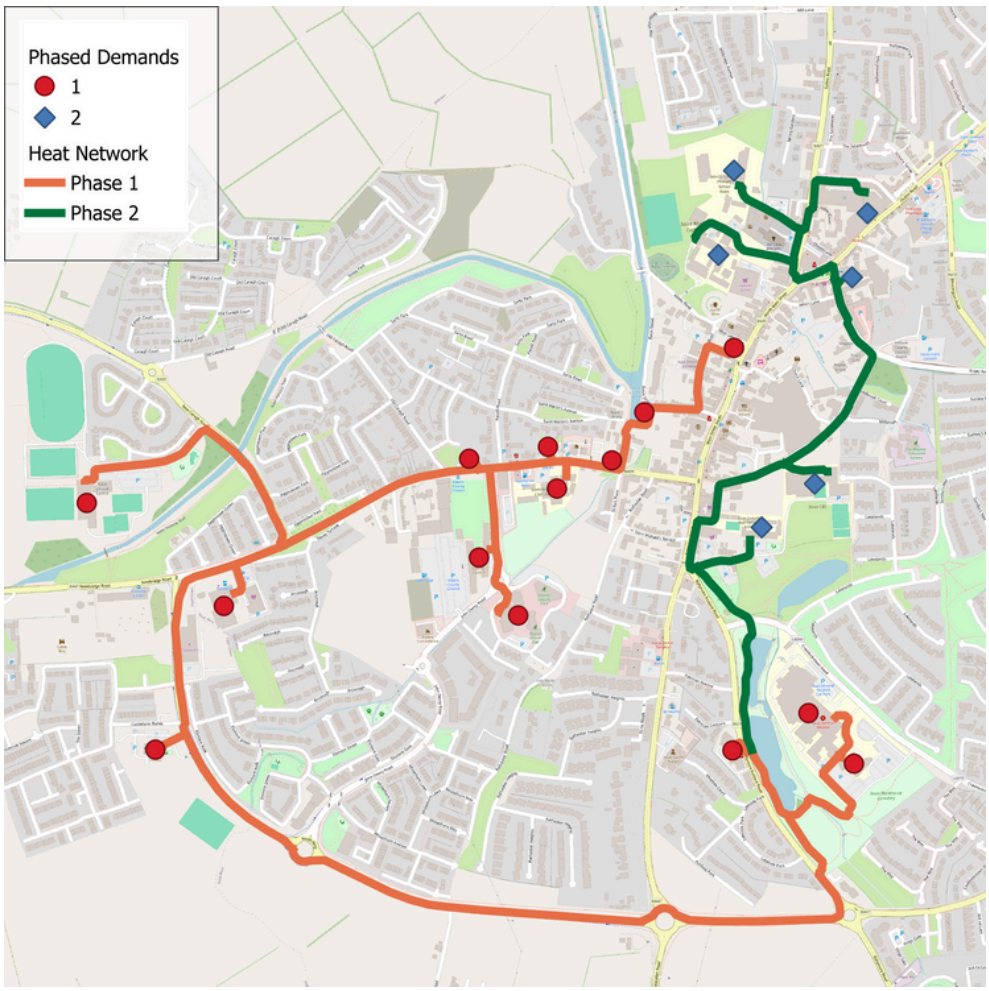


Figure 3: Route mapping

This route begins at the energy centre and follows the ring road around the town, serving the hospital, Áras Chill Dara and other customers along the Newbridge road. In later phases, the network runs along Corban's lane to connect the schools on Sallins road. **This is a preliminary route, and may be adapted to the context in which the network is being built following more detailed analysis and stakeholder engagement.** As phase three links in with future planned developments that are not in place yet, it is not pictured in the map above.

Heat source analysis

Codema carried out a detailed evaluation of potential heat sources in the area, considering options like geothermal energy, wastewater heat recovery, biomass and large-scale, air-source heat pumps. Each option was assessed for cost, technical feasibility and environmental impact.

Heat sources assessed

Shallow geothermal

Using heat from up to 400m below the earth's surface

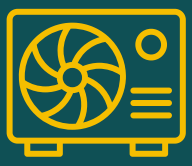
Wastewater heat recovery

Using heat generated by operations at wastewater treatment plants

Biomass

Using animal or plant matter to create energy for heating

Air-source heat pump



Taking heat from the air outside and using elecricity to raise the temperature

Data centre waste heat

Using waste heat generated by cooling processes in data centres to provide heat

Preferred heat source

Among all options, a proposed data centre stood out as the most viable heat source. It can provide a **large, consistent supply of low-grade waste heat**, is situated near the planned distribution network, provides a security of supply and - like the other heat sources assessed - has low dependency on fossil fuels. Its integration into the scheme represents **a rare opportunity to use industrial waste heat on a town-wide scale.**

Financial analysis

The project requires a total capital investment (CAPEX) of approximately €25 million. This investment encompasses all infrastructure, construction and integration of customer connections. These costs are based on best available information at the time and may be subject to change as a result of inflation or other factors.

- **Total CAPEX (core scheme with Route 2 + Data Centre)**: Approximately €25 million (including contingency costs)
- **Payback Period:** 25 years

These figures demonstrate that with targeted support, stakeholder engagement and grant funding from the Infrastructure Climate & Nature Fund, the project is financially sound and capable of delivering value over its lifecycle. While its lengthy payback period makes it unsuitable for private investment, this project is considered feasible as a long-term public infrastructure project. The assessment shows that district heating is financially viable for Naas.

Energy and emissions savings

By replacing traditional, fossil-fuel based heating systems with an energy efficient and low carbon district heating network, the scheme achieves substantial reductions in greenhouse gas emissions. Carbon emissions are reduced by approximately 70% compared to buildings using individual gas boilers and by 36% compared to those using air-source heat pumps.

70%

compared to buildings using individual gas boilers.

36%

compared to buildings using air-source heat pumps.

District heating enables several heating systems to be combined into one. Similar to how one train engine is more efficient than several car engines running the same distance, district heating allows for major gains in efficiency, even taking into account the heat losses that occur when transferring the heat through the pipe network. Additionally, given that the network would be using heat already produced for other purposes and boosting it with a heat pump, rather than burning fuel directly for heating purposes, emissions are reduced even further. This proposed district heating network would reduce energy consumption by 13 GWh a year, which is the **equivalent energy consumption needed to heat 1,200 households a year**.

In real terms, the district heating scheme could reduce annual emissions by up to 4,200 tonnes of CO_2 every year. This is the equivalent of **taking 2,000 diesel cars off of the road each year**. As more renewable energy is integrated into the national electricity grid, the carbon intensity of district heating will continue to decrease, making it an increasingly low-carbon heat solution over time. This positions the project as a cornerstone of local climate mitigation efforts, delivering measurable and lasting environmental impact.

Each year, the proposed district heating network in Naas saves:

The equivalent energy use to heat **1,200 households.**

More than **4,200 tonnes** of CO_2.

The equivalent of taking **2,000 diesel cars** off of the road.

Key considerations

Within this study, Codema identified several important factors that could influence the project's success:

Variations in energy prices

Variations in **energy prices** were one of the factors the network financial outlook was sensitive to. The fuel for the network is electricity, tying the price of heat to the electricity grid.

- This risk can be minimised by building a **thermal storage** tank on site, which can be heated at night when electricity prices are low and used during the day at peak hours.

Heat demand

Heat demand is another sensitivity outlined in the study. **Customers disconnecting** presents an issue when designing the network, as several revenue losses could result in the network being unworkable.

- Competitive heat prices, early customer engagement and long-term contracts can all be utilised to ensure customer connections throughout the lifetime of the project.

With these assurances, among other minor mitigation tasks highlighted for smaller risks, district heating would be suitable for deployment in Naas town.

Why district heating for Naas?

The combination of the data centre as a heat source and the preferred route as the distribution path offers the best balance between technical reliability, environmental performance and economic feasibility. This pairing supports phased development, aligns with future urban expansion and delivers immediate carbon savings.

Taking these considerations on board, **district heating technology is feasible in the town of Naas**, thanks to the alignment of opportunity and need. It supports local policy objectives, offers a scalable model for replication across Ireland and demonstrates that sustainable heating infrastructure can deliver both financial and environmental returns.

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