techUK
FOR WHAT COMES NEXT

Warming Up to Efficiency:

Understanding the Potential Benefits and Pitfalls of Data Centre Heat Export in the UK

February 2024

Contents

Introduction

District heating networks are widely seen as a low-carbon heating solution for cities and semi-urban environments. Data centres, which play a vital role in the development of digitally enabled cities and are frequently clustered in such regions, naturally generate heat as part of their operations. Given the need for heat in heat networks, integrating data centre heat into heat networks should, in principle, be a simple equation.

The Department for Energy Security and Net Zero (DESNZ) intends to introduce a regulatory framework for heat networks to enable heat network zoning in towns and cities across England. Heat network zones will identify and designate zones where heat networks provide the lowest-cost, low-carbon heating option. In November 2023, it was announced that the Government's plan is for data centres to be the next industry to feed into new heat networks.[1]

This techUK paper explores some of the opportunities, barriers, and successes of reusing data centre residual heat, as well as outlines the benefits and risks of planning future networks around the assumption of heat offtake from data centres.

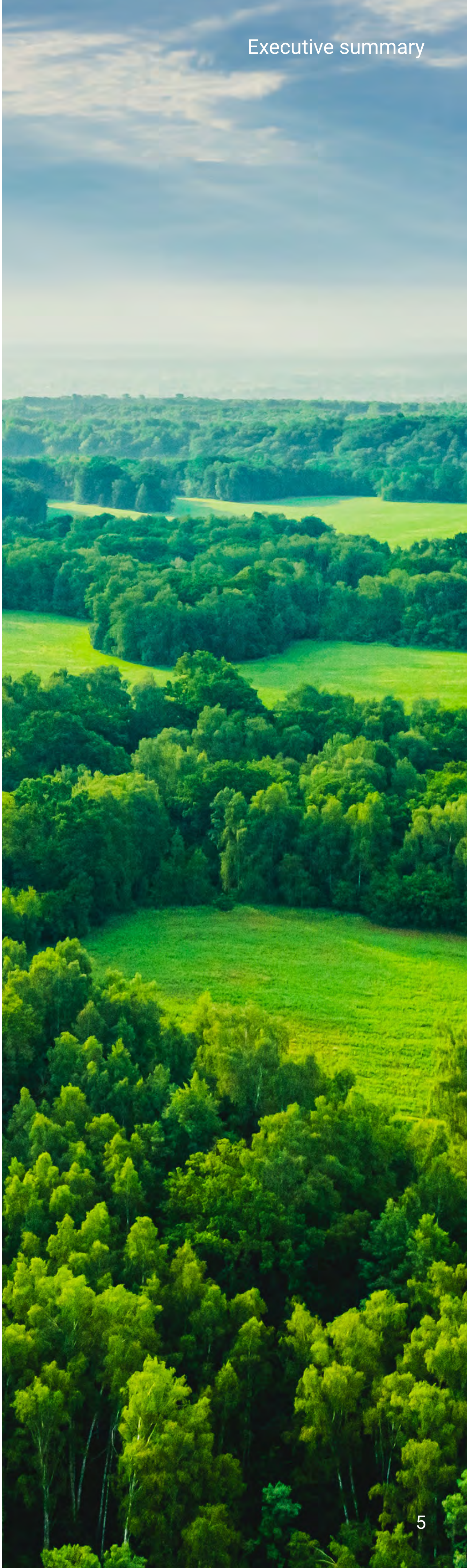
Executive summary

While the integration of data centre heat into district heating networks in the UK holds a significant promise, particularly when viewed through a sustainability lens, addressing unexplored facets is essential to foster effective collaboration between data centres and heat network operators, and contribute to the broader net-zero objectives.

The industry consensus is that residual heat reuse should ideally be explored after a data centre has been optimised from an energy point of view. In other words, data centres must first seek to reduce their energy consumption and then recover heat whenever feasible.

There are some key challenges that must be tackled before data centres scale up heat export. Seasonal fluctuations and variable energy demand in the UK climate present logistical hurdles for efficient heat distribution, necessitating careful planning and design. The proximity and availability of heat networks also play a pivotal role in the feasibility of heat transfers, with data centres located in city centres having an advantage over larger outlying ones in industrial areas.

Practical considerations regarding the functioning of data centres must also be taken into account. New data centres are planned with a projected IT load in mind, but it can take years to reach this target as it is dependent on the time it takes an operator to secure (and retain) customers. In other words, although data centres often exhibit a large capacity for server space, they house few actual servers in the first few years of their operations and their ability to produce and export heat is therefore limited. Data centre operators have limited control over external factors such as occupancy levels, and relying on exporting the majority of the potentially available heat based on the maximum projected IT load carries a significant risk.



Sustainability considerations add another layer of complexity. While there are notable benefits in terms of reducing electricity consumption for cooling and addressing fuel poverty, caution is warranted to ensure that the necessary implementation of heat pumps for temperature control does not lead to a rise in energy usage and carbon emissions.

With data centres increasingly embracing sustainability and innovation as key drivers, our members are wary of their potential limitations in meaningfully participating in heat networks in the future. There is also growing concern that, in some cases, this commitment could impede efforts to minimise energy consumption and address environmental concerns.

In view of these unanswered questions, the data centre industry wants to work with the Government and other stakeholders to ensure that there are agreed principles regarding the scope of funding, ownership, operation and maintenance of heat network infrastructure connected to data centres.

Introduction to data centres

Data centres are specialised facilities that house computing equipment, primarily servers, and are equipped with a guaranteed power supply and high bandwidth connectivity. They play a pivotal role in consolidating IT functions for organisations, supporting various aspects of the modern economy, including business processes, government services, telecommunications, transportation, and social networks.

The sector is performing well in key priority areas such as security of supply, adoption of renewables, energy stewardship, reporting energy use and customer transparency. Progress is slower in other areas, such as playing a more dynamic role in the electricity market, where projects are mainly at R&D or pilot stage. Success is elusive in the reuse of residual heat and using embedded capacity to facilitate a more distributed grid. Barriers include risk aversion, contractual arrangements, lack of infrastructure and consumption of resource by unproductive compliance activity.

What is district heating?

A heat network, also known as district heating, is a network of underground pipes that transports heat from a central location to multiple residential or commercial structures.

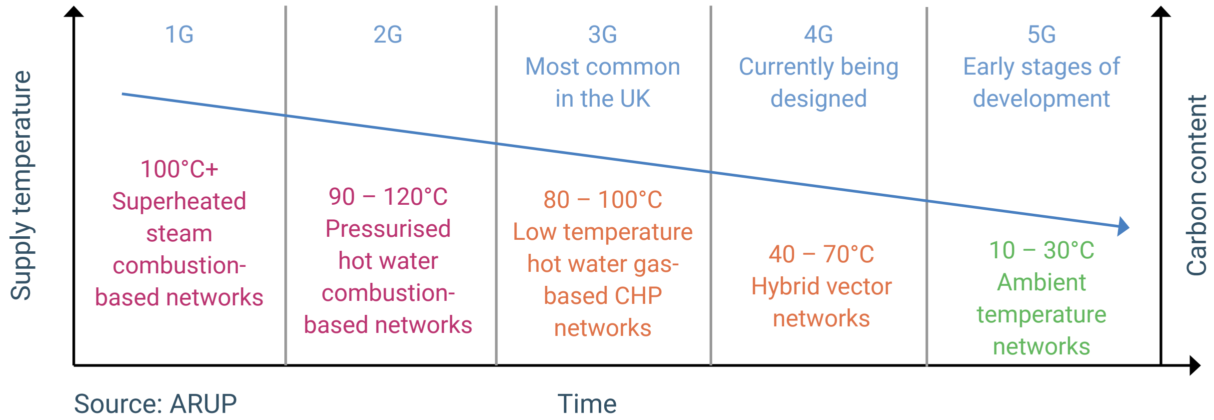
It is crucial to emphasise that there is a difference between district heating and community heating which lies primarily in the scale of operation. Community heating is a specialised form of a heat network that serves smaller developments, typically consisting of just 1-2 buildings, like a tower block or housing complex. In contrast, district heating is engineered to cover a much broader geographical area, serving numerous buildings.

There are over 14,000 district heating networks in the UK, with nearly half a million connections, generating 2% of the UK's heat.[2] District heating works best in densely populated areas such as Southampton, where a district heating network serves a number of different kinds of users, including West Quay Shopping Centre, a Hospital, University, Police Headquarters, as well as residential properties.[3]

Within district heating systems, it is possible to incorporate new users progressively, leading to enhanced energy conservation and improved energy efficiency. It is therefore not surprising that heat networks are widely regarded by government and industry experts as a promising avenue for supplying environmentally friendly heating to urban areas.

The development of heat networks has evolved over time, now in the 5th Generation (5G) of design, illustrated in the graphic below.[4] 4G and 5G heat networks can operate with lower temperature heat which suits the data centre environment. Yet, the majority of current heat networks in the UK operate as 3rd Generation systems, which generally exhibit lower energy efficiency and higher carbon intensity.
To achieve the sustainable integration of data centre heat into heat networks, it will be necessary to construct new heat networks that leverage more advanced technologies, such as 4G and 5G systems.

Evolution of district heating

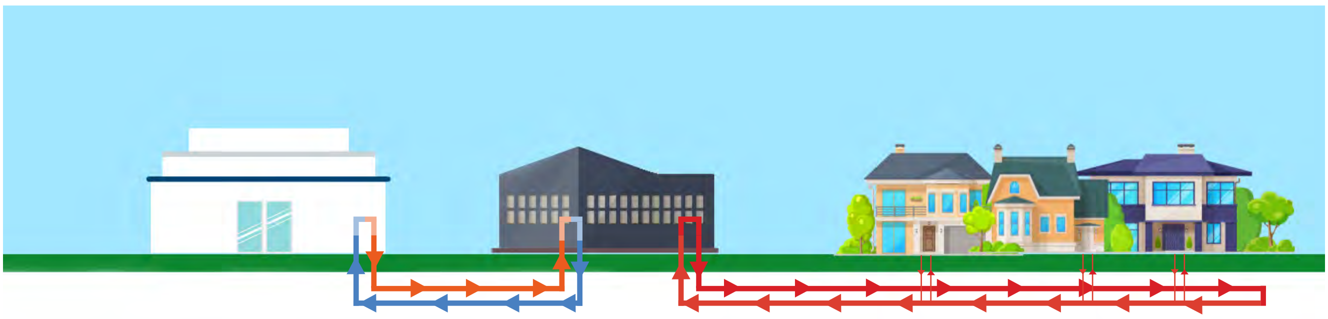


Source: ARUP

How can data centres be part of the equation?

Data centres produce heat as a natural outcome of their computing operations, and this heat must be removed in some way to protect the integrity of the servers. As such, actively productising it by connecting data centres to district heating projects appears to be a sensible strategic step.

Data centres already export residual heat in parts of Europe with adjacent customers and/or district heating networks. The sector has even adopted a performance metric based on the proportion of residual heat that is reused – Energy Reuse Factor or ERF.



Data centre servers (typically powered by renewable energy) produce heat as a result of their operations.

The heat goes to a heat exchanger, and its temperature is then increased through the use of a heat pump. This makes it suitable for integration into district heating networks.

The heat is transported to nearby buildings through underground pipes for space heating and domestic hot water.

Regulatory landscape

The Energy Act 2023, which received Royal Assent in October 2023, introduces provisions that enable the implementation of heat network zoning in England. This is a fast-developing area, with DESNZ confirming in November 2023 that it will provide almost £65 million in funding for green heating projects aimed at utilising residual heat from data centres to heat homes, making data centres the first industry to lead the way in repurposing their residual heat for low-carbon heating solutions in the UK.

In December 2023, the Government published a consultation on heat network zoning in which data centres are classified as "owners of heat sources capable of selling heat to heat networks".[5] The document details the implementation of zoning and proposes the establishment of new zoning bodies. It defines the responsibilities of these bodies in facilitating heat export, identifies industries that may be impacted, and addresses key considerations including pricing, enforcement and carbon emission limits. Although certain details are pending refinement, the clear indication is that the Government might soon possess powers to require data centres to connect to heat networks. As different initiatives unfold, we expect regulation to be enshrined in law in 2025.[6]

European Union

Recently, Germany (the second-largest data centre market in Europe after the UK) enacted legislation that will require all businesses that consume more than 2.5GWh of energy annually to reuse the residual heat within their own operations or offer it to external parties, unless this is assessed and deemed unreasonable or not possible. If requested, information on the quantum, quality, availability and temperature (including options for controlling these parameters) of residual heat will have to be made available to heat suppliers and other possible buyers. This data will also have to be reported to Germany's Federal Office for Energy Efficiency every year, and the Federal Office will subsequently publish this information on a dedicated platform, all while ensuring the protection of proprietary business data.

The new requirements have been criticised for imposing targets without taking into consideration the complex infrastructure that will be necessary for data centres to meet them. As the UK Government develops regulations on heat reuse, it must be mindful of the lessons learned from the experiences of other jurisdictions, taking into account both successes and shortcomings in order to craft a framework that is effective and feasible for the unique challenges faced by the data centre industry.

Benefits and opportunities

Integrating data centre heat into heat networks holds significant appeal when viewed from a sustainability perspective.

Reduced cooling electricity use

Traditional cooling methods can be either energy or water-intensive and impact the sustainability credentials of the provider, as well as the end user whose data is being processed at the facility. Making this heat available for use to heat a housing development, leisure centre, or any other manner of development, could reduce data centre cooling electricity or water use and simultaneously reduce the power required to generate heat in a city. This heat can be sold by the data centre under the right circumstances.

Use of green energy

Data centres are progressing at pace to be as energy-efficient as possible, with more than 100 operators and trade associations committed to the industry-led initiative, the Carbon Neutral Data Centre Pact. While the past decade has seen significant growth in their use and overall processing output, the energy requirements have remained flat.[7] If a data centre can source 100% clean energy to run their servers, transferring residual heat to a heat network will also help that network maintain a low carbon footprint, thereby optimising environmental benefits.

Circular economy

Using surplus residual heat generated by data centres in local heat networks aligns with the circular economy model. Rather than squandering excess energy, it is redirected to heat nearby buildings, closing the loop on energy utilisation and ensuring a more sustainable and resource-efficient approach.

Addressing fuel poverty

Leveraging residual heat from data centres in heat networks could help combat fuel poverty. It offers a practical solution to provide cost-effective heating to households struggling to meet their energy needs. Beyond environmental benefits, this approach actively contributes to social welfare by empowering local communities with affordable and sustainable heating solutions.

Green industrial opportunities

While most district heating success stories have relied on government intervention to be seen to completion, the private sector has a chance to seize a new market opportunity in the coming decades. France, Denmark, and Germany are all considering whether a data centre will be ready to connect to a heat network when reviewing new building applications, and we are seeing a similar trend emerging in the UK.[8]

Local authorities have been assessing planning permissions with a focus on heat export readiness; therefore, a data centre's commitment to contribute to a heat network is likely to expedite the granting of planning permissions.

Designing data centres which can be easily plugged into district heat networks without significant losses of efficiency is a genuine green industrial opportunity for UK businesses, especially considering that the Government is expected to start implementing heat network zoning in England in due course. Google, for instance, has already embraced this opportunity and announced a $1 billion investment towards establishing a new data centre in the UK, equipped with facilities for extracting heat for off-site utilisation.[9]

Green skills

As heat export becomes more common, the demand for skilled professionals in residual heat recovery is likely to grow, creating new employment opportunities and driving economic growth. In support of this trend, techUK emphasises the importance of adopting a holistic approach that integrates education, training, and policy initiatives. This will help ensure that individuals and industries are well-equipped with the necessary skills, fostering a greener and more sustainable future.

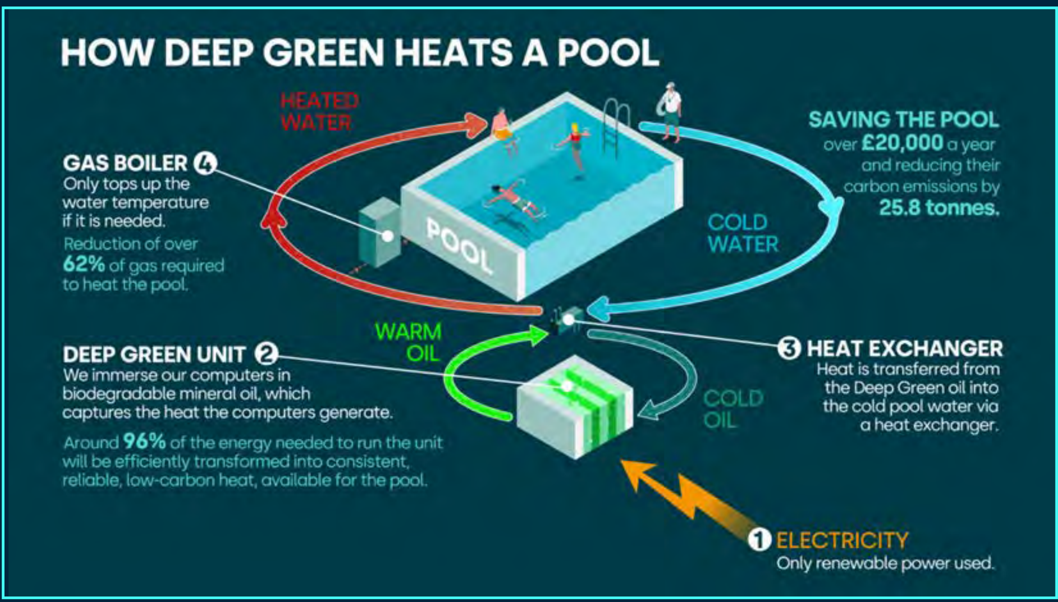
Case Studies

Member spotlight | Deep Green

A small data centre in Devon made national news when it was able to heat a public swimming pool, saving the leisure centre thousands of pounds in heating costs.

To enhance heat capture efficiency, Deep Green implemented a Direct Liquid Cooling System in the data centre. The technology used involves immersing high-power consuming hardware in cooling pods, resulting in reduced power consumption for the infrastructure. The cooling process utilises biodegradable mineral oil, which aids in heat capture.

When connected to the variable flow heat exchanger, this facilitates the redistribution of the excess heat and ensures the pool is maintained at a comfortable 30°C for 60% of the time while recovering over 70% of the energy used. The success of this model has paved the way for its broader implementation across various pools and district heating systems, scheduled for 2024.



Small successes

Near town

Data centres are also being trialled to provide heat for commercial greenhouses. The Netherlands, famous for its culture of smart farming and greenhouses, has begun using “Blockheating” to warm indoor farming environments. This consists of many ‘mini’ data centres, distributed across farms by fibre optic cables, providing heat via direct chip cooling of servers. These systems can provide around 95% of residual heat back to the greenhouse environment.[10]

User at close proximity

Even within a data centre, server heat can find a use. For instance, data centre staff require office space and heat in the winter months. By transferring server heat to an exchanger, it can be used to cut costs in the company heating bill, warming radiators in the office space and communal areas for free.

Member spotlight | Equinix

For over a decade, Equinix has been at the forefront of reusing residual heat from data centres to provide sustainable heating solutions to Finnish communities. The journey began in Kanavaranta, where Equinix participated in one of the first data centre heat export projects. Residual heat generated by the HE3 data centre in the Helsinki area is captured and reintegrated into a third-party operated district heating network. For this scheme, Equinix purchases district cooling, which is used as the primary cooling source, and returns the excess heat to the district heating network. The district cooling is produced with carbon-neutral energy sources, and it promotes a more efficient energy system when the surplus heat from the data centre is fed into the heating network that is operated by Helen.

Equinix has two further data centre sites in Finland where heat export is planned with partners Fortum and Helen.

Equinix will also use their renewable residual heat to warm local homes near the Paris Olympic Aquatic Centre, as well as grow vegetables, providing affordable food to those who are at risk of food insecurity. Their new data centre in Paris, PA10, houses an innovative system to recover the renewable heat produced by customer equipment for greenhouse farming on-site and for export off-site to a local heat network.

Heat exported off-site will be transferred to the Plaine Saulnier urban development zone and the Olympic Aquatic Centre (swimming pool), which will host several events during the 2024 Olympic Games in Paris. Equinix has agreed to provide this heat free of charge for a period of 15 years.

Heat used on-site for greenhouse farming will enable local people to develop new skills, support solidarity grocery stores, and help address food insecurity. The crucial aspect of this project lies in its implementation in a prominent urban setting, showcasing the practical applications and possibilities of urban farming.

Heat exported from PA10 is projected to achieve approximately 2,000 tonnes of carbon emissions savings per year, which is equivalent to serving 1,000 homes or taking 400 cars off the road. Furthermore, the ongoing greenhouse project supports over 1,000 people who face food insecurity by providing free tomatoes to solidarity grocery stores and associations.

Member spotlight | Dell Technologies

Dell Technologies is helping BNP Paribas make their atNorth-hosted data centre in Stockholm more sustainable. Working together with other partners such as AMD and Stockholm Exergi, they deliver green heating to up to 20,000 modern homes.

The data centre uses Direct Liquid Cooling, a system that leverages the thermal capacity of liquid to absorb and remove heat from the Dell server infrastructure through a warm water loop. atNorth and Stockholm Exergi then capture up to 85% of the electricity (from renewable hydro and wind sources) used in the data centre and pass it on as heat to the district heating system, fostering circular economy principles.[11]

Member spotlight | Digital Realty

Digital Realty is involved in numerous district heating network projects across the globe, from Seattle and Stockholm through to Zurich and Chicago. In Vienna, they help heat the Floridsdorf Hospital by supplying it with more than half of its required warmth using residual heat, which will save up to 4,000 tonnes of $CO2$ emissions per year when fully operational. In Stockholm, they have been feeding residual heat into the water supply since the early 2000s and have been involved in Stockholm Exergi's district heating network since 2015, keeping more than 800,000 Stockholmers warm.

Stockholm is an example of a city that has successfully implemented a circular energy system that epitomises the efficiency of district heating networks. The immediate usability of residual heat eliminates the need for energy-intensive heating processes using fossil fuels, and the cold water that is returned via the district cooling network serves both as a sustainable cooling source, as well as reduces overall energy usage by data centre operators. Nordic cities' cold climate fosters collaboration between data centres and local authorities, ensuring a mutually beneficial approach to sustainability.

However, economic and environmental challenges surface when the cost of district cooling (both from a monetary and energy consumption perspective) exceeds the cost of running internal cooling equipment. This can prompt data centre operators to choose more cost-efficient options, sometimes leading to residual heat disposal. Conflicting government legislation can complicate matters by requiring residual heat reuse while pushing for lower Power usage effectiveness (PUE) values. Harmonising legislation is essential for a seamless integration of data centres into district heating networks, as well as the creation of a supportive environment that encourages both sustainability and efficiency without compromising either.

Challenges

When deciding on how much heat export a data centre can commit to, there are several factors that need to be taken into consideration.

Seasonal changes and climate

The efficacy of heat networks supported by data centres is tied to the local climate, which is why their involvement must be flexible and responsive to changing environmental conditions. For optimal utilisation of captured surplus heat, the region must have substantial heating demands, making colder climates (e.g. Scandinavia) better suited for such projects.

Varying seasons in the UK pose logistical challenges, as heat distribution needs to be adjusted based on the fluctuating demand, which is typically lower during the summer months. This dynamic seasonal demand requires careful planning and infrastructure flexibility to ensure the efficient use of data centre-generated heat throughout the year. A district heating network must therefore consider the off-season for demand so that data centres can maintain viable cooling options when it is warm, especially during summer heatwaves that are becoming increasingly common.

Proximity and infrastructure

The proximity of a data centre to an appropriately designed heat network is a pivotal factor in the efficient utilisation of recovered residual heat. The geographical closeness of viable facilities to the data centre is of paramount importance, significantly influencing the feasibility and efficiency of heat transfer.

In addition to proximity, the availability of infrastructure is also a crucial determinant in the effective utilisation of recovered residual heat. This infrastructure includes pre-established pipes, fluid pumps, heat pumps and heat exchangers. Retrofitting these infrastructure components can often incur substantial costs and resource allocation, underscoring the significance of the initial infrastructure setup for the successful integration of data centres into heat networks.

Smaller data centres, which generate lower heat output, tend to be strategically positioned within urban areas, where they can readily connect to existing heat network infrastructure and contribute to the heating needs of nearby facilities. In contrast, larger data centres are frequently situated in outlying regions, which might prove to be a challenge for new zoning bodies when they are conducting a mapping exercise.

Design

The feasibility of reusing residual heat from data centres hinges significantly on the initial planning and design choices, as adjustments are difficult to make afterwards. Inevitably, some existing data centres may find themselves facing

significant obstacles when attempting to connect to heat networks due to the decisions made at the outset. It is therefore imperative that any residual heat requirements are not compulsory for existing sites. The Government should also give data centres reasonable lead time, allowing them to develop designs that seamlessly integrate with heat networks and facilitate the efficient channelling of residual heat.

Occupancy levels

When a data centre is first built, it will be a building with a large capacity for server space, but few actual servers. Over time (10+ years), the facility will be filled with servers. It is at this point that the data centre will be producing the most heat, and therefore be of most use to customers.

Unfortunately, this time span creates a lot of uncertainty with the stakeholders involved in a district heating network. Some may be expecting heat earlier than it is available, for example, a housing development which is expected to finish 5 years earlier than a newly built data centre will reach its maximum capacity. It may be that in the time it takes a data centre to reach its capacity, there are broader changes in the energy mix, which means that its heat is no longer needed. It is also possible that the customer will no longer be there to receive the residual heat when it is available.

IT load

Data centres generate heat as a result of internal operations and the intensity of computing tasks they handle. The amount of heat produced is closely tied to the level of computational work and data processing being performed by computer servers, storage devices, and networking equipment, as well as the energy efficiency of the data centre's infrastructure. In other words, data centres can experience varying workloads based on the demand for the services they provide, which can fluctuate.

The emergence of artificial intelligence (AI) and its increasing utilisation within data centres can have a notable impact on heat production, as AI workloads can be particularly demanding, requiring robust computing capabilities that can contribute to higher heat generation within these facilities. However, predicting the exact level of this impact can be challenging due to the dynamic nature of AI workloads.

Ownership and operation of heat network infrastructure

The ownership and operation of the heat network infrastructure, both within and outside the data centre's land boundaries, have commonly been a source of concern. Security concerns, particularly in terms of safeguarding data centre operations during the integration of external infrastructure, introduce an additional layer of complexity. This stems from the necessity for data centre operators to secure agreement from their clients, whose services rely on the servers housed within the data centre, to allow external partners access to their sites.

The Government's consultation released in December 2023 mentions that heat sources such as data centres might be required to 'give access'. It is not clear what is meant by this, but it raises questions about the practical implications and logistical challenges associated with connecting to heat networks.

Financial implications and pricing

While both data centres and heat networks could financially gain from the sale of heat, the implementation of heat recovery introduces additional financial risks to a business.

To put things into perspective, if a data centre makes an initial investment to enable connection to a heat network but it does not reach the required occupancy levels or experiences a decline in occupancy over time, a reduced heat output will fail to cover that initial investment. In this scenario, participation in the scheme exacerbates financial difficulties. Furthermore, if a decision is taken to close that data centre location, there are typically extra costs associated with leasing the premises and restoring the facility to its original condition.

Deciding who bears the costs and responsibilities can also become a contentious issue, as data centre operators may naturally be reluctant to shoulder the financial burden of infrastructure changes, while heat network operators might be hesitant to assume the full burden of ongoing maintenance.

Heat network infrastructure, which is outside of control of a data centre, may also fail and impact the effectiveness of the cooling system, potentially causing major disruption to services and loss of revenue. Finding equitable solutions to these challenges is imperative to ensure the successful convergence of data centres and heat networks as part of government-mandated energy efficiency initiatives.

Moreover, the industry has raised concerns about potential hidden costs associated with contributing to a heat network, specifically apprehensions about being billed for cooling energy.

The extent of the above concerns hinges largely on the contractual arrangements established between data centres and heat network operators. Both parties should maintain the flexibility to shape such contracts according to their preferences, but more guidance over how issues like this can be managed will be important to gain the confidence of the sector.

Innovation of cooling systems and necessity for heat pumps

Different cooling systems in data centres result in varying heat characteristics. Liquid-cooled data centres produce high-grade heat, reaching temperatures of up to 65°C, which can be seamlessly integrated into most of the existing heat networks in the UK. However, liquid-cooled data centres currently represent a minority of the industry. In contrast, the residual heat from air-cooled data centres, which represent the majority of the current data centre portfolio, has a lower initial temperature (e.g. energy-efficient data centres with direct evaporative cooling will hardly reach above 28°C). This necessitates the use of heat pumps to elevate it to levels suitable for integration into heat networks.

The above means that a power connection and space to house heat pumps and ancillary equipment will be required.

Sustainability considerations

Data centres are dedicated to sustainability, with all operators aiming to reduce their environmental footprint through initiatives such as climate change agreements and industry schemes such as the EU Carbon Neutral Data Centre Pact. However, the contribution of district heating projects to demonstrating emissions reductions or energy efficiency improvements remains uncertain.

This may not be an issue in some areas, but in parts of the UK where data centres are typically located, access to the grid is already constrained. Adding heat pumps to the mix will put more pressure on the grid in the area, challenging the viability of the project.

If the primary objective is energy conservation, the industry should be assured that investing in heat export is both economically and environmentally more viable than generating heat

through traditional methods. Data centres must also be confident that directing resources toward enhancing the overall energy efficiency of a data centre would not be a more favourable option.

It is worth noting that data centres do not see residual heat as a desirable outcome of their activities. Residual heat represents energy which operators are paying for, but which is being lost because of physical inefficiency in the hardware. The goal of a data centre is to reduce the amount of wasted energy. This is represented by the flattening of energy demand over a period of exponential growth in output. For data centres, energy efficiency is money.

Furthermore, in order to guarantee the project is aligned with sustainability goals, it is imperative to verify that heat export does not lead to a rise in carbon emissions. Although there is an understanding that regulation will require heat networks to use green heat sources and adhere to a maximum gCO2e/kWh, thorough scrutiny will be necessary.

Another area of concern is the impact that heat export projects might have on the climate targets of different entities. In order to mitigate this, we propose that clarification of carbon reporting boundaries is provided. It would also be beneficial for the Government to look at standards such as ISO/IEC 30134-6:2021 or EN 50600-4-6:2020.

Uncertainty of heat projections

District heating projects must be careful not to assume that the heat produced by a data centre will remain consistent over time. New hardware has a roughly 3–5 year turnover, with improvements being made which will reduce the overall heat being produced by a data centre. This means that is it hard to make accurate projections on how much heat a data centre will produce in the future. An over-reliance on data centre heat for a building will result in disappointment or a lack of heat at some point in time. Any long-term requirements that do not allow for a degree of flexibility might also pose questions regarding a data centre’s ability to innovate in order to become more energy-efficient and advance its sustainability efforts.

Unaddressed issues for Government and other stakeholders to consider

The integration of data centre heat into district heating networks presents a promising avenue for sustainable, low-carbon heating solutions. However, this transition is not without its challenges. Seasonal changes, infrastructure proximity and occupancy levels pose logistical hurdles that require careful consideration and planning. The uncertainties surrounding heat projections and emerging technology necessitate a careful approach for sustained viability and alignment with broader net-zero goals.

As such, securing long-term success in the integration of data centre heat into heat networks will require relevant stakeholders to assist the industry in addressing the following questions:

Participation criteria

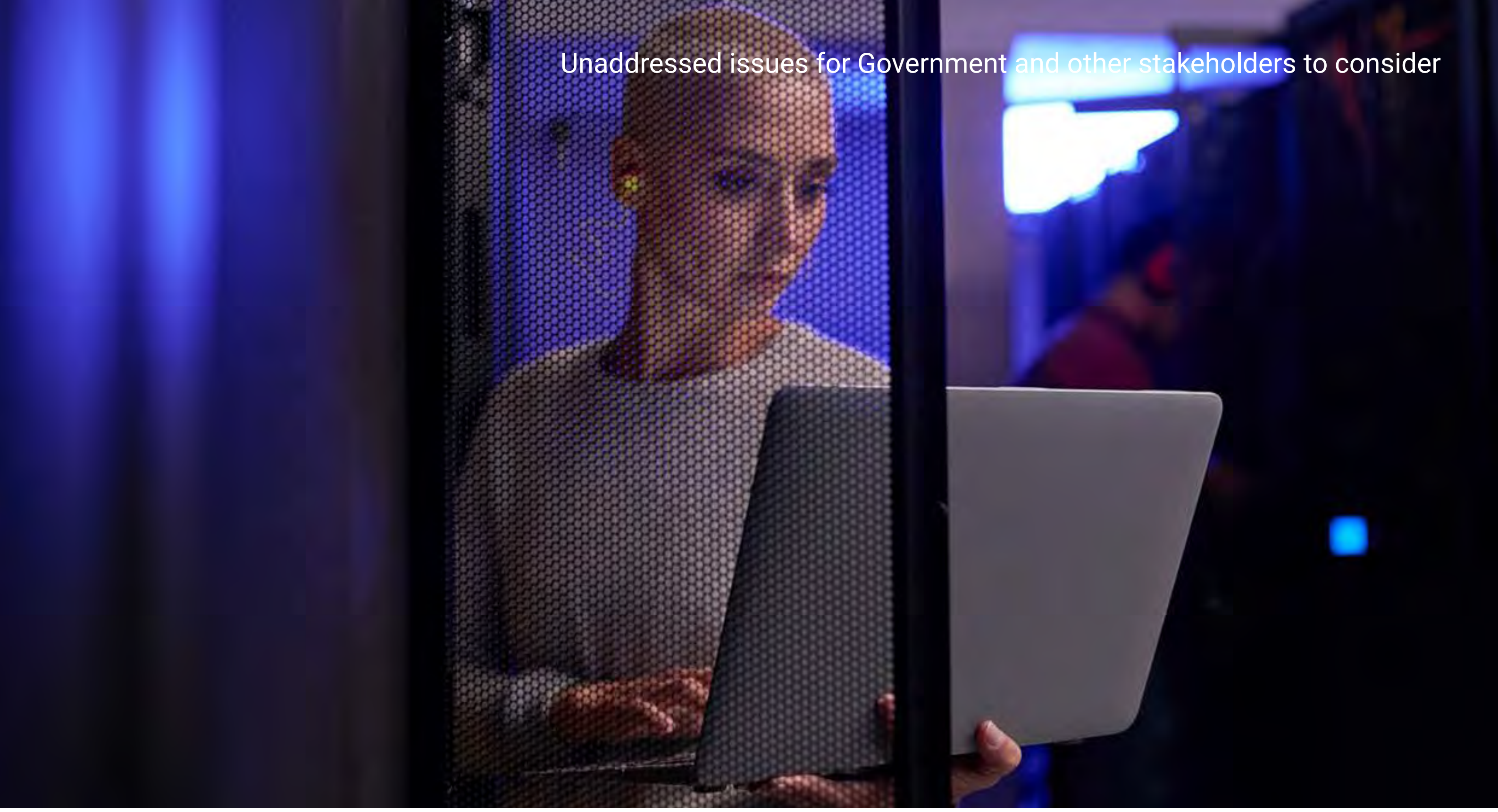
- What criteria will be used to determine which data centres will be most suitable for heat export?
- Will retrospective and new build applications be subject to different participation criteria?
- What criteria will be used to ensure consistent, standardised and scalable solutions?

Heat availability and demand

- How will the varying availability of residual heat be addressed?
- How will heat be redirected in the summer when the demand is inevitably lower?
- How will legal and liability issues associated with data centre participation in heat networks, including heat supply disruptions or accidents, be addressed?

Heat quality

- What quality standards will be set for the heat supplied by data centres to ensure it meets the necessary standards for residential or industrial use?
- Who will be responsible for assessing the quality of residual heat?



Sustainability and carbon emissions

- How will the transition to heat networks impact sustainability goals of data centres?
- How will the Government ensure that the implementation of this initiative aids in meeting net-zero goals, as opposed to potentially hindering progress or causing unintended negative consequences?
- Would there be a standardised framework for data centres to report on their residual heat contributions and the associated environmental benefits, and would this be integrated within the UK Sustainability Disclosure Standards (UK SDS)?

Data centre infrastructure

- Where will the necessary heat pumps be located?
- Will there be guidelines or standards for the physical infrastructure and design of new data centres to facilitate the capture and transfer of residual heat to a network?
- Will there be any financial incentives or grants available to support retrofitting legacy sites?

techUK will persist in working with the Government, local authorities, and regulators to establish an appropriate framework that will allow data centres to seamlessly contribute to heat networks, aiding in the provision of affordable heating to communities.[12]

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About techUK

techUK is the trade association which brings together people, companies and organisations to realise the positive outcomes of what digital technology can achieve. With around 1,000 members (the majority of which are SMEs) across the UK, techUK creates a network for innovation and collaboration across business, government and stakeholders to provide a better future for people, society, the economy and the planet. By providing expertise and insight, we support our members, partners and stakeholders as they prepare the UK for what comes next in a constantly changing world.

techUK's award-winning Data Centres programme provides a collective voice for UK operators. We work with government to improve the business environment for our members. To date we've saved UK operators over £150M, alerted them to business risks, mitigated regulatory impacts and raised awareness, most recently negotiating key worker status for the sector. techUK is a signatory of the Carbon Neutral Data Centre Pact.

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With special thanks to techUK members that provided case studies for this report.

References

1. GOV.UK, Thousands of homes to be kept warm by waste heat from computer data centres in UK first, 2023
2. GOV.UK, Energy Security Bill factsheet: Heat networks regulation and zoning, 2023
3. GOV.UK, Heat Networks Investment Project: Case Study Brochure, 2018
4. techUK, Data Centre Deep Dive: Heat Networks - The evolution and future for energy networks and district heating, 2023
5. GOV.UK, Proposals for heat network zoning 2023, 2023
6. techUK's response to the consultation on heat network zoning proposals
7. IEA, Data Centres and Data Transmission Networks, 2023
8. TechTarget, Data center heat reuse: How to make the most of excess heat, 2023
9. Google, Our $1 billion investment in a new UK data centre, 2024
10. Wholegrain Digital, Could your data center not just power your website, but also grow your salad?, 2021
11. BNP Paribas, Data centres: embracing the circular economy, 2023
12. An overview of techUK's previous and ongoing activity around data centre heat reuse

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