Heat Network

Sunderland City Council

Peter Graham – Group Engineer, City Development

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What are Heat Networks?

A heat network, or district heating system, is a distribution system of insulated pipes taking heat from a central source and delivering heat to multiple buildings.

The heat source could be a dedicated facility supplying heat to the network, such as a combined heat and power plant, or heat recovered from industry, infrastructure, rivers, ground water or energy from waste plants.

Heat networks are an important part of the UK's plan to reduce carbon and provide energy security for both domestic and commercial customers. It's estimated that around 18% of UK heat will need to come from heat networks by 2050 for the UK to meet its carbon targets in a cost-effective manner.

The UK Government is committed to delivering heat networks, investing millions and with a commitment to implement Heat Network Zoning by 2025.

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Low Carbon Framework

- Partnership Approach
- Supported by Low Carbon Action Plans (SCC Carbon Neutral by 2030)
- Our vision 2040 – Carbon Neutral Sunderland
- Strategic Priority 4: Develop renewable energy generation and storage

"Climate change remains the challenge of our generation. Sunderland is committed to playing its part in tackling the global climate change emergency. As a city, we recognise that we need to act now to reduce direct and indirect carbon emissions. We need to prepare and adapt to deal with the projected impacts of climate change.

This Low Carbon Framework sets out the vision and purpose to enable us, together with our residents and businesses, to deliver on these goals. Collective sustainable action will help to ensure that Sunderland's vision of becoming a dynamic, healthy and vibrant city is realised for all."
(Cllr Graeme Miller, Leader of Sunderland)

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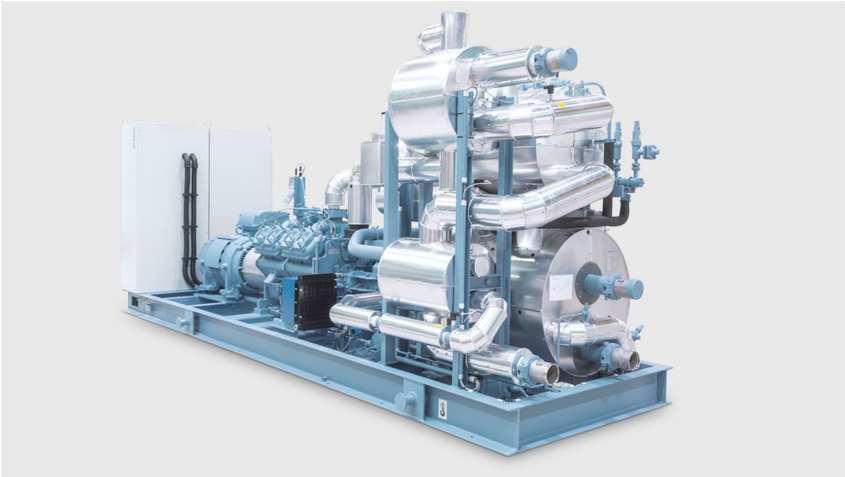
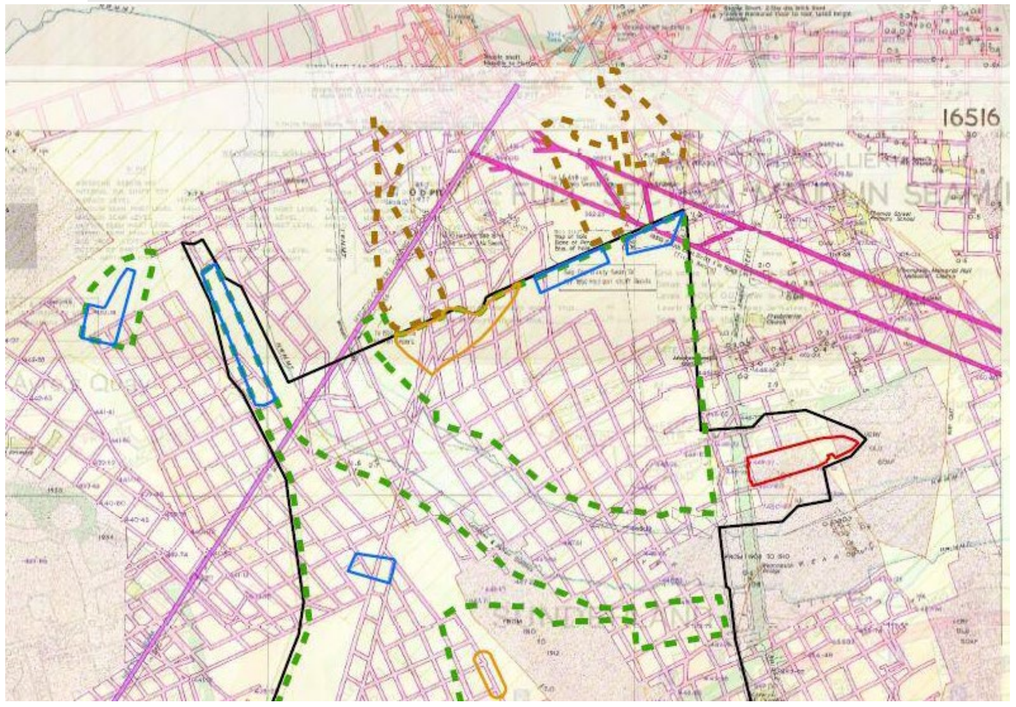
Scheme Overview

- Mine Source; heat from flooded roadways of former Wearmouth Colliery c.600m below at +20^{0}C
- Heat exchange at surface and mine water sent back to re-circulate
- Temp uplift to c.70^{0}C using Heat Pumps
- 33GWh of Anchor Load heat demand
- 8.1KM District Heating Network, including river crossing inside new footbridge
- Carbon Saving of c.4,100 tCO2e per annum

- GHNF Transition Scheme Funding Approved
- Commercialisation and Construction Support Procurement – WSP
- Mine & Borehole Support – Coal Authority





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Network Routing

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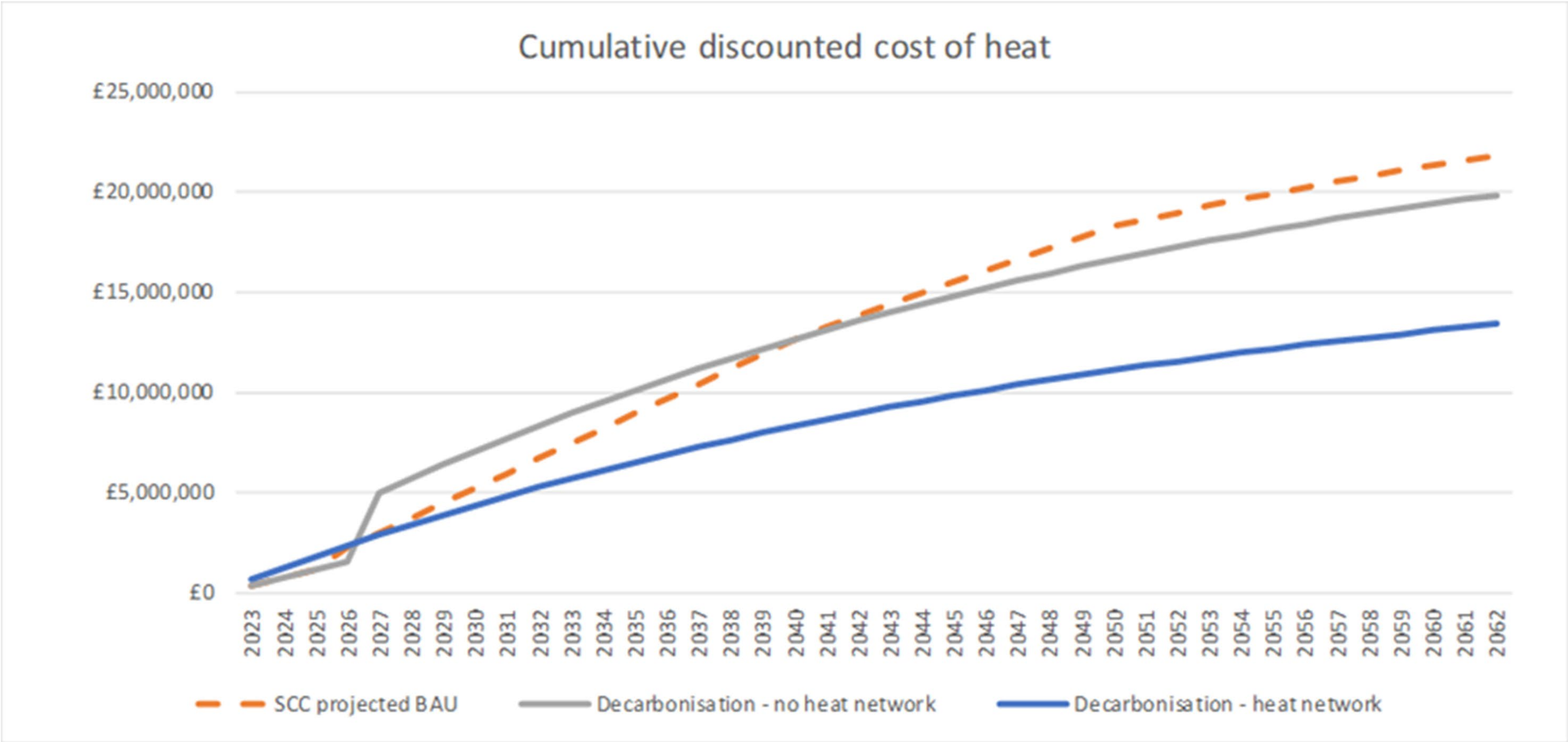
Sustainability

- Higher source temperature = Increased efficiency over other decarbonised heat sources
- Centralised production allows shift of production to low demand/carbon periods – use of thermal storage and smart controls
- Initial >70% reduction in CO2e vs. Gas
- Carbon savings increase over time as National Grid decarbonises
- Gas back up as interim – Future decarbonisation will be explored
- Aim for Net Zero heat

Do nothing isn’t an option

- Global warming must be limited to 1.5°C, as opposed to the previous target of 2°C
- UK Climate Change Act now legislates for a commitment to net zero greenhouse
- Young people - Environment and climate change is their number one priority
- Change is coming:
    - Climate Change Levy is changing - gas up and power flat
    - Current gas pricing unsustainable and at risk of becoming volatile - demonstrated through ongoing energy crisis
    - Govt. Policy is beginning to follow to achieve national 2050 target, it’s now a case of what and when, not if
    - Heat Network Zoning – Energy White Paper commitment by 2025, BEIS consultation is now live and SCC have agreed to help pilot test the methodology.

Heat Network vs. Air Source Heat Pumps



Heat network would save this customer ~£8.5m over 40 years compared to the SCC projected BAU scenario and ~£6.5m when compared to an alternative decarbonisation pathway of air source heat pumps.

Further savings in reduced capital outlay, plant maintenance, power supply upgrades and floor space.

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Commercial and funding position

- Outline Business Case and Techno Economic study complete, inc. 40year Financial Model
- SCC target IRR of 6%+ (with grant support) viable through modelling
- £2.22M – Estimate for commercialisation and pilot boreholes to prove source
- £41.6M – Estimated construction cost
- Net Present ‘Social Value’ (NPSV) £3.4M
- Diverse customer anchor load; SCC, NHS Trust, University, Housing Association and large-scale mixed-use development + significant expansion potential
- Draft HoT’s tabled and letters of support received from main anchor loads
- GHNF Transition Scheme – Grant funding approved

Programme

Milestone	Date
Cabinet	Jun 2021 - Approved
GHNF Grant Application	Oct 2021 - Submitted
Funding Decision	Dec 2021 - Approved
Borehole Drilling	Jun 2022 to Dec 2022
Customer Agreements	Dec 2022
Construction	Spring 2023 to Spring 2025
Heat On – Phase 1	Phase 1 Autumn 2024
Heat On – Phase 2	Phase 2 Spring 2025

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Any questions?

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