Full Circle
Alpha Show and Tell

SGN Commercial Services

UK Power Networks
Delivering your electricity

ARUP

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INVESTORS IN PEOPLE™
We invest in people Platinum

NES NATIONAL EQUALITY STANDARD

SGN has a planned development of 637 homes and commercial space on its disused gas holder site at Wandsworth

ASHP/ Gas Contribution	London Plan Be Green Compliance (35% betterment on Part L)
ASHP 60%/40% gas	NO (27.5%)
ASHP 70%/30% gas	NO (30.9%)
ASHP 70%/30% gas + 140m² PV	NO (33.9%)
ASHP 80%/20% gas	NO (34.2%)
ASHP 80%/20% gas + 140m² PV	YES (37.0%)
ASHP 90%/10% gas	YES (38.2%)
ASHP 100%	YES (46.5%)

Annual Heat Demand (3500 kWh)	**Ratio**	**Capped Rate (p/kWh)**	**Cost @ cap rate & efficiency**
Gas boiler	1:1	10.3	£360.36
Electric ASHP Average	1:2.5	17.36	£607.56

All major new developments must meet the new SAP regulations plus 35% improvement in London

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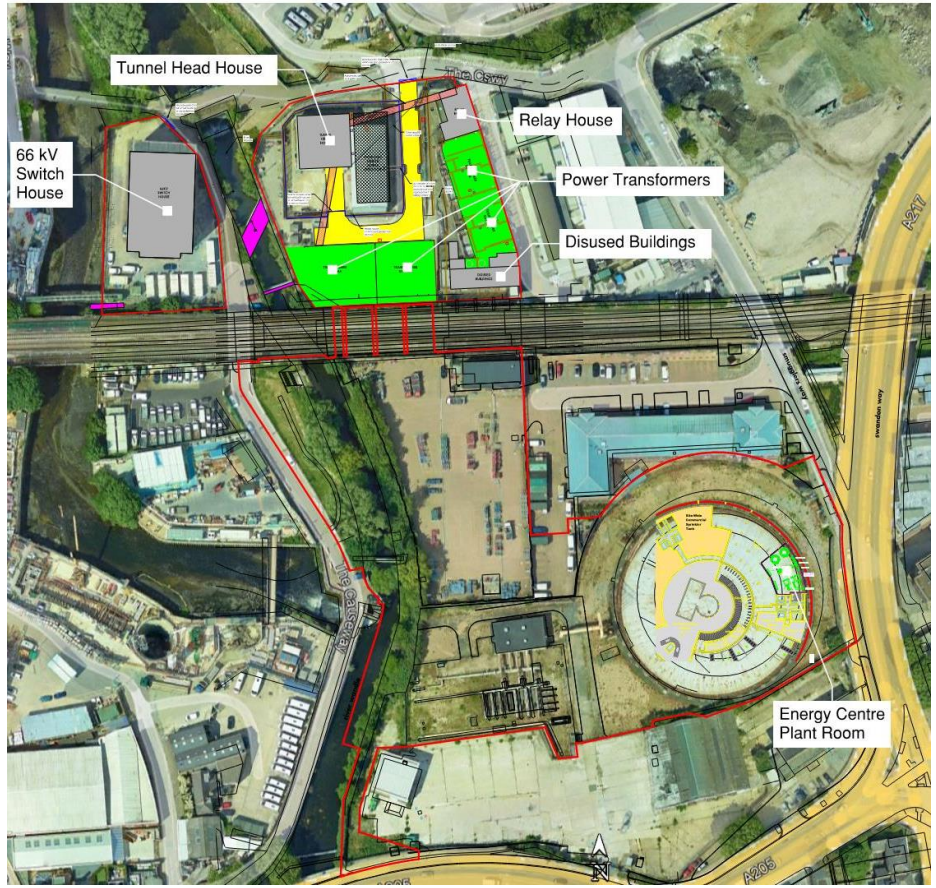
The proximity of the UK Power Networks transformers has created an opportunity to recover waste heat to reduce energy generation and customer bills



UK Power Networks Transformers in Green

Four Large Scale Transformers

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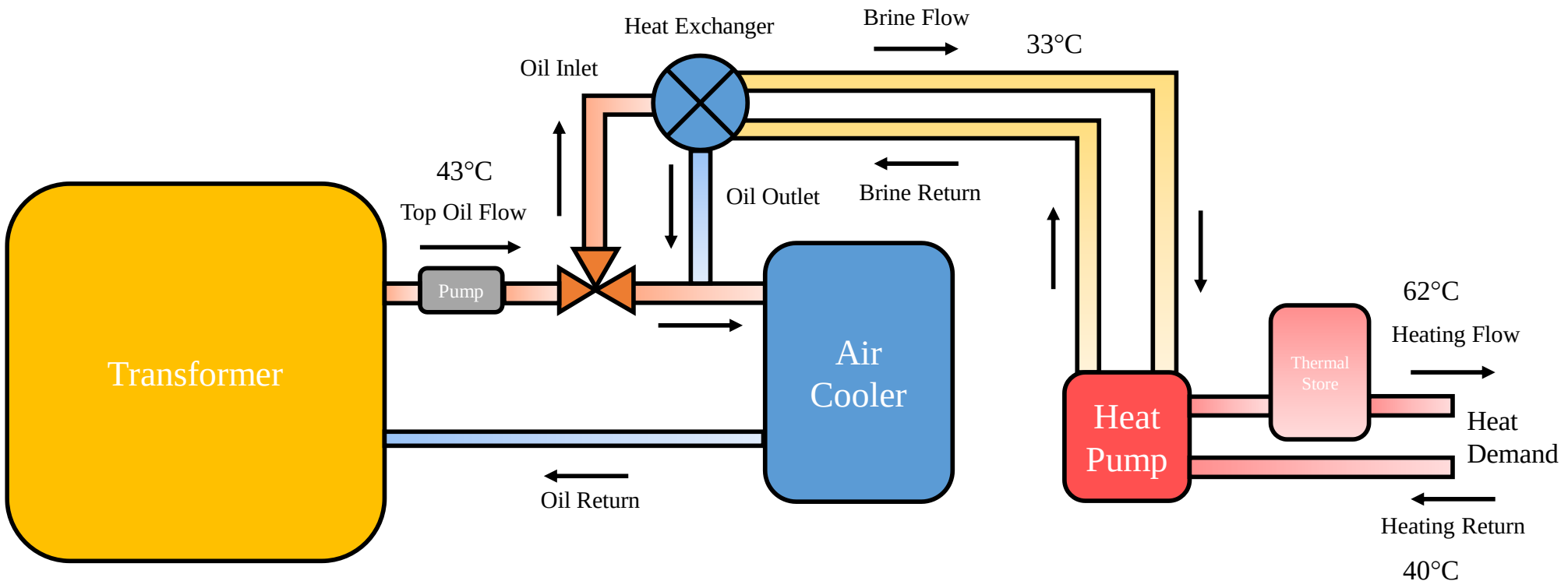
The technical solution for transformer heat recovery



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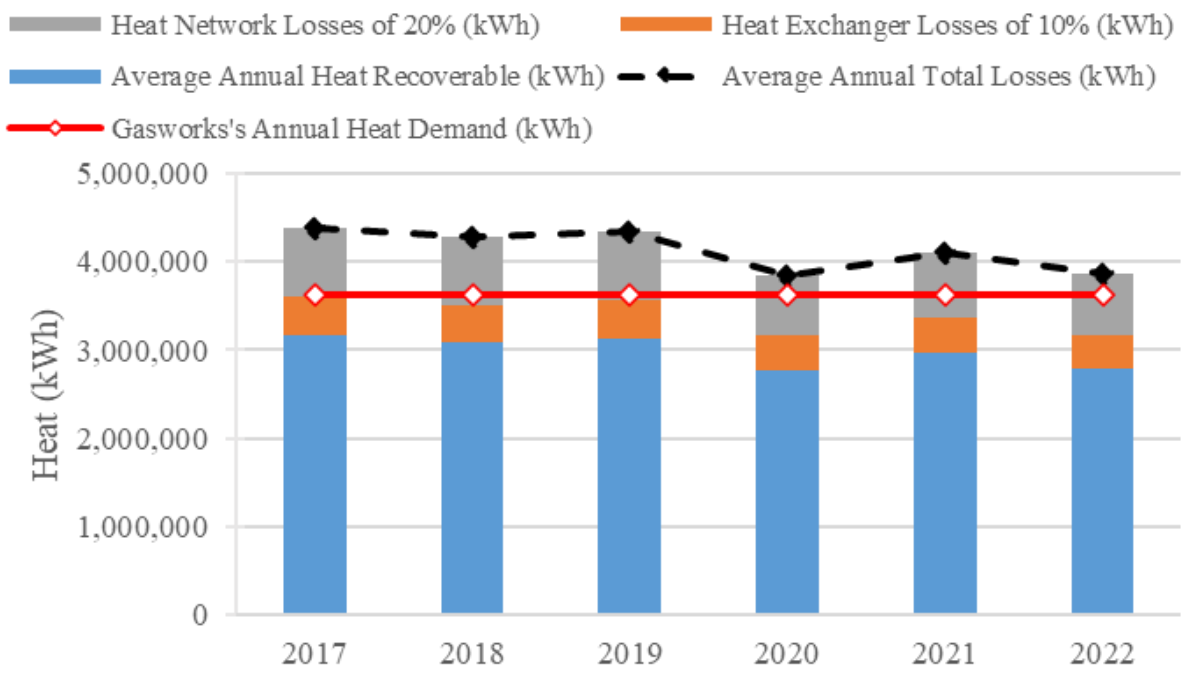
A plate heat exchanger can recover up to 70% of the waste heat from the transformer, based on modelling calculations



Heat Source	Energy Mix 1 (3500 kWh)	Energy Mix 2 (3500 kWh)
Transformer losses	0%	92%
Air Source Heat Pump	90%	8%
Gas boiler	10%	
Cost	**£298**	**£185**

Modelling results show that waste heat could supply up to 92% of the site heat demand and a saving of 38% on customer energy bills after capex and O&M costs

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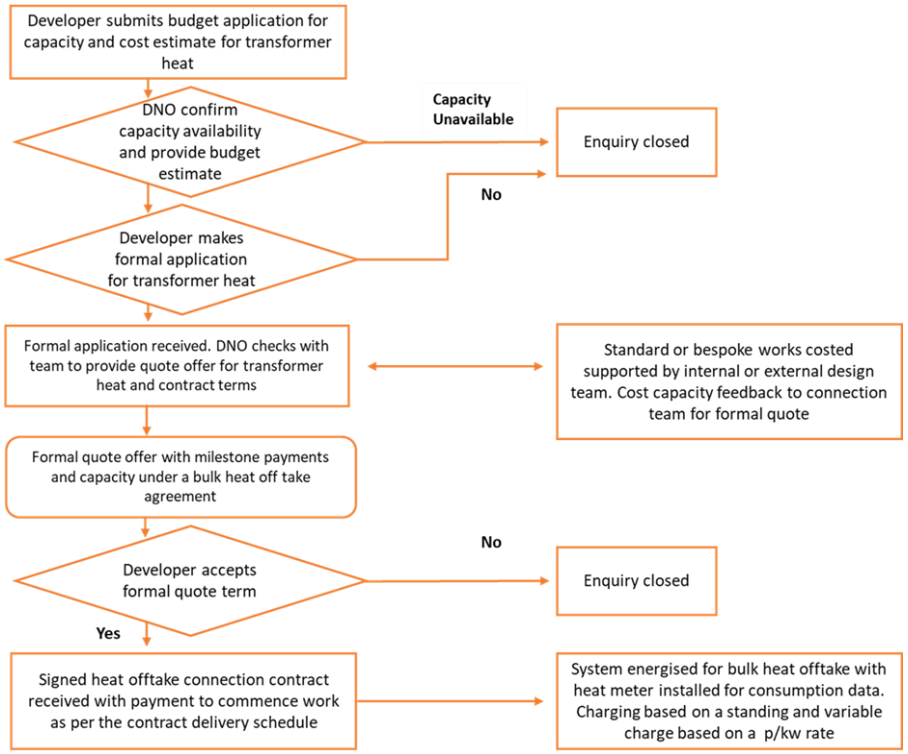
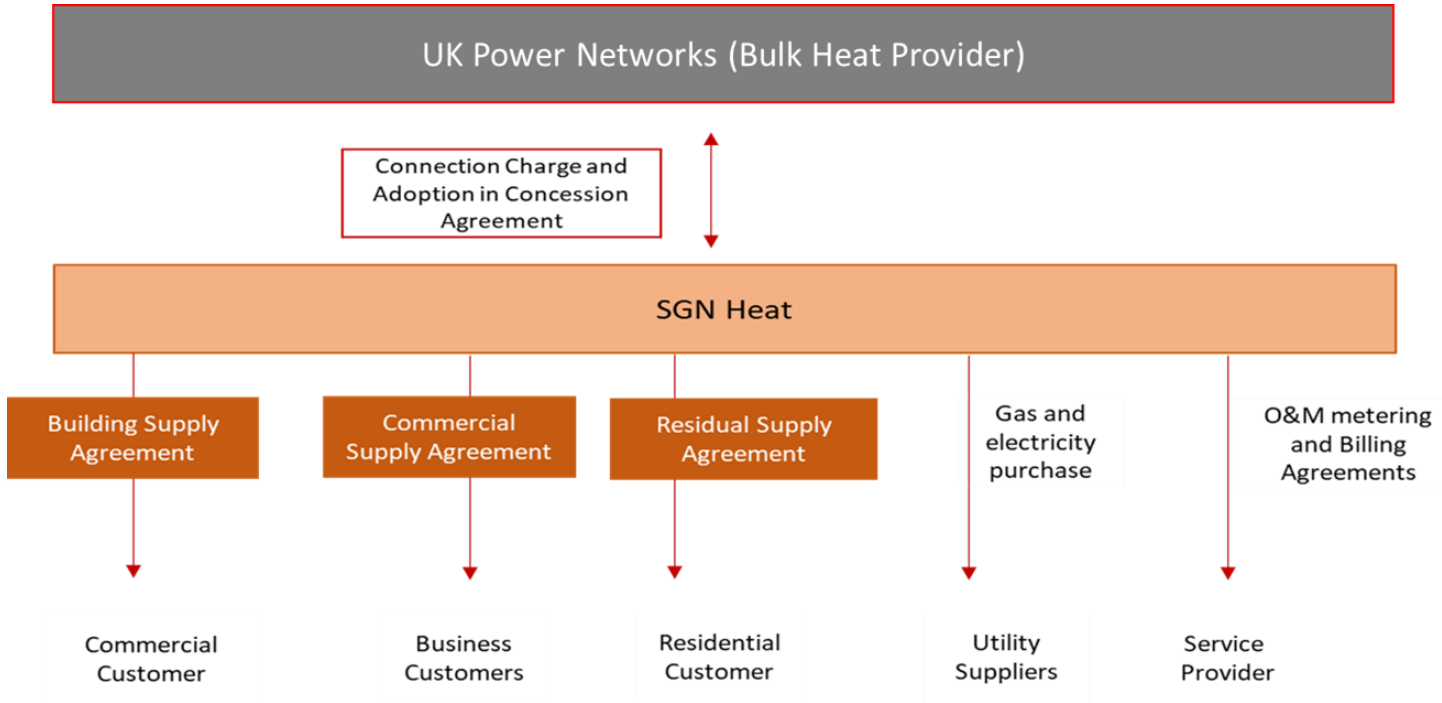
We have considered the barriers to a business-as-usual application and drafted a connection process, commercial structure and template heat contracts.





We have also explored the regulatory barriers to this miscellaneous income and believe existing licensing condition allows the provision, but we intend to pursue formal ratification.

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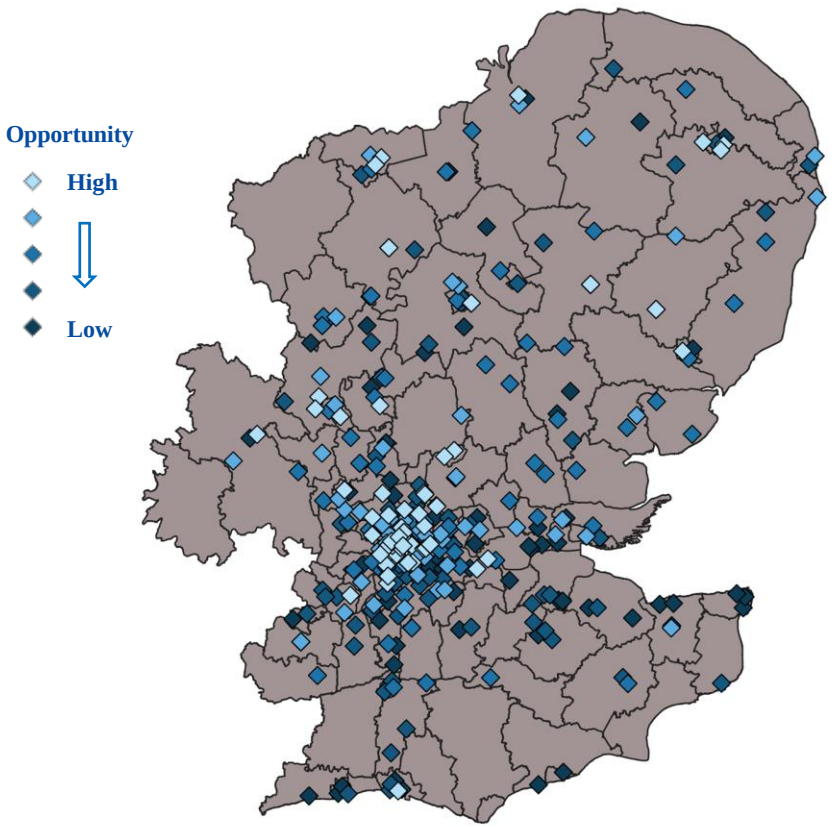
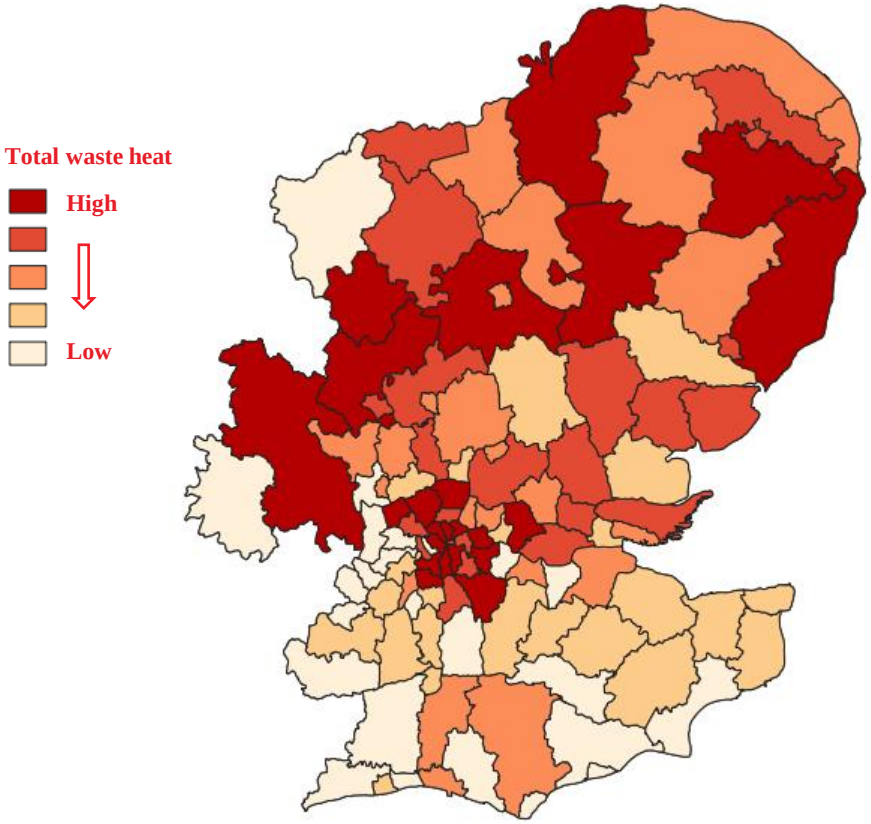
Early modelling has outlined the potential for replication of this work



Total of 884 UK Power Networks sites for analysis*



Estimated total heat loss from all sites in local authority**

* Each site must be validated on a case-by-case basis
** No empirical data, estimates will be explored further

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Summary of Work

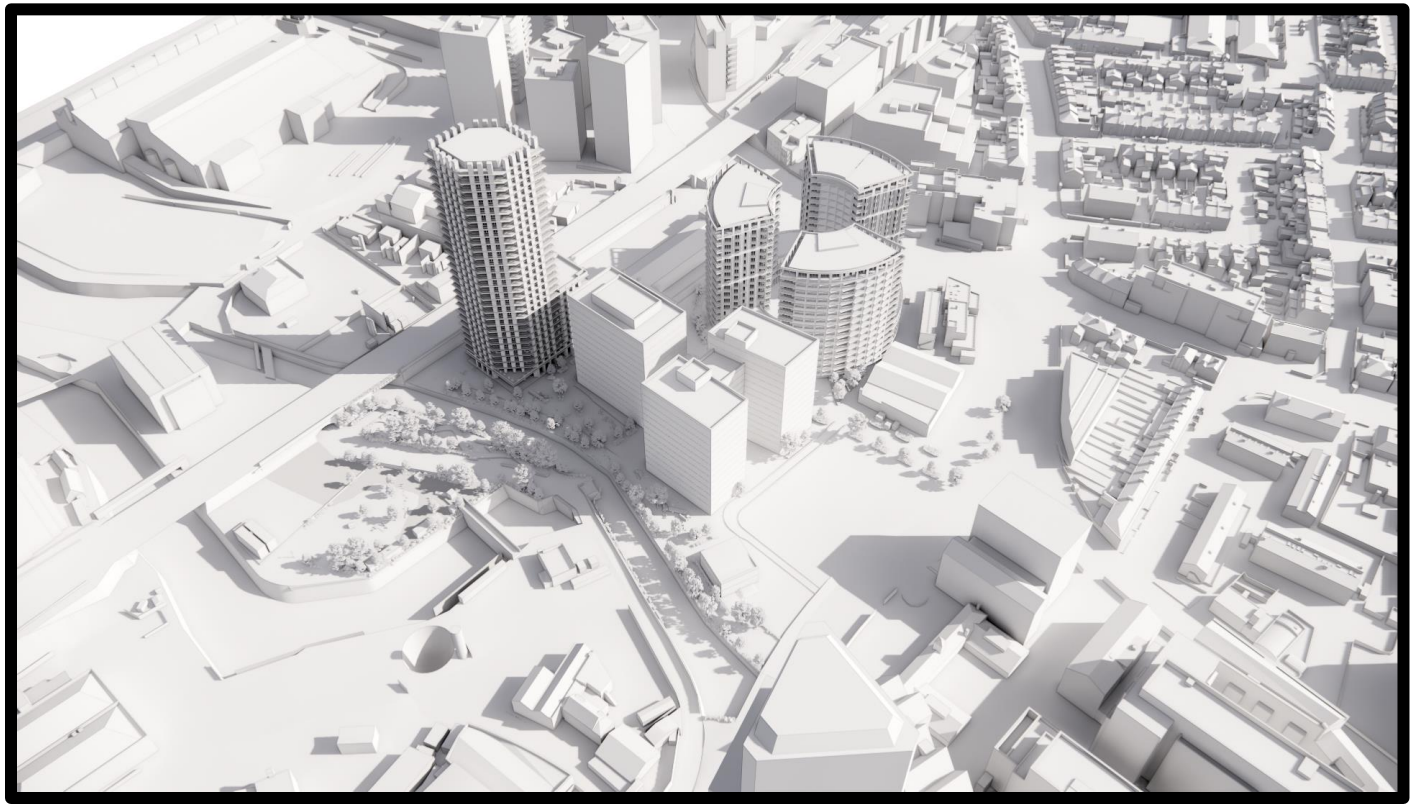
Scope	Outcome
Heat recovery system	The calculations show significant benefits from transformer heat recovery, a demonstration through installing and operating the real system will be critical, to validate these calculated benefits.
Integration to the SGN Gasworks Development's heat network	Agreed piping route from Wandsworth Substation to SGN site via the train track viaduct. Least obtrusive system selected to ensure normal operation of substation.
Commercial structure and regulatory assumptions	We assume that the special condition DRS15 allows UK Power Networks to have a commercial arrangement and gain a revenue for the transformer heat recovery at Wandsworth. We will seek confirmation from Ofgem at the appropriate stage of the project.
Replication opportunities in UK Power Networks jurisdiction	GIS mapping tool we developed can identify opportunities for replicating this pilot scheme, further work must be taken on a case-by-case basis.
Energy Strategy Impact Assessment and Planning Variation	Modelled network energy consumption data reviewed and contribution from waste heat, ASHP and gas boilers calculated. Housing development energy and carbon emissions quantified from updated SAP calculations

Next Steps

Prove the technical and economic case for extracting waste heat from transformers for use in heat networks.

A demonstrator will:

- Build, test and commission the system
- Finalise and implement commercial agreements between partners involved in a long-term heat offtake agreement
- Develop and share material to support the uptake across other locations and in other networks.



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THANK YOU

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