DESNZ Technical Standard for Ambient Loops Shared Ground Loops

and preview of CIBSE TM51

Ken Gordon

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CIBSE
Inspiring people. Transforming places.

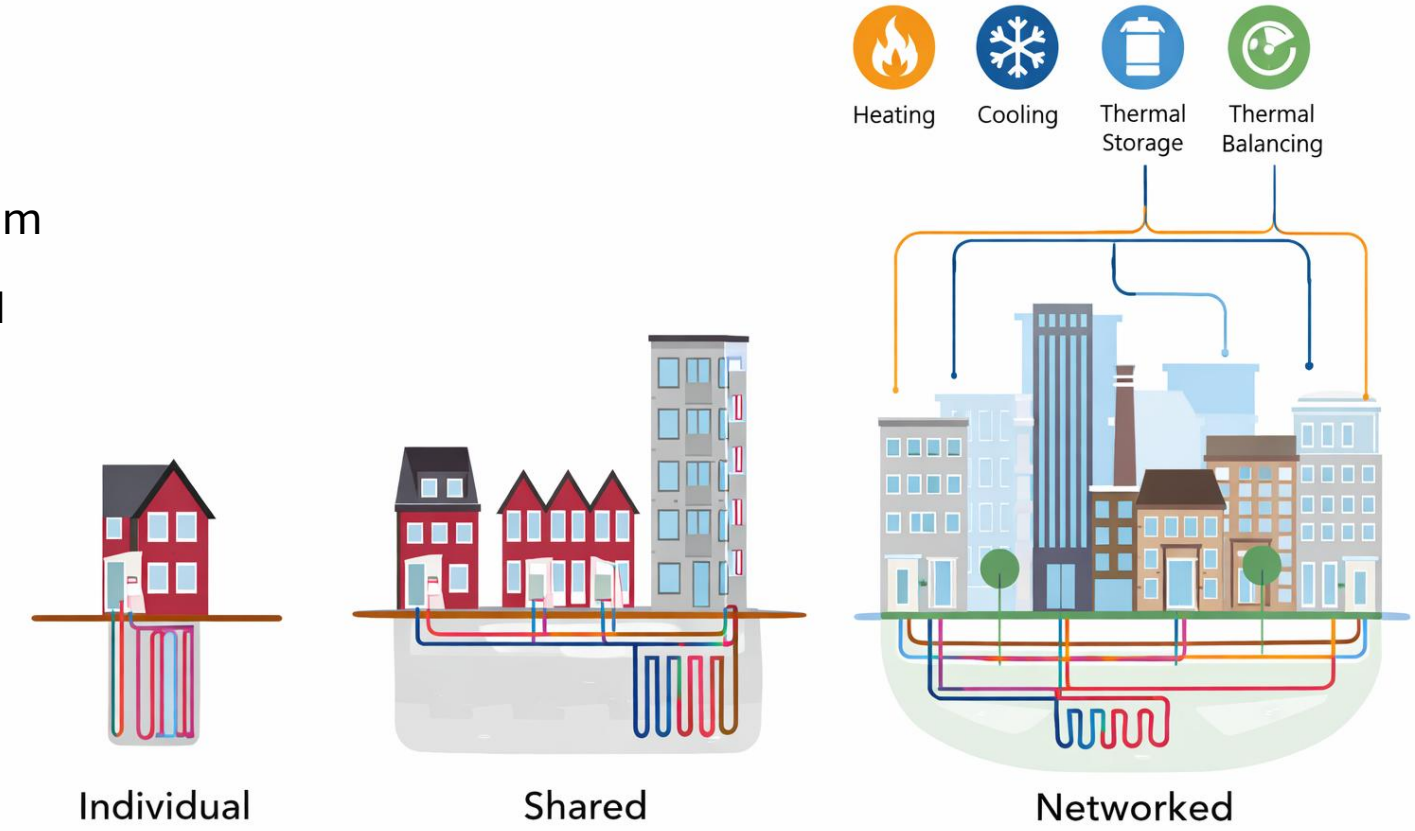
Presentation to CIBSE Scotland
Wednesday, 27th May 2026

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Heat Networks

The Direction of Travel

From individual heat pumps to scalable thermal infrastructure

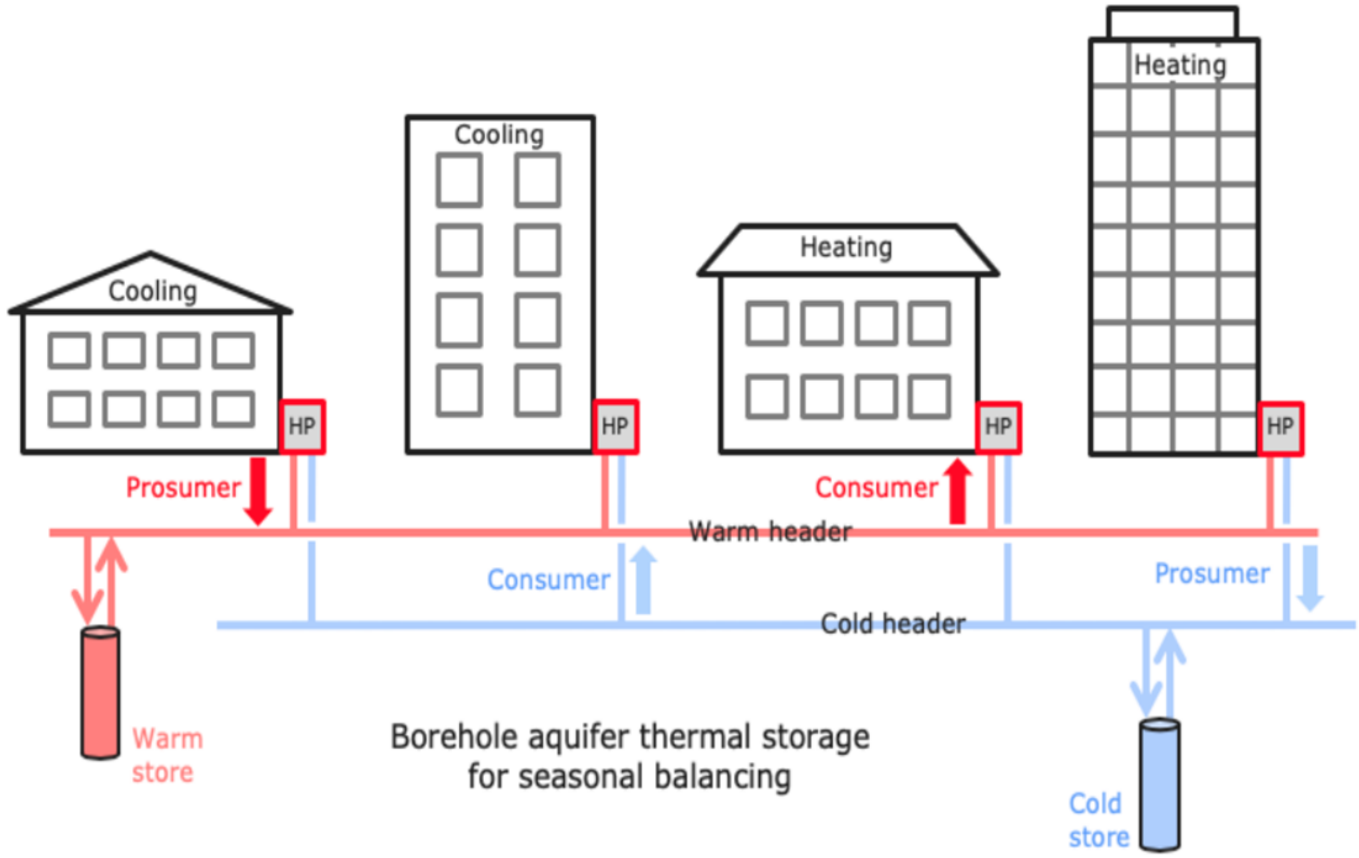
1. Why shared thermal infrastructure changes what the solution can be
2. Why it matters to the wider energy system
3. Why it changes delivery, ownership, and financing
4. What this means for Scotland & the UK



Ambient Networks as Shared Thermal Infrastructure

One loop can connect heating, cooling, storage and multiple building loads

- A shared low-temperature loop serves multiple buildings
- Each building still uses its own local heat pump
- Heating, cooling, and storage can all be integrated on the same network
- This starts to behave like shared infrastructure, not isolated building plant

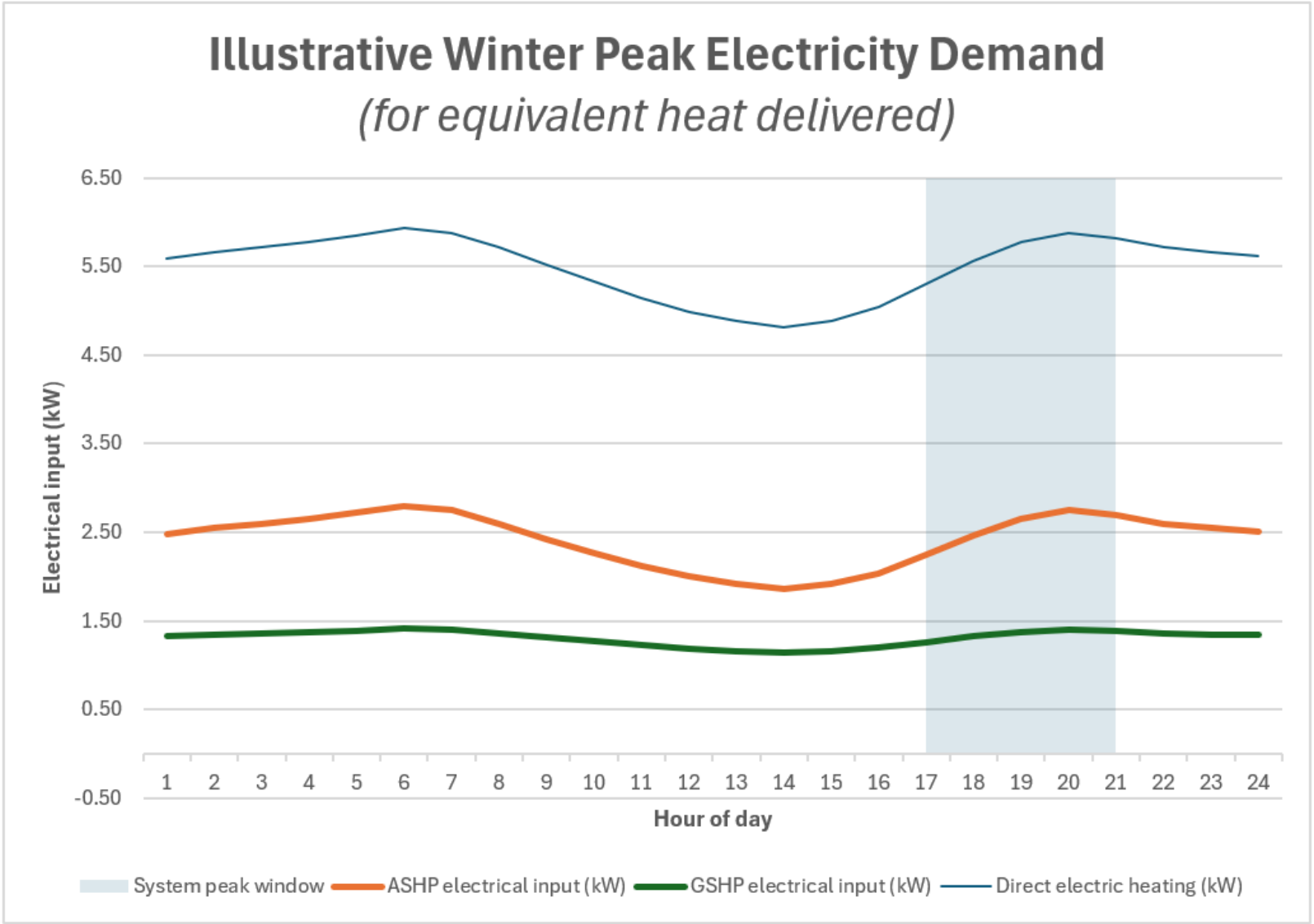


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Grid Stability and Winter Peak Demand

Electric grids are built for peaks, not averages

- Grids are designed around peak load, not yearly energy use
- Cold-weather heating can drive the system at exactly the wrong time
- Ground-coupled systems can reduce peak electrical demand



Illustrative model © Ken Gordon, based on equivalent delivered heat and indicative COP assumptions

Shared Ground Loops as Infrastructure

Once the ground is shared, the model changes

- The energy source is no longer tied to one building
- Loads can be diversified across multiple users
- The shared ground loop becomes a long-life thermal asset



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From Engineering Solution to Utility Infrastructure

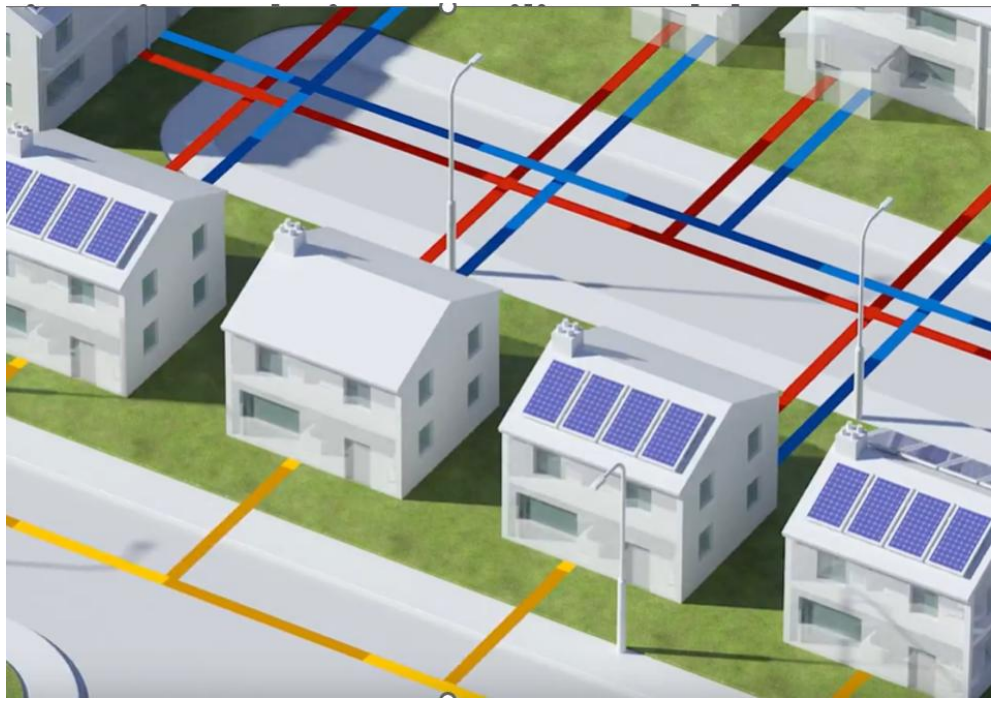
Why regulation becomes critical for scalable thermal infrastructure

Network owners become utility-like organisations:

- Demand assurance for investors
- Standardised technical performance
- Consumer protection

Resulting in:

- Defined long-life asset ownership
- Reduced investor risk
- More predictable revenue
- Lower cost of capital



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The UK Legislative Framework

How UK policy becomes enforceable market structure

UK Government – Department of Energy Security and Net Zero (DESNZ)
Scottish Government – Housing Portfolio (Heat in Buildings & Heat Networks)
(Policy)

↓

Energy Act 2023
(Law)

↓

Office of Gas and Electricity Markets (Ofgem)
(**Regulator of market framework)**

↓

Heat Network Technical Assurance Scheme (HNTAS)
(Assures technical compliance)

↓

Technical Specifications & Assessment Procedures

(Define what good looks like)

Heat Network Technical Standards

From guidance to regulated technical assurance

"will act as the primary technical reference point for the Heat Network Technical Assurance Scheme"

TS1 is the core technical standard underpinning regulated heat network delivery in Great Britain

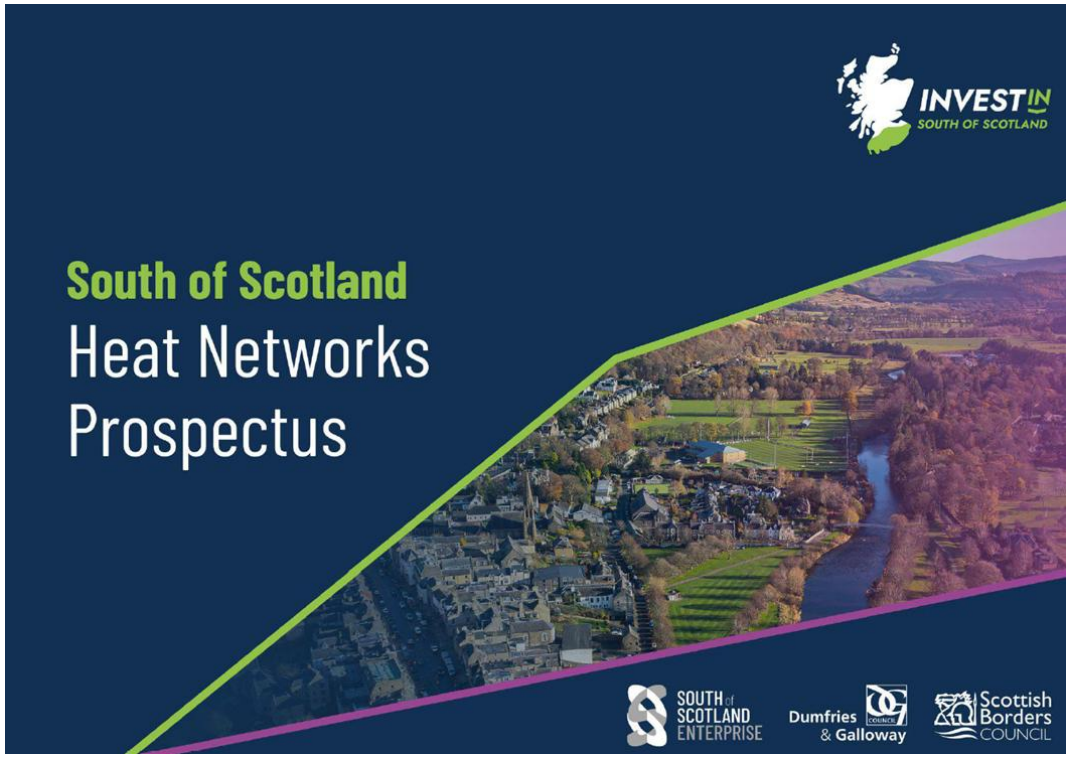
Current work is extending that framework to include Shared Ground Loops and Ambient Heat Networks



Rural Scotland – Heat Network Opportunity

A route beyond city-centred heat networks

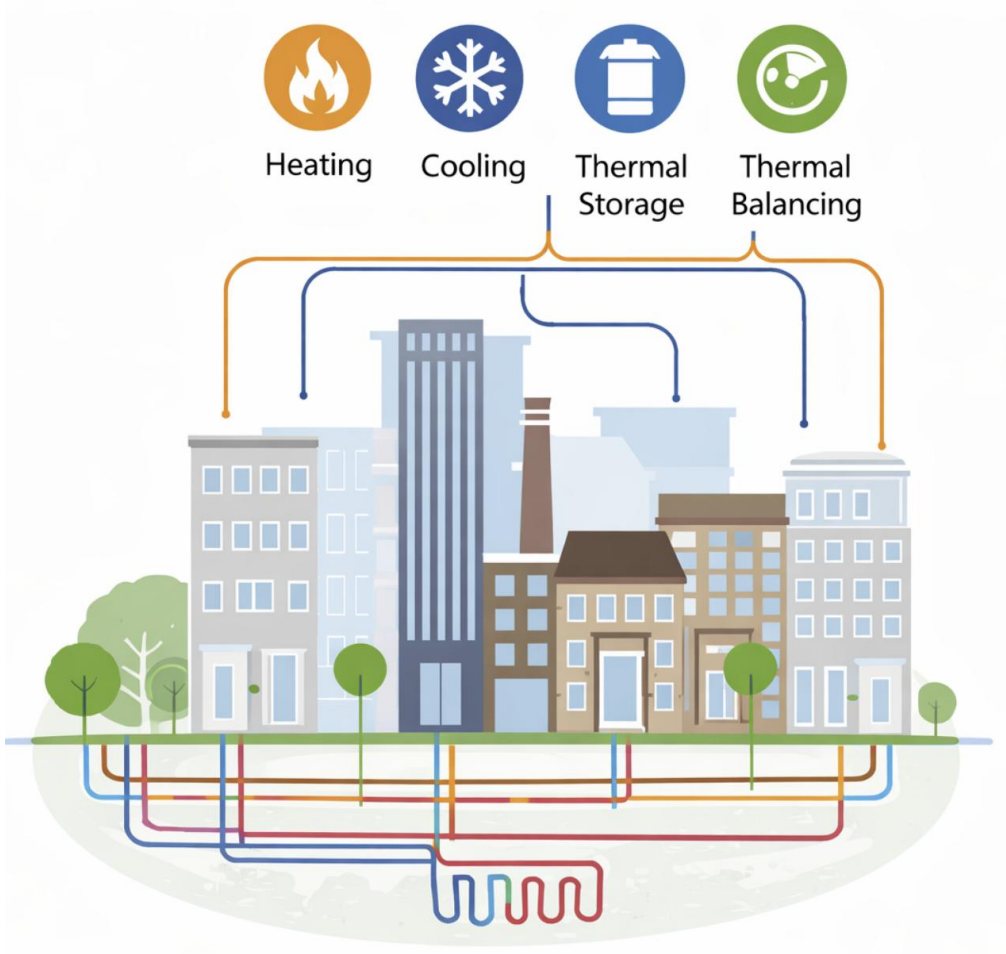
- SOSE has identified heat networks as a strategic regional opportunity
- Rural and small-town Scotland often falls between individual systems and conventional district heating
- Shared ground loops and ambient networks can bridge that gap
- This creates a route to decarbonisation beyond major urban centres



Why This is Becoming Investable Infrastructure

The elements required for scaling are no longer theoretical

1. The engineering model is proven
2. Government policy is increasingly supporting investment confidence
3. The commercial logic is compelling
4. Demand assurance supports the investment case

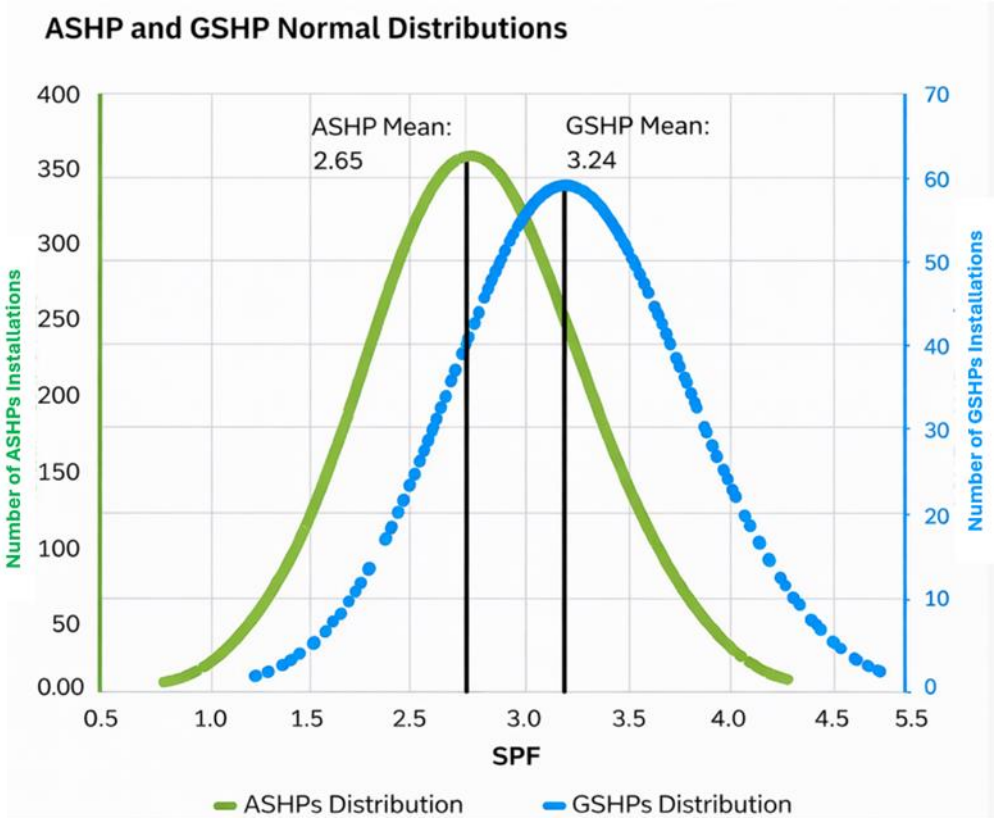


CIBSE TM51

Ground & Water Source Heat Pumps

Executive Author: Ken Gordon

- Full re-write of CIBSE's principal UK guidance for GSHP and WSHP systems
- Establishes engineering framework for Shared Ground Loops and Ambient Heat Networks
- Integrates heating, cooling, thermal storage and seasonal performance methodology
- Supports grid resilience, demand reduction and low-carbon infrastructure delivery
- Aligns with emerging UK heat network regulation and HNTAS direction



In-Situ SPF Distributions for Air Source and Ground Source Heat Pumps
(Meek, 2024)

Scotland and the Future of Thermal Infrastructure

From early heat pump innovation to scalable thermal infrastructure



Foswell Estate, Perthshire, Scotland

Underlying thermodynamic principles were established earlier by William Thomson (Lord Kelvin), University of Glasgow.

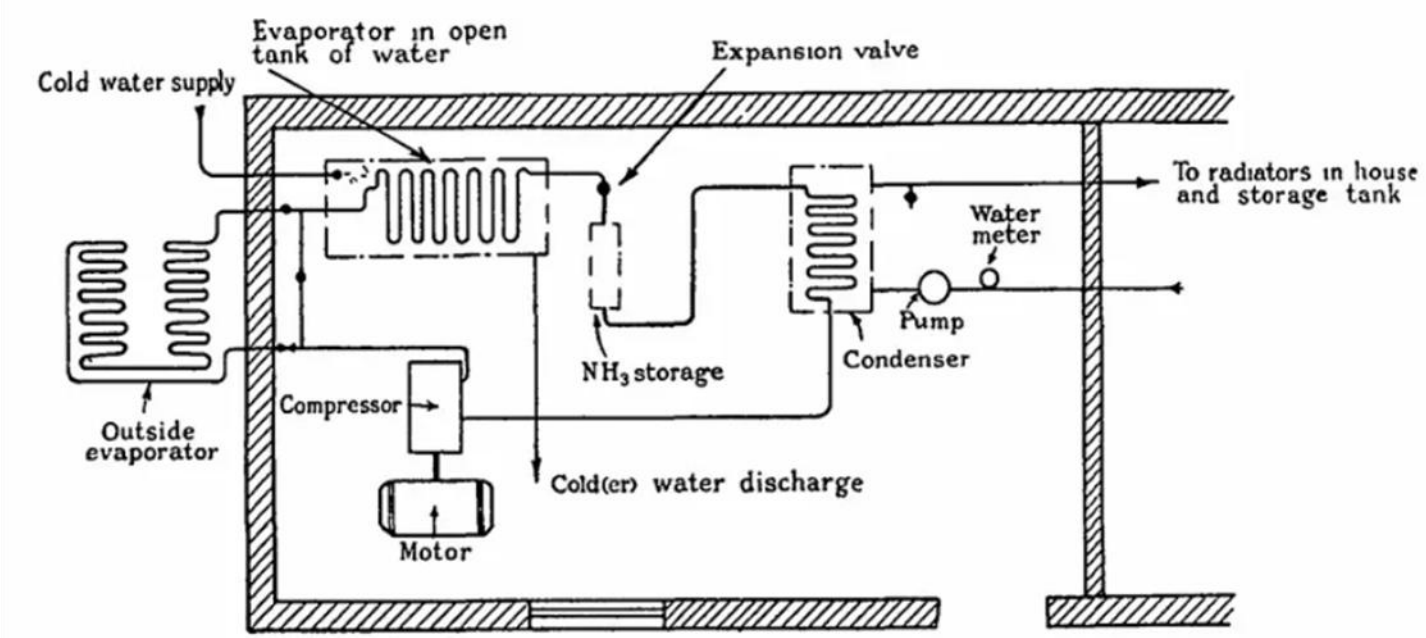


FIG. 6.—Experimental plant installed in author's home.

Haldane, T.G.N. (1930)
"The heat pump – an economical method of producing low-grade heat from electricity"

Journal of the Institution of Electrical Engineers, 68(401), pp. 666–683.