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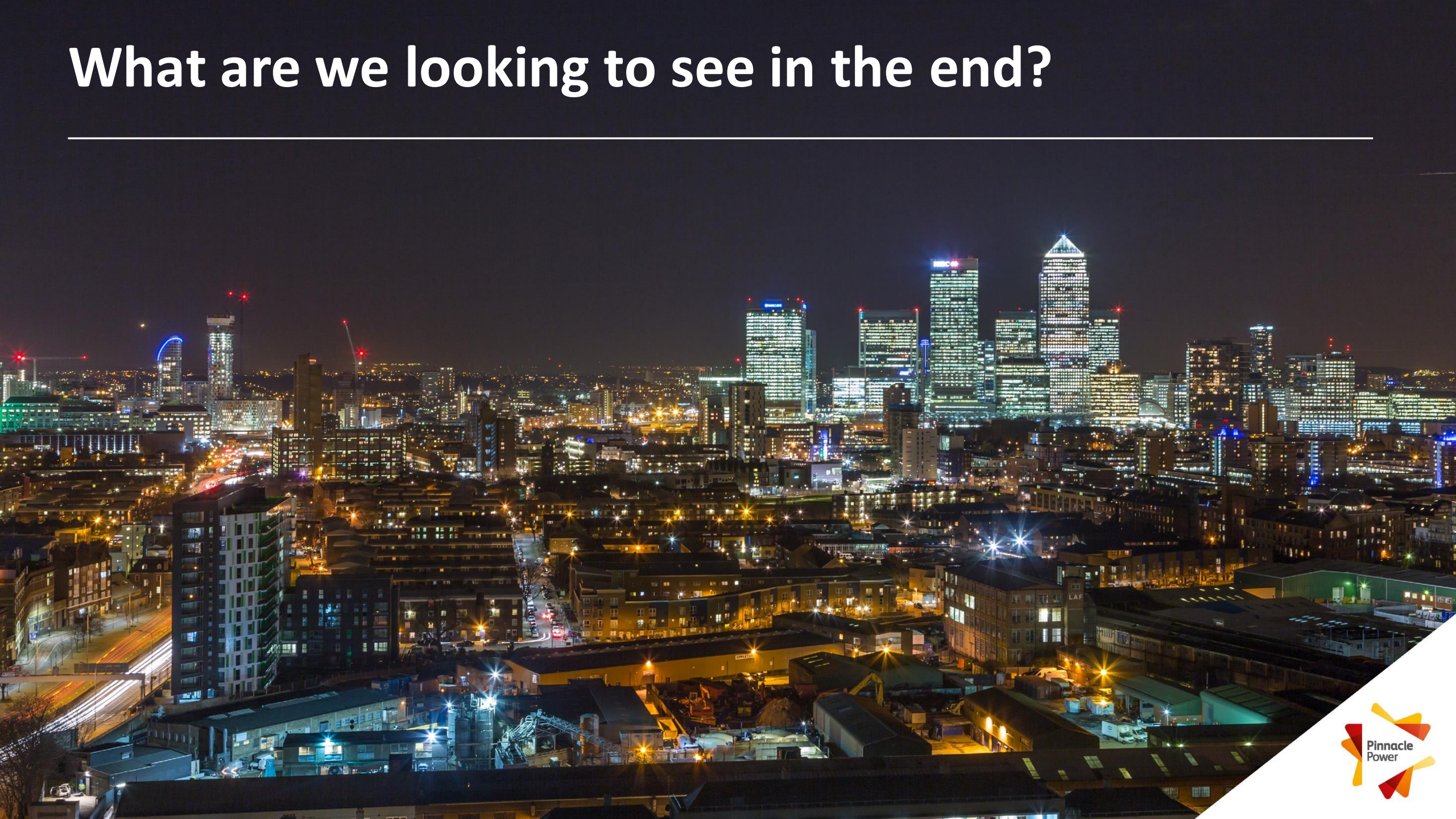
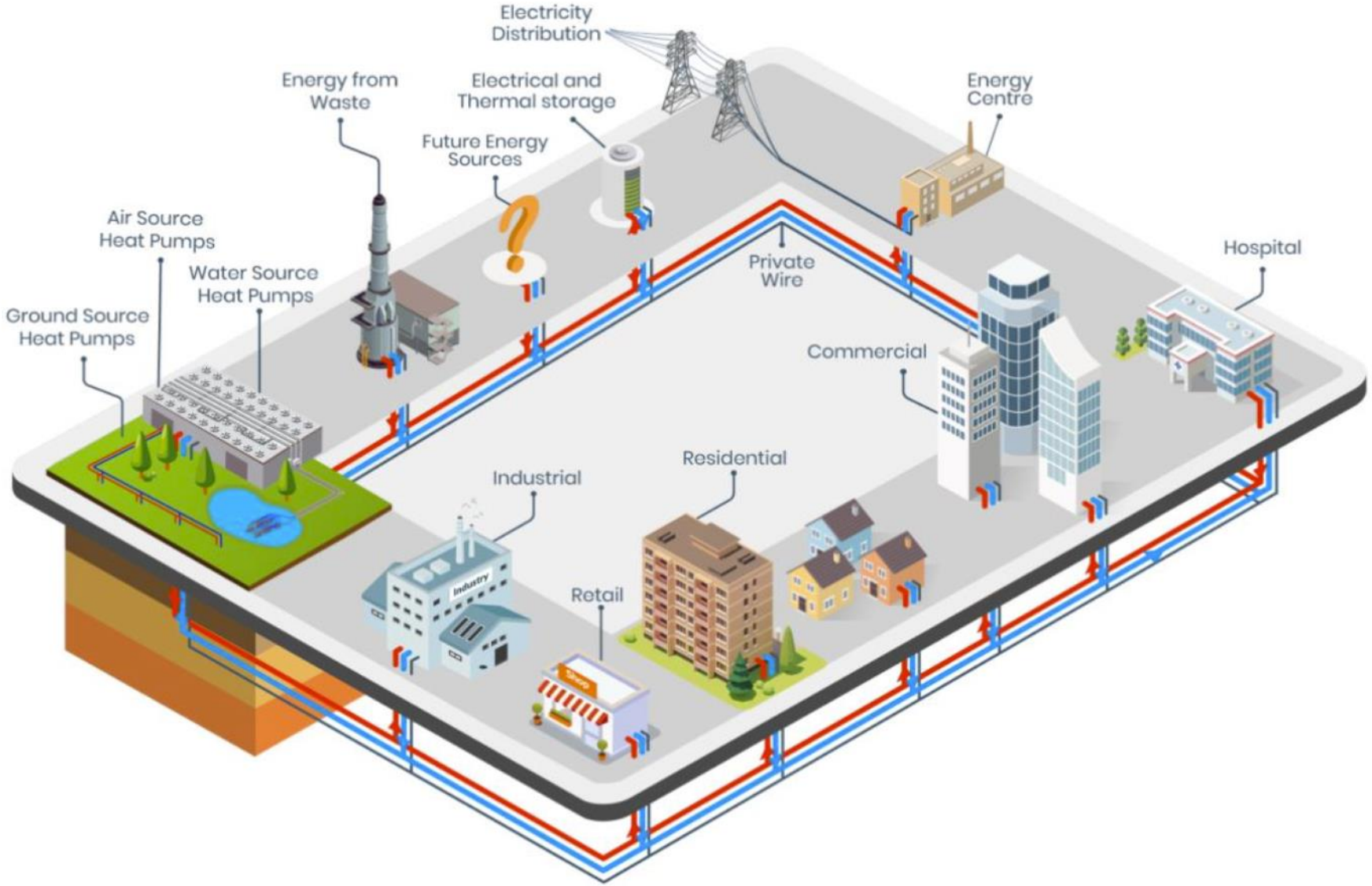
Partnering to deliver Heat Networks

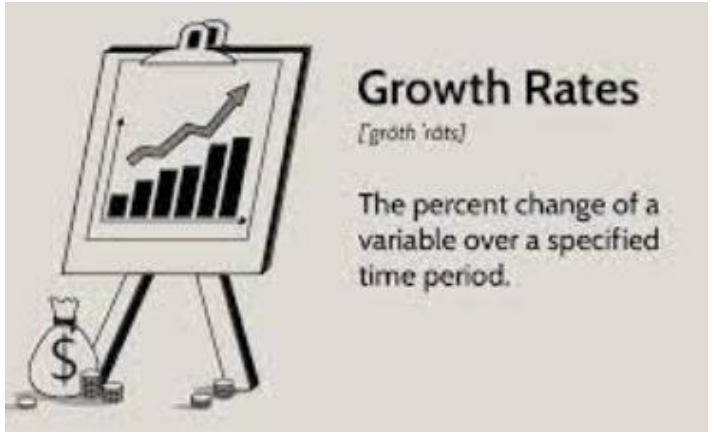
What are we looking to see in the end?



What is a heat network? Not always clear!



Why do we do it?



Three Simple Messages

1. District Heat should be both the **cheapest** and most secure form of heating **dense urban** environments.
2. This is a new asset class, that should be seen as a city wide infrastructure roll out, not a series of mini projects. But we need to set up the networks commercially and financially to get to the scale needed.
3. Successful delivery is all about connections and what we can do to get scale.

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Message 1: Free Market connections are the easiest

Our analysis shows that a district heat network's economies of scale reduce the levelised cost of heat to 40% less than an air source heat pump, per household.

£130 / MWh air source heat pump

£92 / MWh district heat network

Source – Innovate UK, PWC, Otley Energy, University of Leeds

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Message 2: New Asset Class – get cost of capital down?

Date	Target	Acquirer	EV / LTM EBITDA	Target Country
Mar-21	Fortum Baltics	Partners Group	15.1x	Baltics
Oct-20	Adven	JPMorgan	25.0x	Finland
Oct-20	Nevel	Ardian	31.0x	Finland
Jul-20	Fortum Järvenpää-Tuusula	Vantaa Energy, Infranode and Keva	34.0x	Finland
Jun-20	Vasa Värme	Solor Bioenergi	20.0x	Sweden
Jan-20	Fortum Joensuu	Savon Voima Oyj	26.0x	Finland
Nov-19	Solor Bioenergi (21.45%)	Polhem Infra	22.0x	Sweden
Oct-19	Rattvik and Leksand (municipal)	Värmevärden	23.0x	Sweden
Jul-19	Elenia Heat	DIF, Aberdeen Standard and LPPI	23.1x	Finland
Dec-18	Riihimäen Kaukolämpö Oy	SL Capital	22.8x	Finland
Nov-18	Utilitas	First Sentier	12.0x	Estonia
May-18	Groupe idex	Antin Infrastructure Partners	17.6x	France
Mar-18	E.ON Värme Lokala Energilosningar	Adven	21.0x	Sweden
Dec-17	Elenia	Allianz and Macquarie	21.4x	Finland
Feb-17	Värmevärden	JPMorgan	19.5x	Sweden
Aug-16	Coriance	First State	16.2x	France
Dec-15	Adven	Infracapital, AMP	16.6x	Finland
Apr-14	Fortum Norway	iCON Infrastructure	10.7x	Norway
Sep-12	Coriance	KKR	9.2x	France
Jan-12	Vattenfall Finland (DH business only)	3i, GSIP, Ilmarinen Mutual	9.5x	Finland

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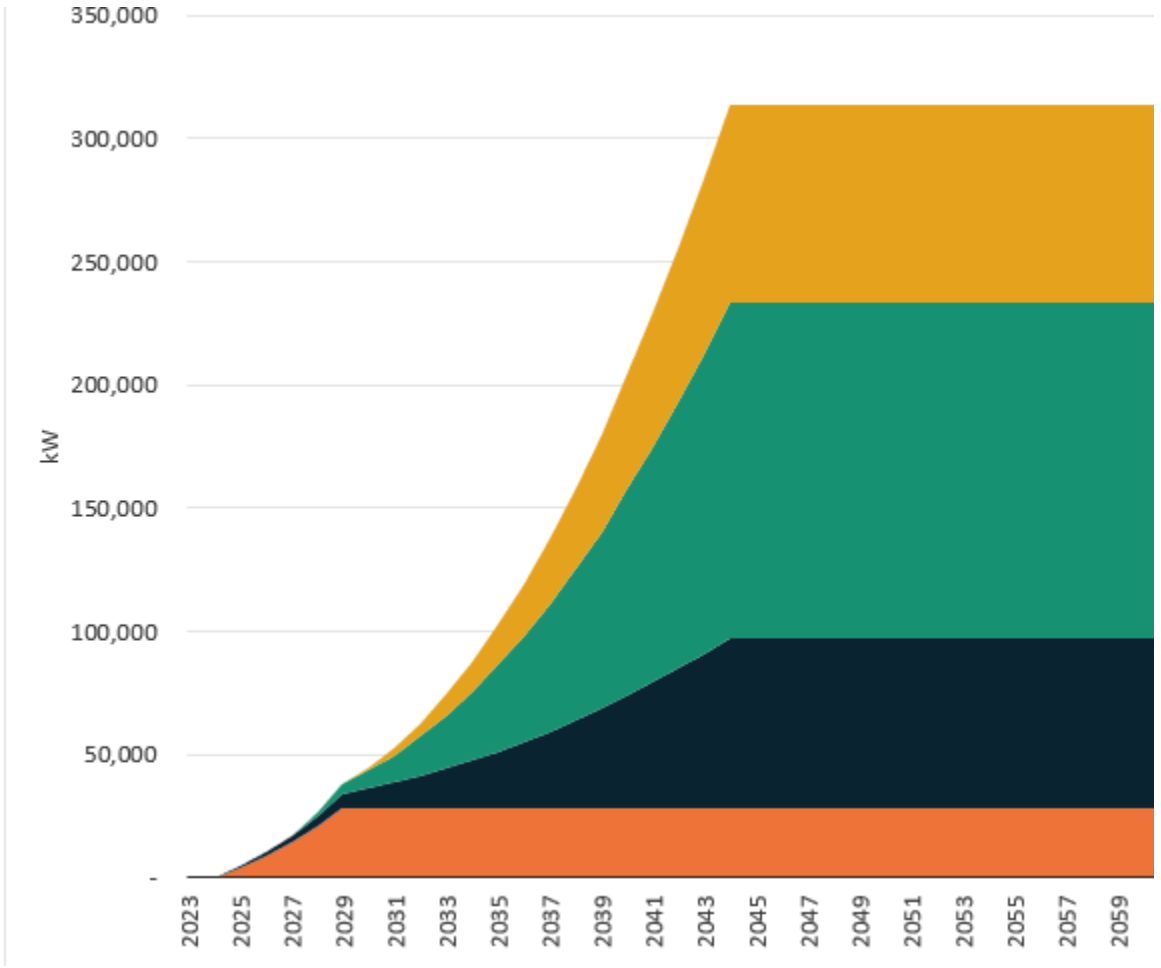
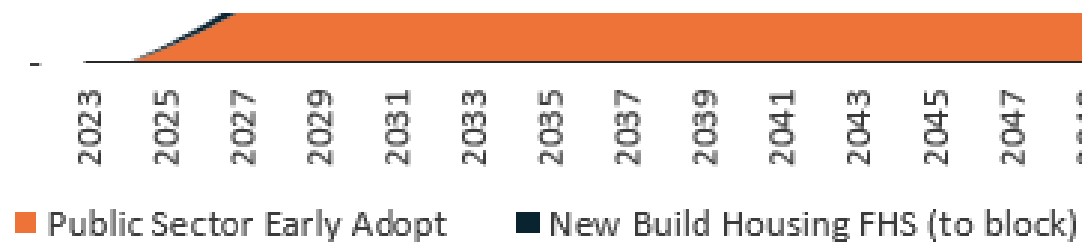
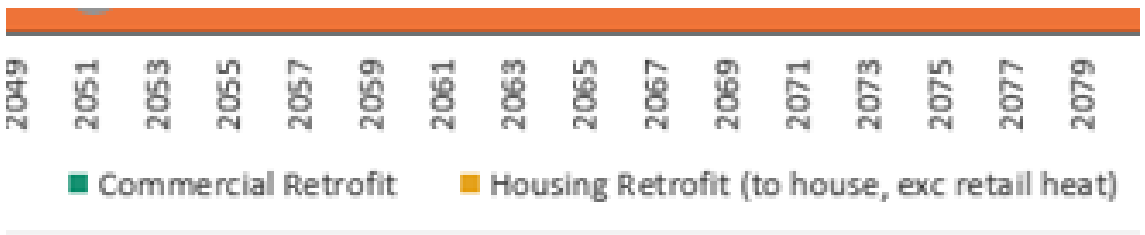
Message 3: Pace and Scale







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What makes people connect?

Low Cost - (man maths)

Source	Source temp	Possible COP/ Z	Heat price @ 14p elec	Heat price @ 20p elec	Heat price @ 10p elec
EfW steam extraction	80> <110	15	0.93	1.33	0.67
EfW condensate	35> <55	5-7	2.3	3.3	1.7
Sewer	<25	4-5	2.5	3.6	1.8
River	7-11	3-4	4	5.7	2.9
Mine water	12-20	3-4	4	5.7	1.7
Gas fired CHP	<95	-	3	7	2
Aquifer	>14 depth dependent	3-6	3.1	4.4	2.2
Ground	11-14	3.5	4	5.7	2.9
Data centre	28-35	5-7	2.3	3.3	1.7

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Looking at heat sources we can make it cheaper

This is very rough but it shows a trend and it shows what is possible if the infrastructure is in place:

1. It is possible to get the heat price below the gas price at current spark spreads IF you already have the infrastructure.

2. That we need to be going hard to get new high temp waste heat sources

3. That heat sources need to be used and encouraged to have a heat offtake – use planning and other levers.

This leads me to ask **how do we start getting to the scale needed?**

Pioneer Networks often driven by towns and cities looking to attract the level of investment needed

1. Provide an anchor heat load
2. Provide licenses, easements and rights to install the infrastructure
3. Provide planning system style influence that drives the town towards a cheaper, cleaner future.
4. Ensure that the network is commercially and practically set up to grow to many many times its original size.
5. Consider that the network should be growing at c10% per year.

But what the keeps it going and gets the level of money coming into the network that is needed?
This is what Zoning is looking to achieve –

I worry that we have not created enough of a carrot to match the zoning stick

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How can partnering work?

Council Drivers?

1. Climate Emergency
2. Cost of heat?
3. Cost of decarbonising?
4. Air quality?
5. Jobs?
6. Council buildings and other large users?
7. Investment?

Our objective is to:

Develop renewable energy generation and storage, and renewable/district heating schemes.

Renewable energy generation and storage

Strategic Objective

Develop renewable energy generation and storage, and renewable/district heating schemes

Low Carbon Framework

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How does the partnership happen?

1. Local Councils have different ambitions for involvement in heat networks.

2. Routes available for involvement:
   i. Totally hands off – provide council buildings heat supply contracts (potentially in a package)
   ii. Totally hands on – council owns, develops, pays and then can sell as a secondary asset (Bristol)
   iii. Involved as a passive partner – SPV delivered by Private Sector but council retains an interest in customer service and heat price (both will be regulated in next 2 years), would like to be a passive shareholder. Potential for passive equity stake
   iv. Involved as an active partner – SPV delivered by Private Sector with council wanting to be a board member, with an investment stake (typically including the work already done on early work of a network). Roles to be defined.

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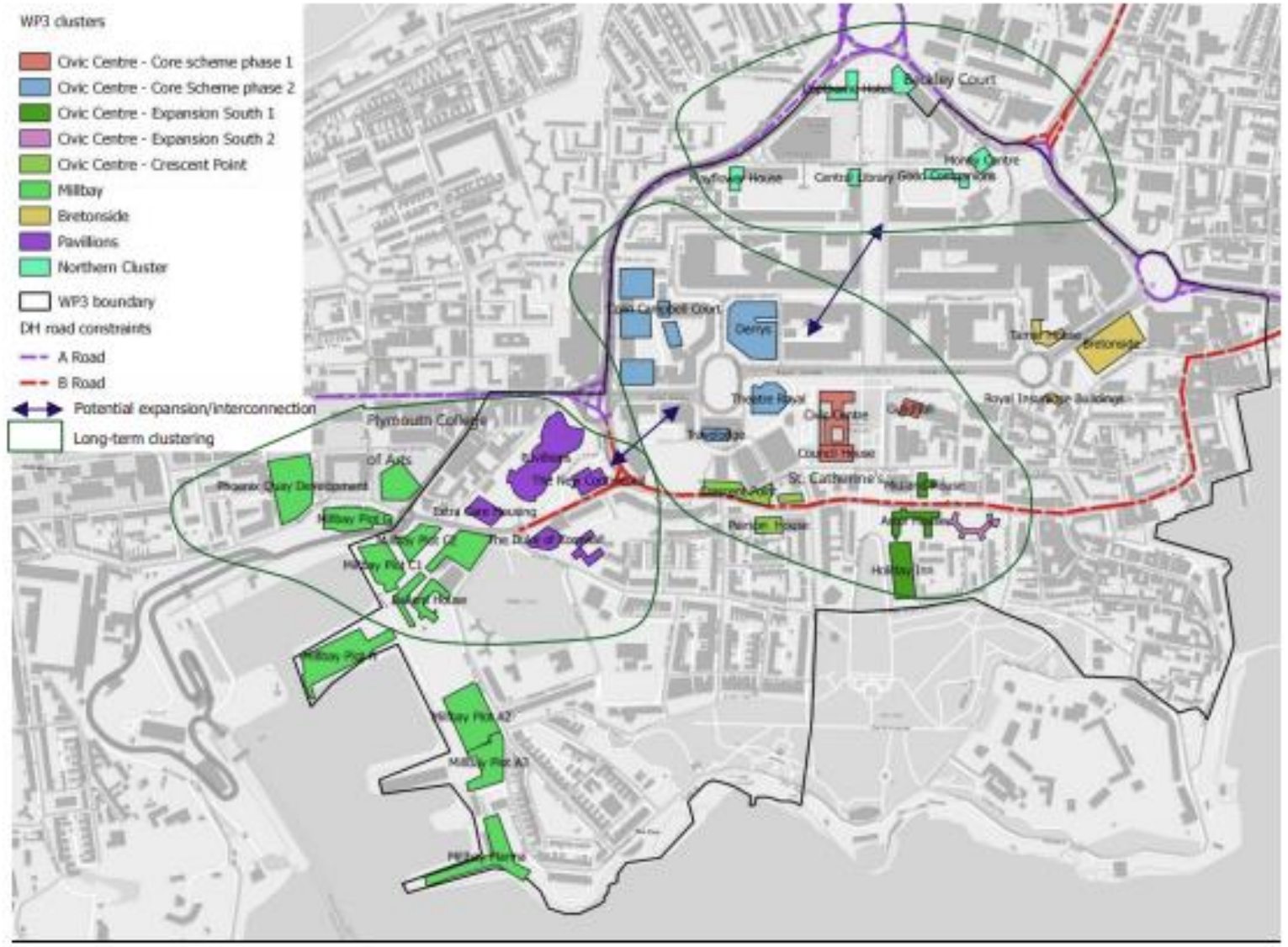
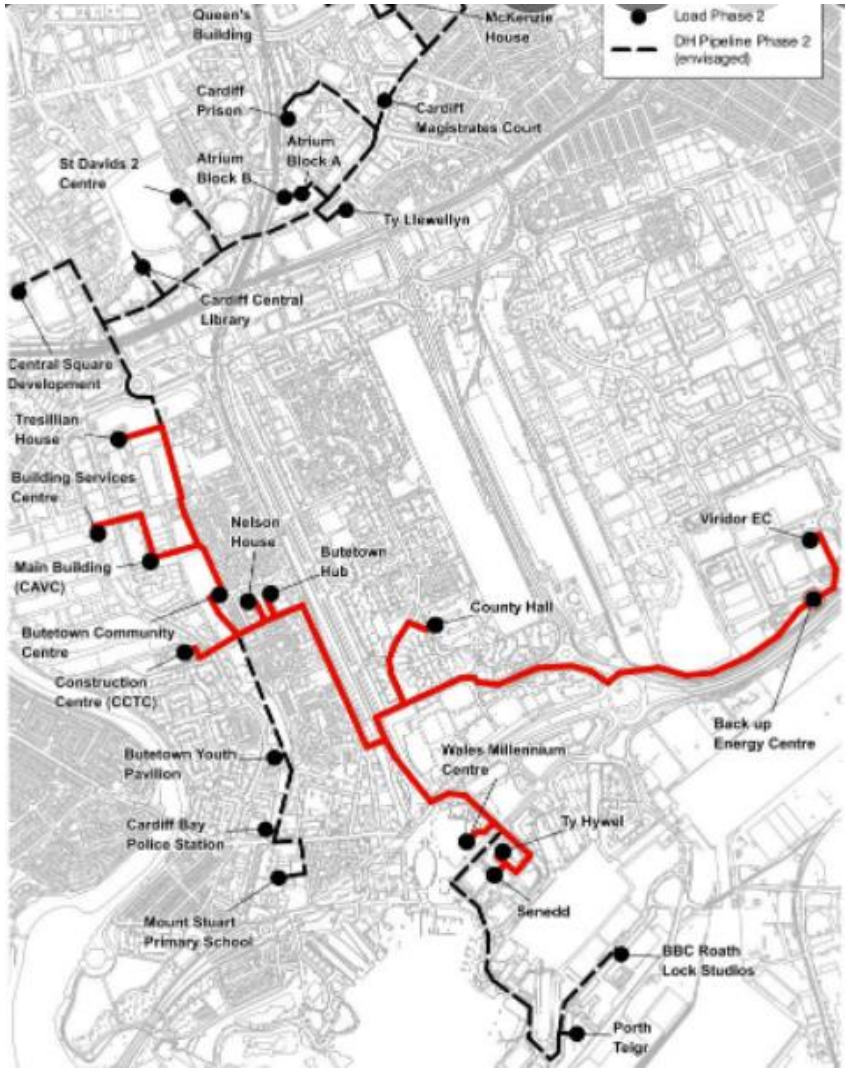
Look at the size of the prize - £150m-£multi billion

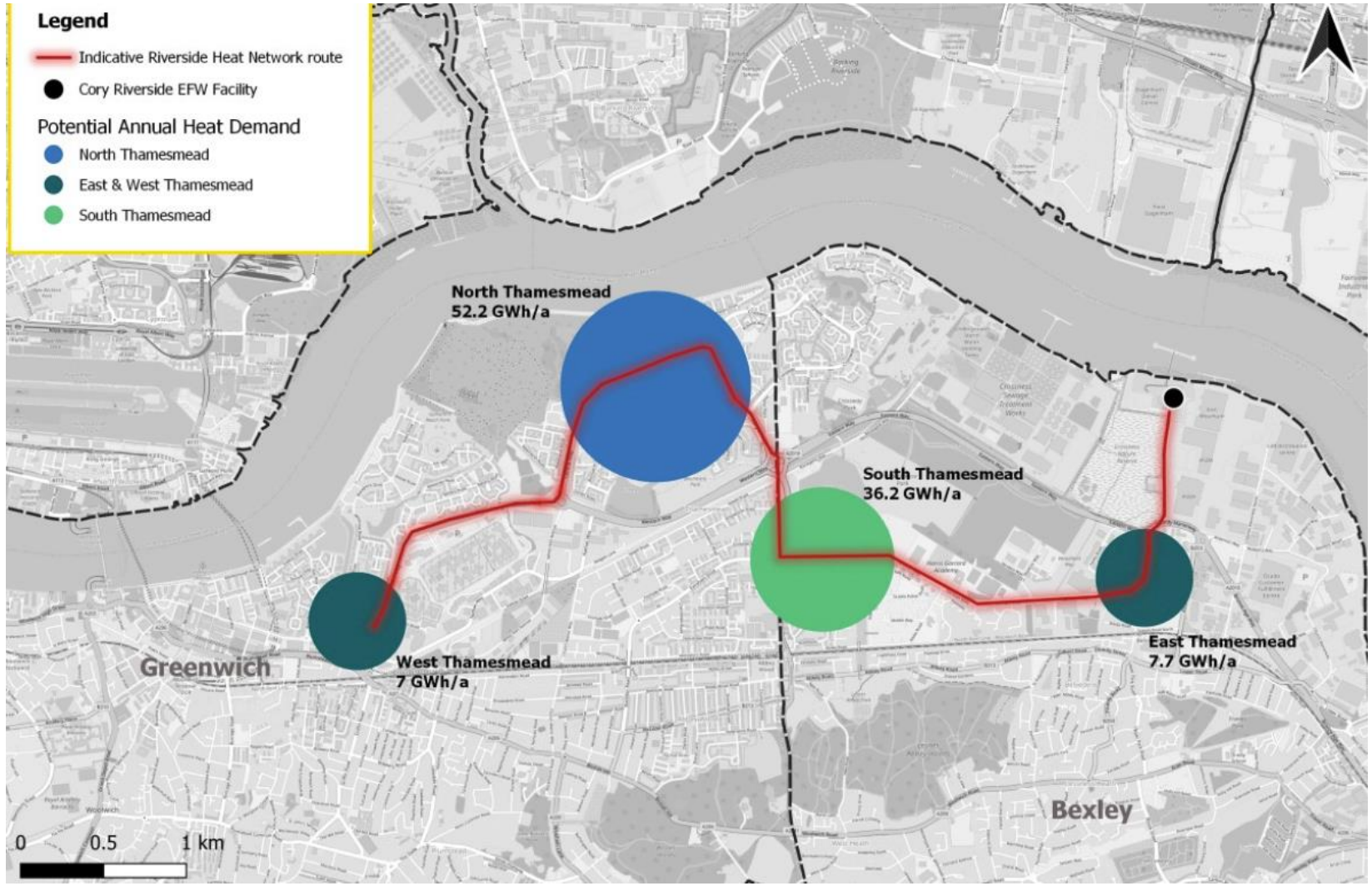


Example of Council developed Network



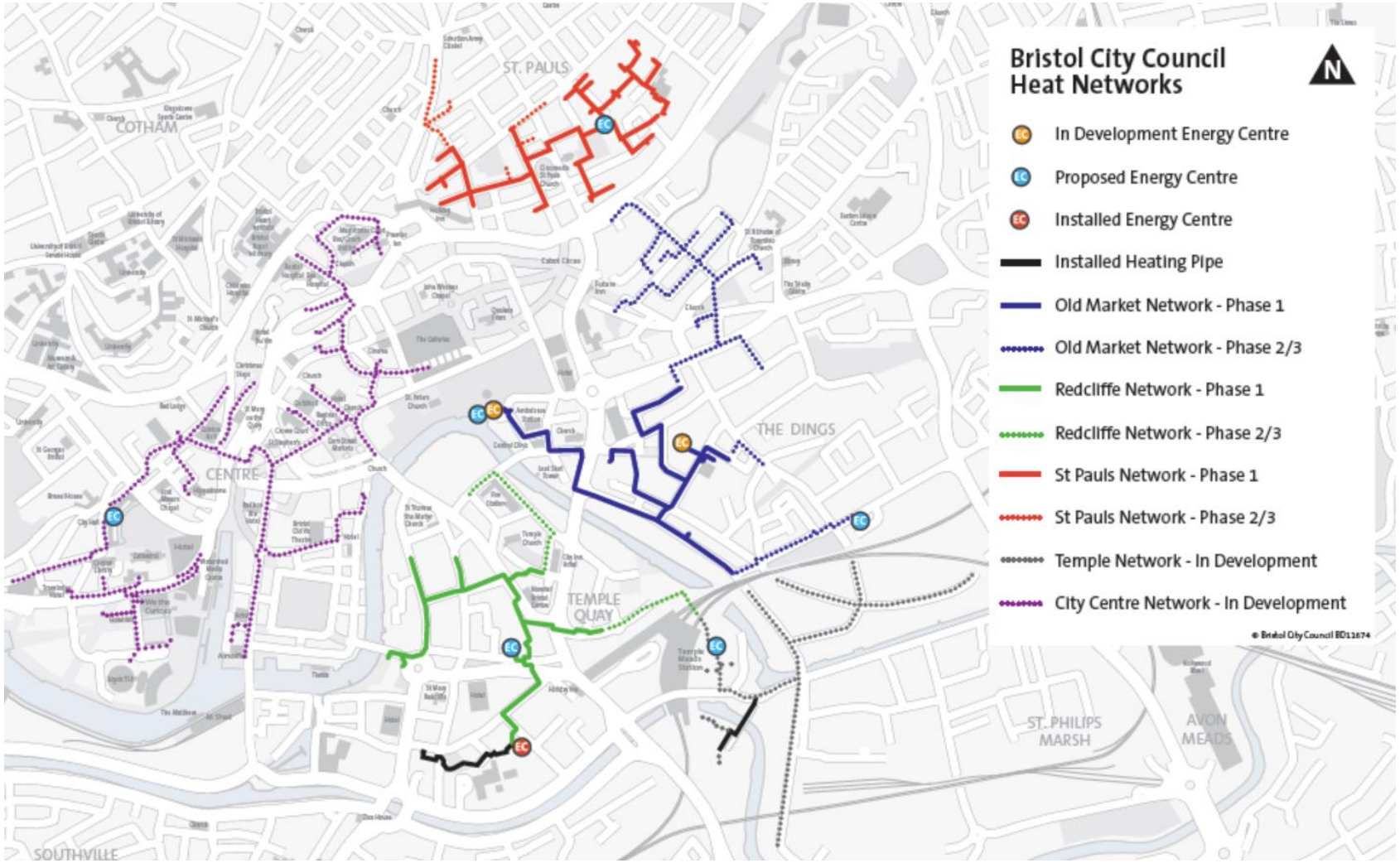
- Not using the full investment opportunity, but own it. They can sell into the future.
- Council own the scheme and can sell in the future

More hands off partnership



- 500k connections at £11k/ connection is £5.5bn

Start then sell



How does the infrastructure develop

Development Phase:

1. Do a deal with the base heat users – Anchor loads
2. Confirm the first heat source to come onto the network (Energy from Waste plant or heat pump energy centre)
3. Continue to have a “development presence” in the town to allow for further connections wanting to connect to the low carbon network are able to. SALES!

Pioneer Network

4. Fund and install the Pioneer Network, connecting up the anchor loads and anchor generation sources

Growth Phase 1:

5. Heat zoning is enacted and all major heat users in zone are forced to connect to low carbon network.

Growth Phase 2 - 2025 onwards:

6. Gas has no future as a heat source going forward (Heat and buildings strategy) so the network is the obvious low cost and low carbon solution. This allows a rapid development and further connections .
7. Now network is established further low carbon sources (data centres, power plants etc) are trying to connect to the network. This brings the heat cost down dramatically.
8. Progressively all larger heat users and then smaller and smaller heat users connect to network.

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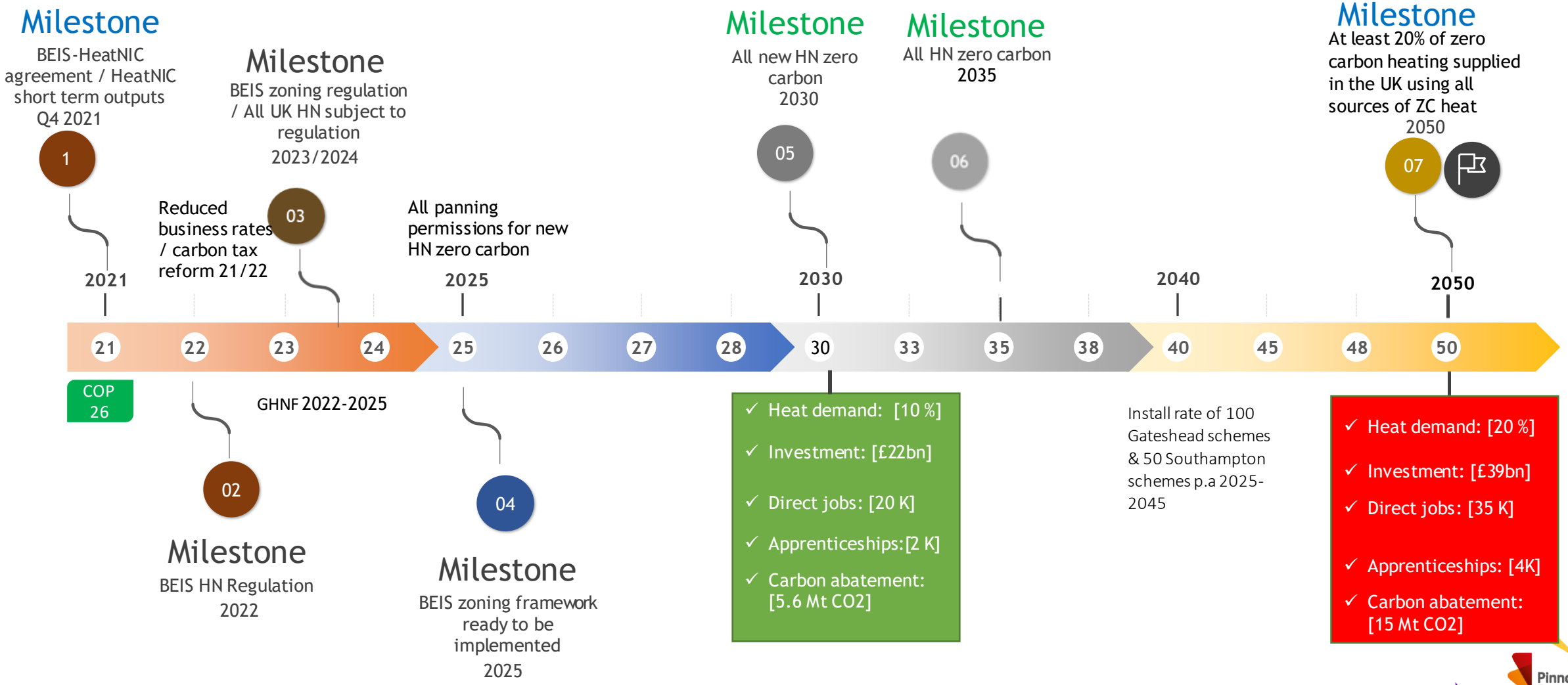
Procurement routes to find a partner

There are various levels of procurement possible at the beginning of a project:

1. No procurement
2. Procure council heat offtake contract
3. Beauty parade then joint development
4. Joint venture (BHIVE)
5. Full City scale procurement partner

Journey to Net Zero



Creating the lowest cost of low carbon heat in towns and cities - Delivering excellent customer experience – Supporting creation of smart liveable cities

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