

# Natural Infrastructure and Growth Scrutiny Panel Briefing Report - Heat Networks Delivery Approach



## National context

1. Heat represents the biggest energy use in the UK, accounts for 46% of all the energy used, and around 30% of UK carbon emissions. 90% of these heat related emissions are from burning gas. Providing heating and hot water to buildings constitutes 28% of Plymouth's carbon emissions. To reach Net Zero by 2050, Climate Change Committee sets out that the sector needs to be almost completely decarbonised. It is however, one of the hardest sectors to decarbonise, due to the variety of building stock, different ownerships and extent of engagement required.
2. To date progress to decarbonise this sector this has been very slow indeed across the UK. 'Plymouth's greenhouse gas reporting and sector emissions monitoring and projections 2022' (University of Exeter) estimates that to achieve Net Zero 72,000 heat pump installations are needed by 2030 (as one of the primary technologies) – which requires the installation of an additional 8,977 heat pumps annually. To date EPC data suggests the installation of only 180 heat pumps in Plymouth to 2022. Heat networks provide an opportunity to accelerate progress significantly by providing an 'at scale' approach, utilising waste heat that will otherwise only contribute further to global warming.
3. Climate Change Committee, in its Sixth Carbon Budget sets out different pathways to Net Zero, all of which show Heat Networks contributing to 20% of overall heat demand by 2050 and 42% of non-domestic properties. As well as driving the decarbonisation of heat, they also highlight other benefits, including improved energy security and improved air quality.
4. Heat networks can provide space heating, hot water and cooling, and are considered to be a key infrastructure for decarbonising heat, as they can access and utilise larger scale sources of waste and renewable heat, offering a clean and low-carbon supply at competitive prices to businesses and households. Waste heat is by far the cheapest source of heat but also decouples supply of heat from some of the volatility of energy prices, associated with fossil fuels. Conservative estimates suggest that industrial waste heat could cover at least 25% of district heating generation. In Sweden 45% of all heat used in heat networks came from sources of waste heat in 2018. Figure 1 provides an illustration of what a heat network is.
5. Many buildings are expensive or difficult to retrofit with a low carbon heat source in isolation. Studies have shown that approaches to decarbonisation in higher density urban areas, using district energy networks with heat pumps can involve lower capital and operational costs than individual heat pumps.
6. Another advantage is the improvement to air quality through the reduction in the significant NOx emissions relating to gas boiler use.
7. In October 2023, the Energy Act received Royal Assent. The Act gives powers for the Government to develop legislation around zoning and regulation of heat networks. The Government has already consulted on the Heat Network Zoning legislation and suggested this should be in place early in 2025. Ofgem have been appointed as regulator.
8. Heat network zoning will be designated by Government, on the basis of heat demand density, using a national model. Heat networks are expected to be the lowest cost solution for decarbonising heat in these areas. Local authorities and heat network developers will be able to quickly identify

where new heat networks should be built, but also there will be requirements for certain buildings to connect.

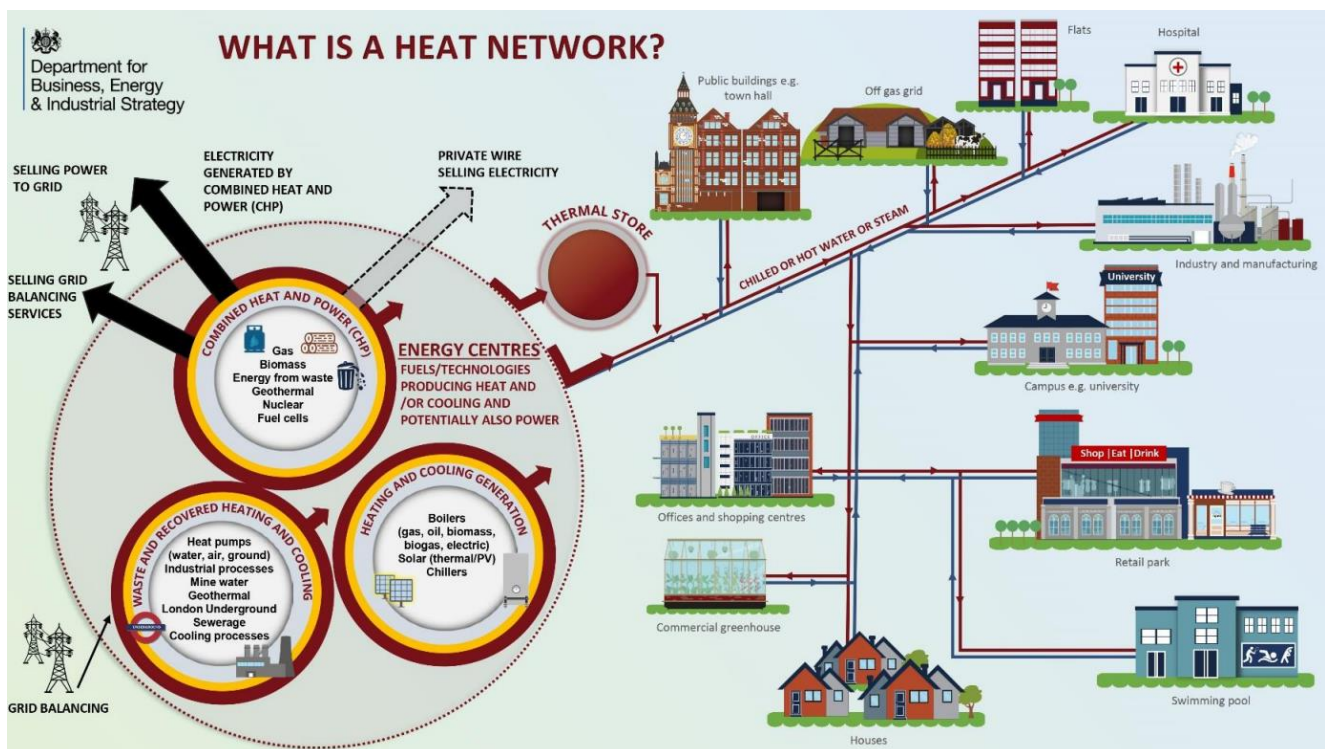


Figure 1. 'What is a Heat Network' illustration

9. Local authorities will be consulted on the zones and invited to oversee management of zones, as Zone Coordinators, along with the Central Authority (central government) overseeing the zoning nationally. The recent consultation of heat network zoning suggests that resources will be made available to Local Authorities to fulfil this statutory role. Should Local Authorities not wish to carry out this role, then it is likely this would be carried out by the Central Authority.

10. The Government have also set out delivery options for heat networks, which are likely to be:
- Local authorities invited/ enabled to lead process of procurement, if fulfilling Zone Coordinator role under Heat Network Zoning secondary legislation
  - Government will take the lead as the Heat Network Zoning Authority (the Central Authority) under Heat Network Zoning secondary legislation, in absence of local authority interest.
  - Advanced Zone Programme areas (including Plymouth, as one of 17 cities) are able to move forward first (with government support and funding committed) and are likely to be the first zones designated nationally.

## Plymouth opportunity

11. The City Council has been working with the Department of Energy Security & Net Zero (DESNZ) as part of the Heat Network Zoning Pilot Programme (28 cities). This pilot has identified two preliminary zones as shown in Figure 2 (please note these are pilot zones and subject to final policy approval).

12. Plymouth was shortlisted by DESNZ through its Advanced Zoning Programme (AZP) along with 16 other cities. Plymouth AZP studies show a deliverable scheme in west and south of City with capital value of approximately £300m, and also at Derriford (an additional £50m). The southern area is based principally around two large waste heat sources; the South West Water Central Plant, and the Devonport Energy from Waste plant. At Derriford the scheme is focused around waste heat from

the NHS medical waste incinerator, together with expanding the existing ground source scheme at Plymouth Marjon University to provide heating and cooling across this area.

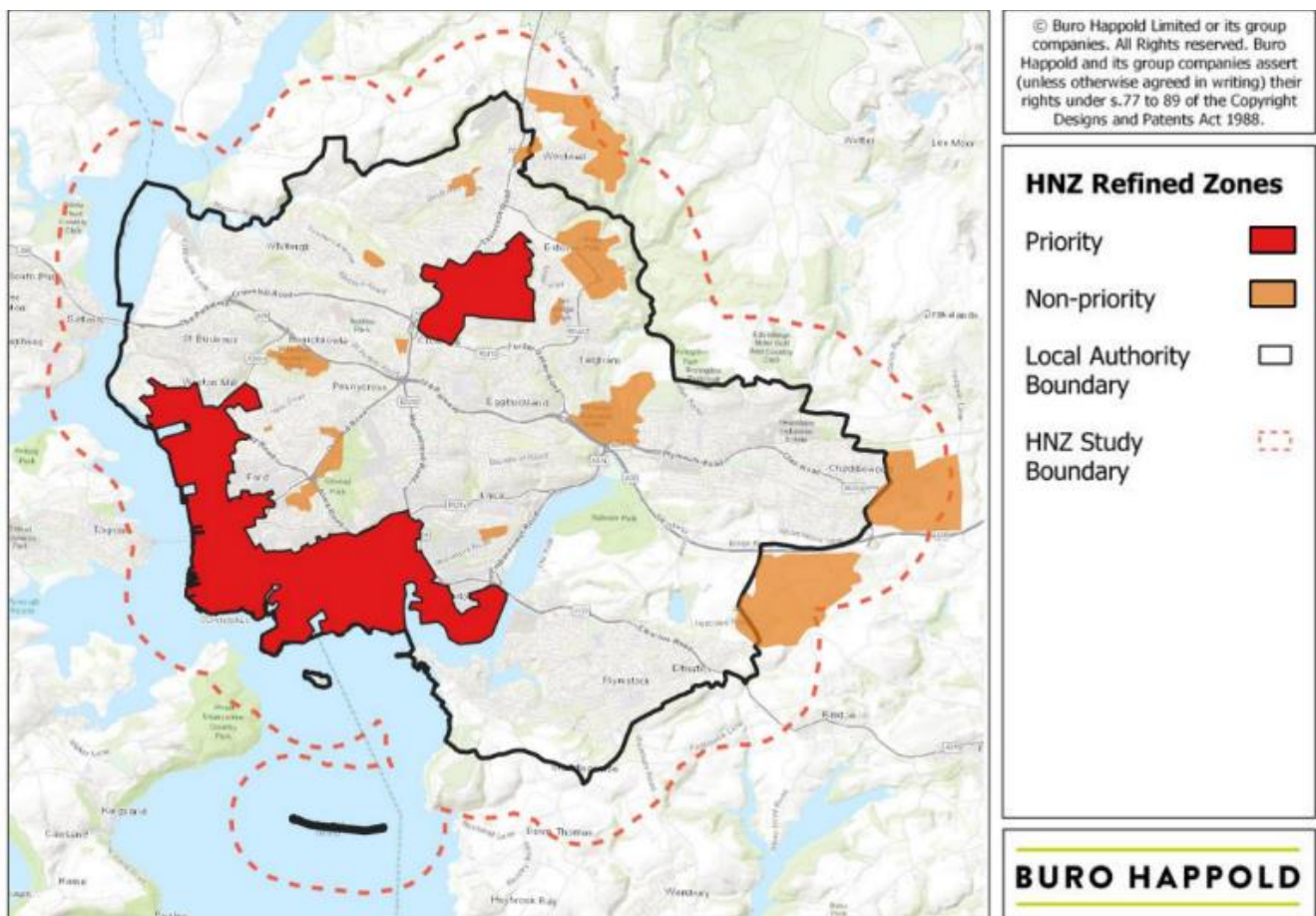


Figure 2. Two potential Heat Network Zones in Plymouth

13. Annual carbon savings with significant build out for both zones have been estimated to be **31,000tCO<sub>2</sub>**, which represents over 3% of the current city emissions but we would expect the carbon savings to be higher as this network is expanded and to be in excess of 5%. Figure 3 shows a potential strategic heat network across the southern waterfront zone alone, with estimated carbon savings of 26,000tCO<sub>2</sub>/ annum. This is therefore an intervention with significant impact in the journey to a net zero city. Additionally, the strategic heat network creates significant opportunities for creating new pathways in the city for green jobs and skills, which is one of the Plymouth Economic Strategy's key areas of focus.

14. Plymouth has been further supported through the AZP process to move to delivery. DESNZ has directly appointed consultants to support Plymouth, in terms of technical/ financial/ commercial development for the first phase of zonal roll out, which would enable an application for grant funding to the Green Heat Network Fund. This will also support the procurement of a zonal 'Development Partner', to work with the City Council and bring investment, deliver, operate and maintain the network.

15. The build out of these zonal opportunities would require a number of phases, over a number of decades and a potential initial phase is shown in Figure 4.



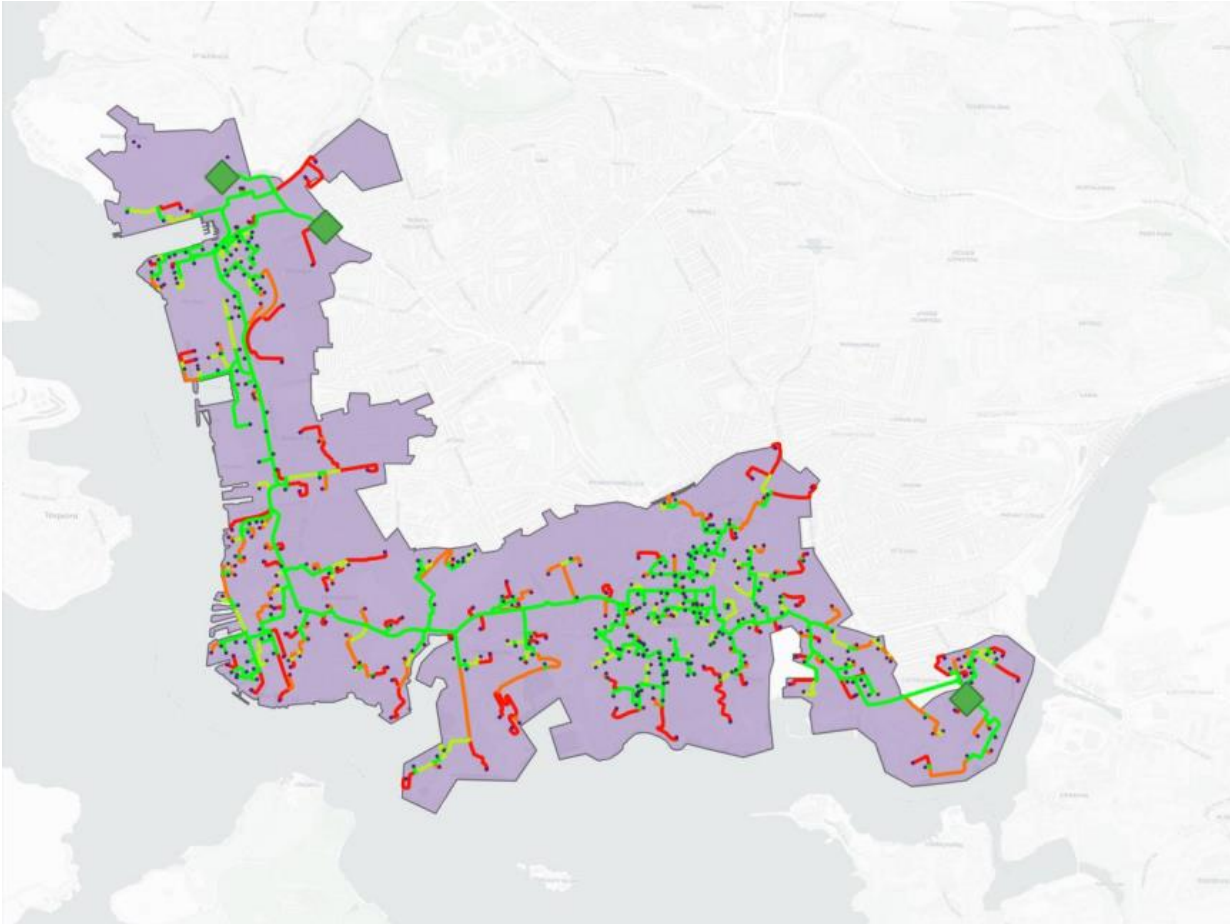


Figure 3. Potential strategic heat network across southern zonal area.

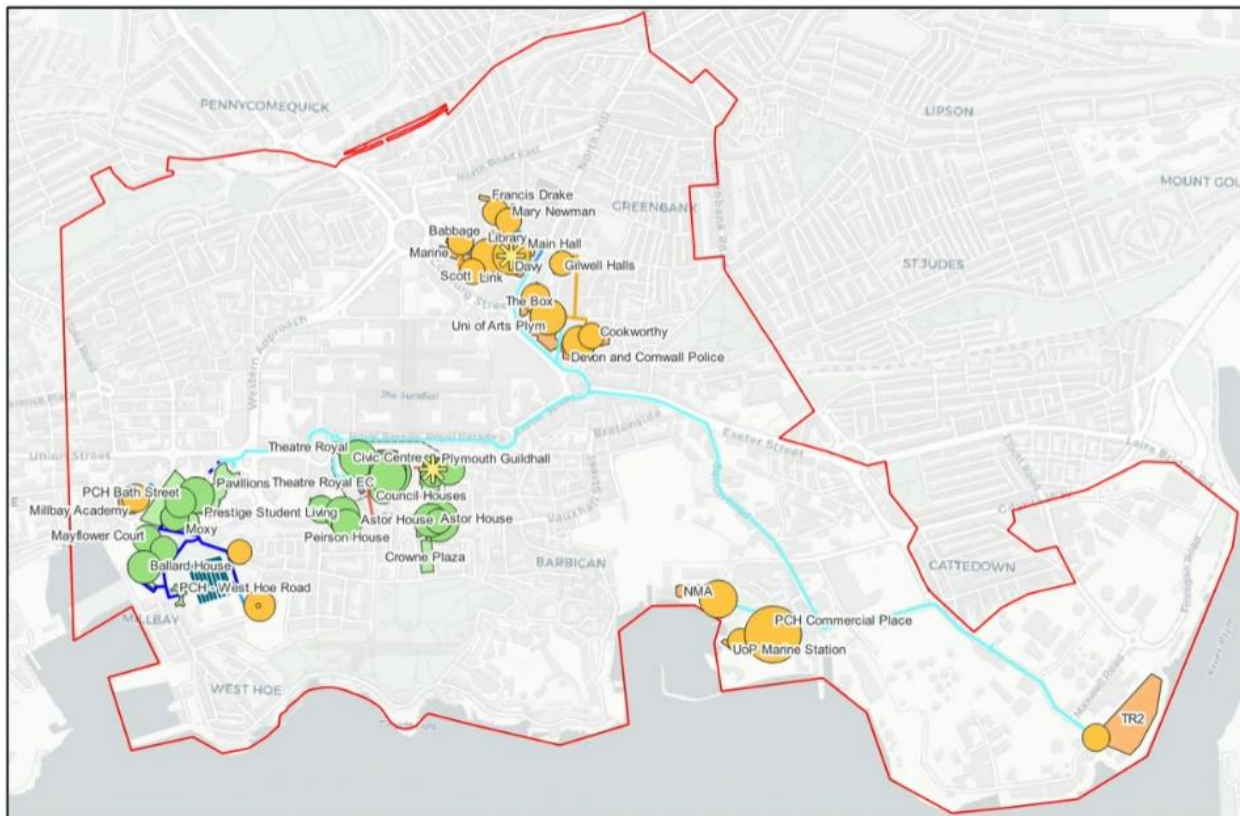


Figure 4. Potential first phase.

## Corporate policy alignment

16. Delivery of heat networks has been identified in every **Climate Emergency Action Plan** and **Net Zero Action Plan** (NZAP) between 2020 and 2024, including:
- Submitting funding applications to support development and delivery of heat network
  - Feasibility studies and testing for different heat sources
  - Delivering heat network cluster around Civic Centre
  - Participation in government's Heat Network Zoning pilot.
17. **The NZAP 2024-27** includes the latest action commitment:
- Develop a strategic heat network delivery programme for the city, including the city centre/waterfront and Derriford areas, including the procurement of a delivery partner, aided through participation in the Government's Advanced Zoning Programme.
18. **The Plymouth and South West Devon Joint Local Plan** (March 2019) requires developments to connect, or be able to connect, to a heat network, if within a 'district energy opportunity area'. As a result, many developments in the City Centre and other areas, have already been designed to be ready to connect to a heat network.
19. **The Plymouth Plan** Policy GRO7 specifically sets out 'promoting the creation of infrastructure to supply low carbon heat through the delivery and expansion of district energy networks'.
20. **The Plymouth Economic Strategy 2024** targets inward investment and growth activity from businesses linked to Net Zero opportunities, including specifically heat networks.
21. Additionally, the current **Corporate Plan** identifies green investment, jobs and skills as a corporate priority.

## Market and investment interest

22. Informal engagement with the market over the past few years and in 2024, has demonstrated strong interest from **heat network developers**, with significant investment to deploy, looking to prioritise which cities work with over the next few years. Indeed, heat networks are not necessarily dependent on public sector investment. Our engagement in **Government pilot / AZP** work will further increase this market interest.
23. Estimated investment in this sector nationally is £80 billion to 2050, which requires significant expansion of supply chain, with associated jobs and skills required.
24. The **Green Heat Network Fund** (Government grant) is a funding source focused on heat networks. DESNZ are providing a support package through the AZP programme, part of which will allow the City Council to apply for GHNF towards an initial phase, as there is already significant demand for this funding.
25. The **UK Investment Bank (UKIB)** prioritises cheap loans to the public sector for major green infrastructure investments, including specifically district heating networks. It also provides finance to private sector organisations.

## Delivery options appraisal

26. A new approach to delivery of heat networks has been proposed by DESNZ to reduce the time and cost to delivery, but also achieve delivery over a zonal scale required to meet the UK's net zero commitments. Some Local Authorities are now using this approach to work with the private sector to bring investment, deliver, operate and maintain this infrastructure, recognising that they do not have the capacity, skills or resources required to achieve this alone. The approach typically involves the procurement of a development partner based on a set of criteria, and seeking to maximise the local and social benefits, through this process. This procurement approach normally takes 6 months to complete.
27. The City Council has engaged Burges Salmon, an independent law firm, to complete an assessment of potential routes to market, including options for delivery vehicles, alongside commercial advisers (Energy Direction Ltd). This reviewed a number of options, against a number of criteria (which may have different weighting).
28. In summary, the principal approaches are:
- Option 1: City Council owned: the City Council plays a leading role by establishing a wholly-owned subsidiary;
  - Option 2: 50/50 Joint Venture (JV) model: the City Council plays a significant role by establishing a 50/50 corporate joint venture vehicle (which will be the heat network developer) with a private sector partner;
  - Option 3: City Council led procurement, with two variations on this approach:
  - 3a. Golden share JV model: the City Council plays a residual, strategic role by holding a single "golden share" in a corporate joint venture vehicle (which will be the heat network developer), while a private sector partner has primary responsibilities in relation the heat network developer;
  - 3b. Joint delivery agreement model: the City Council enters into a joint delivery agreement (and governance agreement) with a private sector partner who is responsible for delivering and operating the heat networks within boundary conditions set by the City Council;
  - Option 4: Private model: a private sector heat network developer promotes a scheme independently or is selected through a competition run by the Government, to be responsible for the delivery and operation of the Heat Project. The City Council plays no active role in the development or delivery of heat networks.
29. The results are summarised in Figure 5. Only the City Council owned or JV 50/50 options (Options 1 and 2) would require any City Council capital funding, with the City Council owned option (Option 1) particularly carrying significant risks for the organisation. The Private Option (Option 4) would however limit the City Council's influence, such as in terms of maximising local or social benefits.
30. Burges Salmon, Energy Direction and the Council's procurement team highlighted the need to engage further with market before finalising the detailed option, to ensure any procurement approach is successful and is something that the market can work with. Initial market testing has shown strong interest from the industry, that they have significant funding to deploy and also they can work with either a City Council led procurement (Option 3, including both sub-options a and b) or alternatively a JV arrangement (Option 2). Responses highlight certain characteristics of the proposals being attractive, including the availability of large waste heat sources and the scale of opportunity in Plymouth.

	Private	JDA	JV Golden Share	JV 50/50	PCC owned
Risk Allocation	Green	Green	Green	Yellow	Red
Financial Implications to PCC	Green	Green	Green	Yellow	Red
Governance	Green	Green	Green	Yellow	Yellow
Operational Decision Making	Yellow	Yellow	Yellow	Yellow	Green
Alignment with AZP timescale	Green	Green	Green	Red	Red
Alignment with Legislation	Green	Green	Green	Green	Yellow
PCC influence	Red	Yellow	Yellow	Yellow	Green
Social Value	Yellow	Yellow	Yellow	Yellow	Green
Alignment with Market	Green	Green	Green	Yellow	Yellow
Attracting Finance	Green	Green	Green	Yellow	Red
Managing delivery	Green	Green	Yellow	Yellow	Red

Figure 5. Burges Salmon analysis of the main delivery options.

31. Burges Salmon have advised that it is important for the City Council to establish early on whether it wishes to have a shareholding early on using assets, land, intellectual property or finance (e.g. UKIB at low rates), which will in effect favour a Joint Venture approach.
32. Under the different delivery models there are different risks and rewards as set out briefly in Figure 6.

	Option	Risk	Reward
	<b>PCC Owned and Managed</b>	Substantial ongoing finance required Major financial risks and liabilities Reputational risks if the energy company fails	Retain full control over project Retain all profits if successful Social value outcomes able to be maximised
	<b>Joint Venture with Shareholding</b>	Limited liability as a shareholder Greater financial implications and risks, depending on level of shareholding Greater reputational risks	Greater influence on social value and other outcomes Potential revenue generation
	<b>PCC led procurement</b>	Can be delivered without significant financial implications or risks for PCC No PCC liability for delivery or operation of the network what company Some reputational risks	Influence on social value and other outcomes Little or no opportunity for revenue generation
	<b>Private Sector only</b>	No financial implications or risks for PCC No control of phasing / locations Greater risk of cherry picking.	Little or no influence on outcomes No opportunity for revenue generation

Figure 6. Risk/ Reward analysis of the main delivery approaches.

## Preferred delivery approach

33. On the basis of officer analysis, together with engagement with the Cabinet Member for Environment & Climate Change and Cabinet and the risk/reward assessment of the different approaches, the following conclusions were reached:

- That the recommended option is that of City Council led procurement (Option 3), given its limited risks and significant scope for reward. As part of the subsequent Business Case, options 3a) and 3b) will be assessed in greater detail to determine the optimum approach, which can then be taken forward.
- That the City Council owned and managed option, and the Joint Venture (50:50 or alternative) options (Options 1 and 2) carry significant cost and risk for the City Council, and could be ruled out.
- That the private sector option (Option 4) is not attractive in that it would leave the City Council with minimal influence on a range of factors, including local or social outcomes.

34. Funding is already committed by DESNZ to directly support development of the design for Phase I, the associated business case and procurement.

35. The preferred option **does not** require the City Council to commit any capital investment to delivery. The Council's role would be in relation to procuring a development partner who could take **all** of the financial risk.

36. Some clear benefits would seem apparent from the City Council taking the lead in this way:

- It would be able to maximise benefits for Plymouth including jobs, skills, carbon, fuel poverty alleviation, and cost of heat (e.g. City Council buildings).
- It helps ensure a development partner is secured who best aligns with City Council objectives.
- It provides the City Council with greater control over the delivery process - e.g. where and when pipeline is laid in streets along the route.
- It helps ensure that supply chain interest is focused on Plymouth as one of the national frontrunners, rather than pushing the city to the back of the queue.
- Roll out is likely to be much earlier than if selection of a district heat delivery partner does not begin until zoning is formally introduced and implemented (from 2025/26).

## Advanced Zoning Programme support and timescales.

37. Involvement in the Advanced Zoning Programme (AZP) gives the City Council a favourable position in securing grant from DESNZ's £280m Green Heat Network Fund (GHNF). It provides DESNZ support to apply through AZP programme towards Phase I. This is particularly important as this will be the final round of the Green Heat Network Fund, with no current guarantee that it will be extended, beyond the final deadline of January 2025.

38. Significant consultancy support has already been provided directly committed by DESNZ, to support the following:

- Design of Phase I technical proposals, commercial and financial advice.
- Procurement of a development partner
- GHNF application.

39. The City Council has entered into a non-binding commitment with DESNZ to aim to meet pre-set milestones:

- Current – July 2024: develop zonal outline business case
- July 2024: approval for zonal outline business case, including scope for GHNF bid
- May/ June 2025: selection of preferred delivery partner



- October 2025: final business case developed by preferred partner, demonstrating how Phase I delivery will be commercialised / Approval gateway Phase I (stop/go decision for the City Council and preferred partner)
- December 2025: start construction.

40. DESNZ is also considering offering further support to AZP councils to move to delivery.

### Indicative timeline for City Council led procurement.

41. Assuming the City Council is leading the process, below is an indicative timeline showing the respective roles to procure a Development Partner.

Milestone	2024				2025				2026	2027	WHO LEADS?
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1-4	Q1-4	
Technical reference and financial model Phase I scheme	Yellow	Yellow	Yellow								DESNZ
Phase I: Green Heat Network Fund application				Yellow							DESNZ
Phase I: GHNF decision					Green						GHNF
PCC Business Case approval			Green								PCC
PCC Procurement Development Partner				Green	Green						PCC
PCC Negotiation and final agreement with preferred bidder						Green					PCC
HND develops Phase I to commercialisation							Blue	Blue			HND
Approval Gateway PCC & HND								Green			PCC/ HND
HND Financial Close								Blue			HND
HND Commences Construction									Blue	Blue	HND

DESNZ: Department for Energy Security & Net Zero

HND: Heat Network Developer

GHNF: Green Heat Network Fund

42. Across both zones, the initial estimated investment value has been assessed to be in excess of £350M (£300m City Centre/ Waterfront and £50m Derriford).

43. Roll out in phases from 2026 to 2050 (and beyond). Phase I likely to include University area, Civic quarter and Millbay, using surplus heat from the South West Water Central Water Treatment Works, Cattedown.

### Implications for the City Council

44. Funding has already been identified to cover the revenue costs by the City Council to support the procurement (alongside Government DESNZ funding), from a variety of Section 106 contributions and grant funding, all of which is specifically ring-fenced for heat networks and cannot be used for any other purpose.

45. There is **no** requirement for the City Council to provide any capital funding.

46. The City Council could also support delivery by applying for Green Heat Network Fund grant funding towards phase I of a heat network, with the delivery partner taking on the grant agreement, rather than the City Council.

47. The City Council would be able to put forward some of its buildings for connection to the heat network, to access low carbon heat at a competitive rate (cost determined through the procurement), further supporting decarbonisation of its estate.

48. Council land at Prince Rock or other locations could be provided for an energy centre to support the first phase of the development. Options are being explored with Facilities Management and Land & Property which would also generate a rental income. Decarbonisation of the Council's estate is one of the core priorities of its Net Zero Action Plan 2024-27.

49. The City Council is able to secure commitments to a range of City Council priorities (skills/ jobs/ fuel poverty) by procuring the partners in the project.

Option	Capital implications	Revenue implications
<b>City Council owned</b>	Phase I £60m Southern Zone £300m Both Zones £350m	Significant revenue/ staff resourcing requirements, especially during development stages, with range of specialist skills. Significant governance arrangements needed.
<b>Joint Venture (50/50)</b>	Phase I £30m Southern Zone £150m Both Zones £175m	Typically staff resources can be provided by JV partner, although client-side staff resources needed. Some governance requirements.
<b>City Council led procurement</b>	No Capital requirement	Can largely be managed through existing staff, with some external support. Limited governance.
<b>Private</b>	No Capital requirement	No revenue implications

#### Characteristics

- Long term investment of 40 years plus.
- Slow returns over medium term, once capital repaid.
- High capital deployment early in the scheme development.
- Capital requirement could be reduced through grant. UKIB potential source of loan finance.
- Preliminary financial modelling Phase I indicates a positive Internal Rate of Return, sufficient to attract a private sector partner.

## Potential risks for City Council with possible mitigations

50. Some of the potential risks for the Council are set out below and possible mitigations. These will be developed in more detailed for the final Business Case.

Risk	Consequences	Possible mitigations
<b>Fail to attract suitable Development Partner</b>	Delays to development. Alternative options for delivery pursued (most likely by Zone Coordinator).	Continuing market engagement. Secure grant funding to support scheme.
<b>Lack of performance of Development Partner</b>	Slower development. Outputs not achieved. Scale not achieved	Contractually binding timescales for project development. Contract reviews and key milestones for delivery/ outputs. Development Partner loses opportunity to deliver a viable project
<b>Lack of take up/ connections</b>	Slower delivery. Smaller scale.	Planning policies ensure that new and existing buildings are required to connect. Requirement to Connect rules likely to apply when zoning enters into force.
<b>Delivery issues e.g. costs escalations/ unforeseen</b>	Slower delivery. Changes to scheme/ approach.	First phase sufficiently commercialised in advance of procurement, to reduce risks, and further work before final decision gateway. Risks primarily with Development Partner.
<b>Fail to meet requirements for Zonal Developer</b>	Development Partner not accepted by Ofgem as Zone Developer. Other Development Partners selected	Ofgem, as Regulator will authorise Zone Developers. Procurement will demonstrate a competitive process in line with this, also due diligence through the evaluation criteria.
<b>Reputational risks</b>	Plymouth City Council as scheme sponsor associated with scheme progress.	Contractual mechanisms/ commitments, and engagement. Role of Ofgem will also ensure provide additional oversight.
<b>Cherry picking</b>	Slight risks if areas where proposals don't meet hurdle rates	Contractually binding commitments/ reviews can be included in project documents assessed at the decision gateway. Potential grant options in areas which are sub-economic.
<b>Entity goes bust</b>	Under zonal legislation, Ofgem likely to step in and reappoint for continuity.	Regular monitoring and reviews under contract. Option through contract for 'last resort' step in rights.

## Next steps

51. Cabinet endorsed the approach on 9<sup>th</sup> September 2024, and delegated the final Business Case and associated decisions to the Service Director for Strategic Planning & Infrastructure in consultation with the Cabinet Member for Environment & Climate Change.

52. The next steps include the following:

- Engagement with key stakeholders, including South West Water and future heat customers, will continue to take place. Whilst the final agreements will be directly with the appointed development partner, agreement will be sought on 'in principle' Heads of Terms with key stakeholders for the supply of surplus heat into the network, and agreement on the locations for energy centres to create certainty on these key aspects.
- Work will continue to determine the optimum delivery approach and to allow the development of the relevant templates and documentation for the procurement.
- A community engagement strategy is being developed to inform the procurement and ensure this key aspect is addressed by the selected development partner.
- Further work is underway to inform the social value aspects of the procurement.
- Development and completion of the Business Case setting out the proposed approach to procurement of a Development Partner and to apply to the Green Heat Network Fund government grant in January 2025 to support delivery.

53. The resources to take forward these next steps has already been committed by the Department of Energy Security & Net Zero, with some ringfenced Section 106 revenue funding also available to support delivery, including community engagement.

54. A provisional timetable for decision making is set out below:

- November 2024 – Executive Decision to approve the revenue business case, to launch procurement for delivery partner against favoured delivery option and apply to Green Heat Network Fund to support the first phase.
- January 2025 – Procurement process commences & Green Heat Network Fund application submitted
- April 2025 - Green Heat Network Fund decision
- May/ June 2025 – preferred partner selected
- October 2025 – stop/go decision in consultation with Cabinet Member for Climate Change and the Environment