Peterborough Accelerated Net Zero (PANZ)

Delivery Model Suitability Assessment for Small-Scale Heat Networks

July 2025

Contents

Acronyms and abbreviations

BMI	Business Model Innovation
DBOM	Design, Build, Operation and Maintain
DBFOM	Design, Build, Finance, Operate & Maintain
DESNZ	Department for Energy Security & Net Zero
DM	Delivery Model
ESCo	Energy Services Company
GHNF	Green Heat Network Fund
HDNU	Heat Networks Delivery Unit
IRR	Internal Rate of Return
JV	Joint Venture
LAEP	Local Area Energy Plan
O&M	Operation & Maintenance
PANZ	Peterborough Accelerated Net Zero
PCC	Peterborough City Council
PWLB	Public Works Loan Board
RAG	Red Amber Green
SPV	Special Purpose Vehicle
UKIB	UK Infrastructure Bank
WP	Work Package

Executive summary

Research context and report overview

The PANZ project aims to create a comprehensive platform that integrates technical, social, demographic, and economic data to develop effective Net Zero plans.

Energy Systems Catapult (the Catapult) is supporting Peterborough City Council (PCC) to explore practical pathways for developing an emerging portfolio of small-scale heat networks, aligned with local decarbonisation objectives and wider place-based priorities.

To support this work, the Catapult has produced this delivery model suitability assessment to support PCC's approach to small-scale heat network delivery. This assessment includes:

- Stakeholder insights that highlight practical and commercial considerations for heat network delivery.
- An overview of the delivery models available to the Council, including its respective roles, responsibilities, and risk allocations.
- A comparative appraisal of each model against a defined set of evaluation criteria.

These insights are structured around three focus areas (outlined to the right) prioritised for their relevance in shaping a robust business case for future project delivery.

This report does not prescribe a preferred delivery model. Instead, it provides a structured, evidence-based assessment of each option's risks, requirements, and suitability. Although developed with a focus on Peterborough, the aim of the report is to support informed decision-making by highlighting the trade-offs involved. As such, it provides useful inputs for all local authorities choosing a delivery approach aligned with their capabilities and ambitions for heat network deployment.

Report focus areas

Additional stakeholder insights

Purpose: Outline the "softer" enablers essential for long-term success beyond purely technical and commercial feasibility. Core themes discussed include the role of the Council, governance & procurement, enabling functions, adaptability and community trust.

Council roles by delivery model

Purpose: Map the Council's leading, partnering, and oversight activities across each phase of the heat network lifecycle, for every shortlisted model (Golden-Share JV, Concession model and Merchant model). Aligned to the Department for Energy Security and Net Zero's (DESNZ) five-phase development lifecycle for consistency across delivery models.

Suitability appraisal of delivery models

Purpose: Evaluate each shortlisted model against set criteria to identify the optimal route to market for small-scale networks. This involved a Red-Amber-Green (RAG) analysis across 11 criteria to rank performance per model, providing a broader decision-making framework adaptable by other councils building their own heat-network business cases.

Overview of shortlisted delivery models (DMs)

This page provides an overview of the three delivery models discussed throughout the report. These models were short-listed through rigorous analysis of a longer list of delivery models. The methodology for this is set out on page 13.

DM1

- The Council establishes a Special Purpose Vehicle (SPV) with a private Energy Service Company (ESCo) partner.
- The Council is granted a single "golden share", but no equity, board representation or profit entitlement.
- This share grants the Council special veto rights (e.g. on tariffs, carbon targets, governance) and, in some instances, the power to terminate the contract.
- As a majority shareholder, the ESCo is responsible for funding, development and operations & maintenance.
- Ideal for procuring authorities seeking enhanced project involvement post-commercialisation stage without direct capital investment.

Golden Share Joint Venture (JV)

DM2

- In a concession model, the Council awards a long-term contract (a "concession") to a private ESCo.
- The private ESCo then owns, finances, builds and operates the network, usually under exclusivity for a fixed term.
- Critically, the Council retains ownerships of the assets (or has pre-financed them).
- The Council transfers demand and operational risk onto the concessionaire, meaning the Council retains limited control over the ESCO's contractors, tariffs and/or future expansion of the network.

Concession Model

DM3

- Under a merchant model, the Council plays virtually no role in development.
- Instead, a private ESCo independently builds and operates a heat network for profit, without a public-sector procurement.
- It does so at its own risk, contracting directly with building to supply heat.
- Thus, the model relies on the ESCo securing sufficient pre-committed demand from customers before commencing construction.
- The Council is not a project sponsor, so does not invest or contract (except as a possible heat offtaker). It may only act as a regulator or facilitator.

Merchant Model

Key Council activities by delivery model

This page summarises how the Council's leadership, risk exposure and oversight shift across each development stage under the three delivery models assessed in this report: a ***Golden-Share Joint Venture****, a* ***Concession Model*** *and the* ***Merchant Model*** *(see page 22). It shows the tapering of Council control and resource commitment - from high strategic involvement in the JV, to contractual and regulatory enforcement in the Concession, and minimal ongoing engagement under the Merchant model. These differences should guide delivery model selection, alongside internal capability, risk appetite, and long-term resource needs.*

1. Inception & Masterplan

The Council's strategic leadership recedes from end-to-end strategic planning in the JV; to priority-zone setting in the Concession; and then to demand-signaling only in the Merchant model.

2. Feasibility

Responsibility shifts from Council-led outline studies in the JV; to high-level validation pre-tender under the Concession; to entirely ESCo-driven analysis in the Merchant model.

3. Business Case

Ownership moves from SPV-draft and Council sign-off under the JV; to Council-crafted public justification in the Concession; to internal ESCo business decisions in the Merchant model.

4. Contracts & Procurement

Both the JV and the Concession models requires the Council to build a business case justifying risk transfer and value-for-money, with the former ratified by the Council via golden-share vote. Conversely, the Merchant path sees no Council-led business case - ESCos own their internal investment decisions.

5. Design, Construction & Commissioning

Delivery risk transitions from SPV under Council-facilitated consents within the JV; to ESCo-only execution with contract enforcement under the Concession; to private-sector discretion subject only to statutory consents under the Merchant model.

6. O&M and expansion

Council stewardship evolves from golden-share veto and board oversight under the JV; to KPI enforcement and connection mandates under the Concession; to full ESCo autonomy with only regulatory back-stop under the Merchant model.

Key findings from suitability appraisal of delivery models

*This suitability assessment offers local authorities an initial comparison of shortlisted delivery models for small-scale heat networks. Each model was evaluated against criteria from targeted literature and industry guidance, highlighting strengths and risks across key performance areas.** The analysis identifies the **Golden Share JV** and **Concession Model** as the strongest overall options, while the **Merchant Model** consistently underperforms against several criteria.*

Factor	Golden Share JV	Concession Model	Merchant Model
Suitability for small, low-IRR schemes	3	2	1
Council risk appetite	2	3	3
Council investment appetite	3	3	3
Council's capability burden	2	2	3
Desire for control	3	2	1
Desire for profit-sharing	1	2	1
Desire for long-term asset ownership	1	2	1
Exit strategy	3	3	0
Decarbonisation & fuel poverty	3	2	1
Simplicity / ease of deployment	2	2	3
Flexibility to adapt	2	1	0
TOTAL	25	24	17

Red	Amber	Green
Low suitability	Contract-bound fit	High suitability
High risk exposure	Moderate risk exposure	Low risk exposure
High capital	Conditional capital	No capital
High burden	Moderate burden	Low burden
Low control	Moderate control	High control
No share	Conditional share	High share
No ownership	Conditional ownership	Direct ownership
Complex exit	Structured exit	Simple exit
No influence	Partial influence	Strong influence
High complexity	Moderate complexity	Low complexity
Low flexibility	Moderate flexibility	High flexibility

* These scores are indicative only and not weighted - local authorities may wish to build on this framework and apply tailored weightings to inform a more robust multi-criteria decision analysis.

** RAG criteria definitions vary by assessment category to reflect the specific performance thresholds and risk tolerances relevant to each factor. The scoring methodology assigns numerical values of 1, 2, and 3 to Red, Amber, and Green ratings respectively, with definitions given in the right-hand side table above. For detailed RAG key definitions and scoring methodology, please refer to Section 6 'Suitability appraisal of delivery models'.

Bringing small-scale heat networks to market

For Council's seeking to facilitate the deployment of small-scale, low-carbon heat networks without exposing themselves to significant capital or delivery risk, a delivery model is required that is tailored to the unique characteristics of small-scale schemes.

Preferred option: Golden-Share JV

A golden-share JV allows the Council to maintain strategic oversight without day-to-day operational involvement. It also requires the ESCo to source all capital funding for the project, minimising commercial risk for the Council.

The Council's golden share allows it to exercise control in relation to a limited number of reserved matters, which could include obligating the ESCo to deliver the entire portfolio, thus also mitigating the risk of cherry-picking.

Preferred option: Concession Model

The concession model shifts demand and capital risk to the private sector, which is critical for small, complex schemes with variable demand profiles.

Robust contractual obligations protect portfolio integrity by requiring delivery across all sites, deterring cherry-picking through enforceable penalties specified at procurement.

With clear governance, tariff, and carbon standards at procurement, this proven model could attract capable partners to deliver the schemes.

Rationale for not choosing the Merchant Model

The merchant model depends on developers driving projects independently, which can work for larger schemes with high IRRs but is poorly suited to small-scale networks with modest returns that are unlikely to attract organic investment.

Without active Council intervention, delivery risk remains high and there is no guarantee that schemes will progress - making this model misaligned with the Council's ability to steer heat decarbonisation outcomes locally.

Key takeaways

Enables the Council to unlock private sector investment and expertise for small-scale heat networks while retaining strategic control to safeguard public interest, without taking on development or delivery risk.

This proven, market-familiar structure - when clearly packaged, governed, and well-defined from a specification standpoint - can attract capable partners to deliver a cohesive portfolio across local areas.

An unsuitable model for small-scale heat networks, as it relies on ESCos to initiate development. This is unlikely to occur without Council taking on a formal 'promoter' role pre-procurement.

Introduction

Introduction

The PANZ project aims to create a comprehensive platform that integrates technical, social, demographic, and economic data to support the development of effective Net Zero plans.

These plans include tailored financial strategies, engagement activities, and training to encourage the adoption of Net Zero technologies.

Building on Peterborough's pioneering Local Area Energy Plan (LAEP), the project further tailors energy plans to the specific needs of local communities.

The Catapult is supporting this programme of work by helping PCC explore practical pathways to develop an emerging portfolio of small-scale heat networks. This includes assessing delivery approaches that can enable projects to progress from early-stage opportunities through to delivery and long-term operation.

This report distills the research activities that have shaped its direction and provides a structured assessment of delivery model options for small-scale heat networks. It sets out the typical activities, roles, and responsibilities associated with each shortlisted approach across the heat network development lifecycle, and provides a comparative appraisal against a defined set of evaluation criteria. The report also draws on insights from engagement with developers and potential delivery partners to ensure the findings reflect current market practice.

Although developed with a focus on Peterborough, the approach and insights set out in this report are relevant to all local authorities considering delivery routes for small-scale heat networks.

Research activities to support heat network deployment

	Lead partner
Assessment of existing delivery mechanisms and tools with gap analysis.	Peterborough City Council
Exploration of delivery mechanisms and their use in addressing district energy roll out in potential projects.	Peterborough City Council
Assessment and shortlisting of potential delivery models for heat network deployment.	Catapult Energy Systems
Creation of a business case for future project delivery.	Peterborough City Council
Evaluation of the PANZ system in the development of the proposed project.	Peterborough City Council

Method

Evidence base built from prior research activities

The Catapult undertook a series of research activities to inform the development a delivery model assessment. These activities can be grouped into two key phases: developing an initial long-list of potential delivery models, and shortlisting and refining of delivery models through targeted stakeholder engagement.

Key objectives and activities within each stage were as follows:

1. Long-list of delivery models

Objective: To define the landscape by identifying the full range of potential delivery models for heat networks deployment.

Key activities:

- Desk-based research to develop an initial long-list of delivery models.
- Produced diagrams mapping out key value flows and financial flows between stakeholders.
- Outlined benefits, risks and key considerations.
- Included relevant case study evidence to illustrate real-world application for each model.

Refining the focus

Partway through the project, the work was refined to focus on delivery models for **small-scale heat networks**. This adjustment was driven by two key developments:

- The publication of relevant DESNZ guidance through the Advanced Zoning Programme (AZP) on delivery model guidance for regulated zones; and
- A decision to ensure the assessment addressed the practical realities of smaller schemes, where delivery requirements and market conditions can differ from larger, zone- or city-scale programmes.

2. Short-list of delivery models

Objective: To identify suitable delivery models for delivering small-scale heat networks.

Key activities:

- Mapped assumptions on the relative strengths and weaknesses of delivery models for small-scale heat networks.
- Tested feasibility and market appetite through stakeholder engagement with developers and investors.
- Agreed a shortlist of three preferred delivery models with client for further detailed appraisal.

Focusing the delivery model shortlist

As discussed on the previous page, the research activities undertaken across the earlier phases directly informed the selection of **three shortlisted business models**:

- **Golden-share joint venture (JV) model**
- **Concession model**
- **Merchant model**

This shortlist was shaped by several key insights from earlier research activities:

- **Strategic alignment:** Public sector–led models such as a *Council-led ESCo* and *In-house Delivery* were not progressed following assessment against the agreed criteria, including governance, deliverability, and financial considerations.
- **Relevance to research focus:** The *RESCo model* was ruled out given the scale and nature of small, dispersed heat networks. The anticipated limited number of connections would not support a regional, multi-authority procurement approach.
- **Stakeholder validation:** Engagement with developers and investors reinforced the appeal of the shortlisted options. JV models were valued for enabling Council participation, while merchant models were seen to accelerate delivery by giving ESCos greater control and flexibility.
- **Portfolio approach:** Although the concession model was viewed as less attractive for individual schemes due to exit and refinancing challenges, it was retained for its potential to bundle smaller networks under a single contract, making delivery more investable.

The remainder of this report focuses on the core appraisal areas set out opposite. These focus areas were prioritised to support assessment of the relative merits of each model and support informed decision-making on delivery models for small-scale heat networks.

Report structure

1 Additional considerations from engagement

Captures key insights from stakeholders on the hallmarks of a robust delivery model, and the importance of the Council's enabling role throughout.

2 Council activities by shortlisted delivery model

Sets out how the Council's roles and responsibilities evolve across the heat network lifecycle, with an explicit phase-by-phase breakdown for each delivery model.

3 Suitability appraisal via RAG ratings

Presents an options appraisal assessing the strengths and challenges of each shortlisted delivery model against criteria, providing an evidence base to inform the Council's decision.

Stakeholder lessons on delivery models

Rationale for stakeholder engagement

Following initial research, the Council drew on national guidance from DESNZ, including the Advanced Zoning Programme (AZP) Delivery Model Guidance, which sets out delivery model options for heat networks in regulated zones. This guidance is primarily oriented towards larger, zone- or city-wide schemes; further assessment is therefore needed to reflect the unique constraints of smaller, local heat networks.

To complement national guidance, the report focuses on delivery models for small-scale heat networks, and the practical considerations that shape their attractiveness to partners and investors. To test these assumptions, the Catapult engaged with a range of developers, investors and potential delivery partners.

The schemes considered are typically smaller in scale, with modest investment requirements and more variable demand and delivery conditions than larger heat network projects. Stakeholders consistently highlighted the value of a portfolio approach when bringing multiple smaller networks to market: packaging schemes can improve investability and help avoid selective development of only the most commercially attractive sites ("cherry picking"), supporting more comprehensive delivery across an area.

However, adopting a portfolio approach also introduces delivery model challenges, including balancing risk allocation, investor confidence, and community outcomes without placing an undue operational burden on the Council (see page 36). This section summarises the additional insights from stakeholder engagement to ensure the delivery model assessment reflects real-world delivery experience and current market expectations. More specifically, it highlights the role the Council can play within different delivery models. This was repeatedly emphasised as pivotal to effective delivery, based on lessons learned from previous heat network projects.

Considerations highlighted during engagement

This section summarises developers' insights on governance, procurement, adaptability, community involvement, and the critical role the Council can play in enabling the successful deployment of small-scale heat networks.* These considerations should be addressed as far as possible, regardless of which delivery model is ultimately selected.

Procurement requirements

Securing JV and/or concession partners via public procurement involves extensive timelines and complex governance negotiations. Most delivery models involve procurement elements, even if the Council is not *directly* assuming responsibility for the competitive tendering of delivery contracts covering design, construction, operations, metering and billing.

Adaptability

A delivery model should accommodate evolving circumstances throughout the heat network's operational lifespan. It should foster continuous network expansion, as well as the capital investment needed to do so. In the case of small heat networks, this could mean connecting to larger, existing schemes in the local area.

The role of the Council

While most stakeholders agreed Council involvement is critical for successful heat network deployment, many were cautious due to slow decision-making and limited in-house understanding of delivery. To fulfil its role effectively, a Council will need to strengthen its internal expertise, build sufficient delivery capacity and put in place robust governance structures to address these concerns and enable timely, informed decisions.

Community participation

Stakeholders noted the value of community involvement to increase the appeal of heat networks to domestic and commercial customers. This should occur as early as possible to increase customer "buy-in" by involving the community in decision making. This could be facilitated through participatory governance, e.g. including community representatives on the board or advisory committees.

Community ownership

Community asset ownership vehicles could allow locals to invest directly into the scheme in return for voting rights. It could also lend itself to a debt financing model whereby the heat network would ultimately be publicly owned after paying off debt. This could also unlock additional sources of funding, provided the heat network was 50% community owned.

Governance

Council participation in any delivery model requires internal organisational alignment around 'the principle of delivery'. Plans, strategies and resources must be structured accordingly. Designated offers or representatives must receive the right decision-making powers to execute delivery effectively.

What role should Councils play?

Stakeholder engagement consistently indicated that a robust and proactive role from the Council is critical for the successful deployment of heat networks, regardless of the chosen delivery model. This requires the Council to undertake a set of key roles and responsibilities, as summarized below.

- **Acting as a primary off-taker** by offering Council-owned buildings as anchor loads.
- **Supplying land** to energy centres and other developments.
- **Expediting wayleave agreements** to enable the passage of pipework over Council-owned land, where required.
- **Strategic planning and policy leadership** by providing clear policies (including planning and zoning) that support the adoption and expansion of heat networks in alignment with net zero targets and continuing to set further measurable targets.
- **Providing finance and investment** through offering or obtaining loans or grants, although the former would have to be offered in compliance with the subsidy control regime.
- **Acting as an enabler** through its control over a substantial property estate which can make land and heat demand available for schemes.
- **Protecting customers** by controlling heat prices, ensuring the value to the public is maximised
- **Being quick to respond** to decision-making, in joint venture vehicles, and sign off on land-use approvals.
- **Raising awareness and sharing information** on the benefits of heat networks (lower energy costs, reduced carbon emissions and energy security) and helping ensure that low-income areas are able to access affordable heating.
- **Strategic co-ordination** with other major civil works/infrastructure developments in a Council's area, minimising disruption to other heat network projects.

Summary

Stakeholder engagement findings highlight the practical and governance issues the Council must address when developing a go-to-market strategy for small-scale heat networks. The delivery model cannot focus only on commercial and technical feasibility; it must also build in softer enablers of success – effective governance, community trust, realistic procurement and adaptability – to ensure small-scale heat networks deliver lasting carbon and community benefits.

Firstly…

…the findings reinforce that procurement complexity and timelines must be fully factored into any chosen approach. Securing joint venture or concession partners will inevitably involve extensive procurement and governance negotiations. This underlines the need for realistic programme planning and dedicated internal capacity to manage procurement effectively, even where the Council intends to minimise its direct delivery role.

Secondly…

…adaptability emerged as a key requirement for success. Small-scale heat networks need delivery models that can evolve over time, supporting phased growth, new connections (such as to existing, city-wide heat networks), and attracting new capital investment. The Council must ensure that any contractual or governance structures it enters into do not limit future expansion opportunities or strategic alignment with wider net zero objectives.

Thirdly…

…**the engagement strongly highlighted the importance of community participation and ownership**. Local buy-in and trust are vital for customer connection rates, especially in areas with low heat density or where adoption is discretionary. Incorporating participatory governance or community investment vehicles into the delivery model can strengthen public support and unlock additional sources of funding or debt finance.

Fourth…

…governance and internal capacity were consistent themes. Stakeholders stressed that without clear internal roles, delegated authority, and robust governance arrangements, delivery models can stall or fail. This signals that the Council's strategy must prioritise building sufficient internal expertise, allocating decision-making powers, and aligning relevant teams around the principle of delivery.

Finally…

…the findings clarify the enabling role the Council must play for any model to succeed. Whether acting as an anchor load customer, landowner, planning authority, policy leader, or investor, the Council's active participation is a prerequisite for attracting private partners and reassuring local communities. Strategic co-ordination with wider infrastructure and policy alignment will further ensure that heat network deployment is feasible, investable, and delivers long-term public value.

Council activities by shortlisted delivery model

Council activities by shortlisted delivery model: overview

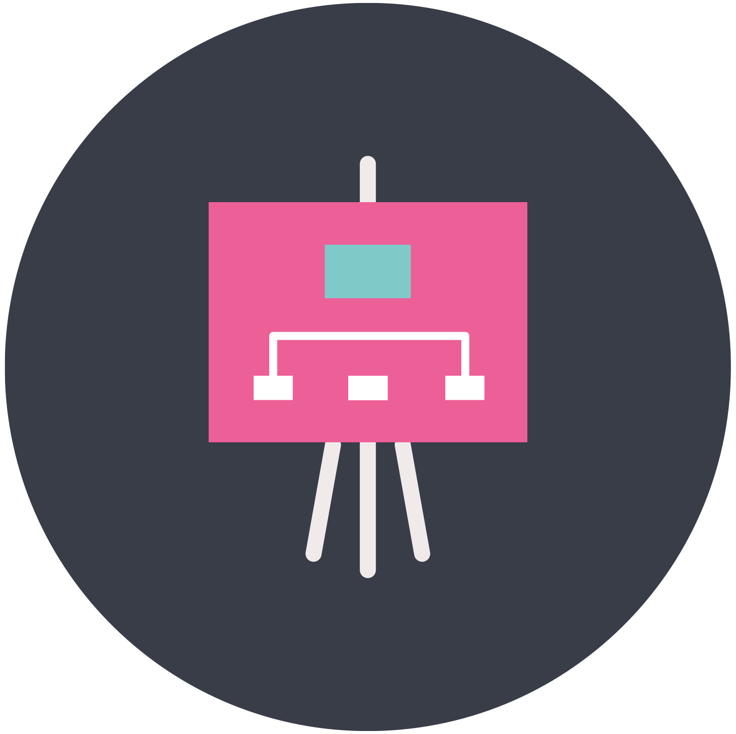
This section unpacks the Council's critical roles and responsibilities across each stage of the heat network development lifecycle for each shortlisted delivery model.

Roles and responsibilities are mapped against the five-phase development framework for heat networks defined by the Heat Networks Delivery Unit (HDNU) within the Department for Energy Security and Net Zero (DESNZ).[1] This ensures consistency with national best practice and easy comparison across delivery models.

This, in turn, should help Councils to:

- Consider activities they may need lead, partner on, or oversee when pursuing different delivery models;
- Equip decision-makers with a clear picture of resource needs, risk points, and governance requirements as they fine-tune their go-to-market strategy.

While tailored to Peterborough City Council's needs, this phase-by-phase breakdown offers a repeatable template for any local authority seeking to assess its readiness and clarify its role when pursuing different delivery models for small-scale district heat networks in their local areas.



Overview of shortlisted delivery models (DMs)

This page revisits the three delivery models shortlisted for small-scale heat network deployment.

DM1

- The Council establishes a Special Purpose Vehicle (SPV) with a private Energy Service Company (ESCo) partner.
- The Council is granted a single "golden share", but no equity, board representation or profit entitlement.
- This share grants the Council special veto rights (e.g. on tariffs, carbon targets, governance) and, in some instances, the power to terminate the contract.
- As a majority shareholders, the ESCo is responsible for funding, development and operations & maintenance.
- Ideal for procuring authorities seeking enhanced project involvement post-commercialisation stage without direct capital investment.

Golden Share Joint Venture (JV)

DM2

- In a concession model, the Council awards a long-term contract (a "concession") to a private ESCo.
- The private ESCo then owns, finances, builds and operates the network, usually under exclusivity for a fixed term.
- Critically, the Council retains ownerships of the assets (or has pre-financed them).
- The Council transfers demand and operational risk onto the concessionaire, meaning the Council retains limited control over the ESCO's contractors, tariffs and/or future expansion of the network.

Concession Model

DM3

- Under a merchant model, the Council plays virtually no role in development.
- Instead, a private ESCo independently builds and operates a heat network for profit, without a public-sector procurement.
- It does so at its own risk, contracting directly with building to supply heat.
- Thus, the model relies on the ESCo securing sufficient pre-committed demand from customers before commencing construction.
- The Council is not a project sponsor, so does not invest or contract (except as a possible heat offtaker). It may only act as a regulator or facilitator.

Merchant Model

Overview of heat network development stages

Council roles and responsibilities have been categorised according to heat network development phases, following the standard lifecycle framework by the HDNU.[1] An additional *'Inception and Energy Masterplan'* phase has been included, consistent with the Catapult's Public Sector Decarbonisation Guidance.[2]

#1 Inception & Energy Masterplan

From the outset, local authorities will often be the party driving or 'promoting' the delivery of a heat network. This involves creating an Energy Masterplan, identifying and mapping out the potential for deploying heat networks within an area.

#2 Feasibility

The Council decides whether to a) undertake feasibility studies internally (and subsequent detailed project development), or b) procure this from external consultancies. It is likely that a local authority will require expert advice from a technoeconomic standpoint.

#3 Business Case

Detailed project development means refining the business case, building on assumptions from the technoeconomic feasibility study. At this stage, the Council could also consider making use of its statutory planning powers to ensure planning policy is supportive of heat networks, helping to secure development commitments to bolster the business case.

#4 Contracts & Procurement

At this stage, the relevant parties should have determined what is being procured, identified key anchor loads, established the project's value and opportunity duration, and agreed on preferred delivery models. These details must be clearly set out in well-defined tender documents, with robust output specifications. This clarity is crucial to ensure the market can respond in a meaningful way.

#5 Design, Construction & Commissioning

The Council can help de-risk construction by securing wayleaves and permits, coordinating with stakeholders for phased works, facilitating switchovers with existing energy users and resolving site-specific issues through local knowledge.

#6 O&M and Future Expansion

Requirements for planned preventative maintenance should have been agreed during the procurement phase. The contractor's proposed 'solution' will be dictated by the output specification in the tender documents. Similarly, expansion plans could include connecting up to legacy schemes.

Golden Share Joint Venture (JV) Model

The following page sets out the Council's key responsibilities and the boundaries of its role at each stage of heat network development. This provides clarity on where the Council should lead, where it should facilitate, and where its involvement should be limited to ensure effective partnership with private delivery partners.

#1

Inception & Energy Masterplan

- The Council leads or commissions strategic planning from external consultancy partners. This would include heat-mapping, energy masterplans and identification of heat clusters.
- It may obtain public grants (e.g. from the Heat Networks Delivery Unit) to fund these early studies.[3]
- Under a golden-share JV the Council typically defines the high-level scope (e.g. serving city centre, schools, hospitals etc.) but works jointly with the private partner once selected.
- The Council ensures alignments with local planning and policies; the SPV partner may provide technical input, but the Council drives the overarching plan from a strategic standpoint.

#2

Feasibility

- The Council will conduct an initial feasibility assessment.
- Post-procurement, the SPV (primarily the private partner) will build on this to conduct detailed feasibility and viability analysis for the schemes, but with Council oversight.
- The Council may fund or co-fund this via grants (e.g. under the Green Heat Network Fund) and require the SPV to report progress.[4]
- The Council's role is to review and validate assumptions, ensure social/environmental objectives are met, and manage public consultations.
- The Council does *not* carry development risk – rather, the private partner should bear the cost of more detailed feasibility studies under the JV agreement.

#3

Business Case

- The Council participates in developing a full business case.
- In practice, the SPV will prepare a business case for investment/funding, but the Council must approve it as an SPV shareholder (even if only by golden share vote on reserved matters).
- The Council may use the business case to apply for grants or low-cost public finance (e.g. UKIB or PWLB).[5]
- The Council ensures the business case covers the financial viability of the whole portfolio of small heat networks.
- While the Council may not inject capital, its role is to endorse and sign off on the business case on strategic grounds, rather than to fund it.

Golden Share Joint Venture (JV) Model

The following page sets out the Council's key responsibilities and the boundaries of its role at each stage of heat network development. This provides clarity on where the Council should lead, where it should facilitate, and where its involvement should be limited to ensure effective partnership with private delivery partners.

#4 Contracts & Procurement

- Initially, the Council procures the private partner. It runs a competitive process to select an ESCo and form the SPV.
- Once formed, the SPV issues contracts for design, construction, technology supply etc. The Council (via its residual golden share) retains rights to approve key contracts or exit clauses.
- In Birkenhead, for example, the Council's golden share reserved approval over tariffs, reporting and carbon intensity. Thus, the Council can influence contract terms on service standards or pricing.
- However, the SPV (*not* the Council) negotiates and signs the construction and O&M contracts. The Council's procurement burden is lower than a full public procurement – it mainly focuses on selecting the SPV partner, not every supply contract.

#5 Design, Construction & Commissioning

- The SPV (through the private ESCo partner) takes primary responsibility for detailed design and building the network.
- The Council's role during delivery is predominantly facilitative: securing land access, street works consents, planning approvals, and liaising with stakeholders (like hospital or university estates).
- The Council monitors progress via SPV governance meetings, ensuring any reserved-matter approvals (e.g. major design changes) are handled.
- The Council does not directly manage construction and avoids construction cost risk. These are borne by the SPV partner.

#6 O&M and future expansion

- After commissioning, the SPV/ESCo operates the network. The Council's role is to oversee that the SPV meets service standards (via periodic review or by exercising golden-share veto if obligations slip).
- The Council may sit on the SPV board or have observer rights.
- If future expansion occurs (connecting secondary clusters), the SPV usually leads this, but the Council's strategic interest means it will support expansion via planning/zoning and may reserve approval of any expansion plan.
- Because the Council holds only a golden share, it is not obligated to inject further capital if the network grows, but it can set broad conditions (e.g., insist on social tariff policies or low-carbon targets).
- To conclude, the Council leverages its golden share to ensure long-term stewardship (tariff fairness, decarbonisation) while letting the private partner handle all operations and expansion financing.

Phase-by-phase roles timeline Golden-share JV

This timeline summarises how the Council and SPV Partner's role, responsibilities and limits evolve across each development stage under the Golden-Share JV model.

1

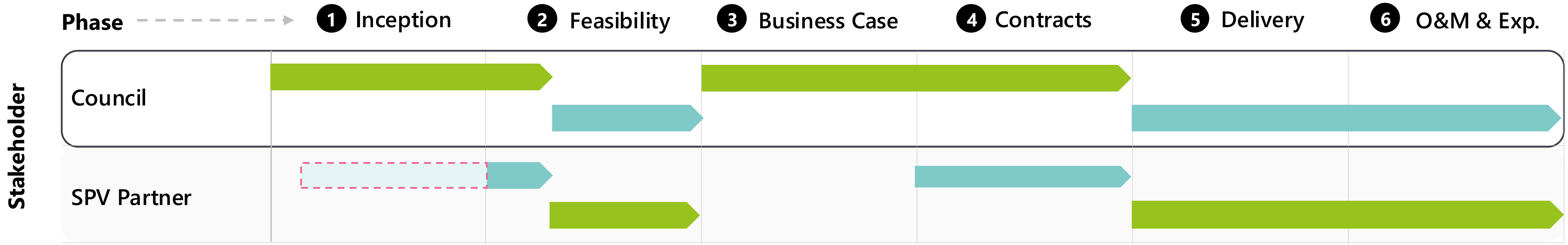
- **Council** leads strategic planning (heat-mapping, masterplan scope) and secures early-stage grants.
- **SPV partner** *may* support by offering technical input if onboarded during early stages, but this is unlikely.
- **Council limit:** sets scope but shares detailed planning with SPV.

3

- **Council** drives business case with consultant input, leveraging funding to build investment pitch.
- **Council limit:** provide oversight role post-award.

4

- **Council** runs procurement of SPV partner; retains golden-share approval over key DBOM contracts.
- **SPV partner** negotiates and signs downstream DBOM contracts.
- **Council limit:** procurement focus is on SPV selection, not every supply contract.



2

- **Council** initially commissions studies to validate broad feasibility, potentially grant-funded.
- **SPV partner** then takes over to lead detailed technoeconomic modelling post-award, funding majority of this phase.
- **Council limit:** post-award, Council retains oversight only – does not bear cost or development risk.

5

- **SPV partner** leads detailed design and construction, bearing delivery risk.
- **Council** facilitates land access, consents, stakeholder liaison, and reserved-matter approvals.
- **Council limit:** avoids execution risk.

6

- **SPV partner** operates network and funds future expansion.
- **Council** oversees service standards through board rights and supports expansion via planning and reserved-approval.
- **Council limit**: not obliged to inject capital but safeguards social/decarbonisation aims via golden-share veto rights.

Key: = Lead / Accountable = Support / Responsible for execution = Where stakeholder's involvement is conditional and/or limited

Concession Model

The following page sets out the Council's key responsibilities and the boundaries of its role at each stage of heat network development. This provides clarity on where the Council should lead, where it should facilitate, and where its involvement should be limited to ensure effective partnership with private delivery partners.

#1 Inception & Energy Masterplan

- The Council leads initial planning, identifying potential districts, mapping heat demand, and preparing an energy masterplan.
- It may zone an area to increase probability of future connections within its role as a Zone Coordinator.
- Heat mapping and strategy remain a Council role.

#2 Feasibility

- The Council may carry out initial feasibility assessments for the concession area(s), but it is typical for the winning bidder to conduct internal feasibility studies after award.
- The Council's role is to validate that the scheme is broadly viable before procurement.
- At this stage, the Council may consult local stakeholders and estimate costs, but final feasibility work (detailed design, heat source selection) is done by the concessionaire once appointed.

#3 Business Case

- The Council prepares a public business case for proceeding with a concession.
- This covers financials, carbon savings, social impact, etc., and is needed especially if public funding (grants/loans) or land use approvals are sought.
- The business case justifies the Council's choice of concession model and outlines how risks (demand, pricing, expansion) shift to the concessionaire.
- The Council must demonstrate that outsourcing via concession is better value-for-money than in-house delivery and thereby assumes responsibility for this analysis.

Concession Model

The following page sets out the Council's key responsibilities and the boundaries of its role at each stage of heat network development. This provides clarity on where the Council should lead, where it should facilitate, and where its involvement should be limited to ensure effective partnership with private delivery partners.

#4 Contracts & Procurement

- At this stage, the Council defines the concession scope (e.g. which buildings or districts are included) and then runs the tender to select a concessionaire.
- The tender documents specify Council requirements (e.g. service standards, pricing frameworks, connection obligations).
- After award, the concession contract (a Service Concession Agreement) details rights and obligations such as the ESCo's exclusive rights to build and run the network, guaranteed term length, and any concession fee or profit-share agreement.*
- Within the contract, the Council negotiates protections such as "reserved matters" or caps on price increases. For example, contracts often require the ESCo to index tariffs to an external fuel price and meet performance guarantees.
- Overall, the Council shoulders procurement work but then shifts execution to the private partner thereafter.

#5 Design, Construction & Commissioning

- Once the concessionaire is appointed, the Council's involvement is minimal during delivery. The ESCo designs and builds the heat network at its own risk and cost.
- The Council's remaining tasks are regulatory – e.g. granting planning approvals, road licenses, and ensuring development consents.
- If any issues arise (construction delays or disputes), the Council enforces contract provisions. However, the demand and delivery risk lies with the ESCo.
- In a nutshell, the Council transfers the fundamental commercial risks (funding, demand, price, expansion) onto the concessionaire.

#6 O&M and future expansion

- The ESCo operates and maintains the network for the concession term.
- The Council retains a monitoring role, checking that service standards and connection commitments are met and intervening if the operator breaches contract terms.
- If future expansion is to be mandated by zoning or local planning (e.g. obligating new developments to connect), the Council enforces connection requirements or works with/through regulators.
- In this model, the Council has a very limited direct operational role. It is essentially the regulator and/or enforcer of the concession.
- However, the Council may collect a concession fee or share of the profits if stipulated).

* In the context of the Concession Model, the terms "Concessionaire" and "ESCo" are used interchangeably throughout this report.

Phase-by-phase roles timeline Concession

This timeline summarises how the Council and SPV Partner's role, responsibilities and limits evolve across each development stage under the Concession model.

1

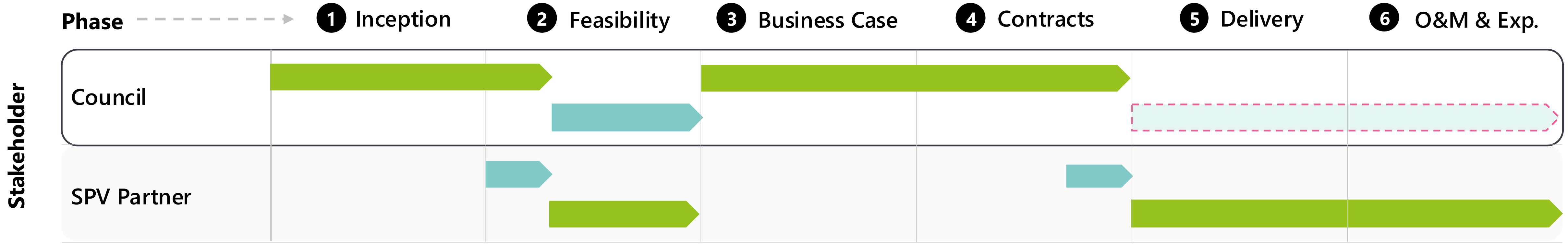
- **Council** leads strategic planning (heat-mapping, masterplan) and secures early-stage grants.
- **Council limit:** sets high-level strategy but not detailed design or technology solutions.
- *Concessionaire assumes no role pre-appointment.*

3

- **Council** develops public business case to justify outsourcing and risk transfer.
- **Council limit:** does not detail final build design or pricing – concessionaire refines this post-award.
- *Concessionaire assumes no role pre-appointment.*

4

- **Council** defines scope, sets KPIs, runs tender, and negotiates concession contract.
- **Concessionaire** prepares bid and accepts risk profile and delivery obligations.
- **Council limit:** procurement role ends at award – does not manage delivery contractors.



2

- **Concessionaire** funds and leads detailed technoeconomic modelling post-award.
- **Council** conducts initial studies to validate viability; consults stakeholders.
- **Council limit:** early studies may be grant-limited; relies on concessionaire for full feasibility appraisal.

5

- **Concessionaire** leads detailed design, build and financing; bears demand and delivery risk.
- **Council** grants consents, monitors compliance, and enforces contract terms if needed.
- **Council limit:** limited influence over design changes mid-build –requires formal contract amendments. Day-to-day visibility depends on concessionaire's reporting obligations/discipline.

6

- **Concessionaire** operates and maintains the network; funds and delivers any expansion.
- **Council** monitors performance, enforces standards, may collect fees, and supports expansion via planning.
- **Council limit:** cannot adjust tariffs beyond agreed indexation. Also cannot compel expansion - any new phases must be funded and led by the concessionaire under existing or renegotiated terms.

Key: = Lead / Accountable = Support / Responsible for execution = Where stakeholder's involvement is conditional and/or limited

Merchant Model

The following page sets out the Council's key responsibilities and the boundaries of its role at each stage of heat network development. This provides clarity on where the Council should lead, where it should facilitate, and where its involvement should be limited to ensure effective partnership with private delivery partners.

#1 Inception & Energy Masterplan

- The Council's role is largely indirect.
- It may still carry out city-wide heat mapping or define zones (to signal demand potential), but it does not sponsor a specific project per se.
- Council-sponsored heat masterplans may note opportunities, but no formal "project brief" is issued under this model.

#2 Feasibility

- Private ESCos undergo their own internal feasibility studies on target areas (e.g. assessing a university campus or hospital cluster).
- The Council has no role in feasibility analysis or validation, though it may be consulted to provide heat demand data for Council-owned buildings.
- Feasibility, viability and site surveys are driven by the ESCo seeking commercial opportunities, which are likely to be deemed as low for a small heat network portfolio.

#3 Business Case

- The Council does not prepare a business case for the project (since it is not a promoter).
- Any business case is internal to the ESCo's investment decision.
- The Council may decide to provide incentives (e.g. relaxed planning or offering anchor loads to bolster viability) if they wish, but this is at the Council's discretion.

Merchant Model

The following page sets out the Council's key responsibilities and the boundaries of its role at each stage of heat network development. This provides clarity on where the Council should lead, where it should facilitate, and where its involvement should be limited to ensure effective partnership with private delivery partners.

#4

Contracts & Procurement

- There is no Council-led procurement. The ESCo contracts directly with heat customers (schools, hospitals, building owners) on a merchant basis.
- The Council is not a contracting party (except if it chooses to sign a heat-supply contract for its own buildings).
- In effect, the market decides which networks are built. This model therefore risks "cherry-picking", where an ESCO only builds networks where returns are highest, leaving low-IRR segments undeveloped.

#5

Design, Construction & Commissioning

- The ESCO privately funds, designs and builds each network.
- The Council's only involvement is providing necessary approvals (planning, highways access) on request, but it does not manage or supervise the project.
- Each network is delivered piecemeal by the ESCO as a separate business venture.

#6

O&M and future expansion

- The ESCo operates the network alone and sells heat.
- The Council has no operational role beyond any regulatory supervision (e.g. under future heat network regulation).
- Expansion into secondary markets occurs at the ESCo's own initiative when new customers can be attracted.
- The Council might use tools like heat zoning to eventually steer such expansions, but under the merchant model the initiative is entirely private.

Phase-by-phase roles timeline **Merchant model**

This timeline summarises how the Council and SPV Partner's role, responsibilities and limits evolve across each development stage under the Merchant model.

1

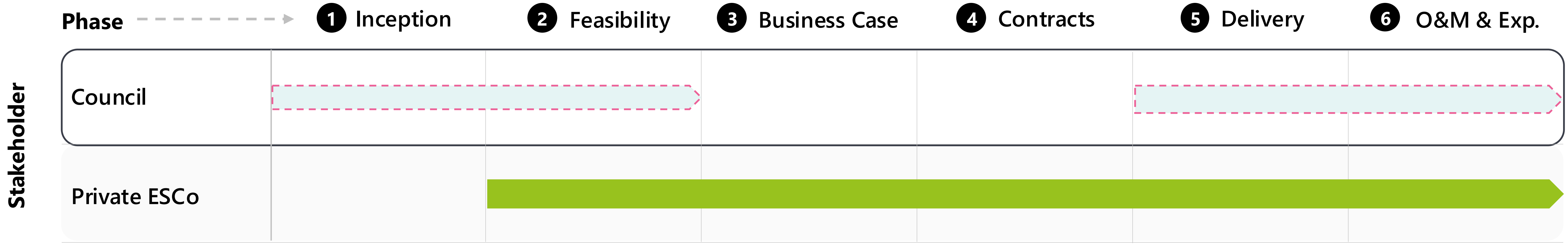
- **Council** role is indirect – may set zoning policy and signal non-financial incentives (e.g. streamlined planning, land facilitation) to attract interest, without sponsoring a scheme.
- **Private ESCo** identifies opportunities independently (market-led).

3

- **Council** assumes no formal role in business case preparation, as this is ESCo-led. May offer non-financial incentives if aware of the opportunity through ongoing dialogue.
- **Private ESCo** develops internal business case to support investment decisions.

4

- **Council** assumes no role due to no direct procurement, but may be contracted as an anchor customer to secure pre-committed demand.
- **Private ESCo** procures all DBOM contracts and contracts directly with offtakers on a merchant basis.



2

- **Council** role is passive, but enabling - for example, sharing heat demand data from Council-owned buildings and brokering early talks with anchor customers like NHS trusts, universities, or social housing providers.
- **Private ESCo** leads all feasibility and viability studies, contingent on its interest in the opportunity.

5

- **Council** acts as an enabler by granting approvals and providing planning and highways consent but does not oversee delivery and cannot influence build-out or (low-carbon) technology selection.
- **Private ESCo** funds, designs, and builds each small-scale network individually, as the Council cannot contractually bundle them into a portfolio.

6

- **Council** assumes a limited role here, using zoning to encourage further connections (if necessary). It cannot ensure tariffs are inclusive of lower-income groups, or influence decarbonisation outcomes.
- **Private ESCo** owns and operates the network, expanding if commercially attractive.

Key: = Lead / Accountable = Support / Responsible for execution = Where stakeholder's involvement is conditional and/or limited

Key findings

This page compares how the Council's leadership, risk exposure and oversight responsibilities shift across each development stage under the three delivery models examined in this report: a ***Golden-share Joint Venture****,* ***a Concession Model****, and the* ***Merchant Model****. It highlights the tapering of Council control and resource commitment - from high strategic involvement in the JV, to regulatory and contractual enforcement in the Concession, and minimal ongoing engagement under the Merchant model.*

1. Inception & Masterplan

The Council's strategic leadership recedes from end-to-end strategic planning in the JV; to priority-zone setting in the Concession; and then to demand-signalling only in the Merchant model.

2. Feasibility

Responsibility shifts from Council-led outline studies in the JV; to high-level validation pre-tender under the Concession; to entirely ESCo-driven analysis in the Merchant model.

3. Business Case

Ownership moves from SPV-draft and Council sign-off under the JV; to Council-crafted public justification in the Concession; to internal ESCo business decisions in the Merchant model.

4. Contracts & Procurement

Both the JV and the Concession models requires the Council to build a business case justifying risk transfer and value-for-money, with the former ratified by the Council via golden-share vote. Conversely, the Merchant path sees no Council-led business case - ESCos own their internal investment decisions.

5. Design, Construction & Commissioning

Delivery risk transitions from SPV under Council-facilitated consents within the JV; to ESCo-only execution with contract enforcement under the Concession; to private-sector discretion subject only to statutory consents under the Merchant model.

6. O&M and expansion

Council stewardship evolves from golden-share veto and board oversight under the JV; to KPI enforcement and connection mandates under the Concession; to full ESCo autonomy with only regulatory back-stop under the Merchant model.

Suitability appraisal of delivery models

How did we assess each delivery model?

This section provides an objective assessment of the suitability of the three shortlisted delivery models for deploying a portfolio of small-scale heat networks. Each model has been appraised against a set of criteria (shown opposite) that were developed through a targeted literature review of published studies and informed by desk-based research and stakeholder engagement with developers. These inputs provided the evidence base for the justification underpinning the Red-Amber-Green (RAG) scores.

The Red-Amber-Green (RAG) analysis illustrates how effectively each model meets these criteria, highlighting areas of alignment as well as potential risks or gaps. While this appraisal has been tailored to reflect PCC's objectives and local context, the RAG framework is intended to be adaptable and could be used by other local authorities to support their own decision-making.

A combined view of each delivery model's overall score is also provided by aggregating its RAG ratings - this is summarised on page 47 for ease of reference.

- Suitability for small low-IRR schemes
- Flexibility to adapt
- Council risk appetite
- Council investment appetite
- Council's capability and delivery burden
- Desire for control (e.g. over connections, tariffs, carbon intensity, build-out rate)
- Desire for profit-sharing
- Exit strategy (should the Council wish to disengage)
- Desire for long-term asset ownership
- Simplicity / ease of deployment
- Decarbonisation and fuel poverty impact

Suitability for small, low-IRR schemes

Small, lower-return heat network schemes are typically harder to deliver on purely commercial terms, requiring strategic planning, risk tolerance, and longer investment horizons. Models with strong public sector involvement - like a *Golden-Share JV* - can help unlock such opportunities by prioritising long-term outcomes over short-term profitability. Aggregating schemes under a single procurement reduces transaction costs and manages risk at a portfolio level, potentially bolstering overall viability and lowering the cost of capital.

A *Golden-Share JV* improves future interconnection prospects and allows for soft influence and stakeholder engagement across a region, particularly where other public bodies have been included in the Contract Notice. However, the model's flexibility allows private partners to potentially deprioritise low-return projects for more profitable ones, especially under commercial pressure.

By contrast, a *Concession model* allows the Council to contractually secure the delivery of the whole portfolio, including smaller, less viable schemes. However, a *Concession model* usually requires higher returns to attract private investment, which may rule out lower-IRR schemes unless subsidised. It also offers limited scope for adaptation post-contract, making future expansion or connection with larger, existing heat networks more challenging. This will be particularly pertinent if future connection is outside the concessionaire's commercial interests.

Merchant models offer no direct route for the Council to promote or influence the development of small schemes. Their commercially-led nature means they are likely to cherry-pick only the most profitable opportunities, limiting coverage and constraining wider network development over time.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Assuming aligned aims, a strong public-private partnership can improve bankability and improve interconnection prospects to future schemes with a more moderate viability profile.	Green
Concession model	Could mitigate cherry-picking by obligating development of entire portfolio within concession specification, but the model's high return requirements and contractual rigidity limit its attractiveness and adaptability. Requires subsidy or strong portfolio economics to accommodate low-IRR projects.	Amber
Merchant model	This model is structurally unsuitable for small, low-return schemes. Absence of public sector levers means there is no incentive to deliver beyond high-return, commercially viable areas.	Red

RAG Key

- (Red) **Commercial focus, limited public influence:** Driven by profit incentives, unlikely to pursue or prioritise small, low-IRR schemes without external intervention.
- (Amber) **Contractually locked but commercially strained:** Can secure delivery through upfront commitments, but typically requires high returns and limits post-contract flexibility.
- (Green) **Publicly-led, portfolio-based approach**: Enables aggregation of projects, strategic planning, and pursuit of policy-aligned schemes beyond strict commercial viability.

Council’s risk appetite

The Council must weigh its project risk exposure against its need for oversight and its commitment to ensuring heat networks are successfully implemented with their intended benefits realised. A potential consequence of reduced control is that projects may be executed in ways that diverge from the Council's strategic goals.

Typically, the degree of project risk the Council faces corresponds to how directly involved it becomes in the project's execution. Project risk encompasses the potential for project failure along with the accompanying financial and reputational consequences, plus the various hazards inherent in implementing major infrastructure projects - including construction-related risks, equipment or contractor failures, cost overruns, revenue shortfalls, and customer dissatisfaction.

Crucially, none of the short-listed delivery models eliminate risk entirely for the Council, including the *Merchant model*. Given the Council's active role in advocating for small heat network development and potential plans to connect its own facilities, it may feel compelled to intervene during project difficulties even without legal obligations to do so. Consequently, some level of risk - both reputational and operational - remains tied to potential project failure regardless of the Council's degree of direct involvement.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Although the Council’s risk exposure is limited to its equity stake, it poses greater risk of reputational damage than other models considered.	
Concession model	Council transfers demand and delivery risk onto concessionaire.	
Merchant model	Council assumes minimal project risk.	

RAG Key

- **High risk exposure:** The delivery model places significant financial, operational or reputational risk on the Council due its direct involvement in project delivery.
- **Moderate risk exposure:** The Council is subjected to some risk – typically reputational – despite formal mechanisms that limit financial or delivery responsibility (e.g. equity stakes).
- **Low risk exposure:** The delivery model structurally transfers key projects risks (e.g. cost, demand delivery) to third parties, limiting the Council’s exposure to direct failure or underperformance.

Council's investment appetite

Heat network investment extend well beyond the initial project launch phase. Ongoing capital will be required to fund the continuous expansion of heat networks and support lifecycle maintenance, equipment replacement, and system upgrades. Successfully operating a heat network resembles managing an ongoing business enterprise rather than completing a discrete infrastructure project, which means future demands for working capital and additional investment are likely to emerge as the network grows or encounters operational challenges.

Reducing the Council's direct involvement in the project will correspondingly reduce its future investment obligations. However, this must be weighed against the Council's interest in capturing all or part of the financial returns the project may generate.

It is also worth noting that investment requirements may necessitate borrowing arrangements. The Catapult recognises that many Councils seek to avoid borrowing for activities that extend beyond their statutory obligations, particularly given the current fiscal constraints requiring Councils to optimise their budgets and reduce expenditure. This position reflects the broader financial pressures facing local authorities, where discretionary spending on non-essential services has been significantly curtailed.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Council does not inject capital into SPV – only has a strategic shareholding.	🟢
Concession model	No public capital required. The concessionaire invests on balance sheet.	🟢
Merchant model	Council assumes no capital risk.	🟢

RAG Key

- 🔴 **High capital exposure:** The delivery model requires the Council to commit significant capital investment - either upfront or over time. This may necessitate borrowing or balance sheet exposure.
- 🟠 **Moderate capital exposure:** The Council avoids upfront capital injection, but may face indirect or future financial pressure to invest later (e.g. in response to network underperformance).
- 🟢 **Low risk exposure:** The delivery model requires no direct public capital contribution. Investment responsibility lies with the delivery partner, insulating the Council from funding and financing obligations.

Council's capability and delivery burden

The Council's resource and capacity requirements increase proportionally with its level of direct project involvement. Greater participation demands greater resources, specialised skills, and relevant experience to effectively deliver and manage such complex projects.

More broadly, relatively few Councils have ample experience of delivering major infrastructure projects, particularly where substantial resources and funding are key. The Catapult's research found limited evidence of such projects being delivered by local authorities without specialist delivery partners, particularly those requiring extensive civil engineering or substantial groundworks within the area.

A Council's limited experience creates challenges in appropriately identifying, managing, and mitigating project risks. Without this, the Council may struggle to accurately budget for procuring the necessary resource levels to deliver heat networks at scale, while also ensuring effective ongoing operations. For example, there may be a capacity constraint on the number of major projects the Council can handle at one time (e.g., 5 at a time).

This criteria also refers to capability to initiate competitive dialogue processes in the procurement stage, negotiate contracts and manage corporate structures (e.g., the SPV within the *Golden-Share JV*). This is a costly, effort-intensive process, and should be factored into the Council's decision making.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Council needs considerable capability to negotiate and manage the JV. While governance/oversight is limited post-procurement, this still requires an in-house Council advisor.	🟠
Concession model	Council burden is considerable during contracts & procurement stage, especially given potential for complex tender negotiations.	🟠
Merchant model	The Council's burden is minimal – needs only to manage zoning/permitting.	🟢

RAG Key

- 🔴 High burden/capability gap: Significant demand on Council resources, expertise, and risk management. Likely exceeds current capabilities without major external support.
- 🟠 Moderate burden/capability gap: Requires meaningful Council input, especially during procurement and setup. Manageable with internal effort and/or external advisors.
- 🟢 Low burden/capability gap: Minimal Council involvement beyond core statutory roles. Limited resource or capability demands.

Desire for control

The Council's desire to exercise control over the heat network spans several key aspects. This includes – but is not limited to - price controls, capped returns, build-out rate, tariff structure and carbon intensity.

The Council's degree of control is inversely correlated with the Council's appetite for delivery. Control will be improved by a higher level of direct participation in the project. However, the Council would need to accept a higher degree of risk and would need to have access to sufficient funding and resources. The degree of control is maximised when ownership is held directly by the Council, and is minimised when ownership lies with external parties.

It is important to bear in mind that some level of control can be achieved with all delivery models, excluding the *Merchant model*. The lack of public involvement (given no public sector sponsor or procurement) means there are limited ways to control delivery. Alternatively, If the Council is offering its buildings as anchor loads under a private sector *Concession model* then, contractually, the Council will be able to impose certain requirements on the way in which the heat network is delivered and operated (e.g., the provision of community benefits and levels of customer service standards).

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	The Council retains a degree of control, often related to specific "reserved matters", without day-to-day management responsibilities (see page 38).	🟢
Concession model	The Council's desire for control over aspects of the network can be specified within the concession's specification. However, modifying the contract's terms is challenging and costly, meaning control becomes difficult once delivery ensues.	🟠
Merchant model	No control over the heat network – entirely private sector owned and operated.	🔴

RAG Key

- 🔴 Low control: Council has little to no influence over delivery, pricing, or service standards. Model is fully market-led with minimal public sector involvement.
- 🟠 Moderate control: Control is defined contractually but limited post-award. Influence depends on upfront specification and enforceability.
- 🟢 High control: Council retains strategic oversight (e.g. through reserved matters) without full operational responsibility. Enables influence over key outcomes.

Desire for profit-sharing

The Council's share of financial returns from a heat network is directly tied to its ownership stake, which in turn reflects the level of investment it commits. This is a standard feature of any commercial enterprise. Where the goal is to establish a purely commercial operation that generates revenue streams for the local authority, complete ownership through a council-owned ESCo would be the appropriate approach.

It is important to note, however, that projects may generate limited or no returns. Therefore, while higher ownership offer greater profit potential, they equally expose the Council to proportionally larger losses. Alternative structures may enable the Council to participate in financial upside without direct investment – most notably the *Golden-Share JV*. In this model, the Council is granted certain protective rights through a residual "golden share," but no equity, board representation, or profit entitlement.

If profit-sharing is a priority, a *Concession* arrangement may be more appropriate, as returns can be structured contractually (e.g. performance-linked sharing above defined thresholds). Nonetheless, given the typically modest IRRs of small heat networks, the probability of achieving material surplus returns remains low.

*A similar contractual mechanism was adopted in the concession arrangement for the Granton heat network, delivered by Vattenfall Heat UK Limited under a DBFOM contract.[6]

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Despite having a residual "golden share", the Council is not entitled to any dividend payments within this model.	Red
Concession model	No right to profit-sharing, unless agreement includes a mechanism by which profits above an agreed threshold are shared with the Council.*	Amber
Merchant model	No right to profits.	Red

RAG Key

- (Red) **No participation:** Council has no ownership or contractual right to share in profits from the heat network.
- (Amber) **Conditional or limited participation:** Profit participation is either minimal (via small shareholding) or dependent on performance-based contractual mechanisms.
- (Green) **Full profit participation:** Council holds a significant equity stake, giving it direct access to returns - alongside exposure to risk. A likely example of this would be a Council-led ESCo.

Desire for long-term asset ownership

The most straightforward approach for the Council to own heat network assets is through direct ownership stakes in the delivery model. Under conventional joint venture arrangements, this ownership would be shared with private sector partners.

In *Concession models*, asset ownership transfers to the project sponsor when the contract expires, typically after 30-40 years. At that point, the Council can choose between:

a) Re-tendering for a new concession
b) Take direct control of the project
c) Selling the assets to private investors

However, private sector partners will likely require compensation for well-performing, revenue-generating assets to reflect their investment contributions, meaning asset transfer may not be without cost to the Council. The condition and residual value of heat network assets after 30-40 years will significantly influence these end-of-term decisions. Major plants and equipment may require substantial reinvestment or replacement around this timeframe, potentially affecting the attractiveness of direct takeover versus re-tendering options. However, some agreements include provisions for the Council to acquire the network for a nominal fee or no fee at all, especially if the concessionaire has failed to fulfill certain obligations.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	No de-facto ownership of assets, as Council owns no equity as a golden shareholder.	
Concession model	Private sector ownership with potential for asset takeover at the end of concession term. This will likely involve payment to the operator.	
Merchant model	No prospect of ownership of assets.	

RAG Key

- **No ownership pathway:** Assets remain fully owned by private sector with no mechanism for Council to acquire them.
- **Deferred or conditional pathway**: Asset ownership may transfer to the Council at contract end, typically subject to payment and asset condition.
- **Direct or co-ownership of assets:** Council retains ownership (or joint ownership) of network assets from the outset.

Exit strategy

Exit feasibility correlates with the Council's integration level within the delivery model and how easily it can disengage later. Private sector *Concessions* and *Golden-Share JVs* provide straightforward exit routes. For the former, the Council holds no ownership stake - only a contractual arrangement with defined terms that permits early termination upon payment of specified compensation.

In contrast, *Golden-Share JVs* do not have a fixed end date. The Council's involvement is therefore indefinite unless it chooses to dispose of its single, residual golden share. This contrasts with co-investment JVs, which typically include defined exit timelines. More broadly, exit strategies are generally simpler to execute in models utilising corporate delivery vehicles (excluding service concessions), as assets are pre-structured within the entity, requiring only ownership transfer rather than asset separation.

Establishing robust governance frameworks during corporate vehicle and/or contract formation is essential to minimise future exit complications. All scenarios necessitate formal sales processes including due diligence and price negotiations, though transactions may be streamlined when selling directly to existing partners.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Provides the Council with low-involvement participation, limited financial exposure, and a straightforward exit route through disposal of the single golden share.	Green
Concession model	Minimal council involvement - purely contractual arrangement with set timeframe. Early termination possible with compensation payment.	Green
Merchant model	N/A.	Grey

RAG Key

- **Not applicable:** Council has no contractual or equity stake to exit from.
- **Moderate involvement, structured exit:** Council holds an ownership stake; exit requires divestment via formal governance and sales processes (e.g. JV).
- **Low involvement, easy exit:** Council has no ownership stake; exit is straightforward through contractual termination (e.g. Concession).

Decarbonisation and fuel poverty impact

Decarbonisation outcomes are largely delivery model neutral, assuming all heat networks contribute to carbon reduction. However, rapid decarbonisation requires significant resources potentially unavailable to the Council. Additionally, some heat networks achieve greater carbon savings than others, making the Council's ability to influence or mandate lower-carbon technology relevant to overall decarbonisation impact.

Similarly, fuel poverty alleviation requires the lowest cost of capital and Council control over tariff structures. This includes influencing heat network rollout programmes and prioritising critical areas, favouring delivery models with greater Council control (though contractual controls could be negotiated in *Concession models*). However, maintaining affordable consumer tariffs may conflict with project viability, potentially reducing private sector investment appetite.

Alongside the trade-off between affordability and investor appetite, there is an additional potential tension: higher decarbonisation ambition often entails higher capital costs, which - without suitable subsidy or tariff protections - may undermine fuel poverty goals by increasing heat prices for end users.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Retaining control during operation enables the Council to manage tariffs to alleviate fuel poverty. Control of carbon intensity can be secured contractually but may be linked to minimum thresholds rather than pursuing the strongest decarbonisation pathway.	Green
Concession model	While the Council can specify carbon and tariff-related requirements within the concession contract, its ability to adapt or strengthen these measures over time is limited once the contract is signed.	Amber
Merchant model	Lack of public involvement means Council has limited ways to control or influence how policy objectives are met through delivery.	Red

RAG Key

- Red: **No policy levers:** Council lacks meaningful control over pricing or technology choices.
- Amber: **Partial policy influence:** Council can embed decarbonisation and affordability requirements contractually but has limited flexibility to adjust them over time.
- Green: **Strong policy alignment:** Council retains control over tariff structures and decarbonisation standards, enabling targeted delivery of socioeconomic outcomes.

Simplicity / ease of deployment

This attribute encompasses several key factors, including the legal and commercial complexity of each model, the extent to which they are established and proven approaches, and their practical feasibility for heat network deployment.

The *Golden-Share JV* model is assessed as amber, primarily because agreeing control rights and governance agreements with private-sector partners is often time-consuming. Establishing the JV typically requires dedicated project management and specialist commercial and legal expertise, and the contractual framework can be complex. A key area of negotiation is the definition of the local authority's veto rights (reserved matters), for example relating to changes in network scope or requirements to use specific low-carbon heat sources (e.g., water-source heat pumps or waste-heat recovery). If these rights are perceived as overly restrictive or uncertain, they can reduce developer and investor appetite and prolong procurement and financial close.

The *Concession model* similarly receives an amber rating as it relies primarily on contractual controls while transferring the majority of delivery responsibilities to the private sector. This model benefits from being extensively deployed across multiple projects, providing a proven track record. The *Merchant model* achieves the highest score due to its minimal council involvement requirements.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Medium-high level of integration and governance. Effort required but deployed already by the Council.	Amber
Concession model	Medium level of legal complexity and effort to roll out.	Amber
Merchant model	Most simple as does not require council involvement.	Green

RAG Key

- Red — **High complexity:** Model requires bespoke structuring, extensive legal input, and sustained Council resource. Deployment is likely to be time-consuming.
- Amber — **Moderate complexity:** Model involves established processes but requires moderate governance setup or contract negotiation. Some Council effort and coordination is needed to mobilise delivery.
- Green — **Low complexity:** Straightforward to implement with minimal legal, commercial, and governance requirements. Limited Council involvement makes it quick and low-effort to deploy.

Flexibility to adapt

A delivery model should be sufficiently flexible to adapt as required, given the evolving conditions over a heat network's lifetime. The model must also support continuous network growth and the ongoing investment required for expansion. This is particularly relevant when local authorities anticipate that small-scale heat networks may connect to wider schemes in the future.

Ultimately, it will always be harder to conjoin heat networks deployed using different models or with different owners than to use the same model across the whole city. Naturally, contractual and commercial interfaces between the projects would need to be managed – especially where profit shares and risk profiles are different between projects.

The most flexible options for the Council are those where it stays in control, as it wouldn't need to negotiate changes with private partners. However, the Council would still need to follow its own approval processes for any major changes to the delivery model or projects, and consider the costs and impacts of other significant changes.

Joint venture structures may require shared decision making around substantial changes, making them harder to manage. Negotiating *Concession* terms is even more challenging because the private party will usually have an ability to refuse. They may be unwilling to accept heat from other sources not under its control, or connect customers where cost of connection exceeds the forecasted hurdle rate.

RAG Rating

Delivery Model	Summary	RAG
Golden Share JV	Dictated by governance procedures, making contract changes potentially difficult to navigate.	Amber
Concession model	High complexity associated with contract changes.	Red
Merchant model	N/A.	Grey

RAG Key

- Red: **Low flexibility:** Model is contractually rigid. Material changes are difficult, time-consuming, or costly to implement due to fixed commercial terms or limited partner cooperation.
- Amber: **Moderate flexibility:** Model permits adaptation but requires negotiation with delivery partners or adherence to pre-agreed governance processes, which may slow decision-making.
- Green: **High flexibility:** Model allows the Council to adapt delivery or operations over time with minimal external negotiation. Well-suited to evolving network needs and future interconnection.

Key findings from suitability appraisal of delivery models

This high-level RAG assessment provides local authorities with an initial comparison of the shortlisted delivery models, supporting informed decision-making on the optimal approach for small-scale heat networks.*

The analysis highlights the **Golden Share JV** and the **Concession Model** perform strongly against the assessment criteria for smaller schemes with modest returns., These options score well on overall suitability, Council capacity and decarbonisation outcomes. In comparison, the **Merchant Model** consistently underperforms against the objective of maintaining a strategic enabling role for the Council.

Factor	Golden Share JV	Concession Model	Merchant Model
Suitability for small, low-IRR schemes	3	2	1
Council risk appetite	2	3	3
Council investment appetite	3	3	3
Council's capability burden	2	2	3
Desire for control	3	2	1
Desire for profit-sharing	1	2	1
Desire for long-term asset ownership	1	2	1
Exit strategy	3	3	0
Decarbonisation & fuel poverty	3	2	1
Simplicity / ease of deployment	2	2	3
Flexibility to adapt	2	1	0
TOTAL	25	24	17

Red	Amber	Green
Low suitability	Contract-bound fit	High suitability
High risk exposure	Moderate risk exposure	Low risk exposure
High capital	Conditional capital	No capital
High burden	Moderate burden	Low burden
Low control	Moderate control	High control
No share	Conditional share	High share
No ownership	Conditional ownership	Direct ownership
Complex exit	Structured exit	Simple exit
No influence	Partial influence	Strong influence
High complexity	Moderate complexity	Low complexity
Low flexibility	Moderate flexibility	High flexibility

* These scores are indicative only and not weighted - local authorities may wish to build on this framework and apply tailored weightings to inform a more robust multi-criteria decision analysis.

Summary and call to action

Bringing small-scale heat networks to market

Council's whose' strategic goal is to facilitate the deployment of small-scale, low-carbon heat networks without exposing themselves to significant capital or delivery risk require a delivery model tailored to the unique characteristics of small-scale schemes.

Preferred option: Golden-Share JV

A golden-share JV allows the Council to maintain strategic oversight without day-to-day operational involvement. It also requires the ESCo to source all capital funding for the project, minimising commercial risk for the Council.

The Council's golden share allows it to exercise control in relation to a limited number of reserved matters, which could include obligating the ESCo to deliver the entire portfolio, thus also mitigating the risk of cherry-picking.

Preferred option: Concession Model

The concession model shifts demand and capital risk to the private sector, which is critical for small, complex schemes with variable demand profiles.

Robust contractual obligations protect portfolio integrity by requiring delivery across all sites, deterring cherry-picking through enforceable penalties specified at procurement.

With clear governance, tariff, and carbon standards at procurement, this proven model could attract capable partners to deliver the schemes.

Rationale for not choosing the Merchant model

The merchant model depends on developers driving projects independently, which can work for larger schemes with high IRRs but is poorly suited to small-scale networks with modest returns that are unlikely to attract organic investment.

Without active Council intervention, delivery risk remains high and there is no guarantee that schemes will progress - making this model misaligned with the Council's ability to steer heat decarbonisation outcomes locally.

Key takeaways

Enables the Council to unlock private sector investment and expertise for small-scale heat networks while retaining strategic control to safeguard public interest, without taking on development or delivery risk.

This proven, market-familiar structure - if clearly packaged, governed, and well-defined from a specification standpoint - can attract capable partners to deliver a cohesive portfolio.

An unsuitable model for small-scale heat networks, as it relies on ESCos to initiate development. This is unlikely to occur without Council taking on a formal 'promoter' role pre-procurement.

Key considerations for the Council

The following questions provide a framework for local authorities evaluating their role in heat network delivery. Responses will depend on project drivers, available resources, and Council risk appetite, as outlined in the delivery model insights section. This framework should inform selection of an appropriate delivery model for any small-scale heat network portfolio.*

Council Role	Key Questions	Delivery Model Insights
Promotion	• Does the Council have an interest in the delivery of a heat network project? • Does the Council have the skills and resources required to undertake the role? • Is there a material reputational risk?	The JV model enables strong Council influence in shaping and prioritising projects within place-based energy master planning. Concessions offer some scope for influence via specification, but public visibility is lower post-procurement. The Merchant model offers the least control but limits the Council's reputational risk.
Customer role	• Does the Council have a sufficient portfolio of anchor heat loads in an area to catalyse a small-scale heat network? • What changes may occur to the customer's needs over time? • Is the supplier capable of delivering the heat services for the entire contract term?	Both the JV and Concession models enable the Council to influence terms of supply; however, the JV allows more ongoing flexibility as needs evolve. Merchant schemes typically pursue anchor loads independently, reducing the Council's ability to shape the customer base.
Governance role	• Could the presence of the Council provide investors, developers, or customers with confidence in the network? • Are vulnerable customers present that need protection? • How, when taking on the governance role, can a Council keep its responsibility within limits?	A Golden Share JV offers the strongest governance role for the Council, supporting customer confidence and enabling safeguards for vulnerable users. Concessions offer more limited governance levers once procured. The Merchant model offers minimal governance involvement unless separately regulated.

* The full list of questions, provided as a prompt for local authorities considering whether to take on each of the defined roles for a heat network, can be found on the Catapult's Net Zero Go platform.[7]

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Council Role	Key Questions	Delivery Model Insights
Asset ownership	• Will the presence of the Council as asset catalyse the development of a heat network? • What are the contractual risks associated with asset ownership? • Does the Council have an ownership interest in the assets?	Asset ownership is likely to be limited in a Golden-Share JV, whilst Concession models transfer these risks to the private party but allow for asset takeover upon contract expiry. Merchant schemes keep assets fully private, reducing public sector risk but also limiting strategic coordination.
Design and delivery	• Does the Council wish to exercise control over technology selection to ensure decarbonisation? • Where does design risk lie? • Does the Council need to retain close control over DBOM contracts?	JV structures provide flexibility to influence technical specifications and decarbonisation goals throughout delivery. In contrast, Concession models rarely allow for technology specification, unless specified at the procurement stage. Naturally, Merchant-led schemes provide no public sector input into technology or design.
Operation	• Are there vulnerable customers that the Council wishes to protect by influencing tariff structures? • Does the local authority have the capability and resources to monitor operations?	The JV model supports ongoing public sector oversight of tariffs and service quality, with the ability to intervene to protect vulnerable users. Concessions can embed tariff and service protections but rely on enforcement through contract. The Merchant model lacks direct controls, leaving consumer protections dependent on external regulation.

* The full list of questions, provided as a prompt for local authorities considering whether to take on each of the defined roles for a heat network, can be found on the Catapult's Net Zero Go platform.[7]

Next steps: Implementation of recommended delivery models

To deliver a well-operated portfolio of small-scale heat networks that advances local decarbonisation and fuel poverty objectives, a structured roadmap is recommended. Building on the assessment of delivery options, the next step is to confirm a preferred model to support mobilisation and inform subsequent activity, including stakeholder engagement, funding considerations, and procurement planning.

1

Conduct technoeconomic modelling on initial schemes

Undertake detailed modelling to assess demand, connection density, and heat sources across connection zones. Use this to define clearly scoped, commercially viable starter schemes to anchor the portfolio.

Finalise council-owned anchor loads to be offered as pre-committed demand to bolster viability.

Why: Creates an investable business case, providing developers with the clarity needed to engage seriously.

2

Confirm Council role and preferred delivery model

Clarify the Council's intended level of involvement across the heat network lifecycle, from inception to asset ownership and operation.

With risk appetite in mind, the Council should select the delivery model that aligns with the its objectives and in-house resources.

Why: Aligns internal strategy with delivery model selection and sets direction for engagement, procurement and funding.

3

Re-engage stakeholders with modelled portfolio

Following scheme definition and modelling, hold further targeted engagement with developers and investors to test appetite for the portfolio and understand key risk concerns and delivery enablers.

This should encompass dialogue around delivery model preferences.

Why: Creates competitive tension and ensures stakeholder buy-in based on feasibility, reinforcing the commercial case pre-tender.

4

Secure funding and shape procurement strategy

Having secured market interest, apply for enabling grant funding.

Shape a procurement approach aligned with the preferred delivery model, detailing risk allocations and enforceable KPIs. It must ensure the developer accepts full portfolio delivery risk to prevent cherry-picking of profitable sites.

Why: Unlocks early-stage funding and lays the groundwork for a structured, procurement process.

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