

Zero Waste Scotland Capacity Building Services

LHEES Strategy Support – Part 2

Strategic Zoning

Strategic Zoning

What is a Strategic Zone?

- Strategic Zones present a visualisation of the **potential pathways** to decarbonise the building stock at a local authority level. These could be split out by intermediate zone or data zone.
- They are useful to understand the scale of potential and initial areas of focus, which could be used to provide a **strategic starting point** to inform Delivery Areas and follow on engagement.
- Strategic Zoning is undertaken as part of LHEES Stage 3 Methodology and outputs include the baselining data generated from the Domestic and Non-domestic Baseline Tools, as well as spatial analysis and GIS files.
- In most cases, Strategic Zoning differs from the baselining activity as it considers more than one data indicator – and are particularly focused on strategic heat decarbonisation and energy efficiency retrofit opportunity identification, rather than reporting on the stock.

Strategic Zoning

What to include in LHEES Strategy

Set out the LHEES Guidance

Visualisation of the Strategic Zones and geographic layout of the opportunities and pathways for:

- Building-level heat decarbonisation
- Building-level energy efficiency retrofit

This should include discussion on:

- Opportunities and challenges for heat decarbonisation and energy efficiency retrofit in local authority.
- Indication of Strategic Zones that may be a focus of Delivery Areas and near-term Delivery Plan actions.
- Buildings that may require additional focus/support in future (e.g. where energy efficiency may be a driver of fuel poverty).
- Recommendations and conclusions that can be applied across the Strategic Zones for heat decarbonisation and energy efficiency.



Strategic Zoning

LHEES Considerations

Strategic zoning involves appraising aggregated data to identify pathways to heat decarbonisation and energy efficiency interventions across local authority. This appraisal is done by considering the following LHEES Considerations:

- **Off-gas** (LHEES Cat 0, 1, 2, 3) – provides insight into which off-gas areas could be most suitable for heat pump deployment.
- **On-gas** (LHEES Cat 0, 1, 2, 3) – provides insight into which on-gas areas could be most suitable for heat pump deployment.
- **Energy efficiency** – this covers a combination of indicators, likely to include wall insulation, loft insulation and glazing. Provides insight into areas with high or low energy efficiency for prioritising interventions.
- **Energy efficiency as a driver of fuel poverty** – this includes a score of energy efficiency alongside fuel poverty prevalence. Provides insight into areas where energy efficiency measure could best help alleviate fuel poverty.

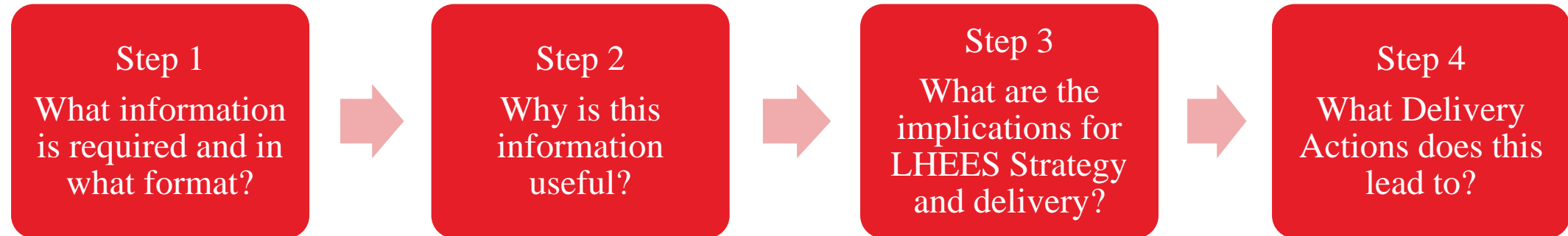
These LHEES Considerations, similarly to the baselining, can be assessed at a Local Authority level and at a Strategic Zone level using outputs from the Baseline Tool in the form of tables, charts and graphs.

Maps can also be prepared that allow for a visual inspection of areas that reside across the local authority – to support fast identification and for the purposes of communicating the evidence in the Strategy.

Strategic Zoning

Process to review Stage 3 outputs for strategic zoning

Four-step process when reviewing outputs against LHEES Considerations for presentation in the LHEES Strategy:



Strategic Zoning

Heat decarbonisation checklist

Scale of opportunities

LA wide summary and top Strategic Zones for:

- Cat 0 i.e. have low or zero carbon heating system
- Cat 1 and Cat 2 buildings
 - Split out by tenure to support delivery planning
- Presented as tables, charts, top 10 ranking
- Discussion of these outputs



Scale of challenge

LA wide summary and top Strategic Zones for:

- Cat 3 buildings – indicating where significant retrofit may be required
 - Split out by tenure to support delivery planning
- Presented as tables, charts, top 10 ranking
- Discussion of these outputs



Visualisation of Strategic Zones

- At data zone or intermediate zone level for Cat 0-3 off- /on-gas
- Specific maps for densely populated areas
- Used to support discussion of scale of opportunities and challenge
- Interrogated further by considering tenure



Initial Delivery Areas and Action

- Recommendations and conclusions to be made that can be applied across the Strategic Zones
- Proposed Strategic Zones or areas to progress as a priority for Delivery Area analysis (LHEES Stage 4-6)
- Strategic actions that could progress to Delivery Plan

Strategic Zoning

Analysis of Outputs – Examples

Heat Decarbonisation

Step 1: What information is required and in what format?

Percentage of total on-/off-gas properties per LHEES Category (Cat 0,1,2,3)

Format can be tables, graphs, charts or maps.

Step 2: Why is this information useful?

Provides a LA summary and Strategic Zone summary into which areas could be most suitable for heat pump deployment; setting out the scale of the opportunity across the LA. Also sets out areas where retrofit may be required prior to considering heat decarbonisation.

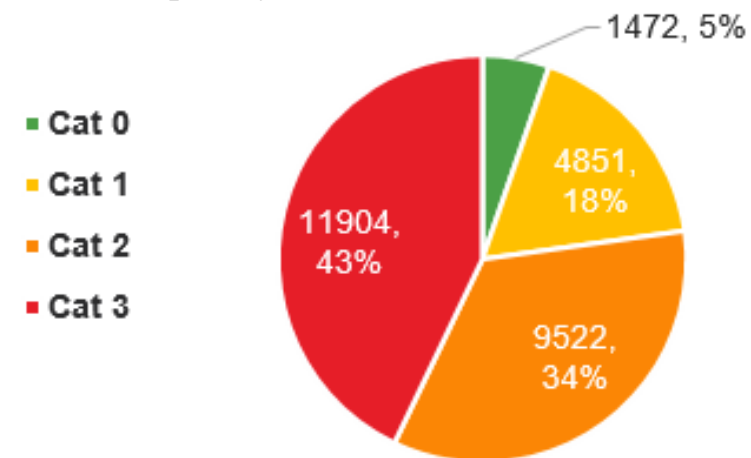
Step 3: What are the implications for LHEES Strategy and delivery?

Consider: What are the opportunities for heat decarbonisation?

- E.g. Data shows over half of properties may be suitable for HP (Cat 1) or require moderate fabric upgrades (Cat 2). The other half will require either extensive retrofit or other heat decarbonisation options (electrification/biomass).
- E.g. Can look into tenure type - if majority of properties are owner occupied, will need consideration around funding and support. However, social housing presents direct opportunity / joint working with RSLs to progress opportunities.

Step 4: What Delivery Actions does this lead to?

Starting to set out actions for the short-, medium- and long-term depending on HP suitability. This may include actions around engagement or where a request for data/building information is required – split out by tenure and level of fuel poverty. Also provides evidence to act as a strong starting point for the focus of initial delivery areas to identify clusters of buildings i.e. setting out Strategic Zones or areas explicitly for action.

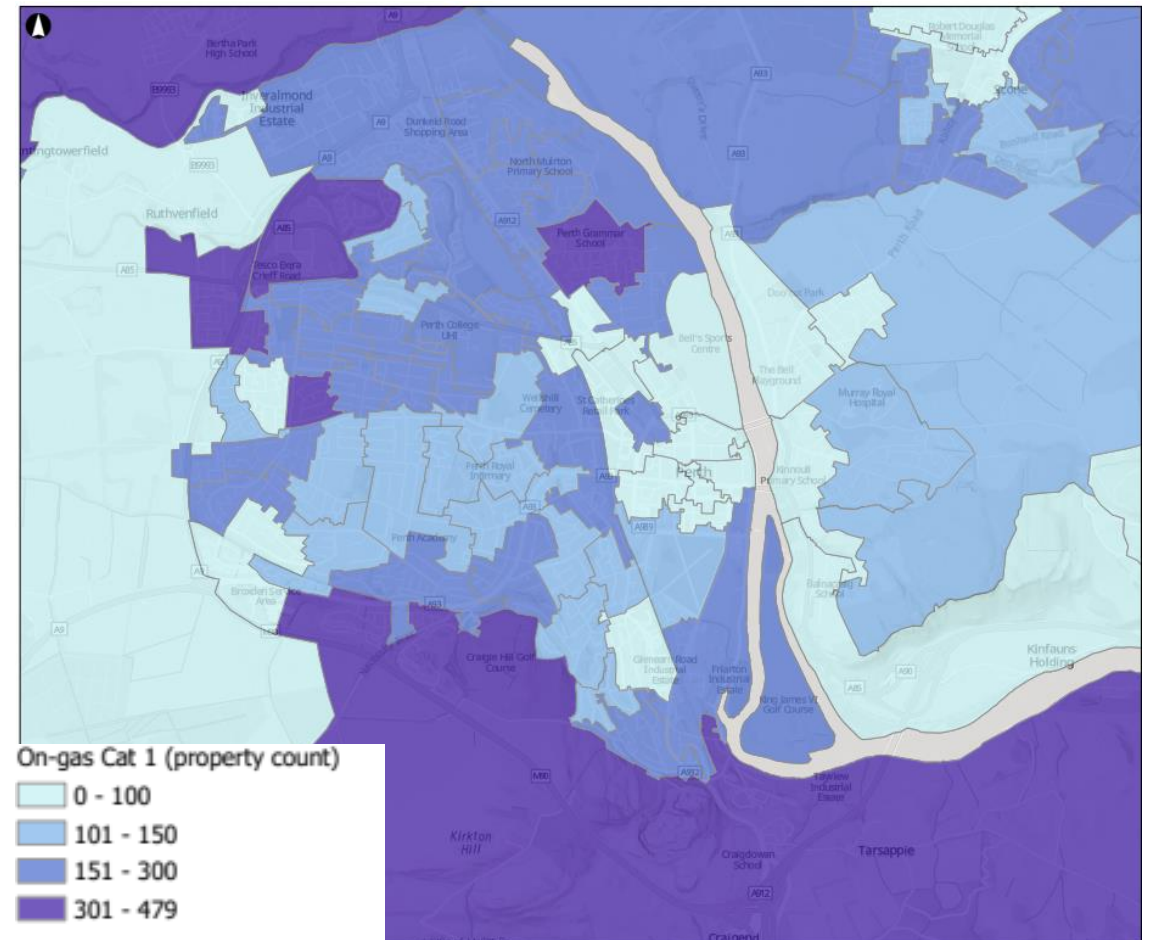
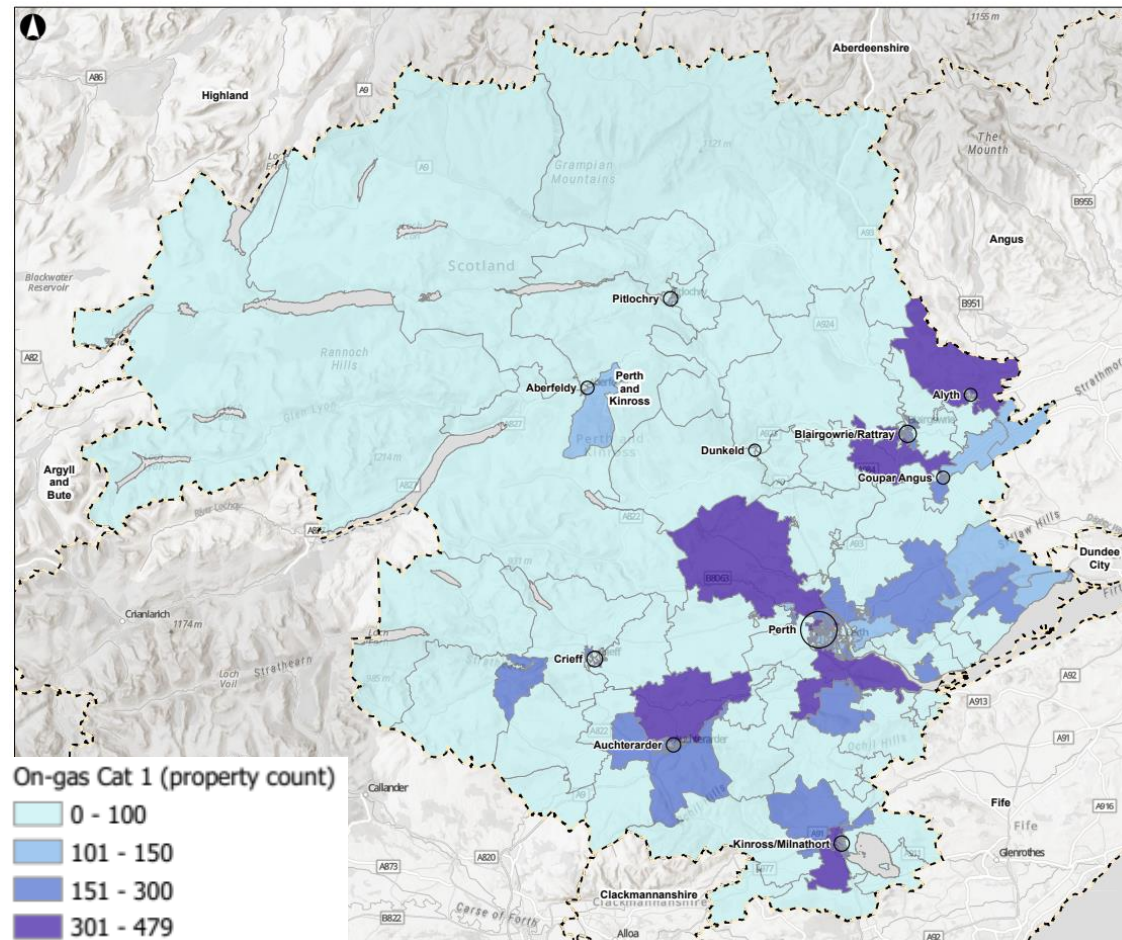


Percentage of total off-gas properties per LHEES Category (produced by Arup for PKC)

Strategic Zoning

Example Maps

On-gas (Cat 1) – properties with immediate potential for heat pump retrofit (i.e. well insulated properties with a wet heating system)



Strategic Zoning

Key points to consider

Strategic Zones – consider where the strategic areas are for heat decarbonisation, for example:

- Prioritise heat pump deployment in Strategic Zones that are off-gas, especially those currently being heated by inefficient, carbon intensive systems such as LPG and oil boilers.
- Prioritise Strategic Zones that may have been identified as strategically important geographic areas early on in LHEES process.
- Prioritise heat pump deployment across local authority-owned building stock, as Council has direct authority to implement heating upgrades – could be considered further by filtering by tenure type.
- Consider areas that may require retrofit activity (e.g. Cat 3) prior to considering heat decarbonisation.
- Look for opportunities to take advantage of economies of scale by strategically prioritising groups of Cat 1 buildings, leading to cost efficiencies and driving down the overall expenses associated with heat pump upgrades.

Delivery Actions – consider what actions may need to be taken for deployment within strategic areas, for example:

- Collaborate with housing associations and engage residents to increase uptake.
- Collaborate with energy suppliers to understand impact of heat pumps on local grid.

Strategic Zoning

Energy Efficiency checklist

Scale of opportunities

Top Strategic Zones for:

- Well performing areas with respect to building energy efficiency (weighted score); building energy efficiency as a driver of fuel poverty (weighted score)
- Presented as tables, charts, top 10 ranking
- Discussion of these outputs



Scale of challenge

LA wide summary and worst performing Strategic Zones for:

- Building energy efficiency (weighted score); Building energy efficiency as a driver of fuel poverty (weighted score)
- Split out by tenure to support delivery planning
- Consideration of mixed-tenure, mixed-use and historic buildings (using Baseline Tool – No. buildings)
- Presented as tables, charts, top 10 ranking
- Discussion of these outputs



Visualisation of Strategic Zones

- At data zone or intermediate zone level for building energy efficiency (weighted score); building energy efficiency as a driver of fuel poverty (weighted score);
- Specific maps for densely populated areas
- Used to support discussion of scale of challenge
- Interrogated further by considering tenure



Initial Delivery Areas and Action

- Recommendations and conclusions to be made that can be applied across the Strategic Zones
- Proposed Strategic Zones or areas to progress as a priority for Delivery Area analysis (LHEES Stage 4-6)
- Strategic actions that could progress to Delivery Plan

Strategic Zoning

Analysis of Outputs – Examples

Energy Efficiency

Step 1: What information is required and in what format?

Percentage of properties with poor energy efficiency weight score.

Format can be tables, graphs, charts or maps.

Step 2: Why is this information useful?

Provides insight into which areas have high or low energy efficiency for prioritising interventions. This sets out the scale of the challenge and where work may be required to support eventual retrofit deployment. Can be combined with baselining information relating to single indicators to deepen the understanding (e.g. insulation status, consideration of mixed-use, mixed-tenure and historic buildings).

Step 3: What are the implications for LHEES Strategy and delivery?

Consider: What are the opportunities for energy efficiency retrofit?

- E.g. Data shows high weighted score for a Strategic Zone, therefore could look at information such as wall type (cavity/brick) and tenure type to determine building suitability for interventions.
- E.g. Provides a starting ranking of Strategic Zones that should be prioritised.
- E.g. Provides a strategic indication of the number of buildings that may require additional focus through support and regulation.

Step 4: What Delivery Actions does this lead to?

Starting to set out actions for the short-, medium- and long-term depending on energy efficiency requirements. This may include actions split out by tenure and level of fuel poverty e.g. around engagement with RSLs and/or private homeowners. Also provides evidence to act as a strong starting point for the focus of initial delivery areas to identify clusters of buildings.

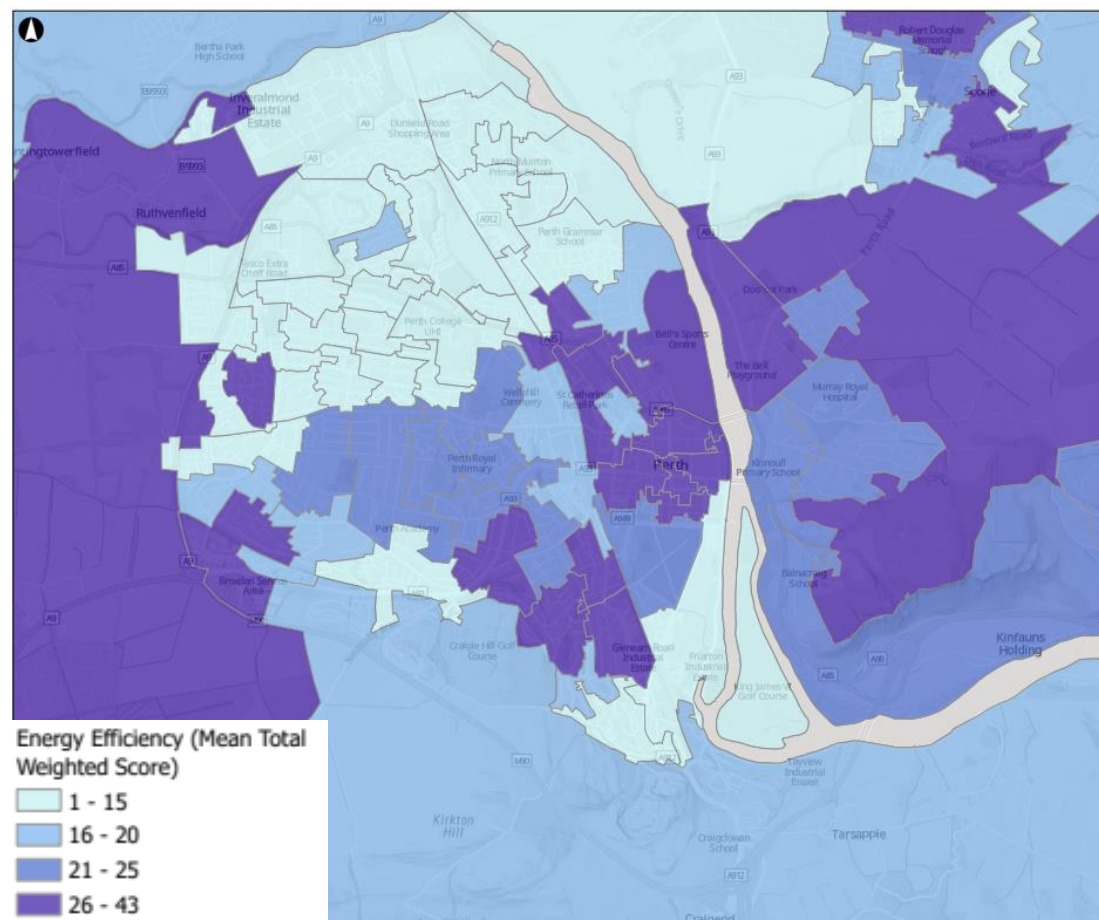
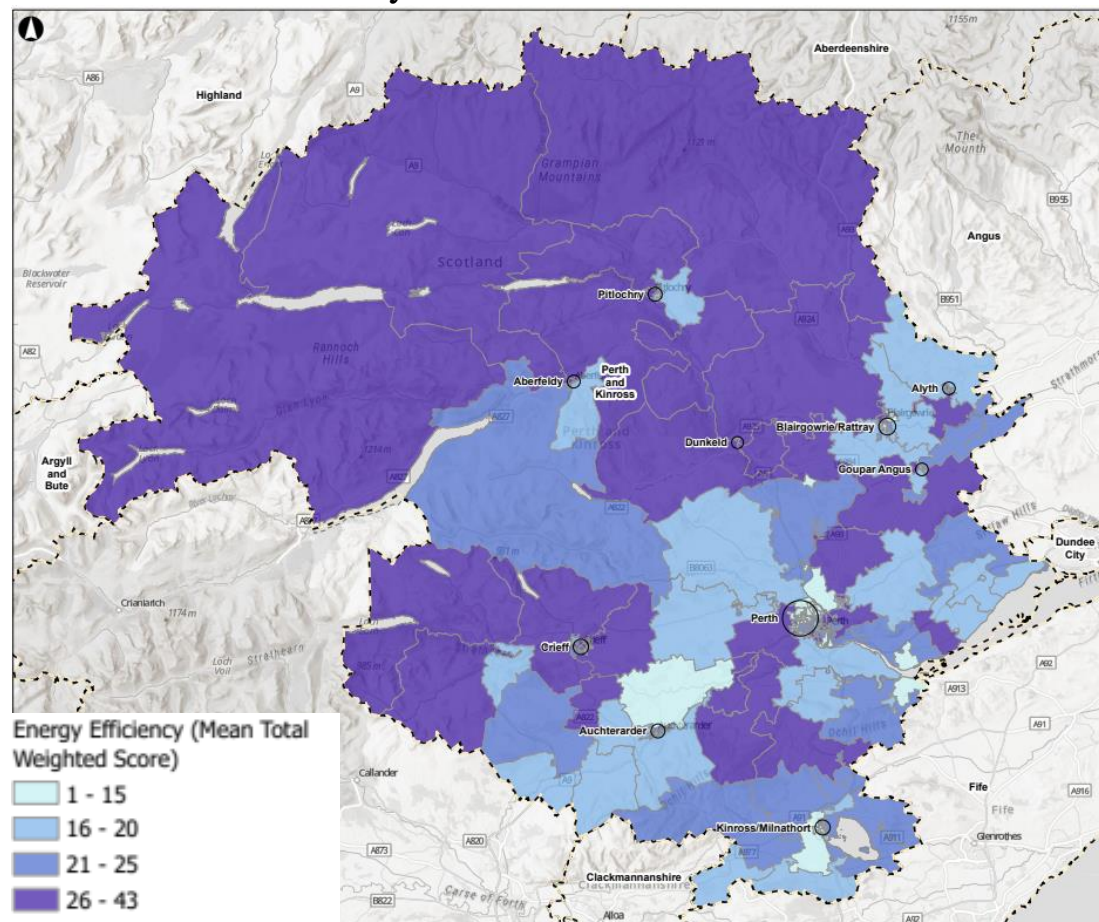
Energy efficiency indicator	PKC	Scotland
Uninsulated walls	45% (34,979)	41%
Single/ partial glazing	8% (6,335)	8%
Low loft insulation (0-99mm)	9% (6,827)	9%

Proportion of properties with poor energy efficiency Indicator vs the national average (produced by Arup for PKC)

Strategic Zoning

Example Maps

Energy efficiency (Mean Total Weighted Score) - provides insight into areas with high or low energy efficiency, for purpose of prioritising intervention and delivery action.



Strategic Zoning

Key points to consider

Strategic Zones – consider where the strategic areas are where the greatest benefits of energy efficiency upgrades are likely to be seen, for example:

- Prioritise energy efficiency upgrades in areas with social housing which have poorer energy efficiency, as this would provide most effective impact.
- Privately owned properties which have high intervention costs may not be perceived as an attractive investment for property owners and will need to be targeted for support/incentive programmes.
- Look for opportunities to take advantage of economies of scale by strategically retrofitting nearby buildings simultaneously, leading to cost efficiencies and driving down the overall expenses associated with energy efficiency upgrades.

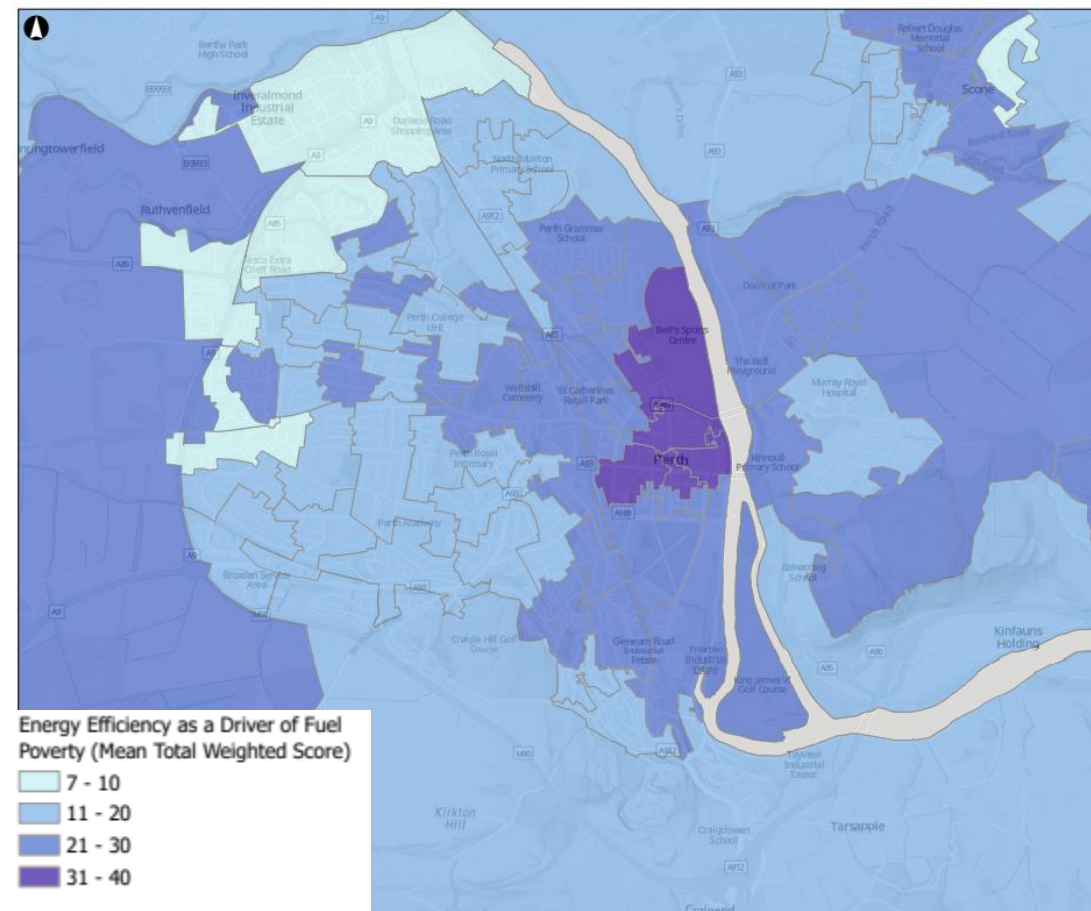
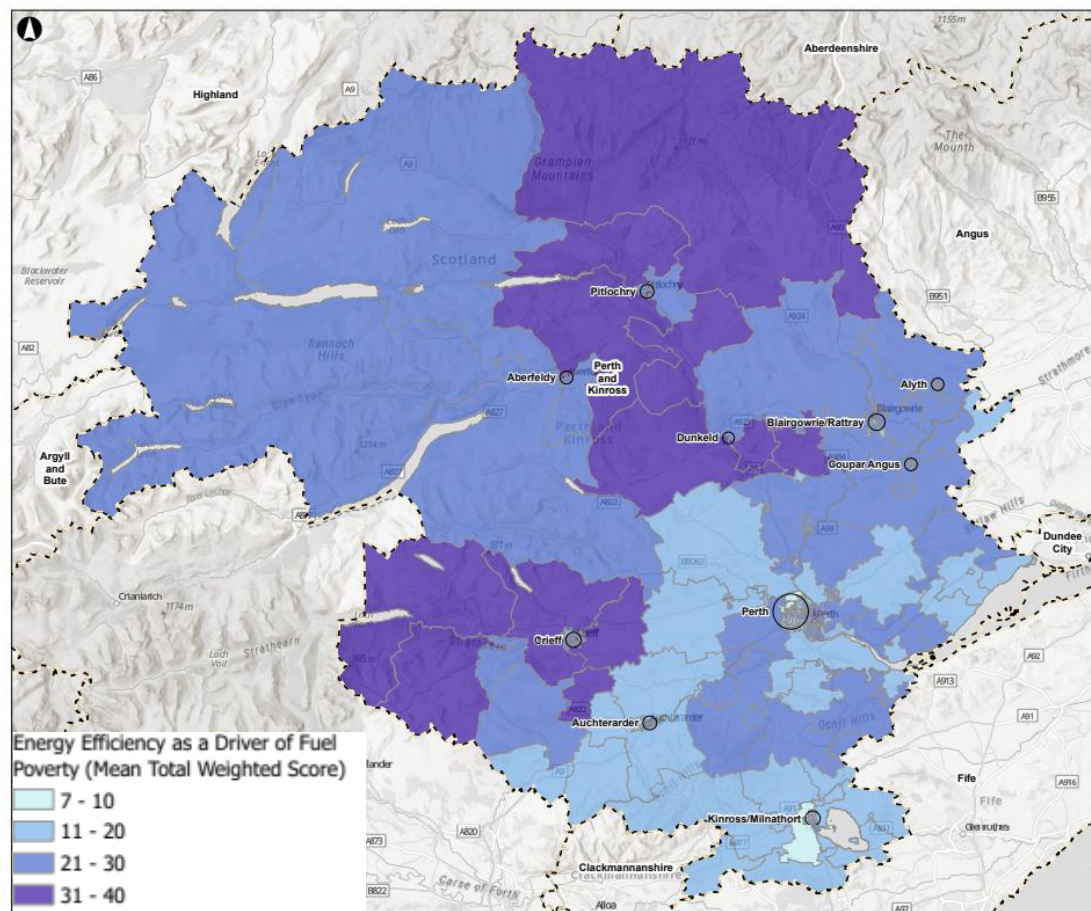
Delivery Actions – consider what actions may need to be taken for deployment within strategic areas, for example:

- Collaborate with housing associations and engage residents to increase uptake.
- Investigate options for support, funding and incentives relating to energy efficiency interventions.

Strategic Zoning

Example Maps

Energy efficiency as driver of fuel poverty (Mean Total Weighted Score) - provides insight into areas where low energy efficiency drives fuel poverty, for purpose of prioritising intervention and delivery action.



Strategic Zoning

Key points to consider

Strategic Zones – consider where the strategic areas are where efficiency upgrades could best help alleviate fuel poverty, for example:

- Prioritise energy efficiency upgrades in Strategic Zones with social housing with high fuel poverty, as they provide substantial impact in terms of reducing fuel poverty compared to other locations.
- Prioritise energy efficiency upgrades in Strategic Zones with owner occupiers with high fuel poverty, as they provide substantial impact in terms of being able to leverage existing funding and support.

Delivery Actions – consider what actions may need to be taken for deployment within strategic areas, for example:

- Collaborate with housing associations and engage residents to increase uptake.
- Investigate options for support, funding and incentives relating to energy efficiency interventions.

Heat Network Zone Analysis

Heat Network Zone Analysis

Heat Network Zoning Outputs

Heat Networks Zoning is undertaken as part of LHEES Stage 4 Methodology.

Potential Zones for heat networks are produced as an output of this process and are presented as maps and tables covering the whole local authority area.

Potential Zone: An area (zone) identified following the geospatial analysis set out in the LHEES Methodology.

These Potential Zones are unlikely to all be strategically important, therefore further analysis and prioritisation is required prior to presentation in the LHEES Strategy.

The aim is to select Heat Network Zones for presentation that are both **strategically important** and **technically suitable** (based on analysis undertaken so far). These would have **good available data**, **limited barriers** to development and **strong ongoing engagement** with building owners/residents – in particular, the public sector.

Potential Zones (Stage 4) → Selected Strategic Heat Network Zones → LHEES Strategy



Example map of Potential Zones for the Highland council area

Heat Networks (Scotland) Act

Summary from LHEES Guidance

- Section 47 of the Heat Networks (Scotland) Act places a duty on local authorities to carry out a review to consider whether one or more areas in its area is likely to be particularly suitable for the construction and operation of a heat network.
- In carrying out a review under Section 47(1), a local authority must have regard to the matters mentioned in Section 48(1)*.
- The LHEES Methodology sets out an approach to **support** local authorities to discharge this duty.
- Section 47(4) – the decision to proceed to consider whether to designate the area as a heat network zone in accordance with Section 48 and; Section 47(6) – the publishing of a statement in relation to each area considered as part of the review, have been considered separately by Scottish Government.
- The designation of a heat network zone (as described in Section 48 of the Heat Networks (Scotland) Act) has also been considered separately by the Scottish Government.

*The QGIS Demo Capacity Building Workshop has a diagram of the contribution LHEES in relation to Sections 47 and 48 of the HN (Scotland) Act (see workshop 10, slide 13 at <https://www.zerowastepartners.org.uk/lhees-capacity-building-workshops/>)

Useful Links:

2023 Heat Network Regulations:
<https://www.legislation.gov.uk/ssi/2023/123/contents/made>

Heat Network Zone Guidance:
<https://www.gov.scot/publications/heat-network-zone-hnz-guidance/>

LHEES Strategy

Summary from LHEES Guidance

The LHEES Strategy should include:

- Overview map and/or table detailing the whole local authority area, highlighting the **potential heat network zones** within.
- High level maps of any areas of the local authority deem as **strategically important**. This would set out, at a higher granularity, the potential for heat networks in this strategic area.
- If appropriate, summary maps and tables for **areas designated as heat network zones** (in accordance with the Heat Networks (Scotland) Act).
- Areas where the local authority consider likely to be particularly **suitable for the construction and operation of a heat network**.
- Other areas that may be considered as being of **strategic importance for the local authority** (e.g. wider area development and other local authority priorities).
- Scale of **opportunities and potential challenges** for heat networks.
- **Recommendations and conclusions** in terms of heat network potential and consideration of next steps from a strategy to a pipeline of potential heat network projects.

Heat Network Zone Analysis

Process for heat network analysis



Heat Network Zone Analysis

2. Internal Review

- An internal review of the Potential Zones should be undertaken to ensure the zones makes sense and the buildings included (and therefore the data used) look correct.
- The internal review should be undertaken with key Officers that have an understanding of the buildings, infrastructure, heat demand/supply or constraints and any planned economic development within the Potential Zone.
- The review should act as an initial screening of the Potential Zones prior to engaging with external stakeholders.
- It is recommended also that a cross-check with the outputs from the First National Assessment of Potential Heat Network Zones is also undertaken to support sense-checking the analysis (outputs also included for all LAs as part of the LHEES National Assessment).
- At this stage, any Potential Zones that have suspected errors can either be re-assessed in terms of data/analysis or be removed from further consideration (these can be noted for further investigation at a later stage, but will not likely go into LHEES Strategy).

Useful Links:

First National Assessment of Potential Heat Network Zones (2022)

<https://www.gov.scot/publications/first-national-assessment-potential-heat-network-zones/>

Heat Network Zone Analysis

2. Internal Review – potential errors

Potential errors to look for include:

- Anchor loads with heat demands that are higher than expected
 - Storage buildings
 - Vacant buildings
 - High heat demands from small buildings
 - Buildings that may have/be changing usage in the coming years (e.g. redevelopment)
- Anchor loads being driven by buildings with low confidence in the heat demand data
- Heat demands that are missing or lower than expected
- Heat resources that are incorrectly located

Heat Network Zone Analysis

3. Stakeholder Workshop (optional)

- A workshop with key stakeholders relevant to heat networks and the buildings within the Potential Zones can be undertaken (e.g. business owners, housing associations, Government agencies, DNO, existing HN operators etc).
- While it is useful to feed into prioritisation of heat network zones, this can also be done at a later stage as a Delivery Plan action to gain feedback on the strategically important areas for heat network development.
- The aim of the workshop is to get insight into local knowledge of the buildings on the ground in order to sense check zone suitability and to get input on opportunities/challenges associated with heat network development or expansion e.g. constraints and supply.
- It can also help to identify if any Potential Zones or buildings have been missed from the Potential Zones and should be included.
- The information gathered in this workshop should be recorded and taken forward to the next step, which is discussion of the strategic areas for heat network development.



Heat Network Zone Analysis

3. Stakeholder Workshop

A suggested structure for the workshop* could include:

- An overview of heat network development in Scotland (e.g. policy commitments; LA duties in the Heat Networks (Scotland) Act)
- An overview of what heat network zoning is (participants may not be aware of this!)
- An overview of the heat network zoning process (e.g. main stages described in the LHEES Methodology)
- A summary of all Potential Zones identified in the analysis that pass the internal review
- An overview of the Stringent and Baseline Potential Zones – 1 slide per zone – with participants completing a check and challenge of these (a suggested checklist/prompt is provided later)

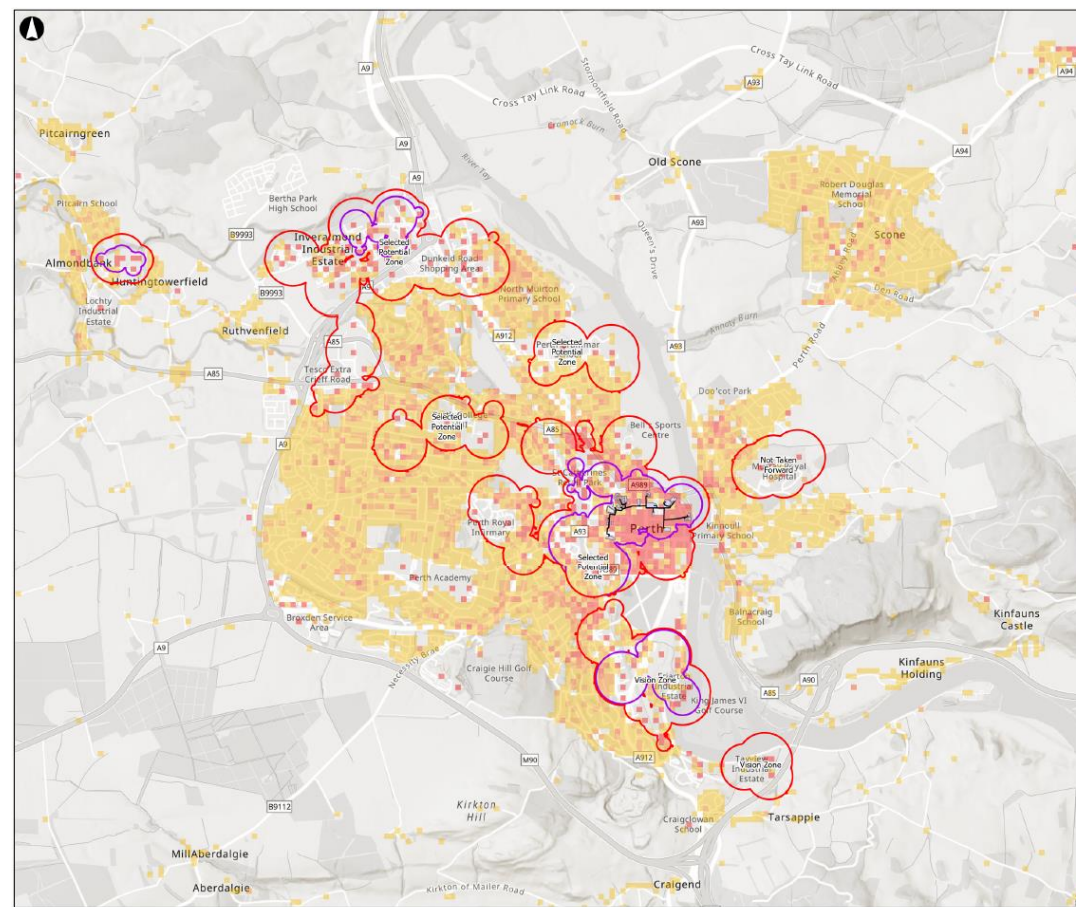
The outcome of the workshop should be a deeper understanding and prioritisation of the Potential Zones that could be taken forward for inclusion in the LHEES Strategy.

* Previous capacity support delivered by Arup has focused on guidance for setting up workshops

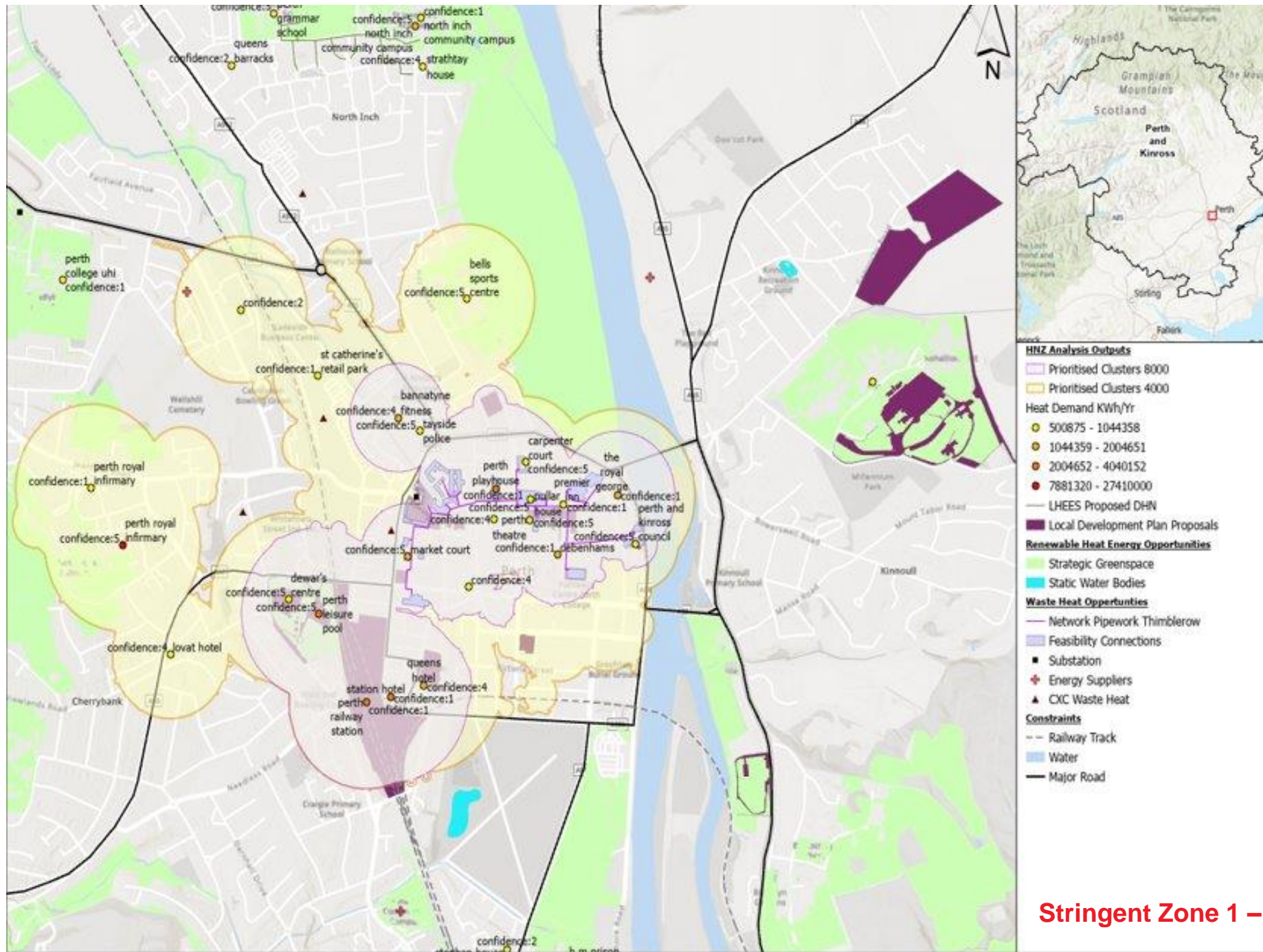
Example overview of findings

- Number of zones** identified with Stringent criteria: 4
- Zones to review: 3
- Located in or around Perth

** All zones based on data used to date, and represent work in progress areas for potential inclusion in LHEES Strategy and Delivery Plan



Identified Potential Zones using Stringent criteria (purple) and Baseline criteria (red); rasters indicate level of heat demand within a particular area (red has a higher heat demand compared to orange/yellow)



Stringent Zone 1 – Perth City centre

Heat Network Zone Analysis

4. Discussion and prioritisation of Potential Heat Network Zones for LHEES Strategy

Using the Potential Zone data, any additional analysis and feedback from the workshops (if undertaken), strategically important areas for heat network development can now be prioritised through consideration of a range of factors, for example:

- **Scale of demand and expansion potential** – Larger demand concentrations are much more likely to be suitable for future heat network expansion than smaller clusters or individual projects. The presence of existing or in-development networks within areas of wider demand concentration can be a strategically significant opportunity.
- **Low carbon supply** – Large scale potential low carbon heat sources adjacent to demand concentrations can be of strategic significance e.g. energy from waste plant.
- **Ownership** – Council / public sector demands can act as a catalyst for development and present opportunities to establish heat networks within an area. Privately owned buildings may present more barriers to initial development.
- **Data Confidence** – How high is the data confidence, or is further engagement required to understand suitability of the zone for heat network development.
- **Redevelopment / new development** – Large-scale development sites, especially located adjacent to existing demand concentrations, can present strategically significant heat network opportunities.
- **Constraints / Distance** – the distance between potential anchor loads, and the constraints that may sit between them should also be considered, as the factors could increase the costs for heat network development considerably.

** depending on timescales, some of these points could be used as discussion prompts at the workshop also

Further analysis

5. Additional analysis of Potential Heat Network Zones

- The additional analysis set out in the LHEES Methodology identifies opportunities and constraints for heat network development in the prioritised heat network opportunity areas, aligning with the matters set out in the Heat Networks (Scotland) Act, and including other factors relevant to LHEES.
- The analysis includes consideration of potential heat resources, constraints, existing heat networks and other infrastructure, future development areas and additional summary statistics of the heat demand for each Potential Zone. The outputs generated provide evidence to support consideration of the matters detailed in Section 48(1) of the Heat Networks (Scotland) Act, from the perspective of a strategic review of the potential for heat networks.
- It is recommended that a lot of this analysis is completed early on to best support engagement with stakeholders and prioritisation.
- The outputs of this exercise (Section 47(1)) should be documented as evidence to support further parts of Section 47 and 48 in the Act (finalising review and heat network zone designation). The LHEES Methodology has an approach to enable this documentation in the form of an **Excel spreadsheet**.
- Judgement should be applied when considering how much detail to include from this additional analysis in the LHEES Strategy (see next slide) – there is a lot of output material!

Stage 4 Heat Network - Potential Heat Network Zone Summary Sheet
Version 4.0 - August 2022

Notes:
 1) This table is the logical zone completion of LHEES Stage 4 - Heat Network zone Section 3.2.2.2.
 2) Input the applicable information for each Potential Zone below into columns B-AT.
 3) Copy the template provided for the first Potential Zone and paste to create tables for each additional Potential Zone in succession.

Potential Heat Network Zone Summary Table

Heat Network Zone	Zone Information Summary	Matter 48(1) - Renewable and Waste Heat Opportunities				Matter 48(1) - Conventional and Sustainable Thermal Storage, Supply Storage and Building Assessment				Matter 48(1) - Existing Infrastructure				Matter 48(1) - Fuel Diversity				Matter 48(1) - Other Matters				Matter 48(1) - Other Matters				Matter 48(1) - Other Matters								
Zone ID	Zone Name	Zone Type	Zone Status	Zone Category	Zone ID	Zone Name	Zone Type	Zone Status	Zone Category	Zone ID	Zone Name	Zone Type	Zone Status	Zone Category	Zone ID	Zone Name	Zone Type	Zone Status	Zone Category	Zone ID	Zone Name	Zone Type	Zone Status	Zone Category	Zone ID	Zone Name	Zone Type	Zone Status	Zone Category	Zone ID	Zone Name	Zone Type	Zone Status	Zone Category
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Potential Heat Network Zone Summary Table

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Notes:
 1. In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.
 2. **Zone ID** - In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.
 3. **Zone Name** - In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.
 4. **Zone Type** - In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.
 5. **Zone Status** - In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.
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 10. **Zone Status** - In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.
 11. **Zone Category** - In the case of shared, copy the Potential Heat Network Zone Summary Table from the 10000 series.

Heat Network Zone Analysis

Summary of Selected Heat Network Zones

Following the analysis, opportunities and constraints mapping, the selected Heat Network Zones with the most strategic importance and best opportunity should be taken forward.

Reminder: The aim is to select Heat Network Zones for presentation that are both **strategically important** and **technically suitable**. These would have **good available data**, **limited barriers** to development and **strong ongoing engagement** with owners/residents.

Other zones not being taken forward at this stage could be mentioned (e.g. in a table or in appendix). There may be a Delivery Plan Action to improve data or carry out further engagement for these zones.

Next Steps and Delivery Areas

Next steps and Delivery Areas

This final section of the LHEES Strategy should set out the main findings, in particular the Strategic Zones for energy efficiency and heat decarbonisation, and selected Heat Network Zones.

This could include examples such as:

- Key strategic areas for energy efficiency and heat decarbonisation, including potential across LHEES considerations, key challenges and related delivery actions
- Key strategic areas for heat networks, including key opportunities, challenges and related delivery actions and next steps
- Consider any high-level actions that have arisen from the strategic zoning e.g. setting up engagement programmes or focus for initial delivery area identification
- Ensure high-level actions have been transferred to the recommended Delivery Plan actions log

ARUP