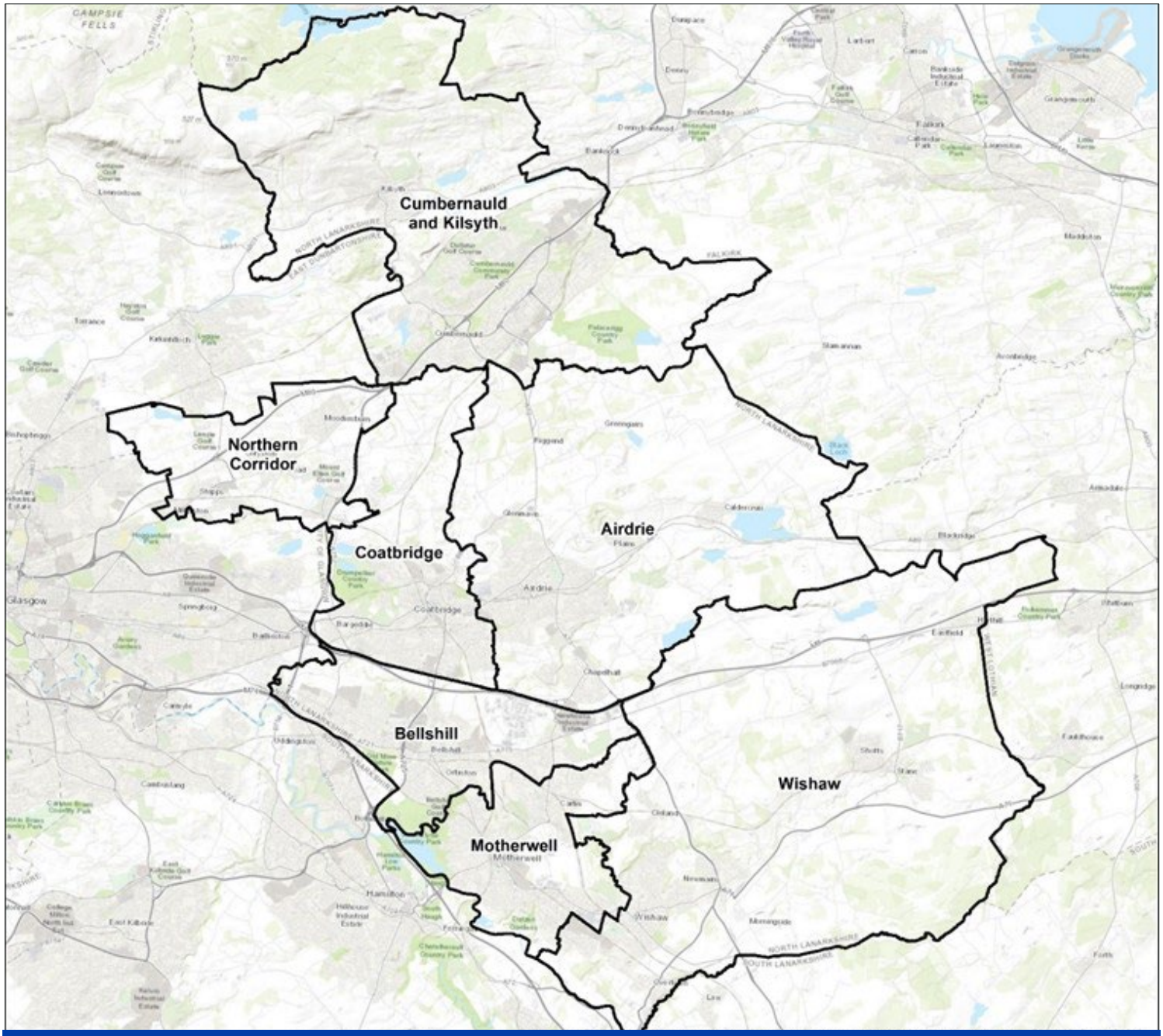

Local Heat and Energy Efficiency Strategy

North Lanarkshire Council

December 2023

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1. Executive Summary

The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022[1] places a duty on Local Authorities (LAs) to prepare and update a Local Heat and Energy Efficiency Strategy (LHEES) and Delivery Plan.

This Strategy is primarily driven by Scotland's statutory targets[2]:

- Net zero emissions by 2045 with 75% reduction by 2030; and
- By 2040, as far as reasonably possible, no household in Scotland is in fuel poverty.

Where are we now?

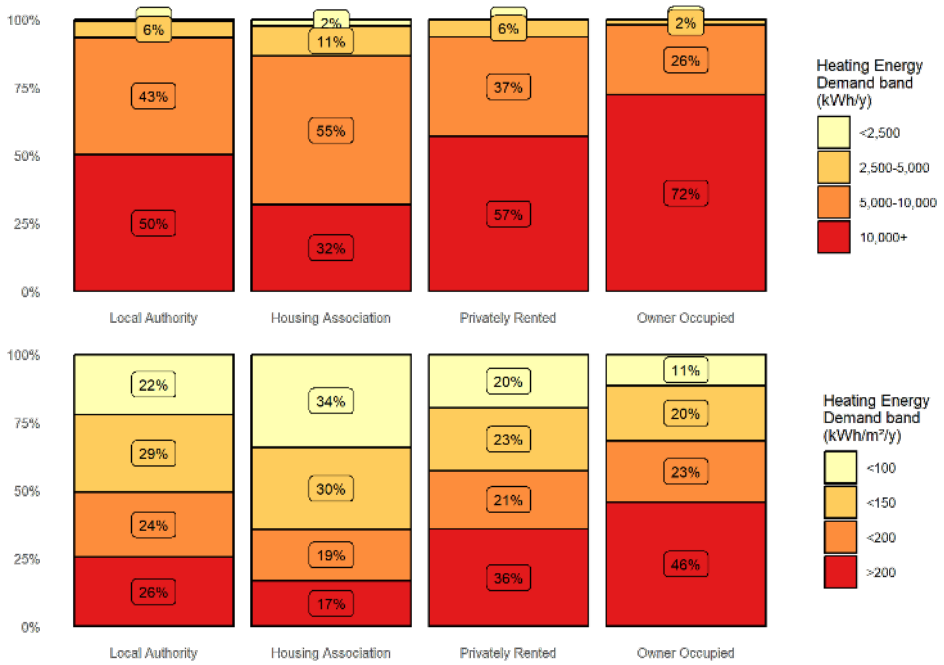
The majority of the domestic building stock in North Lanarkshire was constructed after 1950 (Figure 6) but 75% of NLC's stock was built before 1983. The housing association stock is newer than other tenures which is reflected in the greater proportion of housing association properties reaching an EPC grade of C or better. Within NLC's stock, 41% of properties require an intervention of some sort to bring their EPCs up to C or better.

However, NLC's own housing stock data reveals a potential challenge. Virtually all NLC homes have double- or triple-glazed windows (with most installed since 2008) and less than 15% lack wall insulation, therefore it is going to be more challenging and expensive to install building fabric upgrades which further reduce the heat demand of homes, improve their energy efficiency or EPC rating.

The private sector has an even greater challenge to improve EPCs both proportionally and in absolute numbers of properties.

A similar picture emerges between tenures when isolating the total heat demand and heat demand per square meter of each property. This is demonstrated by Figure 1 below, which shows that housing association and local authority properties have fewer properties with high heat demand per square metre of property.

Figure 1: Domestic Heat Demand Baseline



[1] The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 (legislation.gov.uk)

[2] Local heat and energy efficiency strategies and delivery plans: guidance - gov.scot (www.gov.scot)

Non-domestic buildings

It is not possible to be confident of the definite number of non-domestic buildings which use heat, their energy consumption or fuel used due to data quality issues. It is apparent however that most heating is provided from gas, but electricity has the largest share of small heat loads.

Strategic zoning and pathways

The LHEES Guidance requires the Council to set out Strategic Zones and develop a pathway for each. Locality boundaries were decided upon as the most suitable strategic zoning for North Lanarkshire to allow alignment with other areas of policy.

Energy efficiency

The Home Analytics tool was used to calculate a weighted score for each Locality based on the frequency of low loft insulation thickness, a lack of wall insulation and a lack of double or triple-glazing. A high score equates to poor energy efficiency.

Table 1: Energy Efficiency Measures by Locality

Strategic Zone	Loft Insulation	Glazing Upgrade	Wall Insulation	All	Loft Insulation (%)	Glazing Upgrade (%)	Wall Insulation (%).	All (%)	Total Weighted Score
Airdrie	1,920	460	9,740	12,120	8%	2%	38%	48%	16%
Bellshill	1,870	1,500	6,640	10,010	9%	7%	33%	50%	16%
Coatbridge	1,850	520	8,120	10,490	8%	2%	34%	44%	15%
Cumbernauld and Kilsyth	1,820	740	11,400	13,960	6%	2%	38%	46%	15%
Motherwell	1,780	1,530	7,460	10,770	7%	6%	29%	42%	14%
Northern Corridor	1,060	510	2,760	4,330	10%	5%	27%	42%	14%
Wishaw	2,410	1,370	8,070	11,850	10%	5%	32%	47%	16%
Total	12,710	6,630	54,190	73,530					

Cost effectiveness of energy efficiency measures

Comparing the average cost and potential cost savings from installing different energy efficiency measures, loft insulation upgrades are by far the most cost-effective. Installing external wall insulation on buildings with cavity or internal wall insulation is least cost-effective. However, there may be other reasons for doing less cost-effective measures, such as to reduce the risk of fuel poverty.

Table 2: Cost effectiveness and impact of energy efficiency measures

Measure	Heat Demand Reduction (kWh/y)	Ratio of Fuel Cost Savings per Investment Cost (£/£)
All loft insulation measures	194,000	0.396
All cylinder insulation measures	45,300	0.180
All Single to Double Glazing upgrade	8,700	0.043
All wall insulation measures	375,800	0.032
All Combined Measures	807,400	0.049

Fuel poverty

The Weighted Scores were calculated for each Locality to compare the potential to reduce fuel poverty by improving energy measures. This combines the energy efficiency score with the risk that each household is in fuel poverty, taken from Home Analytics.

Table 3: Comparison of potential for energy efficiency to reduce fuel poverty.

Strategic Zone	Households with energy bills > 10% of income after housing costs	Total Weighted Score
Airdrie	19%	18%
Bellshill	20%	18%
Coatbridge	21%	18%
Cumbernauld and Kilsyth	20%	17%
Motherwell	20%	17%
Northern Corridor	17%	16%
Wishaw	21%	19%

Heat networks

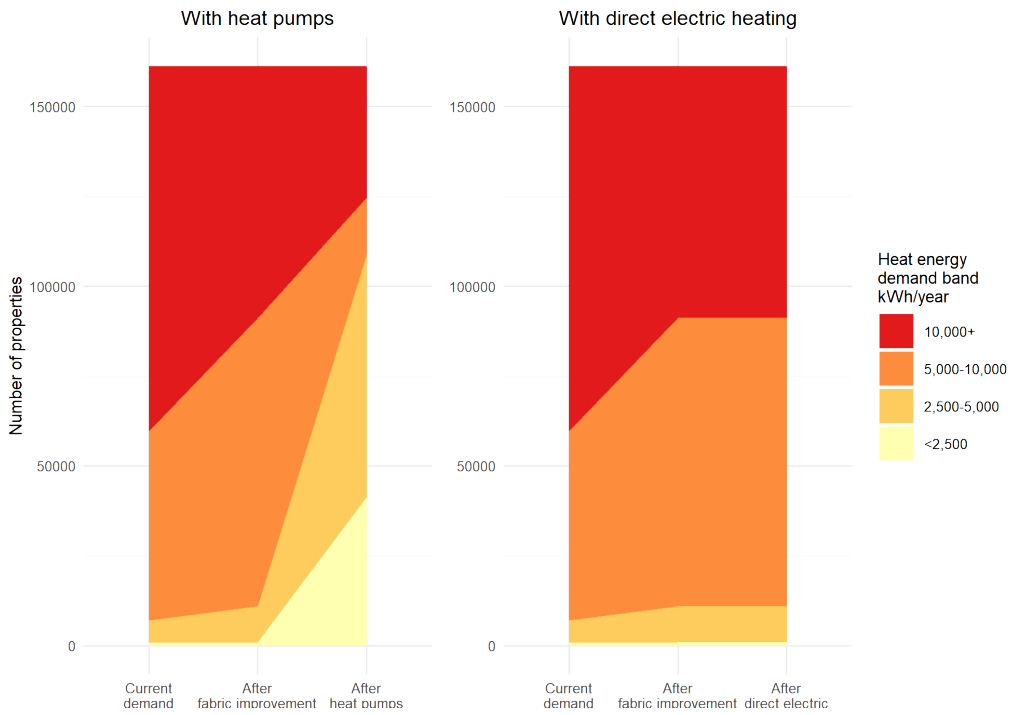
An analysis of the potential for heat network zones identified areas which could be considered for heat network zones. There are different levels of potential viability.

The zones include 6% of the domestic and 11% of the non-domestic properties in North Lanarkshire. The areas in Motherwell, Coatbridge and Cumbernauld offer the best combination of initial viability, potential future expansion and diversity of heat loads. The Drumgray Energy Recovery Centre, under construction, could be connected to potential heat network zones in Cumbernauld, Airdrie and Coatbridge. Options for the Motherwell network include heat pumps sourcing heat from the River Clyde, mine water or air.

Heat pump suitability

Of the total domestic properties in North Lanarkshire, 43.5% could be already suitable for new heat pumps with this increasing to 61.7% if reasonable energy efficiency measures are undertaken and 72.7% if more costly measures are installed. The remaining properties (27.3%) are less likely to be suitable for heat pumps.

Figure 2: Energy consumption of properties with heat pumps compared to electric heating.



Heat pumps can contribute to reduction in fuel poverty compared to electric heating by reducing the electricity consumption of a property, reducing the risk of fuel poverty. Figure 2: Energy consumption of properties with heat pumps compared to electric shows how many properties have a range of different electricity demand for heat with energy efficiency measures and either electric heating or heat pumps. Compared to direct electric heating, Heat pumps offer lower energy consumption and therefore can lower costs and risks of fuel poverty.

Individual or communal heat pumps

For properties where heat pumps are identified as the most favourable technology, the strategy considers communal heat pump systems, both where a single heat pump heats a whole building or where a network of heat pumps shares a single heat source, sometimes referred to as a 5th generation heat network, as having similar energy efficiency requirements as individual heat pump systems. Therefore, they are considered as a single grouping for the purposes of this Strategy.

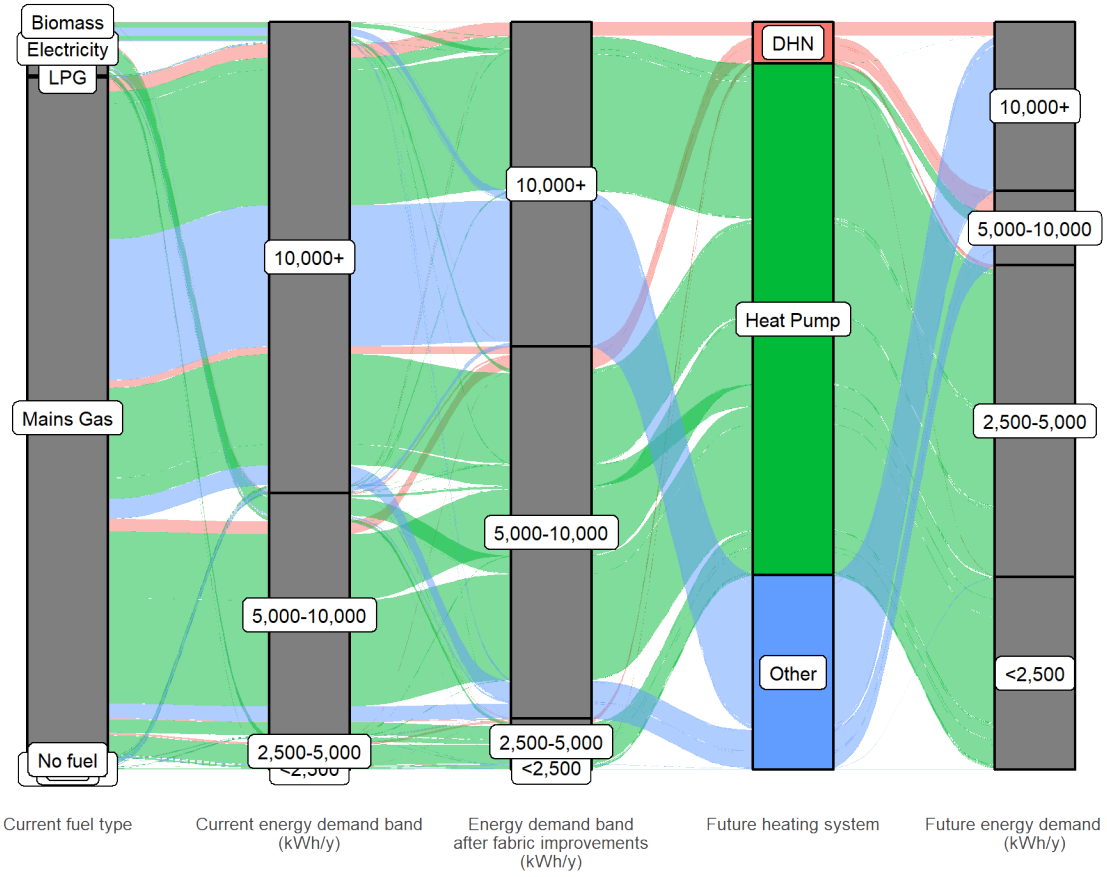
Delivery zones

Two approaches to identifying actions are set out in this Strategy – a spatial approach to identifying delivery zones to make use of area-based funding and align with local priorities as well as grouping properties and interventions based on them having similar attributes regardless of location. These findings will be taken into account when the Council considers capital investment planning to ensure LHEES priorities are reflected.

Pathways for North Lanarkshire

By combining the actions which could be taken by each property, the reasonable energy efficiency measures which could be installed and then consider that the building owner decides to install the most suitable low carbon heating system, then we can get an impression of the potential pathway for North Lanarkshire overall, based on today's technologies. Figure 3: Decarbonisation and Energy Efficiency Pathway shows the individual journey that each property would take and the cumulative result.

Figure 3: Decarbonisation and Energy Efficiency Pathway

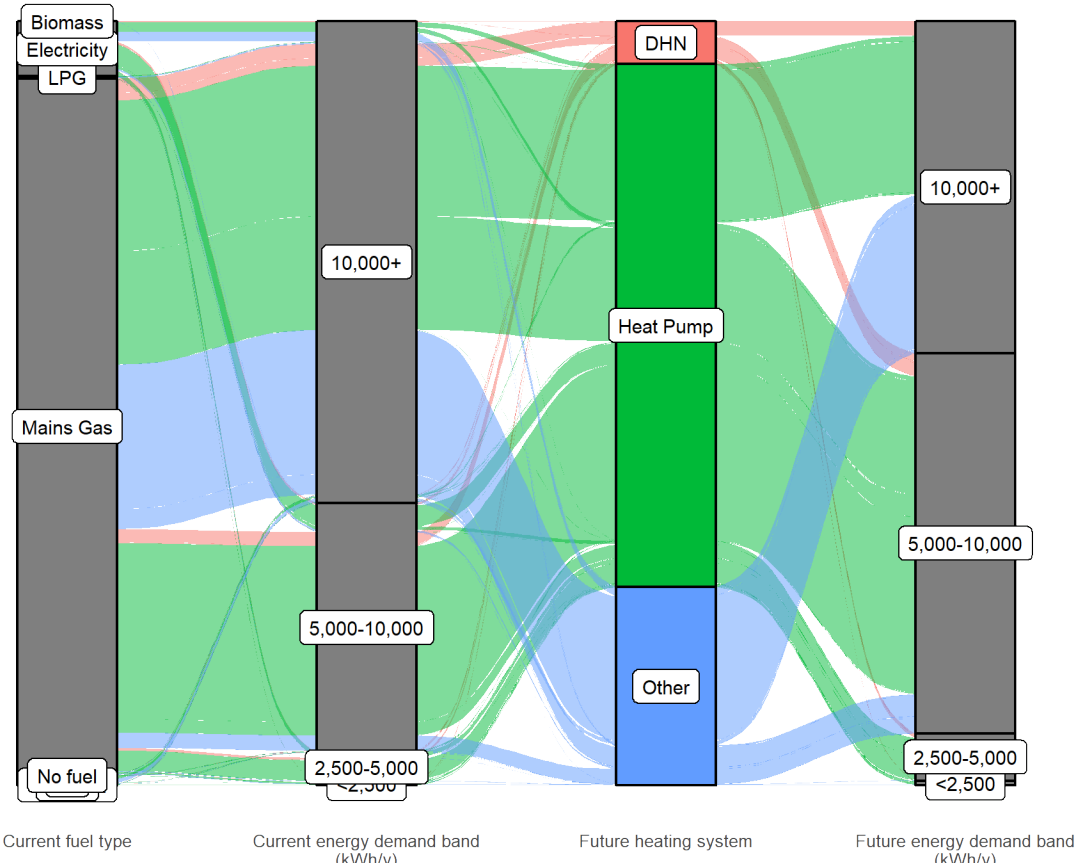


The first column shows how many properties start off with each fuel source. The second groups the properties by their total heat demand, in kWh. The third column assumes reasonable energy efficiency measures have been applied and groups the properties by revised heat demand. The suitability of each property for each of the low carbon heat measures is then shown. This assumes all areas set out in this report are developed but doesn't consider further expansion. It can be clearly seen the high proportion of properties for which heat pumps are the most suitable technology.

Focus on decarbonisation

Installing cost effective energy efficiency measures is always preferable. However, purchasing decisions for heating systems can be made in isolation, such as when a heating system breaks. By isolating the move to low carbon heating from existing properties without energy efficiency improvements we can see that there is significant potential to start decarbonising heat and for that to reduce the in-energy consumption of properties. However, in many cases it may be essential to install energy efficiency measures if operating costs are to be the same or lower as the technology being replaced.

Figure 4: Decarbonisation of heat without further energy efficiency



Stakeholder consultation

Engagement with stakeholders was undertaken, both within the Council and external stakeholder representatives. The findings of these sessions were considered and informed the development of the pathways and analysis.

Conclusions

It is clear that energy efficiency measures and heat pumps have the potential to significantly reduce energy demand, contribute to lower risk of fuel poverty and decarbonise heat. There are areas with potential for district heating networks which can serve a range of domestic and non-domestic heat users. The capacity of the electricity network to support electrification of heat will vary over time and between areas. Continued discussions with the DNO will be essential to understand where constraints arise and when they are likely to be alleviated.

The prioritisation of technologies set out in this report will inform future decisions on the allocation of capital to ensure that the reduction of fuel poverty and decarbonisation of heat are considered.

The LHEES officer and working group will bring together actions from across the Council which are within the scope of LHEES to identify opportunities for shared working, meeting the LHEES objectives and community wealth building.

2. Abbreviations

Table 4: Abbreviations

Acronym	Description
BAR	Building Assessment Report
COP	Coefficient of Performance
EES	Energy Efficient Scotland
EESSH	Energy Efficiency Standard for Social Housing
EPC	Energy Performance Certificate
ESCCS	Environmental Sustainability & Climate Change Strategy
EST	Energy Saving Trust
GHG	Greenhouse gas
GIS	Geographic Information System
EES: ABS	Energy Efficiency Scotland: Area Base Schemes
HIBS	Heat in Buildings Strategy
IZ	Intermediate Zone
LA	Local Authority
LHEES	Local Heat and Energy Efficiency Strategy
LPG	Liquefied Petroleum Gas
MXD	Map Exchange Document
NLC	North Lanarkshire Council
PEAT	Portfolio Energy Analysis Tool
SAP	Standard Assessment Procedure
UPRN	Unique Property Reference Number
Wrt.	With respect to

3. Introduction

3.1 Overview of LHEES

The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022[3] places a duty on local authorities (LAs) to prepare and update a Local Heat and Energy Efficiency Strategy (LHEES) and Delivery Plan. This document has been prepared by North Lanarkshire Council (NLC) to fulfil its duty under that Order.

This Strategy sets out the Council's long-term plan for decarbonising heat and improving the energy efficiency of buildings in North Lanarkshire.

LHEESs are primarily driven by Scotland's statutory targets for greenhouse gas (GHG) emissions reduction and fuel poverty[4]:

- Reaching net zero emissions by 2045 with 75% reduction by 2030; and
- By 2040, as far as reasonably possible, no household in Scotland is in fuel poverty.

The Strategy:

- Sets out how each segment of the building stock needs to change to meet national and local objectives, including achieving zero GHG emissions from buildings, and the removal of poor energy efficiency as a driver of fuel poverty;
- Identifies strategic heat decarbonisation zones, and set out the principal measures for reducing buildings emissions within each zone; and
- Prioritises areas for the delivery of measures to meet national and local priorities.

A Delivery Plan accompanies the Strategy and has been developed in partnership with key stakeholders, to provide a strong basis for action for local communities, government, investors, developers and wider stakeholders, pinpointing areas for targeted intervention and early, low-regrets measures. The Strategy and Delivery Plan will be reviewed and updated on an annual basis.

3.2 Strategy Scope and Limitations

The scope of the Strategy is focused on heat decarbonisation, energy efficiency and fuel poverty and does not include wider energy system planning directly, but the LHEES can be used as a building block for this.

While there are some limitations with the domestic building dataset, which is primarily based on Home Analytics, it is of sufficient quality to allow detailed analysis and conclusions. However, the non-domestic data, which is primarily based on Non-Domestic Analytics, is less reliable overall due to the dataset having significantly more gaps in it and a much wider set of uses for heat. For this reason, the analysis of non-domestic buildings has less depth than that of domestic properties.

[3] The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 (legislation.gov.uk)

[4] Local heat and energy efficiency strategies and delivery plans: guidance - gov.scot (www.gov.scot)

4. Background Information

4.1 LHEES Structure, Function and Scope

4.1.1 LHEES Structure

As established in the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022, LHEES should have a two-part structure. This document sets out the long-term strategy and the accompanying Delivery Plan sets out actions to support implementation of this Strategy.

4.1.2 LHEES Considerations

The LHEES guidance sets out the key considerations for this Strategy, shown in Table 5. These help to categorise building stock into groups that require similar interventions.

Table 5: LHEES Considerations

	No.	LHEES Considerations	Description
Heat decarbonisation	1	Off-gas grid buildings	Transitioning from heating oil and LPG in off-gas areas
	2	On-gas grid buildings	On-gas grid heat decarbonisation
	3	Heat networks	Decarbonisation with heat networks
Energy efficiency and other outcomes	4	Poor building energy efficiency	Identify where energy demand of buildings can be reduced by installing fabric improvements
	5	Poor building energy efficiency as a driver for fuel poverty	Identify where energy efficiency improvements can contribute to reducing fuel poverty
	6	Mixed-tenure, mixed-use and historic buildings	Identify buildings with factors which may complicate deployment of energy efficiency measures or low carbon heat sources, such as: properties of varying tenures or uses; listed buildings; and conservation areas

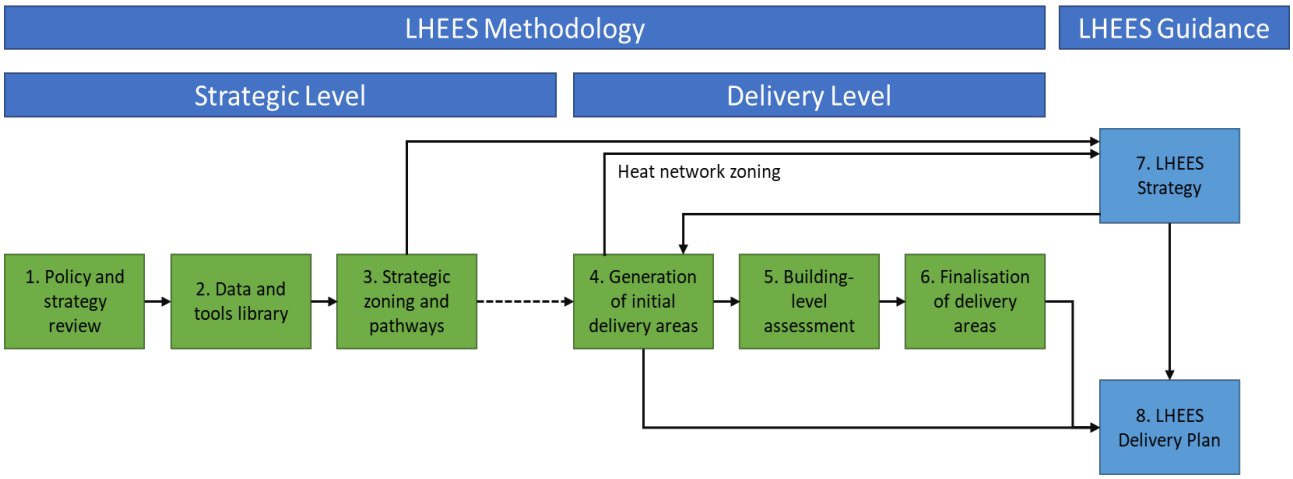
NLC policies do not differentiate by connection to the gas grid or if buildings are mixed-tenure, mixed-use and historic buildings. Instead, the policies apply to the full array of building stock.

4.1.3 LHEES Approach

A suggested LHEES methodology is supplied by the Scottish Government as shown in Figure 5. Although North Lanarkshire Council's approach has been based on the proposed methodology shown, the details have been adjusted to suit the specific context of North Lanarkshire. The methodology is broken down into eight stages that align with the work set out in the LHEES Guidance.

The completion of these stages provides NLC with the data analysis and evidence base to enable development of this Strategy and the accompanying Delivery Plan. The completion of work carried out in stages 1-4 fed into the Strategy plan, and the completion of stages 4-6 alongside the Strategy fed into the Delivery Plan.

Figure 5: Summary of LHEES Approach and Stages



4.2 Heat Decarbonisation Interventions

There are a range of potential low carbon heat sources which are likely to play a role in the LHEES. A technology agnostic approach was taken to consider the full range of technologies without bias, weighing up the advantages and disadvantages of each measure on fuel poverty and decarbonisation – Table 6 summarises these technologies. In assessing the impact of interventions, this Strategy considers the heating energy consumption of properties (in kWh) and the specific heating energy demand (kWh/m^2). The resulting improvements in Energy Performance Certificate (EPC) rating or SAP score are not considered. This is because the associated rating improvement would change with future methodological adjustments. Some adjustments are already planned, and these methodologies may continue to be adjusted a number of times. This focus on the heat demand of these buildings in isolation provides clarity on the real-world impact, particularly around fuel poverty.

There may be differences in prioritisation for specific projects based on the methodology for assessing energy efficiency applicable at that time.

The Heat in Buildings Strategy[5] (HIBS) states that for the period to 2030, focus must be placed on accelerating the deployment of tried and tested measures where they are known to be no or low regrets. These have been identified to be:

- Energy efficiency measures for both existing and new buildings;
- Individual heat pumps in buildings off the gas network which currently use high carbon heating fuels;
- Heat pumps for on-gas buildings where initial assessments suggest heat pumps are likely to be cost effective and are less likely to receive a main hydrogen gas supply in the future; and
- Low and zero emission heat networks in areas deemed suitable.

[5] Heat in Buildings Strategy - achieving net zero emissions in Scotland's buildings - gov.scot (www.gov.scot)

Table 6: Heat decarbonisation interventions

Intervention	Heat decarbonisation	Effect on fuel poverty	Suitability
Energy efficiency	Measures such as double glazing, draught proofing and insulation reduce energy demand which in turn increases the viability for switching to low carbon heat sources	Improved energy efficiency leads to reduced energy costs, which reduces fuel poverty. Grants and loans are available for lower income households.	Where feasible and cost-effective, HIBS aims for all homes to have the at least the equivalent of EPC band C by 2033
Heat pumps	Heat pumps use electricity to extract heat from the air, ground or water. Grid electricity is continuing a trend of decarbonisation through renewable energy.	Appropriately designed and well-running heat pumps can reduce costs, particularly compared to electric heating. Savings are dependent upon the relative price of electricity compared to the fuel displaced as well as the coefficient of performance (COP) of the installation. Replacing electric heating with a heat pump can reduce energy consumption and reduce fuel poverty. Installing energy efficiency measures in conjunction with heat pumps can further reduce fuel poverty.	Heat pumps are commonly used in cold climate, such as Scandinavia and research has found that all UK house types are suitable for heat pumps[6]. Where necessary, upgrades to heat emitters or hot water storage can present practical challenges in some properties. The electricity network will need to accommodate increase in electricity demand from heat pumps, direct electrical heating, and other energy sources such as Electric Vehicles. Hot water production is usually provided through a hot water cylinder, which requires space in a property.
Heat networks	Heat networks, which use waste heat, heat pumps or bioenergy as their energy source	The Competition and Markets Authority found that up to 90% of heat network customers enjoy similar, or lower, bills than those with standard gas boilers and heat networks can cut both emissions and bills.	Heat networks are suitable for all building types but only in areas with a sufficient density of heat demand
Electric heating	Electricity to extract heat from the air or ground. Grid electricity is continuing a trend of decarbonisation through renewable energy	While direct electric heating is more efficient than combustion boilers, including gas, the high cost of electricity must be considered for households at risk of entering fuel poverty. Storage heaters can be used to harness cheaper electricity at night but can emit and waste heat when not required	Electric heating is suitable for all properties with a suitable electricity connection. Hot water production is usually provided through a hot water cylinder, which requires space in a property.

[6] An Energy System Catapult electrification of heat project in the UK finds all housing types are suitable for heat pumps.

Intervention	Heat decarbonisation	Effect on fuel poverty	Suitability
Bioenergy	Sustainably sourced, bioenergy (i.e., solid biomass, biogas or biomethane) is regarded as carbon neutral	There is uncertainty surrounding the future supply of bioenergy and biomass boilers tend to have more maintenance requirements than gas boilers	HIBS indicates that bioenergy is likely to have a limited role in the decarbonisation of the building stock. There may be some buildings for which bioenergy can play a role, for example in hard to treat off-gas properties where heat pumps are unsuitable. However, the UK's Green Gas Support Scheme aims to increase the proportion of biomethane in the gas grid. A bioenergy Action Plan is due to be published in late 2023. Air quality concerns need to be considered in urban settings
Hydrogen	Green hydrogen is produced by splitting water using renewable electricity while blue hydrogen is produced from fossil fuels plus carbon capture. Therefore, both production routes are deemed as low carbon in UK and Scottish legislation. Increased availability of hydrogen for heat will have positive implications for the suitability of hybrid heat pump systems, which may be cost-effective solutions	Currently hydrogen is an underdeveloped fuel and is associated with high costs. The future of hydrogen prices is uncertain but may become competitive with other energy sources in the coming decades. However, without Government incentives prices for green hydrogen are unlikely to be lower cost than using direct electrical heating or heat pumps as hydrogen system efficiency is lower than using electrified heating.	Hydrogen may be appropriate in certain areas where there is local supply or where industrial demand creates economies of scale. The UK Government is establishing large-scale trials of hydrogen for heating and assessing the potential to blend hydrogen into the gas grid, with a final policy decision to be taken in 2026. Decarbonising the gas network is unlikely to deliver substantial emissions savings before the late 2020s.

5. Policy and Strategy Context

5.1 LHEES Policy Context

The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 stipulates that each local authority area must prepare and publish (a) a Local Heat and Energy Efficiency Strategy, and (b) a local heat and energy efficiency Delivery Plan by the end of 2023. These will be the principal mechanism for locally-led heat planning. Both must be kept under review and updated at five yearly intervals.

The six LHEES Considerations, as outlined in Section 4.1.2, are in two categories, namely "heat decarbonisation" and "energy efficiency and other outcomes".

On a UK level, there exists legally-binding legislation to reach net zero emissions by 2050. The Net Zero Strategy: Build Back Greener[7] report denotes than one third of emissions are a result of heating for homes and workplaces. The UK Government is responsible for regulation of the electricity and gas networks and markets. Other targets are set, such as reaching 600,000 heat pump installations nationwide by 2028[8].

The Scottish Government has more ambitious targets than the UK, with net zero by 2045 and interim targets of 75% by 2030 and 90% by 2040. There are certain powers which are devolved to the Scottish Government such as promoting renewable energy and energy efficiency, while many aspects of energy policy are reserved by the UK Government.

Chapter 10 of the Heat in Buildings Strategy[9] (HIBS) discusses the need for the UK and Scottish Government to work alongside each other to facilitate the decarbonisation of heat.

5.2 Heat Decarbonisation – Scottish Government Policy

The Scottish Government's Climate Change Plan update was published in December 2020[10]. The next full plan is due to be completed by early 2025. To achieve net zero by 2045, Scotland has committed to reducing emissions by 75% (compared to 1990) by 2030. As part of this, around 50% of homes and non-domestic buildings will need to convert to a low or zero carbon heating system by 2030. An investment of £1.6 billion has been earmarked for heat and energy efficiency over the next Parliament.[11]

HIBS sets out a pathway to zero building emissions by 2045 and describes 111 actions and proposals that the government will take to work towards these targets. A new provisional Renewable Heat Target is presented whereby at least 22% of non-electrical heat in buildings is to be supplied by renewable sources by 2030, up from today's estimated 4% level.

These policies feed into the LHEES Considerations of:

1) Off-gas grid buildings;
2) On-gas grid buildings;
3) Heat networks; and
4) Poor building energy efficiency as a driver for fuel poverty.

5.3 Energy Efficiency – Scottish Government Legislation

The Tackling Fuel Poverty in Scotland: A Strategic Approach[12] sets the target to maximise the number of fuel poor households attaining EPC B by 2040. At the time of writing, the Scottish Government are consulting on an EPC reform, which likely will have an impact on the grading of the building stock and the effect of measures[13]. The Fuel Poverty Act sets an overarching target that in the year 2040, as far as reasonably practicable, no household in Scotland is in fuel poverty and, in any event, no more than 5% of households are

[7] Net Zero Strategy: Build Back Greener - GOV.UK (www.gov.uk)
[8] Heat Pump Investment Roadmap (publishing.service.gov.uk)
[9] Heat in Buildings Strategy - achieving net zero emissions in Scotland's buildings - gov.scot (www.gov.scot)
[10] Securing a green recovery on a path to net zero: climate change plan 2018–2032 - update - gov.scot (www.gov.scot)
[11] Increased funding to tackle fuel poverty and climate change - gov.scot (www.gov.scot)
[12] Tackling fuel poverty in Scotland: a strategic approach - gov.scot (www.gov.scot)
[13] Energy Performance Certificates - Energy efficiency - gov.scot (www.gov.scot)

fuel poor, no more than 1% are in extreme fuel poverty and the fuel poverty gap is no more than £250 (in 2015 prices).

The Scottish Government will require that all residential properties in Scotland achieve EPC C by 2033, where technically and legally feasible and cost-effective. For the social rented sector, no housing should be let after 2025 if the EPC rating is lower than EPC D. For the owner occupier sector, new energy efficiency regulations will be introduced between 2023 to 2025.

These policies feed into the LHEES Considerations of:

4) Poor building energy efficiency;
5) Poor building energy efficiency as a driver of fuel poverty; and
6) Mixed-tenure, mixed-use and historic buildings.

5.4 Summary of Policy and Legislation

Table 7: Summary of policy and legislation

UK-Wide
The Climate Change Act 2008 (2050 Target Amendment) Order 2019: Net Zero GHG Emissions by 2050
National – General
Heat in Buildings Strategy (2021) Sets out a pathway to zero emissions buildings by 2045 and includes the New Renewable Heat Target for 2030
The Heat Networks (Scotland) Act 2021, which was followed by the Heat Network Delivery Plan, has targeted for 2.6 Terra Watts (TWh) to be supplied by heat networked by 2027 and 6 TWh by 2030. By October 2023, Scottish Ministers are required to set a target for 2035. The Act places a duty on local authorities to conduct a review of areas likely to be particularly suitable for heat networks within its area.
The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 which both defines fuel poverty and sets targets for fuel poverty eradication by 2040 with interim targets for 2030 and 2035. Following this, the Tackling Fuel Poverty in Scotland: A Strategic Approach was published in late 2021, which contains a strong focus on energy efficiency as a driver for fuel poverty.
Climate Change (Scotland) Act 2009: Public bodies have a duty to contribute to Scotland's national emission reduction target
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019: 75% emissions reduction by 2030, 90% emission reduction by 2040, and net zero GHG emissions by 2045
Update to the Climate Change Plan (2018-2032) • By 2030 at least 50% Scotland's building stock heated using zero emission systems; • Retrofit buildings and achieve ultra-high levels of fabric efficiency in new builds; and • Reduce car kilometres by 20% by 2030.
Scottish Government Climate Change Plan Update – Securing a Green Recovery on a Path to Net Zero (2020): Focus on green recovery to deliver net zero ambitions following the Covid-19 pandemic. Emphasis on green jobs, adaptation, and tackling fuel poverty. • "By 2040, no more than 5% of households in fuel poverty, and no more than 1% in extreme fuel poverty"
Scottish Government Hydrogen Action Plan (2022): Ambition of 5GW of hydrogen production capacity by 2030 and 25GW by 2045.
Climate Emergency Skills Action Plan (Skills Development Scotland / Scottish Government) (2020): Local authorities are lead partners on Priority Area 1: Supporting a green labour market recovery from Covid-19, and Priority Area 5: Ensuring fairness and inclusion in the skills system as part of a just transition to net zero.
Scotland's fourth National Planning Framework (NPF4) • Encourage the reuse of brownfield, vacant and derelict land for new developments. Draft Energy Strategy and Just Transition Plan (2023): "More than 20GW of additional renewable electricity on-and offshore by 2030"

National – Public Sector Specific
The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2020: Public bodies must report in their Public Bodies Climate Change Duties (PBCCD) Annual Reports: • where applicable, "targets for reducing indirect emissions of greenhouse gases" Indirect emissions include supply chain emissions, and • how they align their spending plans and use of resources to contribute to reducing emissions and delivering emissions reduction targets and report on this from March 2022.
Scottish Government and Scottish Green Party: draft shared policy programme (2021): • "All publicly owned buildings to meet zero emission heating requirements, with a backstop of 2038." This implies that most buildings would be decarbonised well before that. The programme commits to "a series of phased targets" for decarbonisation of public sector buildings starting in 2024. This will be driven through building standards/Heat in Buildings Regulations. • "All new buildings where a building warrant is applied for from 2024 must use zero emissions heating as the primary heating source and meet significantly higher energy efficiency standards".
Public Sector Leadership on the Global Climate Emergency (2021): • "Decarbonise estate by 2038 at the latest, with zero carbon direct emissions from all buildings". • "Any fugitive emissions that can be reduced to absolute zero must be, however some areas of fugitive emissions may not be able to be reduced to absolute zero by 2045". • Public sector bodies must set emissions reduction targets for indirect emissions (such as business travel).

5.5 Local Policy and Strategy, and Linkages

5.5.1 Local Strategies, Policies and Plans

Relating to the LHEES Considerations, the Council's strategies, policies and plans have been reviewed with specific areas of local analysis highlighted for relevance.

Table 8: Local Strategies

Strategy, Policy, Plan	Description	Linkages
Local Housing Strategy	The LHS helps set out the authority's approach to tackling fuel poverty, acceleration of energy efficiency improvements and uptake of low/carbon heat.	All considerations but primary link to LHEES consideration 5 – poor energy efficiency as a driver for fuel poverty
Local Development Plan	The LDP is a 5-10 year land use planning strategy with the aim to increase sustainable growth and regeneration.	Links to LHEES Consideration 3 – heat networks. The LDP identifies potential energy sources for heat networks via the National Heat Map
Climate Plan Act 2030	A plan to underpin the Council's commitment to net-zero by 2030 within North Lanarkshire. This is significantly more ambitious than Scotland's 2045 target	LHEES Consideration 4 and 5
Plan for North Lanarkshire	The Council's overall ambition for North Lanarkshire	Sustainable Futures

5.6 Indicators

The LHEES methodology sets out a core set of default indicators and analysis weightings which have been used in this report. For each of the six given considerations defined in Table 5 the purpose of an indicator is:

1) To act as a key information field to help characterise the local authority using the Baseline Tool as part of LHEES stage 3 (authority-wide and at a strategic level).
2) To act as a key information field to support strategic zoning and generation of initial delivery areas (as part of LHEES stages 3 and 4).
3) If suitable, to act as a key information field to measure progress against targets over the duration of the LHEES – set out in LHEES stage 8, LHEES Delivery Plan. For some considerations, one target and indicator may be sufficient, but for others a range of indicators may be appropriate to contextualise and characterise performance against a Target and/or progress towards a consideration.

There is flexibility to update and augment these indicators to support local needs or for more focused analysis linked to specific actions and project identification within the future Delivery Plan. In reviewing the policies identified, there was no reason found to amend the indicators used in the National Assessment and as such, this study uses these default indicators and weighting values.

6. Baselining

6.1 Baseline Summary Across North Lanarkshire

6.1.1 Domestic Building Stock

The Home Analytics dataset records just over 161,000 domestic properties in North Lanarkshire, with 26% being in the ownership of NLC and a further 6% owned by housing associations. This group of key stakeholders is responsible for almost one third of the domestic properties covered by this strategy. Private landlords hold 7% of properties, with the remainder (61%) being owner-occupied. There are conservation areas in North Lanarkshire and 2% of domestic properties are situated in those. Listed buildings make up just 0.2% of the domestic building stock, with NLC owning just 12. The data in home analytics differs slightly from Council data[14].

The majority of domestic properties in North Lanarkshire were constructed after 1950 (Figure 6) but 77% of NLC's stock was built between 1950 and 1983, meaning that it is not very new. By contrast, the housing association stock has a larger proportion of newer stock, and this may be reflected in the greater proportion of housing association properties reaching an EPC grade of C or better. Within NLC's stock, 41% of properties require an intervention of some sort to bring their EPCs up to C or better. However, NLC's own housing stock data reveals a potential challenge. Virtually all NLC stock have double- or triple-glazed windows (with most installed since 2008) and less than 15% lack wall insulation. Loft insulation data is patchier, but it is assumed that that low-hanging fruit have been picked already and hence more effort will be required to improve efficiency ahead of changing heat supplies.

The private sector has an even greater challenge to improve EPCs both proportionally and in absolute numbers of properties. According to EPC records across Scotland, around 50% of properties have an EPC rating of C or better. In North Lanarkshire there is a higher percentage of Council-owned properties which achieve this grade (59%) but a lower percentage of private homes (47%).

Around 19% of Scottish homes were constructed before 1919. The percentage of properties in North Lanarkshire build before 1919 is therefore lower than (Figure 6). This may indicate that there is a smaller proportion of properties in North Lanarkshire are hard to treat.

Around one fifth of domestic properties are located in small towns and rural areas where future heat networks are unlikely to supply and so other routes to heat decarbonisation will be required.

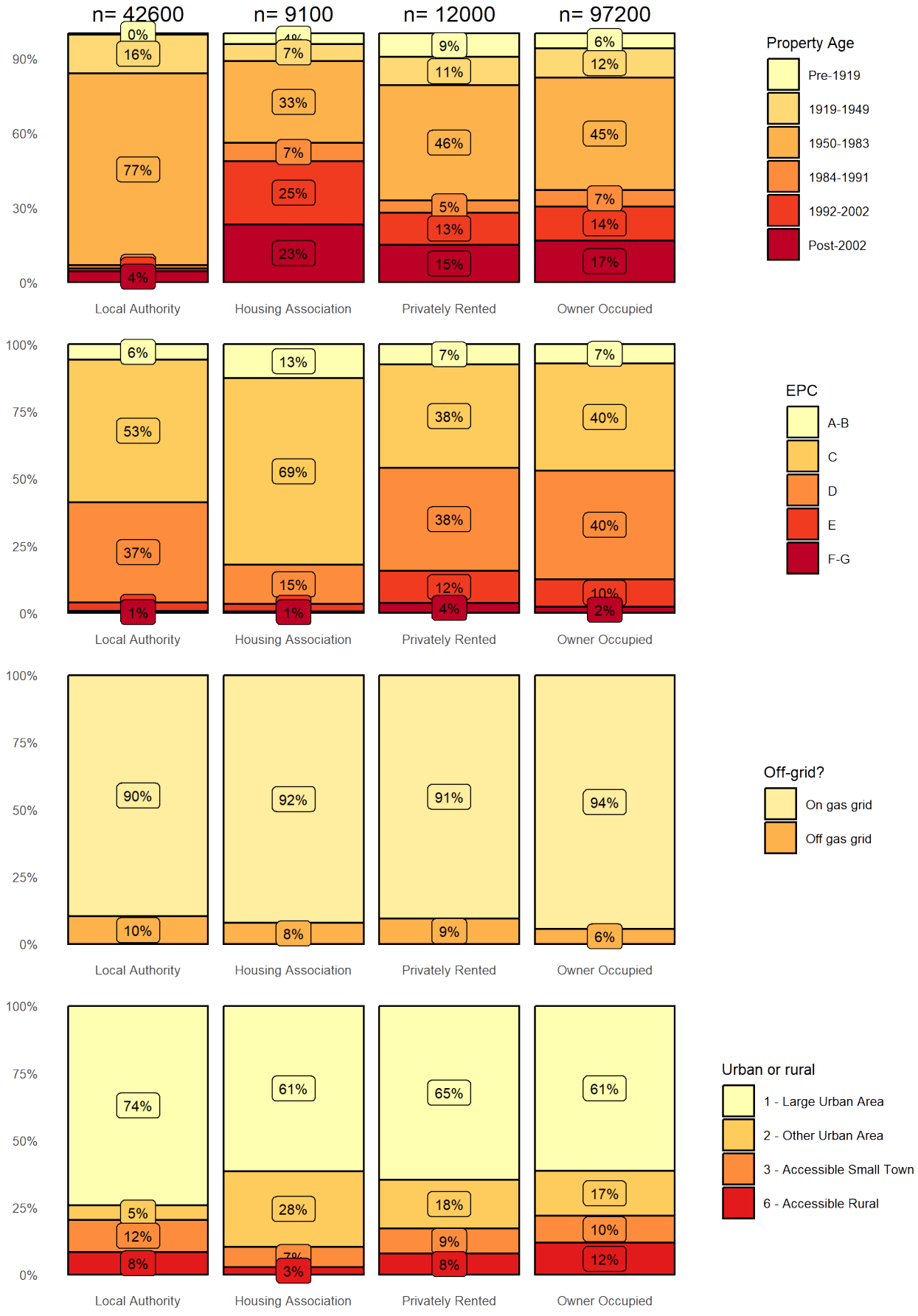
Aside from the noted discrepancy over property numbers, other aspects of the data could not be verified independently from other sources. Home Analytics dataset is prepared by Energy Savings Trust. The release notes state that Home Analytics*:*

"is a combination of two types of data: actual values and modelled values. Actual values are obtained from a variety of sources, such as EPC records, HEED and HEEPS: ABS installation records, HEC records, SGN gas meter data, OS AddressBase and OS MasterMap Topography layer, and the Scottish Census."

There remains a risk that the data is incorrect in ways which cannot be foreseen at this stage.

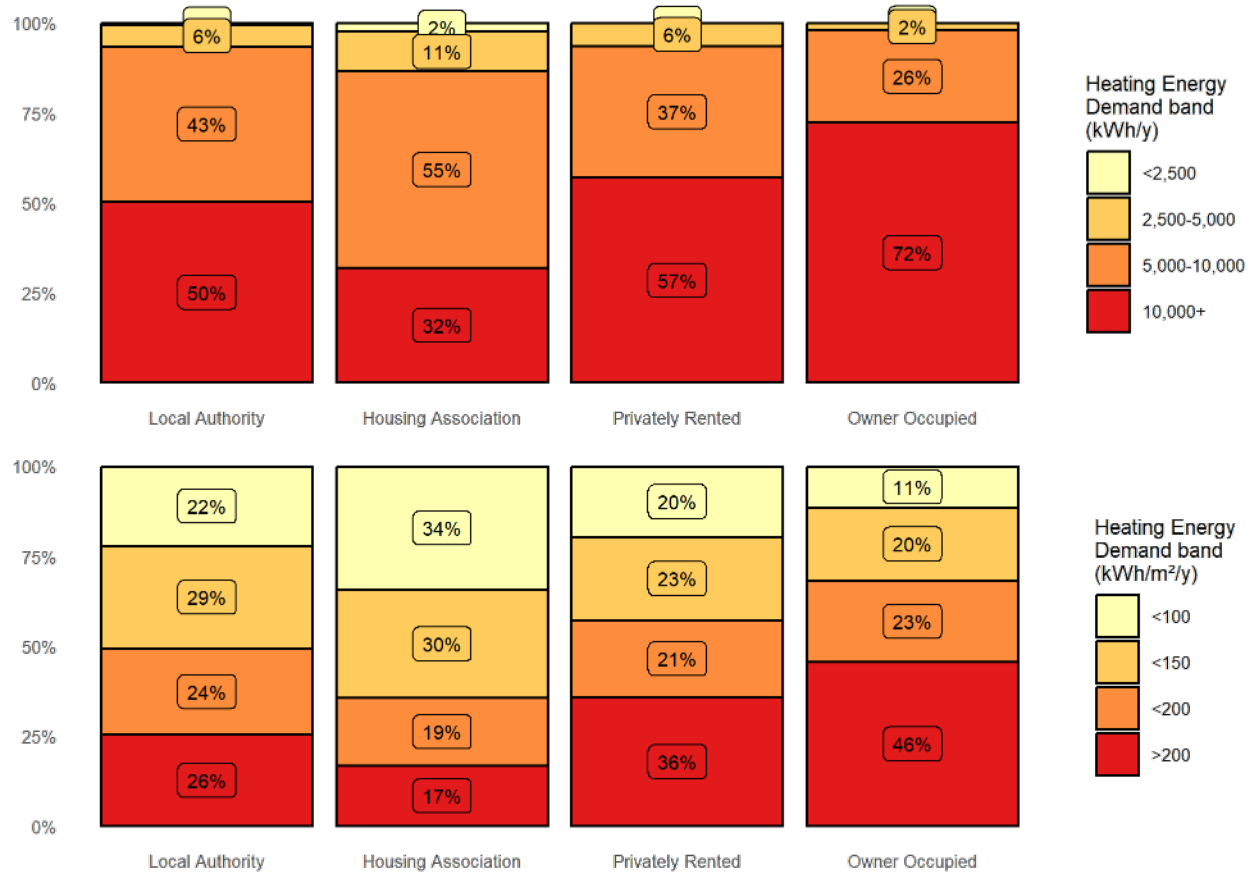
[14] [14] Note that these figures differ from the Council tax data held by NLC (159,857 total dwellings) and from the housing data provided by NLC (36,531 owned by NLC)

Figure 6: Domestic buildings – Distributions of age, EPC rating and gas grid connectivity by tenure type



EPC ratings include a number of other factors in addition to a property's demand for heat. Isolating the heating demand of properties allows an understanding of the existing heat demand and to isolate the benefit to households of energy efficiency measures from other factors which affect EPC rating. The properties have been split into bands by firstly their total requirement for heat and the heat required per m2, based on what is recorded in the Home Analytics dataset, shown in Figure 7. As with EPCs, the worst performing homes are in owner occupied properties. For fuel poverty to be reduced the number of units of heat would need to be reduced (kWh/year) and heating energy demand per square metre (kWh/m^2/year).

Figure 7: Domestic heating energy demand



6.1.2 Non-domestic Building Stock

The Non-Domestic Baseline Tool utilises data derived from Non-Domestic Analytics, which is not based entirely on concrete data collected from building owners but is, in large part, imputed from a few measured parameters. For example, the floor area of a building may be estimated from its footprint on a map and an estimated number of levels based on its height. The energy consumption may then be estimated by multiplying the estimated floor area by a benchmark figure for the building type. This can lead to inaccuracies, of course, and so analytical results should be read with caution. To gauge the relevant degree of caution, the top ten gas-consuming sites in NLC's portfolio were compared with the corresponding entries in the dataset. It was found that only three of the entries correctly identified gas as the main fuel and only one entry was close to the actual annual heat demand. This tells us that the data may not be strong in identifying the correct energy source and energy demand.

Nevertheless, the data has been used for the baselining step of the LHEES process to get a flavour of the building stock. The Non-Domestic Baseline Tool records 7,509 non-domestic buildings in North Lanarkshire. Together, these have an estimated total heat demand of 396,280 MWh/y.

Figure 8 shows the aggregated heat demand for different energy sources. Gas is the biggest source of heat, but electricity and oil have the largest share of small heat loads. Smaller buildings account for half of the total heat demand (Figure 9) and targeting those small oil systems, which would not individually be expensive, for

heat pump or heat network connection could be a priority. It is likely that the small properties using electricity are already using heat pumps for heating and cooling.

The pattern of building age (Figure 10) shows a large proportion of pre-1919 buildings with a high heat demand and this group of properties may be a target for energy efficiency measures. The data lists 46% of these pre-1919 buildings as being retail or financial, so presumably these are typical high street properties. Properties post 1983 show as having the highest total heat demand.

Figure 11 highlights the predominance of “General Industrial, Storage and Distribution”, “Workshops and Offices” and “Retail and Finance”, although the heat loads in the dataset for the former group do appear to be inflated, this could contribute to heat demands overall being inflated and particularly post 1983 properties.

Figure 8: Non-domestic heat demand by energy source and demand category

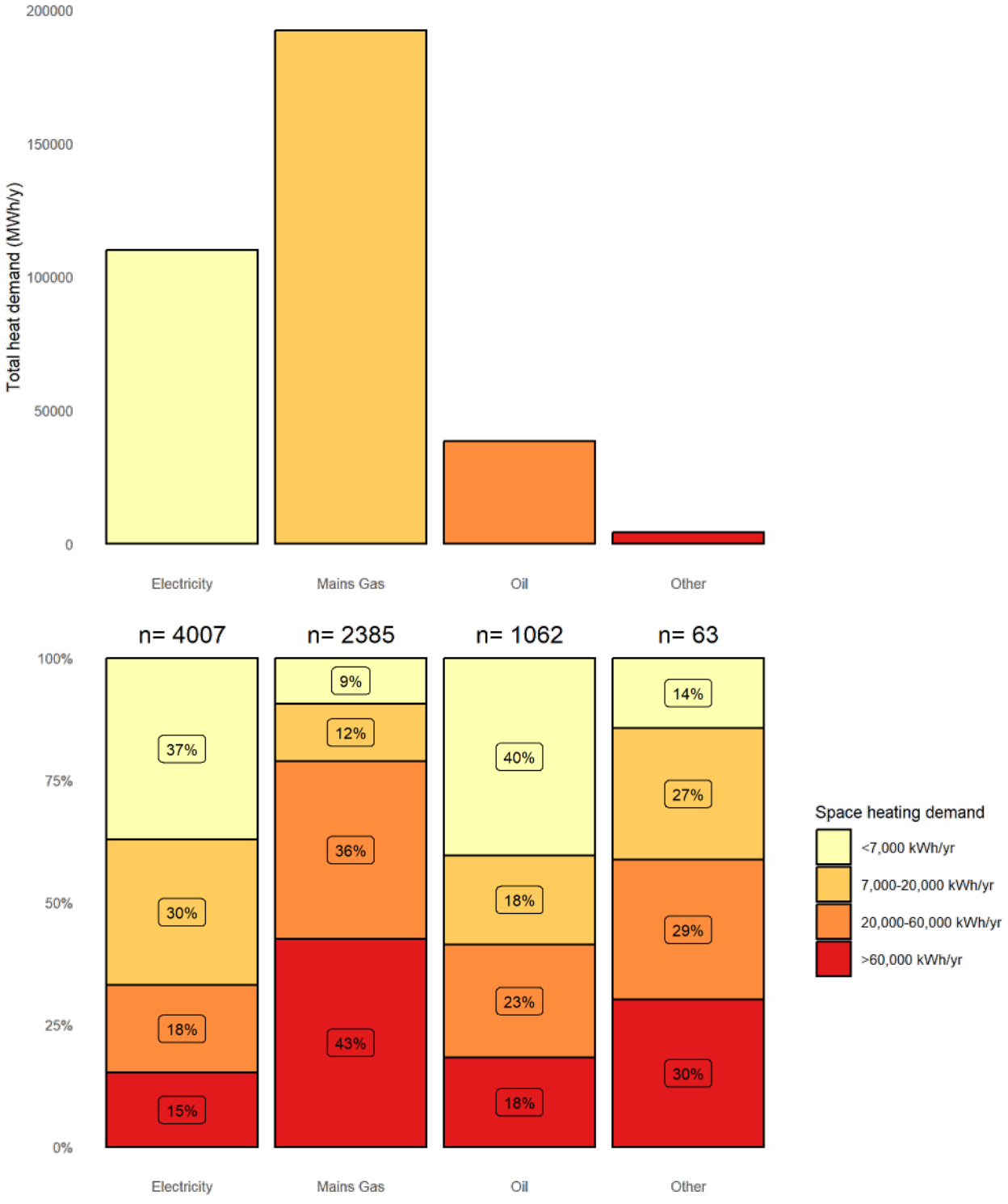


Figure 9: Non-domestic heat demand by energy source and floor area category

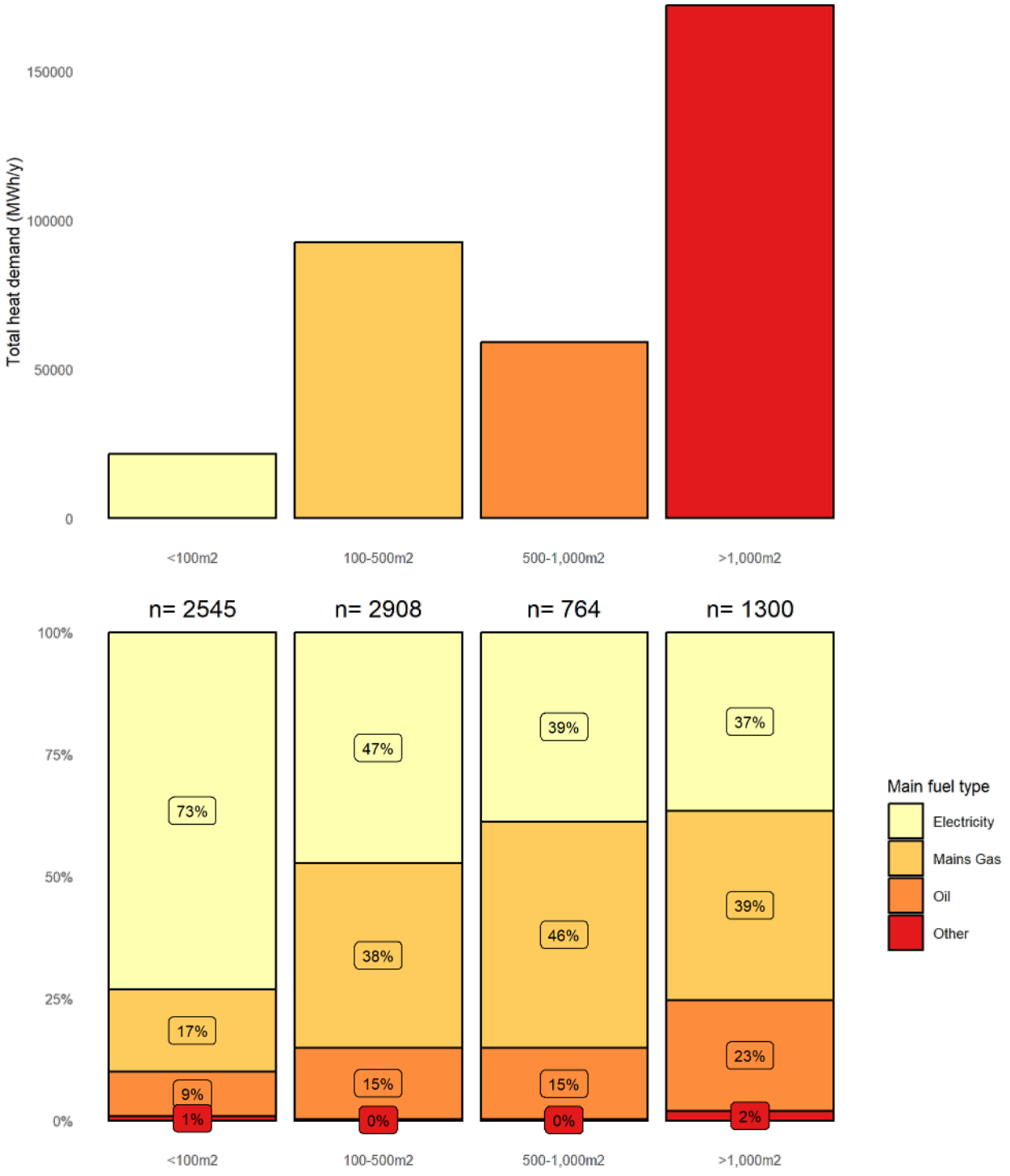


Figure 10: Non-domestic heat demand by energy source and building age category

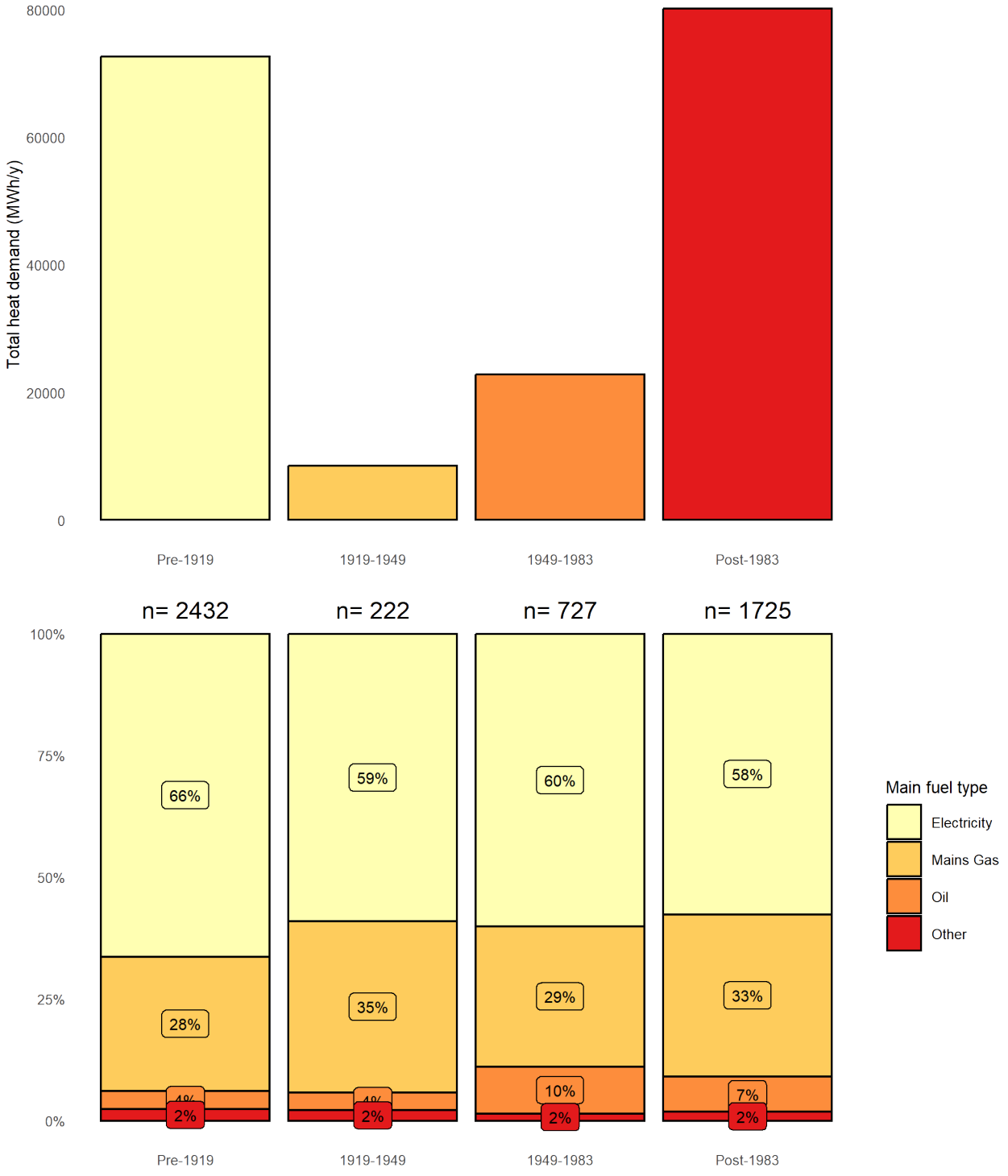
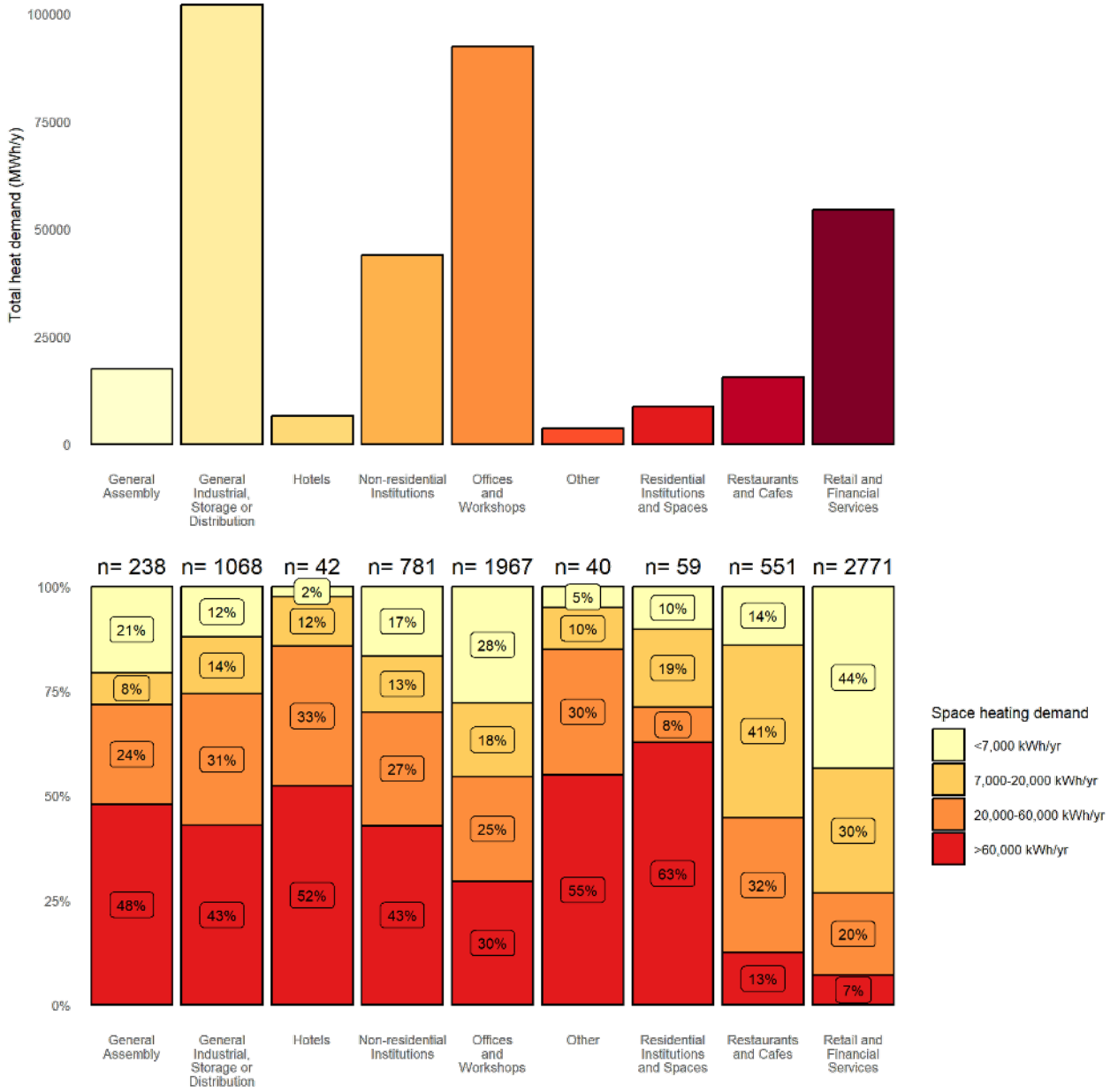


Figure 11: Non-domestic properties by type and energy demand



6.1.3 Non-domestic Buildings Energy Efficiency

Using the publicly available EPC records, around 2,000 EPCs are lodged for North Lanarkshire. By far the largest proportion of these have a rating of G (Table 9). This must be viewed as a target to improve energy efficiency overall in North Lanarkshire.

Table 9: Non-domestic EPCs in North Lanarkshire

EPC Rating	Count	Percentage
Carbon Neutral	3	>1%
A	24	1%
B	87	4%
C	233	12%
D	315	16%
E	354	18%
F	255	13%
G	693	35%

7. Generation of Strategic Zones and Pathways, Including Potential Zones for Heat Networks

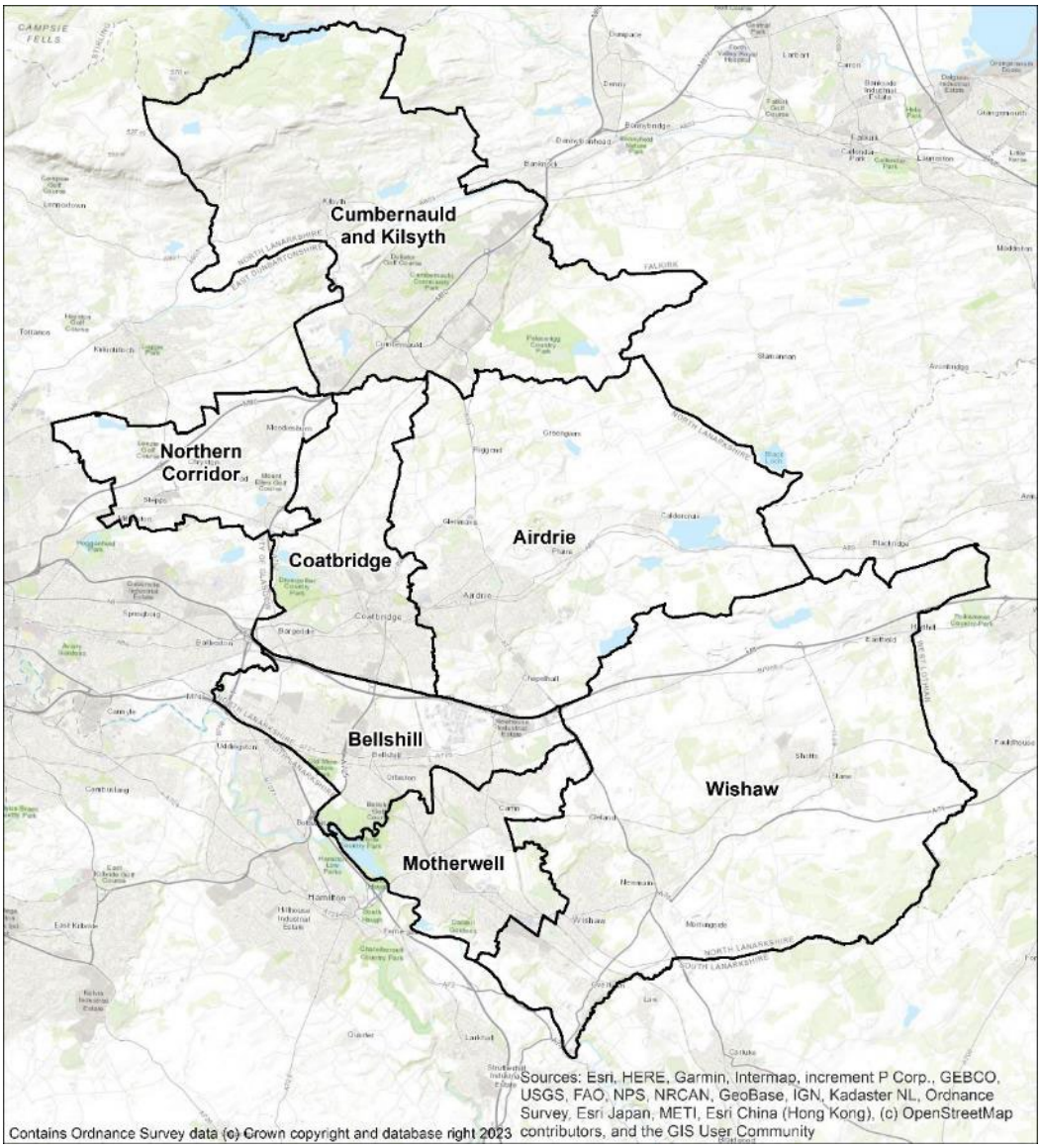
7.1 Purpose

The LHEES Guidance requires the Council to set out Strategic Zones and develop a pathway for each. In this section the approach to selecting Strategic Zones is described, as well as the attributes for each which affect the strategic options.

7.2 Strategic Zones

The LHEES methodology was applied to the standard Intermediate Zone boundaries to assess the impacts of proposed interventions with respect to the LHEES consideration (see Appendix A). However, after engaging with internal Council stakeholders on how policies and actions would be taken forward to delivery, the area boundaries from the North Lanarkshire Local Development Plan (2022) were chosen as the most suitable Strategic Zones. This is because these boundaries capture some fundamental geographical differences and by using existing policy boundaries it allows an alignment with other NLC services and areas of policy. The areas are set out in Figure 12.

Figure 12: North Lanarkshire's Strategic Zones



7.3 Domestic Properties and Tenure

The numbers of domestic properties, broken down by Zone and tenure are given in Table 10.

Table 10: Domestic properties in the Strategic Zones

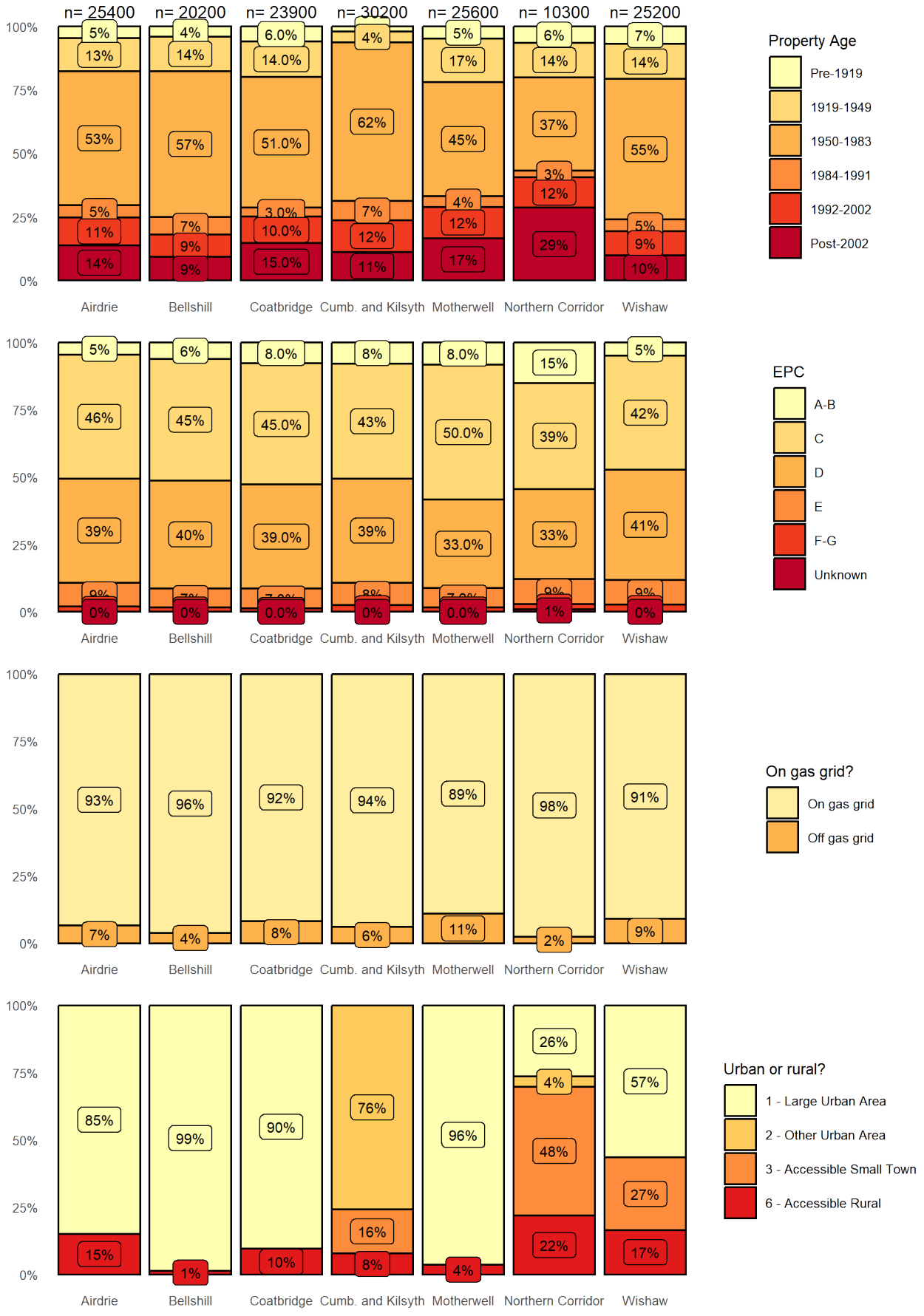
Zone	Total domestic properties	Tenure				Mixed-tenure in parent building
		NLC	Housing Association	Private Rental	Owner Occupied	
Airdrie	25,413	6,917	1,094	2,006	15,396	3,810
Bellshill	20,187	6,070	937	1,344	11,836	2,182
Coatbridge	23,886	7,545	1,050	1,822	13,469	3,970
Cumbernauld and Kilsyth	30,158	4,050	2,770	2,712	20,626	5,214
Motherwell	25,610	8,412	1,653	1,900	13,645	3,811
Northern Corridor	10,275	1,702	209	600	7,764	1,003
Wishaw	25,221	7,936	1,397	1,565	14,323	2,564

A baseline assessment of these properties by area is shown in Figure 13.

This shows that while the building stock ranges from pre-1919 to the present, however the majority of the building stock was built between 1950 and 1983. The energy efficiency ratings show that in all areas, over 70% of buildings has ratings of C or D with a much smaller percentage having higher or lower ratings.

The in all strategic zones there is only a minority of properties which are accessible rural and no properties either remote rural or very remote rural areas.

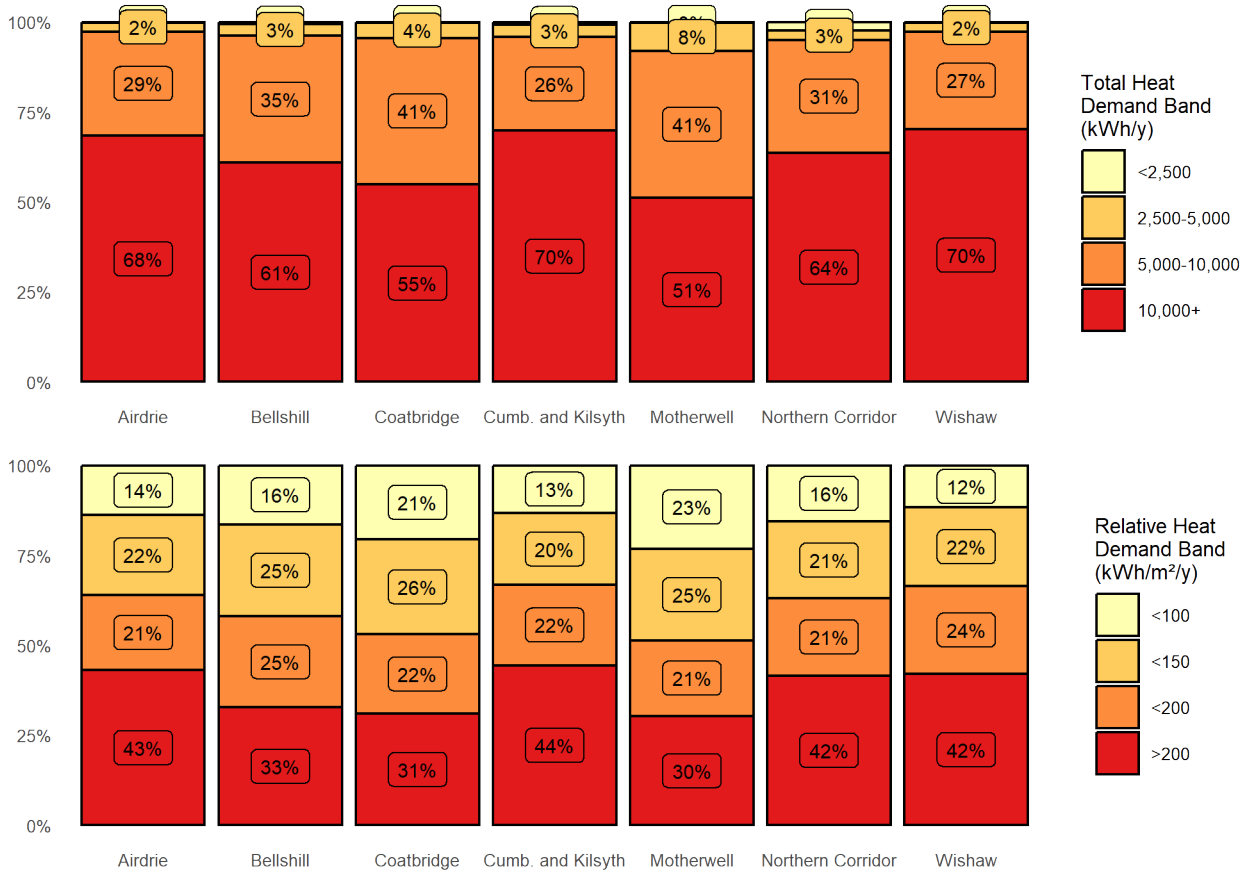
Figure 13: Baselining of domestic properties in the Strategic Zones



7.4 Domestic Energy Efficiency

The energy demand bands (Figure 7) are replotted for the strategic zones – see Figure 14.

Figure 14: Domestic heating energy demand by strategic zone



The Weighted Scores for energy efficiency (Table 11) for the strategic zones, using the default weightings as discussed in Appendix G, have been calculated. The scores are in the range of 0 to 100 and, as expected, none of the strategic zones stand out with respect to the weighted scores. However, the data suggests that Wishaw may be a target area for loft insulation, Bellshill for glazing upgrades (from single to double or triple) and Cumbernauld and Kilsyth for wall insulation and these are examined further.

Table 11: Domestic energy efficiency weighted scores by strategic zone

Strategic Zone	Number of interventions required				Percentage of housing stock				Total Weighted Score
	Loft Ins.	Glazing Upgrade	Wall Ins.	All	Loft Ins.	Glazing Upgrade	Wall Ins.	All	
Airdrie	1,920	460	9,740	12,120	8%	2%	38%	48%	16
Bellshill	1,870	1,500	6,640	10,010	9%	7%	33%	50%	16
Coatbridge	1,850	520	8,120	10,490	8%	2%	34%	44%	15
Cumbernauld and Kilsyth	1,820	740	11,400	13,960	6%	2%	38%	46%	15
Motherwell	1,780	1,530	7,460	10,770	7%	6%	29%	42%	14
Northern Corridor	1,060	510	2,760	4,330	10%	5%	27%	42%	14
Wishaw	2,410	1,370	8,070	11,850	10%	5%	32%	47%	16
Total	**12,710**	**6,630**	**54,190**	**73,530**					

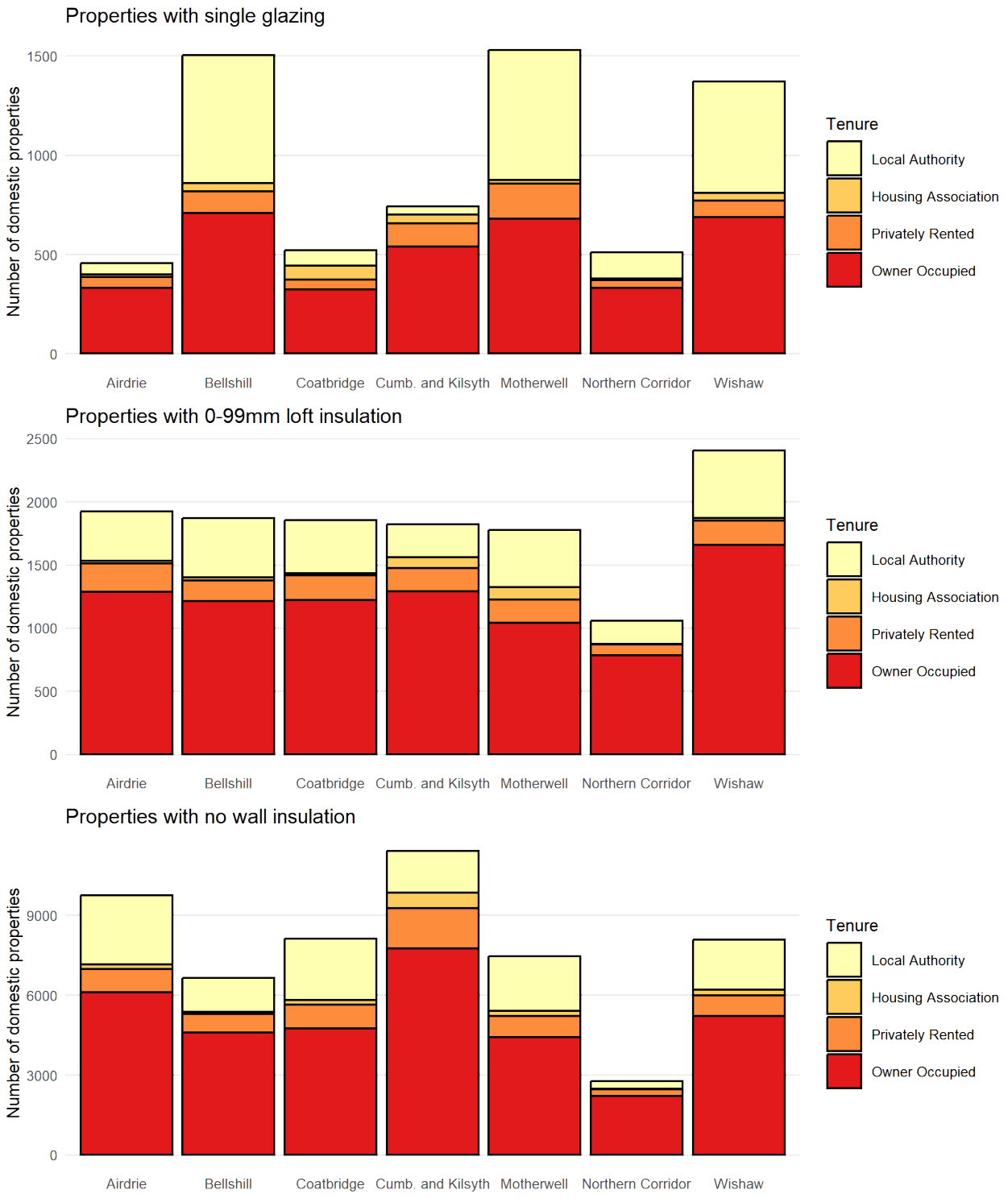
The three suggested interventions broken down by strategic zone and tenure are shown in Figure 15. Much of the Home Analytics data is implied from other observations (e.g., wall construction type) where there is no

direct observation of a feature (e.g., wall insulation) and this may mislead. Immediately, one can see that the Home Analytics data records over 2,000 NLC properties as having single glazing, where NLC's own data records only a handful.

A target for the LHEES strategy must be to improve the quality of the data used for decision-making and this may be done in tandem with the Scottish Government to improve the Home Analytics dataset.

Notwithstanding the concern over data confidence, it appears that, as noted in 6.1.1, the private sector is the key sector for targeting support for improvements.

Figure 15: Domestic properties requiring upgrades to glazing, loft and wall insulation



The biggest burden of potential interventions, according to Table 11, is wall insulation. Figure 16 shows that, in owner occupied and privately rented homes, while there is a small proportion of homes with solid walls which are hard to insulate, the largest group in every strategic zone is cavity walls which should not hinder improved insulation.

Only 224 owner-occupied or privately rented homes with single glazing are either listed or sit in conservation areas. Consequently, the principal barrier to upgrading glazing in private sector properties is likely to be only financial.

There should be limited barriers to installing loft insulation to owner occupied and privately rented homes, since it is both cheap and usually easy to install.

Figure 16: Wall construction in privately rented and owner-occupied houses

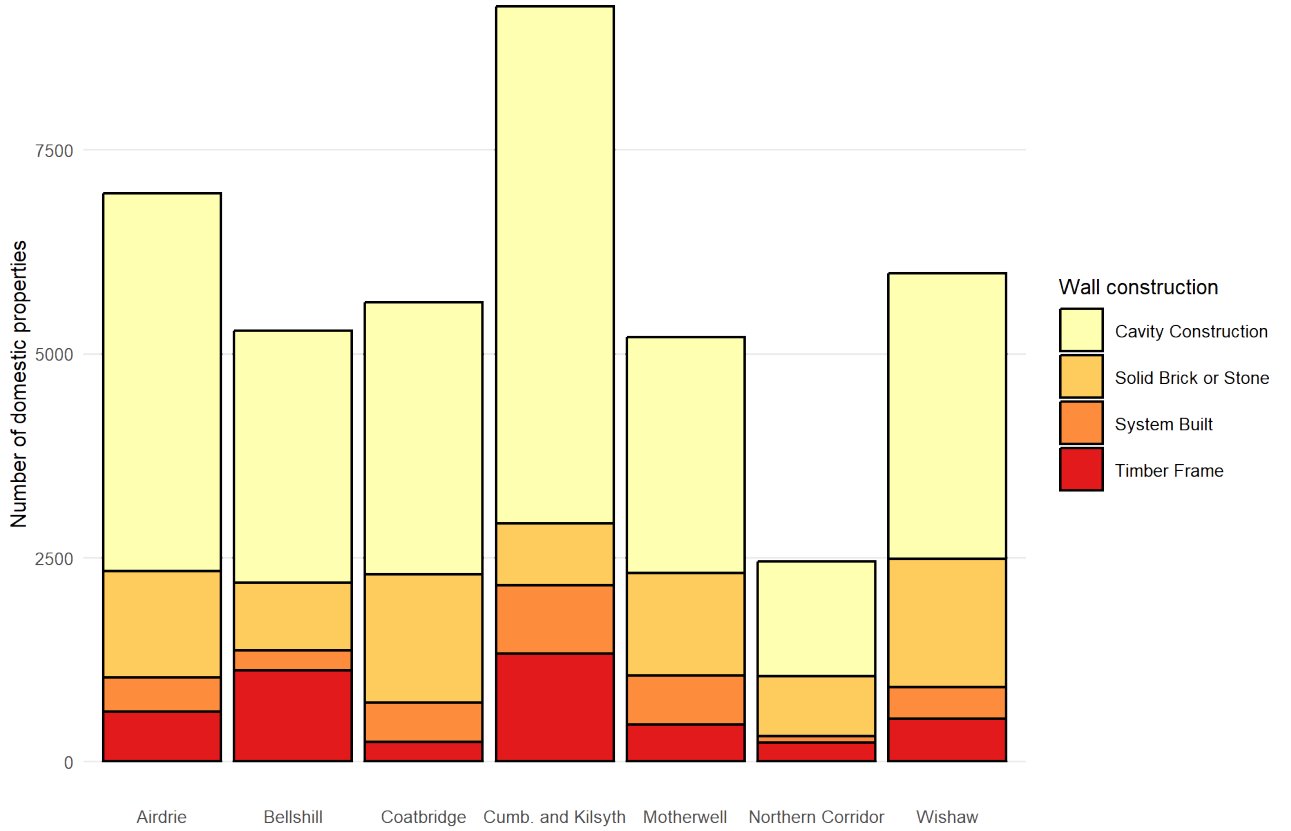


Table 12 shows the breakdown of the effect the energy efficiency interventions have on reducing energy demand across North Lanarkshire. For reference, the baseline heat demand for the domestic buildings in the North Lanarkshire is 1,957,000 MWh/year. This data helps to identify which measures are the most effective way to reduce heating demand, helping both fuel poverty and heat decarbonisation. Loft insulation upgrades are by far the lowest cost method to reduce heating demands. On the other hand, installing external wall insulation on the outside of buildings that already have cavity or internal wall insulation is deemed as the least cost-effective way to reduce heat demand. However, there may be other reasons for doing less cost-effective measures, such as funding streams being allocated only to specific measures or improving the aesthetics of the building with external wall insulation or window upgrades.

Table 12: Summary of energy efficiency interventions across all buildings in North Lanarkshire

Measure	Heat Demand Reduction (MWh/y)	Annual fuel Savings per Investment Cost (£/£)
Cavity Wall Insulation (CWI)	120,400	0.243
Internal Wall Insulation (IWI)	20,600	0.143
External Wall Insulation (only wall measure)	26,800	0.068
External Wall Insulation (alongside CWI or IWI)	208,000	0.019
All wall insulation measures	**375,800**	**0.032**
Loft insulation upgrade from <100mm	44,700	0.944
Loft insulation upgrade from 100-250mm	93,000	0.507
Loft insulation upgrade from 250-300mm	57,200	0.215
All loft insulation measures	**194,000**	**0.396**
All Single to Double Glazing upgrade	**8,700**	**0.043**
Cylinder insulation upgrade from <50mm	39,100	0.204
Cylinder insulation upgrade from 50-80mm	6,200	0.103
All cylinder insulation measures	**45,300**	**0.180**
All Combined Measures	**624,700**	**0.049**

7.5 Domestic Energy Efficiency and Fuel Poverty

The Weighted Scores for fuel poverty as a result of poor energy efficiency for the strategic zones, using the default weightings, have been calculated for the Strategic Zones (Table 13).

No zones stand out above the others and the interventions discussed in 7.4 will reduce the scores.

Table 13: Domestic fuel poverty scores by strategic zone

Strategic Zone	Households with energy bills > 10% of income after housing costs	Households with energy bills > 20% of income after housing costs	Total Weighted Score
Airdrie	19%	2%	18%
Bellshill	20%	2%	18%
Coatbridge	21%	3%	18%
Cumbernauld and Kilsyth	20%	4%	17%
Motherwell	20%	4%	17%
Northern Corridor	17%	2%	16%
Wishaw	21%	5%	19%

7.6 Heat Network Zoning

7.6.1 Approach

The principal determining factors for the feasibility of heat networks are the heat density in an area and the presence of one or more “anchor loads” – loads which are large, stable and likely to connect.

To assess these factors, the Scottish Heat Map data was supplemented the Council estate’s fuel consumption data. A data validation exercise was carried out to remove any duplicate points, heat demands which were uncertain (calculation code 1 in Scottish heat map data), dubious heat loads (e.g., too large for the building size or type) and buildings in sectors less likely to enter into commercial agreements. The purpose of this was to ensure that areas identified have as high a chance of being developed as possible.

The maps presented illustrate the heat demand density of buildings and highlight the possible anchor loads with the addition of other data including local authority-owned properties, potential sources of heat and areas of future development.

Where areas were shown to be viable, additional checks were carried out on the anchor heat loads and any loads considered erroneous were removed from the analysis. This included a number of industrial buildings where the heat required for space heating had been estimated to be very high and a number of instances of heat demands being double counted.

The purpose of this data cleaning is to maximise the likelihood that areas identified in this analysis would make viable heat networks.

Further validation of both the actual heat demands of the buildings and their suitability for connection to heat networks would be important before deciding on future heat network areas.

The linear heat density method was used – this involves drawing a circle around each building the diameter of which is proportional to the heat load of the property. Two measures of heat network viability were used:

- A baseline scenario (purple shades throughout this analysis) using 4,000 kWh/m where the circle around each property (in kWh) is divided by 4,000 to give a radius in metres around the property; and
- A stringent scenario (green shades throughout this analysis) using 8,000 kWh/m where the radius of the circle is the heat load in kWh divided by 8,000.

The 4,000 kWh/m measure highlights more areas as being potentially suitable and the 8,000kWh/m shows fewer areas, but those areas have a higher chance of forming a successful heat network.

Measures of more than 8,000 kWh/m were not considered due to a lack of areas with suitable heat density – this is consistent with North Lanarkshire not having any very urban areas. There were no areas identified using 16,000 kWh/m or higher.

Finally, the areas were filtered based on whether a continuous area could be formed where the circles around each heat load formed, which enclosed heat loads totalling 15,000 MWh or more.

This heat load represents a 3 MW heat source operating for 5,000 full load equivalent hours. The purpose is to identify those areas where it is likely that there is sufficient heat load to warrant a new energy centre being constructed. This is intended only as a guide and the exact cost of each energy centre and network would need to be calculated at feasibility stage.

7.6.2 High rise flats

High rise flats were excluded from this analysis for the purposes of identifying zones. The future plans for these buildings are not in the scope of the report and if a decision is made for them to remain for the long-term then they would be considered anchor loads.

7.6.3 North Lanarkshire Overview

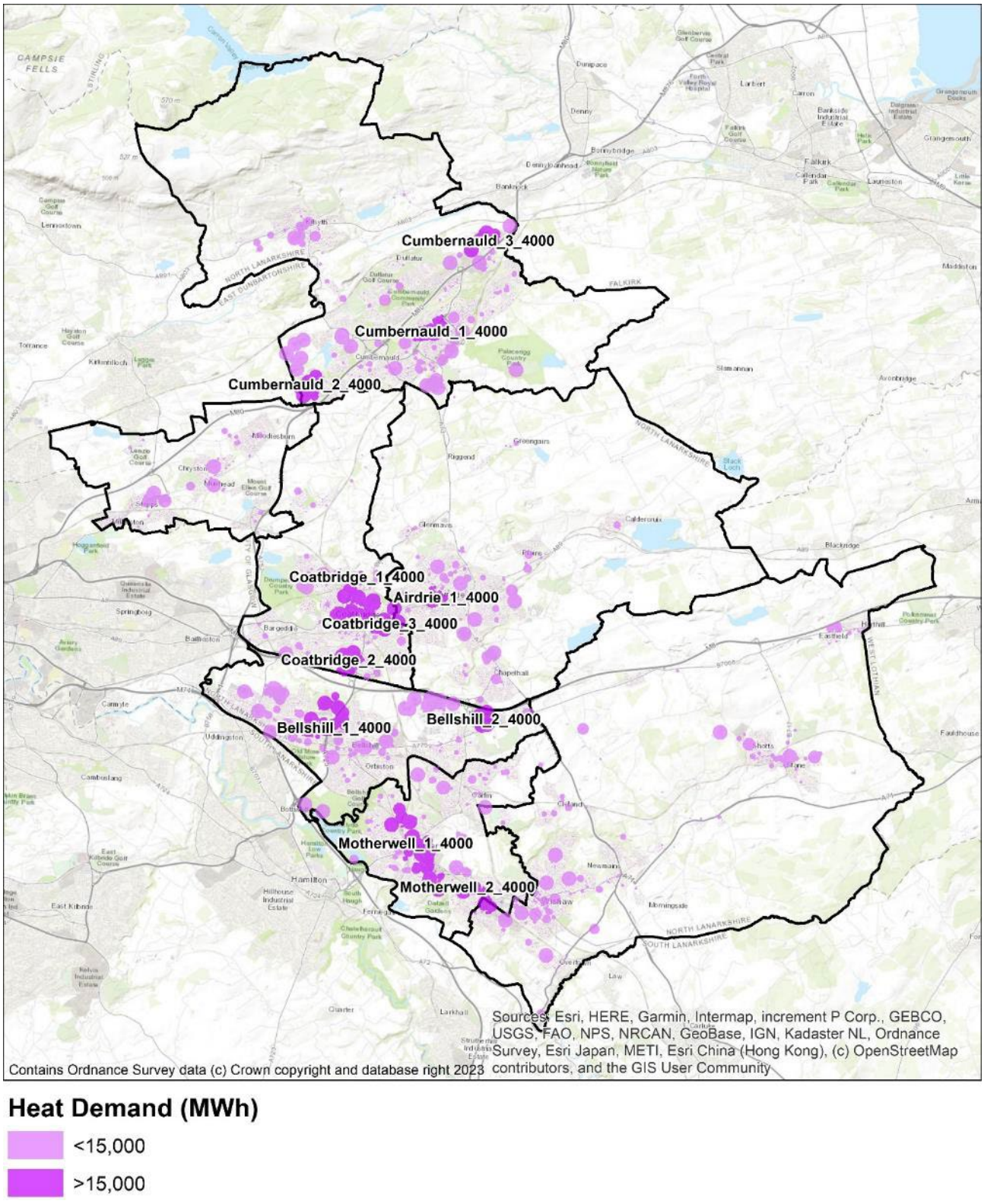
An analysis of the potential for heat network zones indicates several areas where heat networks may be a viable method of delivering low carbon, low-cost heat to homes and businesses – see Figure 17 and Figure 18. Detailed maps of the of the indicated zones are given in Appendix D.

The zones capture 6% of the domestic and 11% of the non-domestic Properties in North Lanarkshire. These low percentages highlight that heat networks are not the primary route to low carbon, affordable heat for everyone in North Lanarkshire. Future new-build developments may lend themselves better to heat networks

as the installation cost and disruption of heat networks is lower if completed at the time of building construction. When considering approaches to housing development, such as in master-planning, it is worth considering that higher density developments, such as flats or mixed-use developments, are more likely to be viable for heat networks than low-density developments.

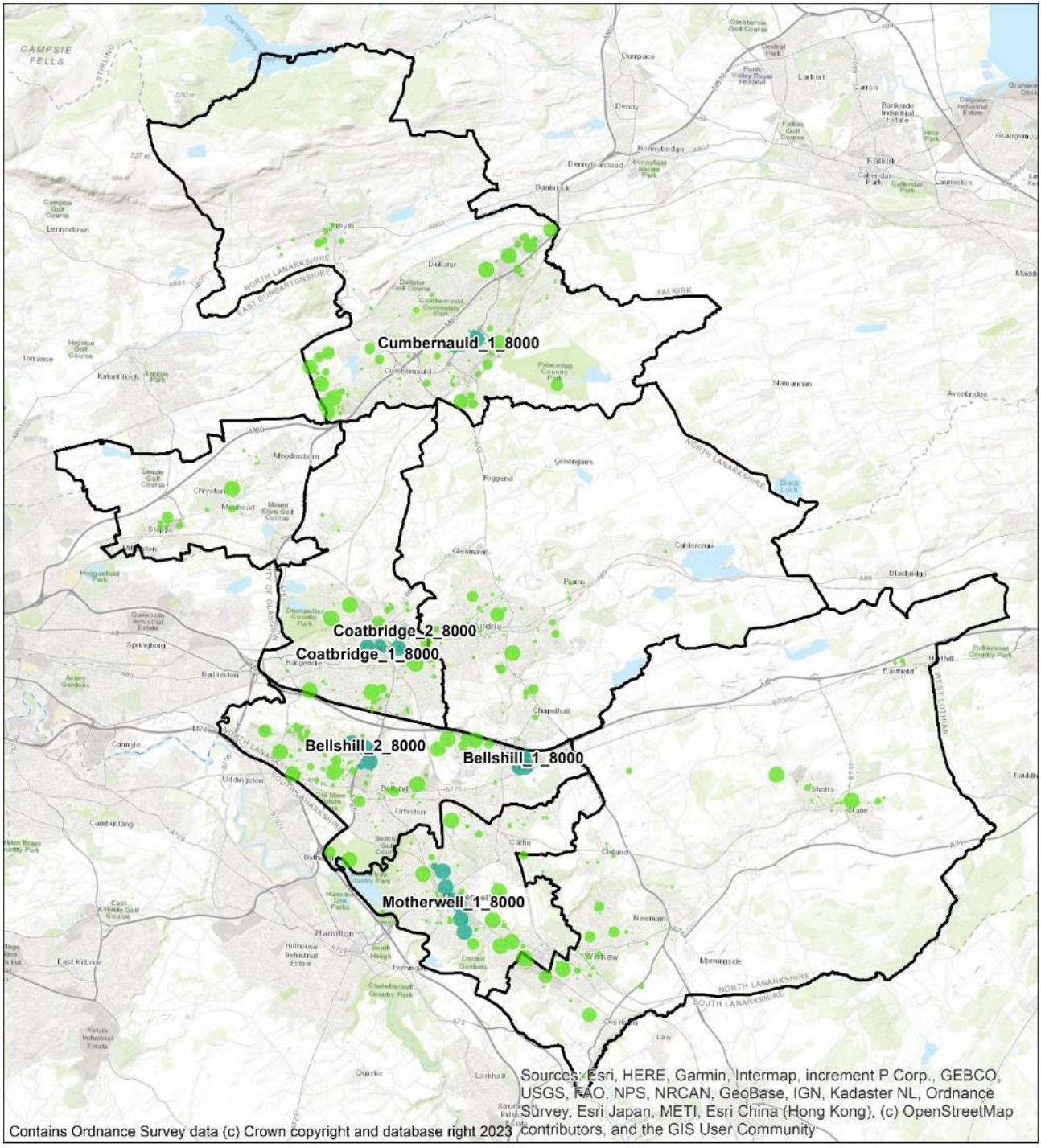
Future iterations of Local Planning Guidance or Local Development Plans could consider whether to allocate some areas for higher density developments to improve the viability of heat networks.

Figure 17: North Lanarkshire potential heat network zones – Baseline



Purple shades represent a baseline assessment (4000 kWh/y/m). Pale shade represents an area within which the total demand of all buildings is <15,000 MWh/y. Dark shade represents an area within which the total demand of all buildings is >15,000 MWh/y. Highlighted and numbered areas are those with the largest total demands in North Lanarkshire.

Figure 18: North Lanarkshire potential heat network zones – Stringent



Stringent Heat Demand (MWh)

<15,000

>15,000

Green shades represent a stringent assessment (8000 kWh/y/m). Pale shade represents an area within which the total demand of all properties is <15,000 MWh/y. Dark shade represents an area within which the total demand of all properties is >15,000 MWh/y. Highlighted and numbered areas are those with the largest total demands in North Lanarkshire.

7.6.4 Motherwell

In the centre of Motherwell there is a potential zone for heat networks. When considering the 4,000kWh/m linear heat density scenario the resulting zone a large number of non-domestic buildings with 10 showing as having a heat load over 1,000MWh in the Scottish Heat Map and 90 as having heat loads over 78MWh, the threshold used for anchor loads in the National Assessment for heat networks.

Under the more stringent 8,000kWh/m scenario there, there continue to be 7 buildings with heat loads over 1,000MWH and 50 loads over 78MWh. As such, it appears that the centre of Motherwell has the potential for a heat network and is worthy of more detailed feasibility analysis.

In identifying a potential heat network zone for compliance with the Heat Networks Act, or for feasibility study consideration will be given to the exact zone boundary and local factors, such as whether to include areas of hard-to-treat housing in close proximity to the zone.

The heat network zone borders the Clyde Mission area[15]. Opportunities for funding or collaboration will be explored further as the LHEES is implemented.

The area also sits close to a number of development zones set out in the Local Development Plan. There is potential for developments in these sites to be connected to any future heat network and therefore they are potential areas of expansion of any network.

As stated in 7.6.2 the high flats have been excluded from this analysis. However, the tower blocks in the Muirhouse area to the Southeast of Motherwell would be anchor loads if they were included and would connect Motherwell_1_4000 zone with Motherwell_2_4000 to form a larger zone.

15

Figure 19: Motherwell heat network zone – 4,000kWh/m

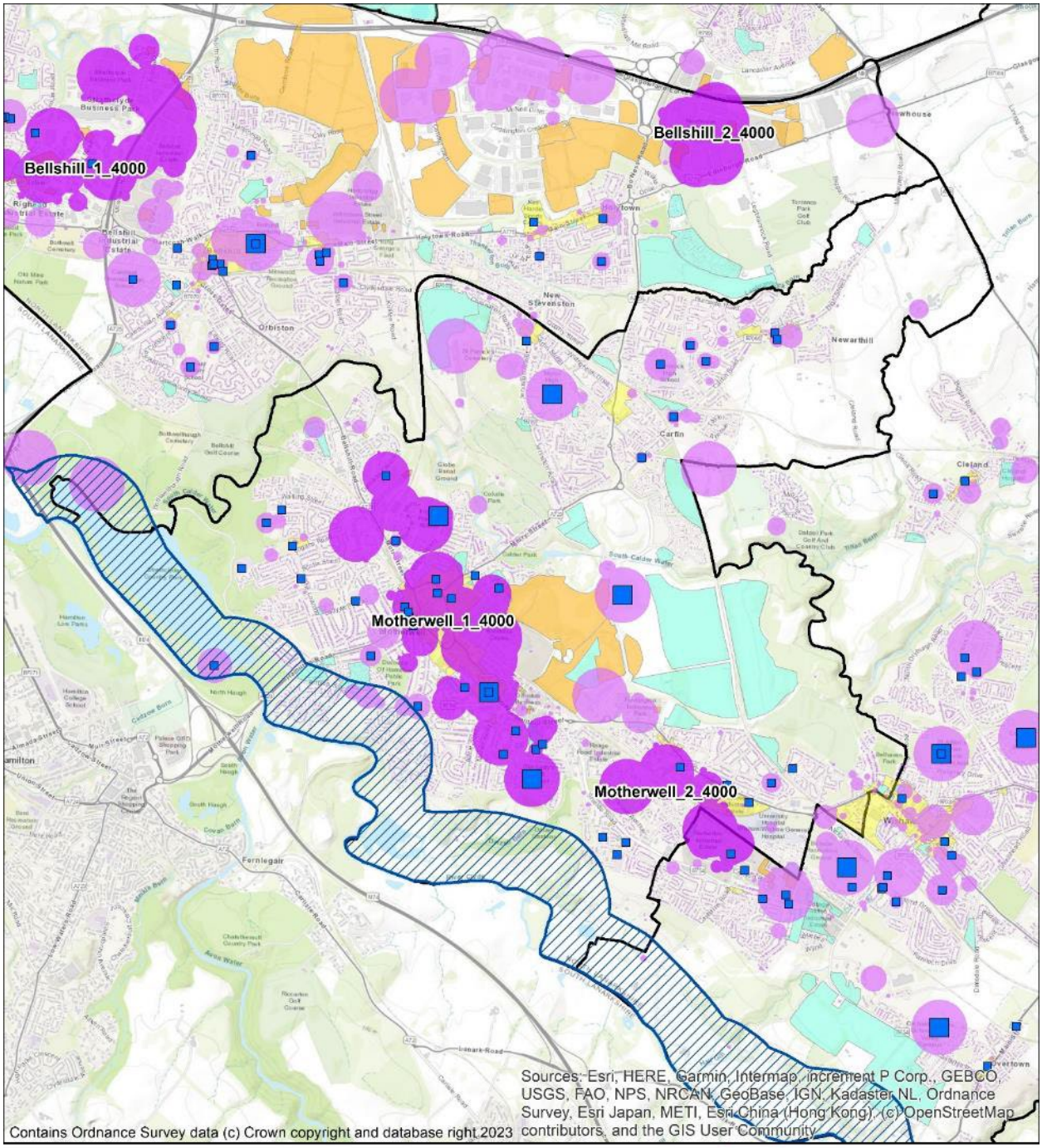
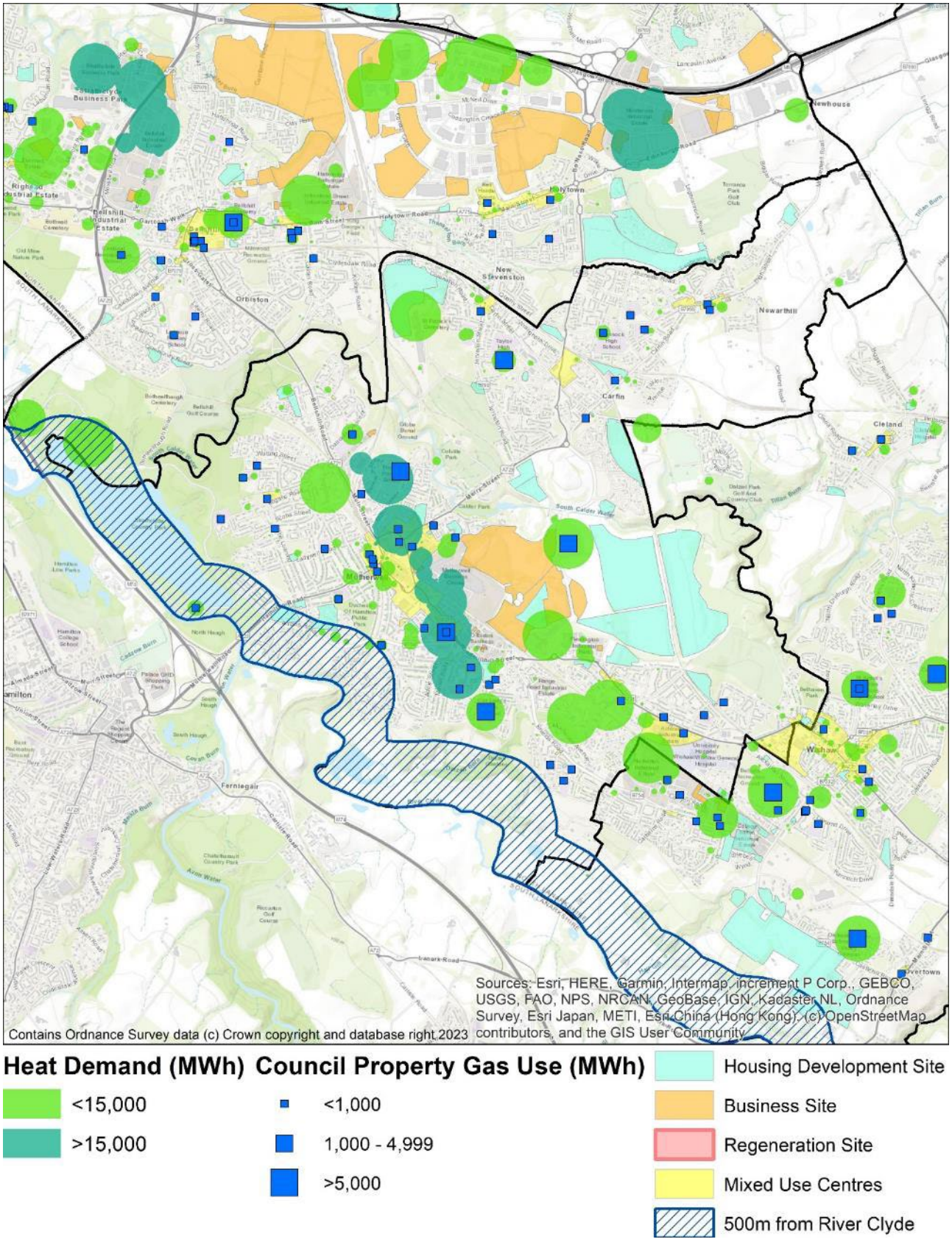


Figure 20: Motherwell heat network zone – 8,000kWh/m



7.6.5 Coatbridge

Coatbridge_1_4000 zone contains 11 buildings with estimated heat loads over 1,000kWh and 66 buildings over 78kWh. There are a number of Council owned buildings within this area with significant heat loads, including the Time Capsule leisure centre.

Coatbridge_2_4000 contains a further 3 buildings over 1000kWh and 26 over 78kWh. This area, if considered in isolation would be more sensitive to the connection of a small number of larger heat loads than the Coatbrige_1_4000 zone.

The largest 3 heat demands in Coatbridge_3_4000 are all relatively low confidence buildings and within the 23 loads over 78MWh demand per year, there are few large public buildings.

Overall, therefore, the main heat zone in Coatbridge has itself higher confidence and the further two areas could be considered as areas of potential expansion as well as the adjoining sites allocated for development.

Checking the 8,000kWh/m/year (stringent) linear heat density measure, the larger heat network zone is still present, but in two areas. This increases the confidence that a heat network could be developed within Coatbridge.

Figure 21: Coatbridge heat network areas – 4,000kWh/m

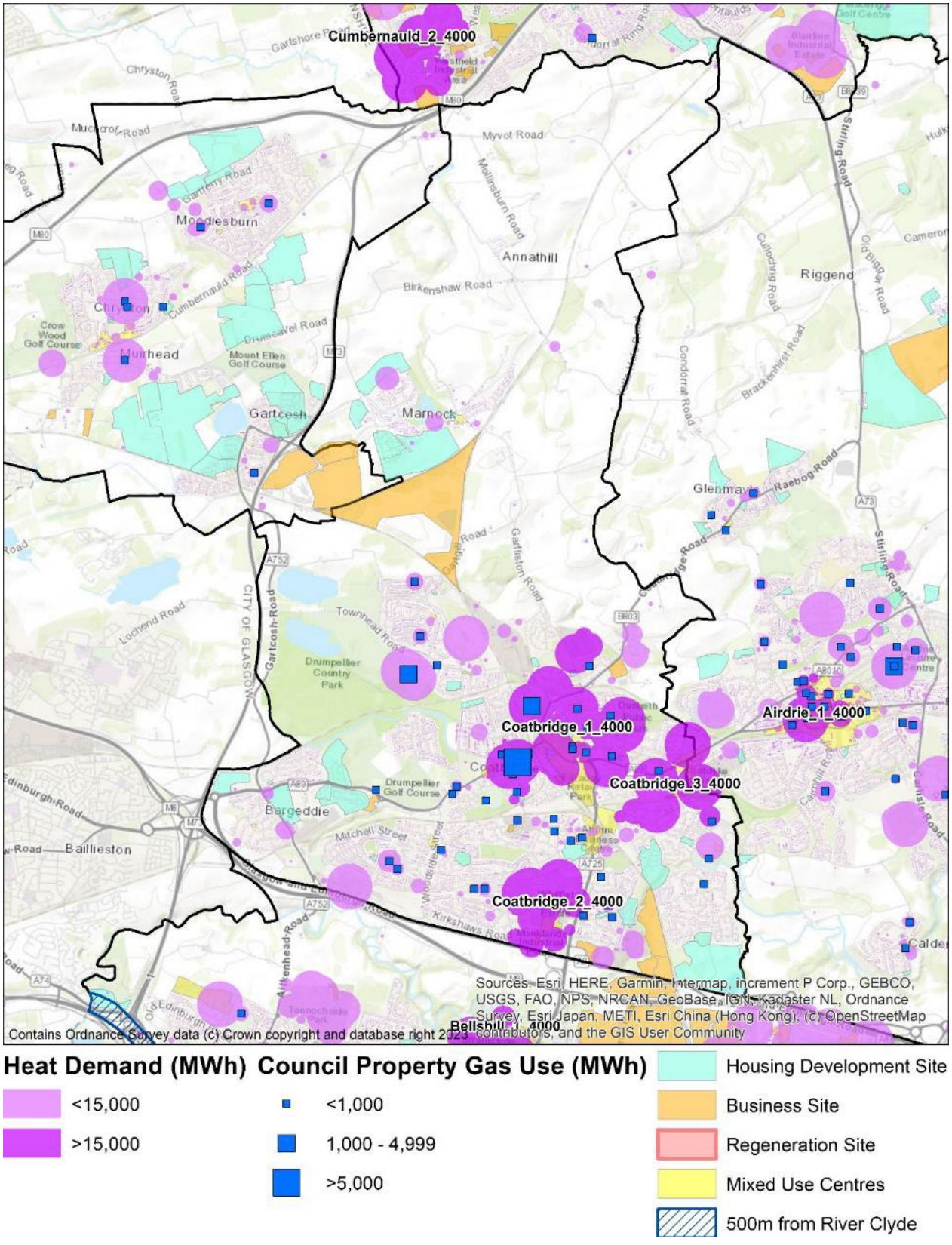
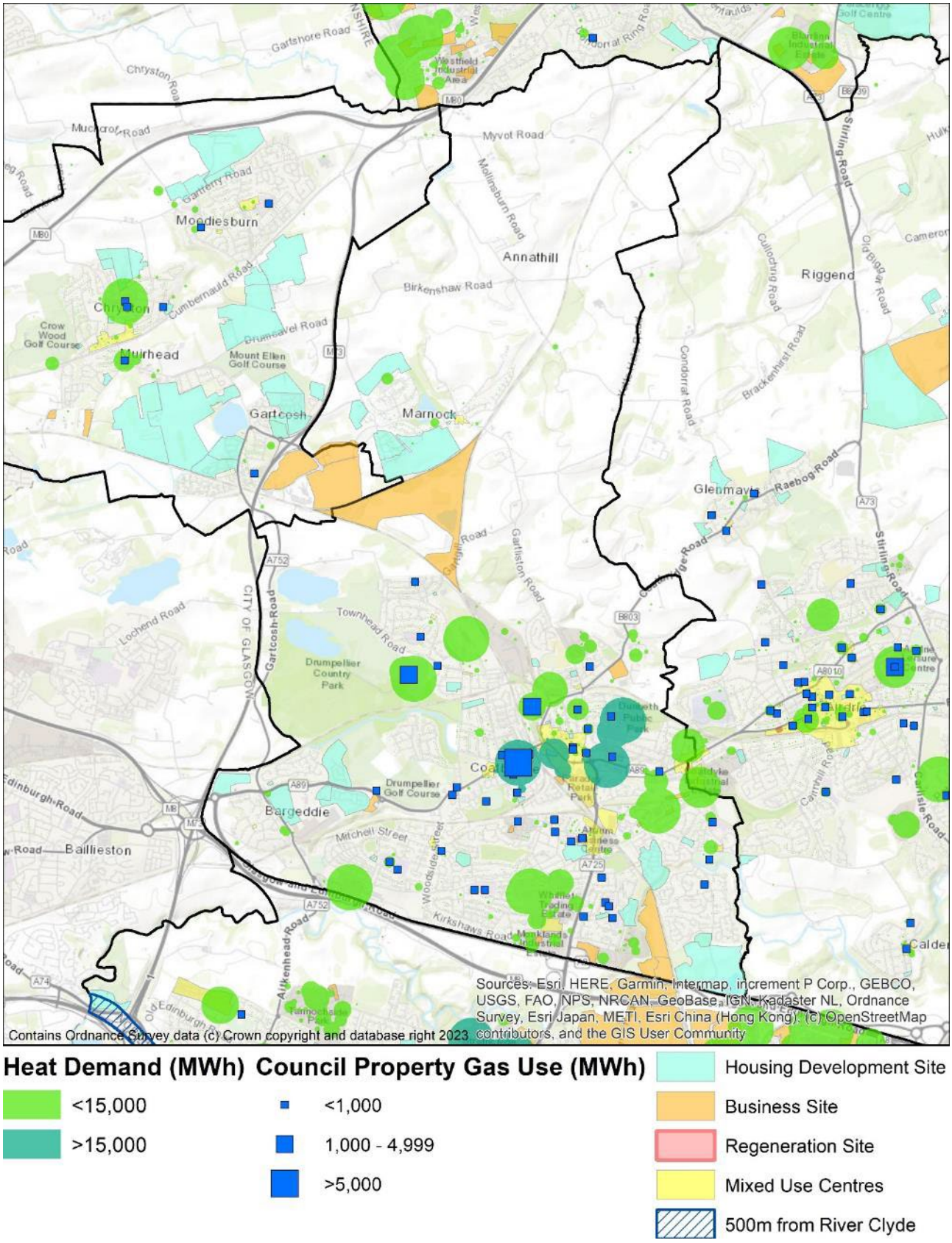


Figure 22: Coatbridge heat network areas 8,000kWh/m



7.6.6 Cumbernauld

There are three heat network areas around Cumbernauld, the three areas are not close to each other and therefore appear to be separate opportunities. However, there are a number of industrial sites on the outskirts

which have been excluded from the analysis due to low confidence in their heat load. If more detailed heat load data becomes available for these buildings, then re-analysis would be warranted.

The Cumbernauld_1_4000 zone has 9 loads over 1,000MWh/year and 50 over 78MWh/year. There are a number of Council owned buildings both within this area and in close proximity to it. The area includes the proposed Cumbernauld Town Centre regeneration. The mixture of heat loads, number of potential anchor loads and presence of the substantial regeneration project mean this area has reasonable potential for heat networking.

The Cumbernauld_2_4000 and Cumbernauld_3_4000 are areas to the South West and North East of Cumbernauld respectively. Both areas are which are almost entirely non-domestic commercial and industrial buildings. They are therefore much less likely to be viable than other areas identified in North Lanarkshire given the absence of public sector buildings, including Council owned buildings and there being no domestic buildings. The areas would be reliant on both the buildings being technically suitable, which is uncertain, and the possibility of arriving at commercial agreements with each.

Figure 23: Cumbernauld heat network 4,000kWh/m

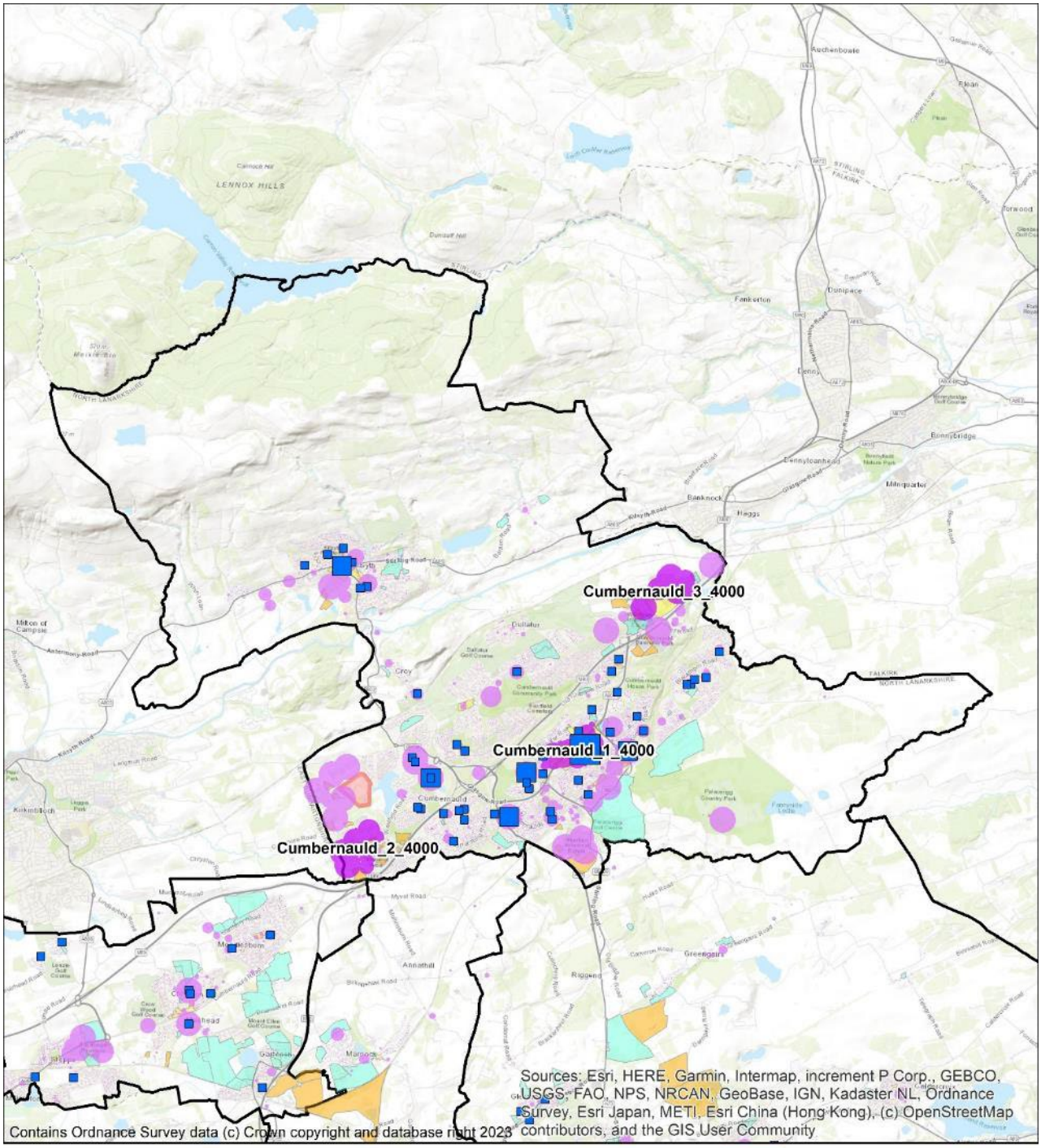
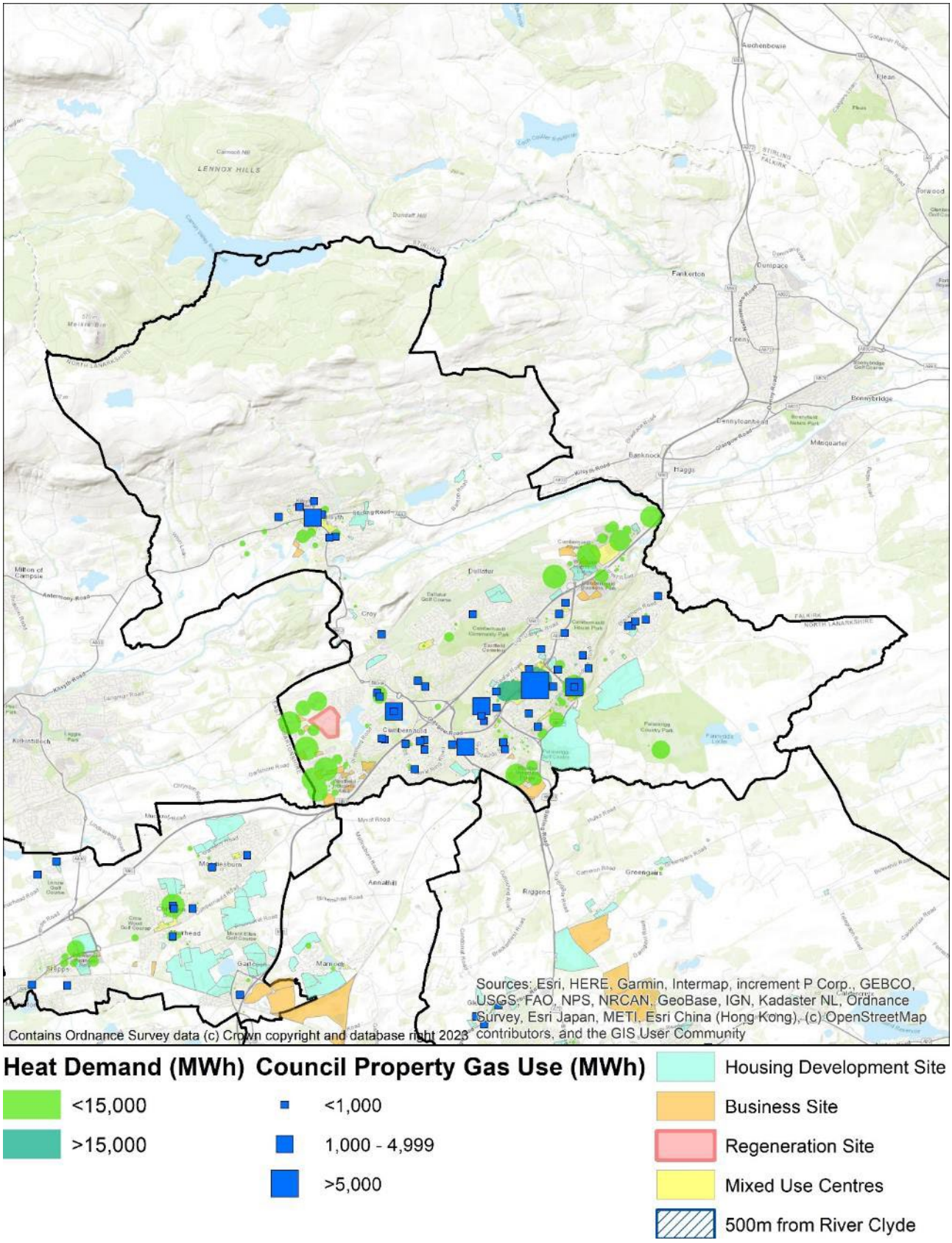


Figure 24: Cumbernauld heat network areas 8,000kWh/m



7.6.7 Bellshill

Two heat network areas have been identified close to the M8 corridor with Bellshill_1_4000 and to the North West and Bellshill_2_4000 to the East of Bellshill.

The area to the West of Bellshill contains a number of large buildings but fewer large Council owned heat loads than Motherwell and Cumbernauld.

Using the more stringent analysis for comparison, there is a much smaller heat network area without any Council owned buildings and almost entirely large industrial buildings with low confidence associated with the heat load data.

As such, Bellshill_1_4000 does not appear to have as a robust opportunity for heat networks., based on the available data.

The area to the East of Bellshill, near to Eurocentral similarly has a small number of large heat loads with low confidence.

Overall, therefore there is significantly lower confidence that a heat network could be realised in these areas than Motherwell, Coatbridge and Cumbernauld. The property types in these areas are also less likely to use heating systems which are suitable for connection to heat networks. However, opportunities to improve the Council's understanding of the energy use of the businesses in these areas, will be considered as part of any future engagement.

Figure 25: Bellshill heat network opportunities 4,000kWh/m – Baseline

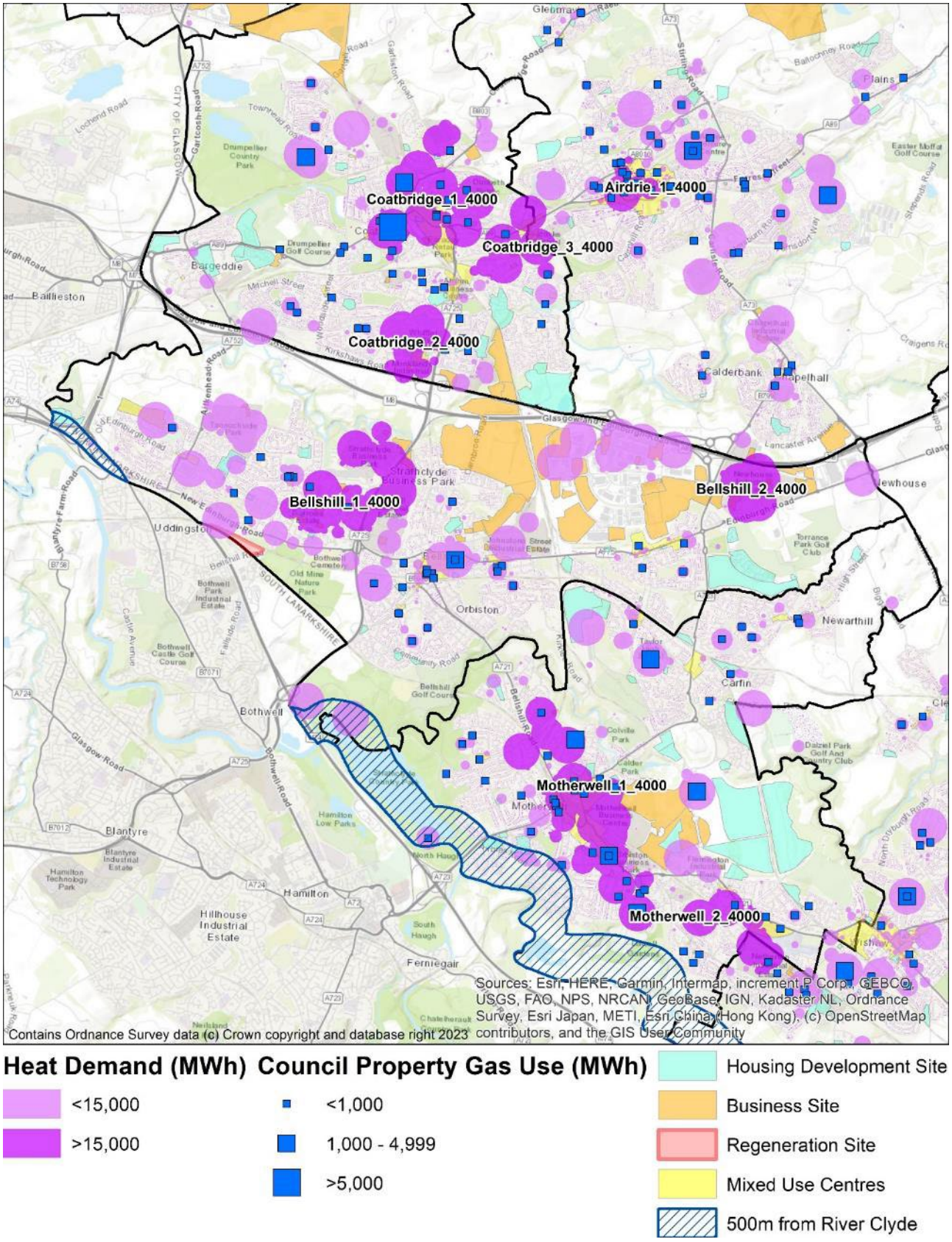
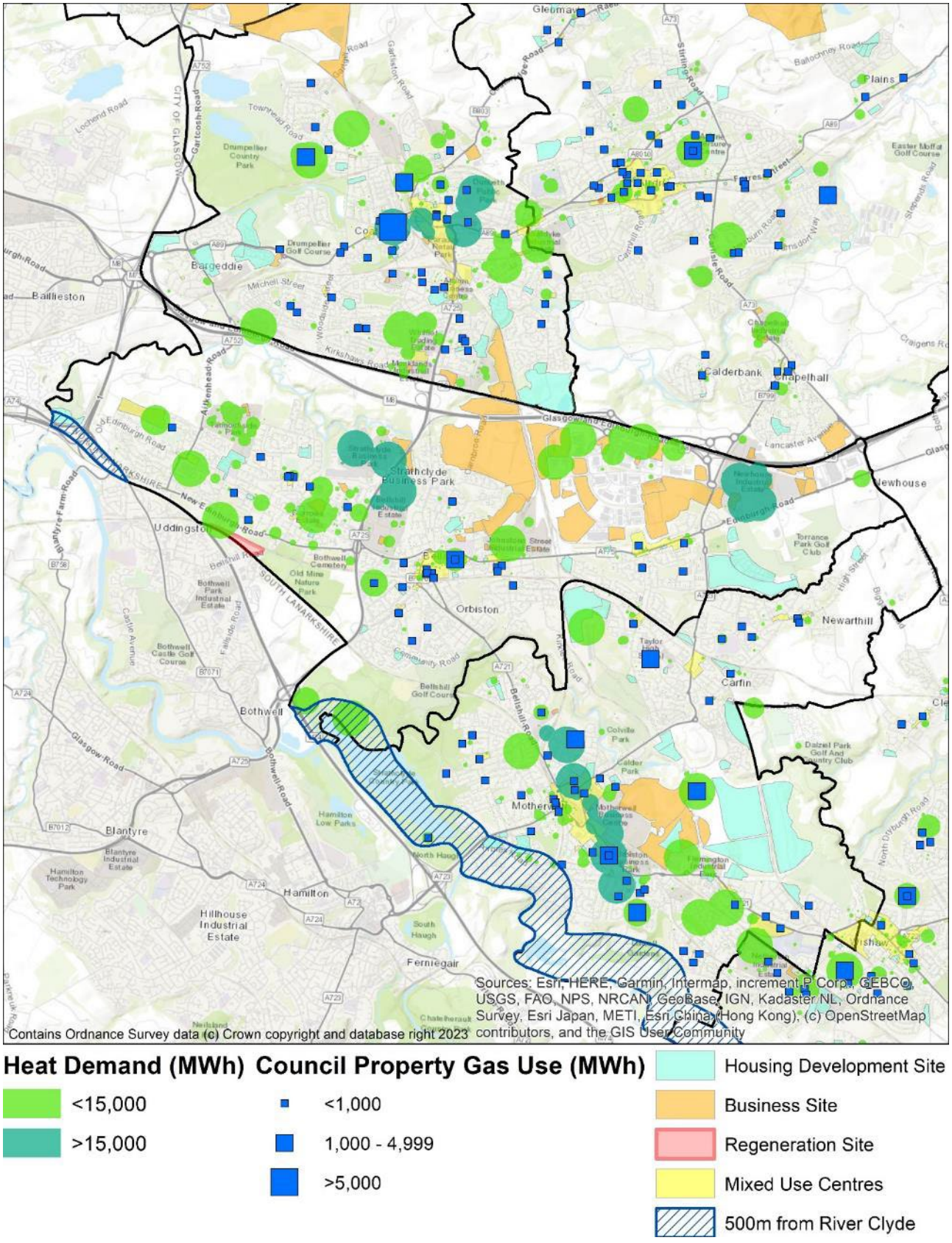


Figure 26: Bellshill heat network opportunities 8,000kWh/m – Stringent

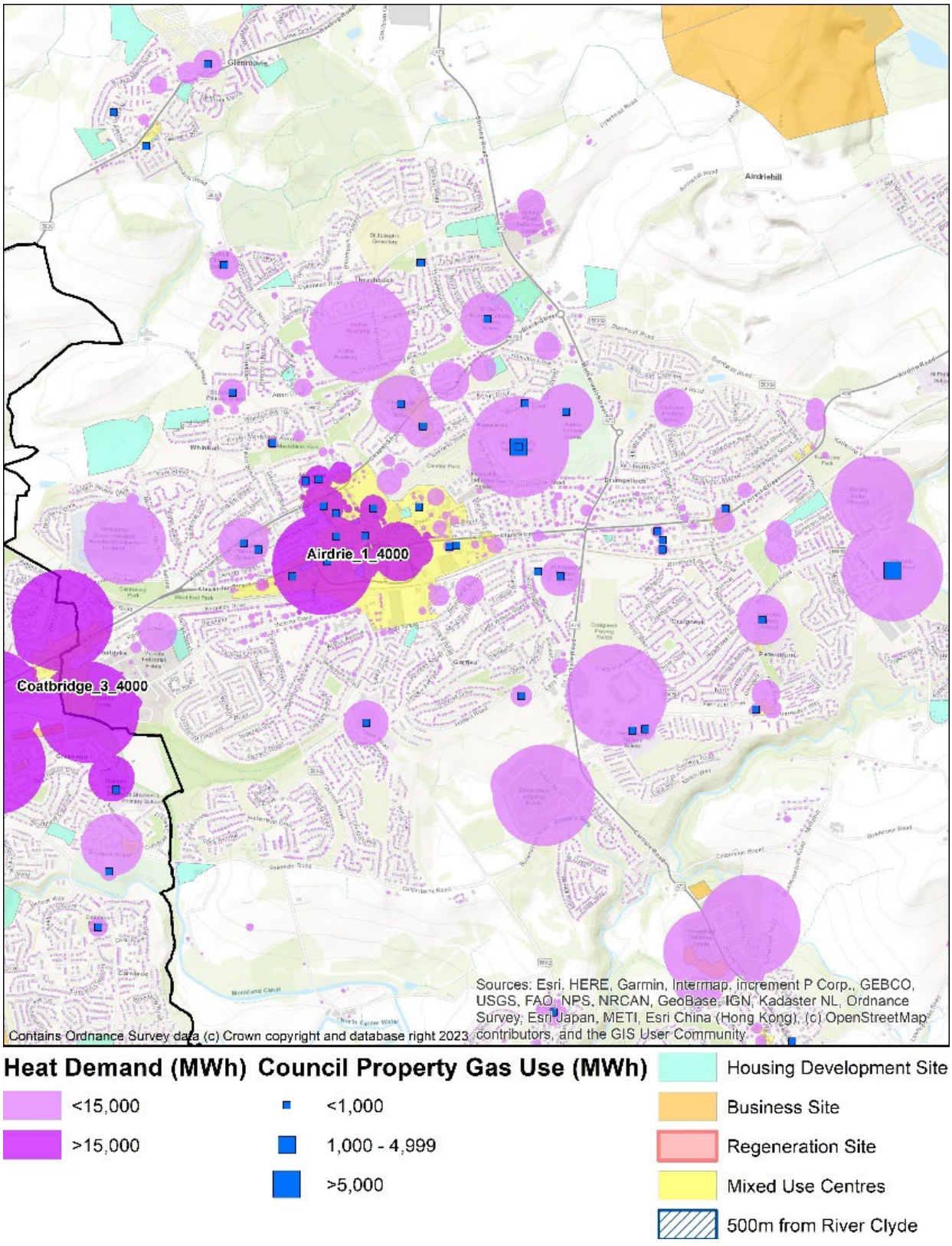


7.6.8 Airdrie

A potential heat network area was identified in Airdrie, Airdrie_1_4000. However, sensitivity analysis showed that the area is reliant on a small number of high heat consumption buildings and therefore the likelihood of long-term viability is low, based solely on the existing buildings. However, regeneration projects are planned

in the area and heat networking opportunities could be reconsidered as part of those developments where the proposed additional buildings in the town centre would increase the heat load.

Figure 27: Airdrie heat network opportunity 4,000kWh/m/year



7.6.9 Sources of heat

Sources identified

A review was carried out of potential heat sources within North Lanarkshire including Scottish Heat Map data and data from other sources, such as the Renewable Energy Planning database and the Embedded Capacity Register.

One data centre was identified, which is close to a potential heat network zone. The technical and commercial feasibility of this opportunity is uncertain at this stage.

Energy from waste

One energy from waste site is consented, the Drum Gray Energy Recovery Centre, Greengairs, approximately 5km South of the centre of Cumbernauld, 4.5km from the centre of Airdrie and around 6km from the centre of Coatbridge.

As this site is at construction phase and is of scale, it has the potential to supply significant heat for long periods and is therefore of strategic importance. There are broadly two potential options for connecting this source to areas of potential heat network development:

1) A route to Cumbernauld_1_4000 potential zone
2) A route to Airdrie and Coatbridge_1_4000

Examples of potential routes for these two options are shown in Figure 29: Energy from waste heat network options.

These two options can be considered seperately, however a heat pipe to Airdrie and Coatbridge could allow heat loads along the pipe route to be served which would not in themselves warrant a heat network. This is particularly the case in the centre of Airdrie where there is a cluster of listed builings which will be challenging to decarbonise.

Figure 28 Listed buildings and conservation areas in Airdrie and Coatbridge

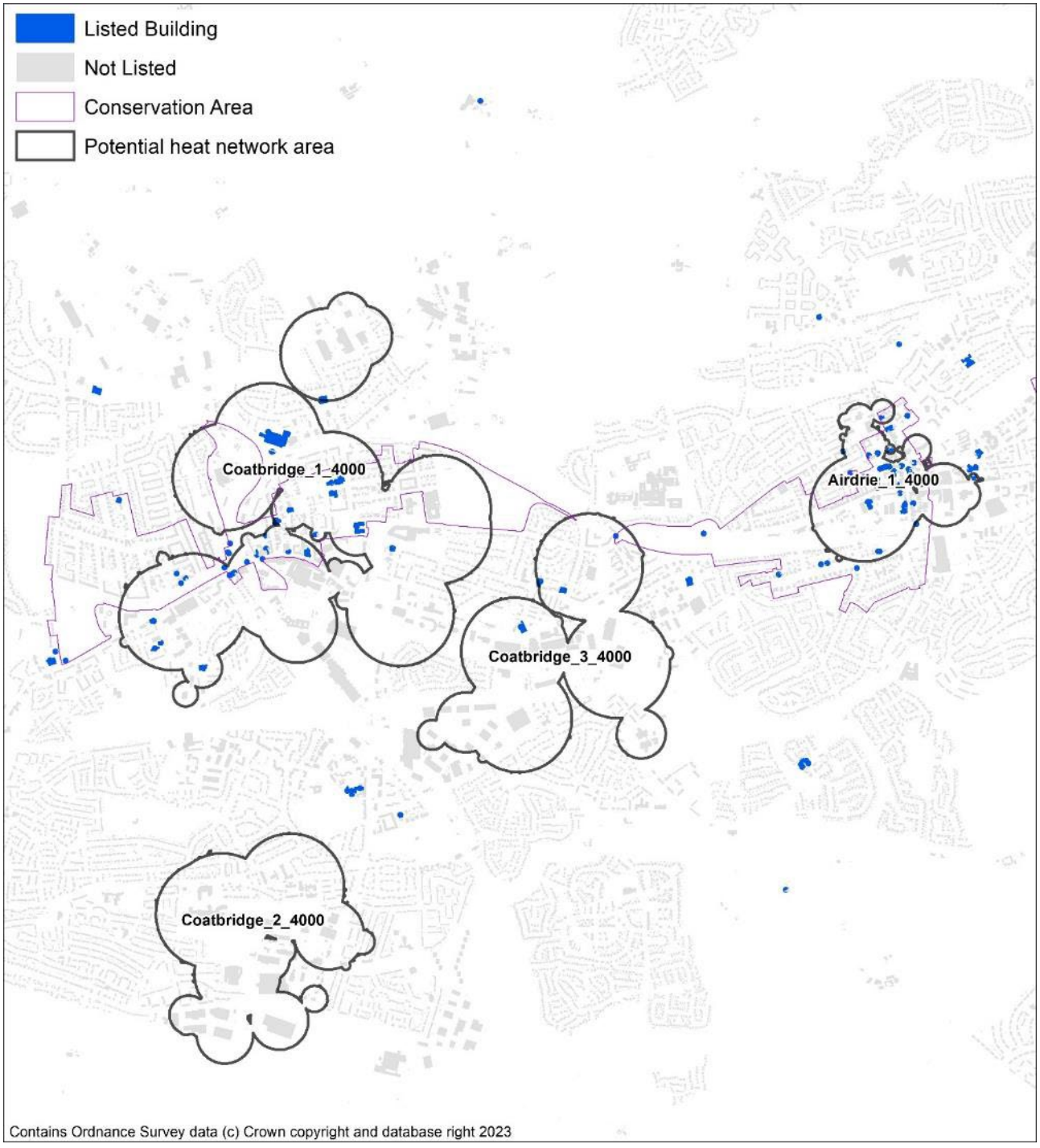
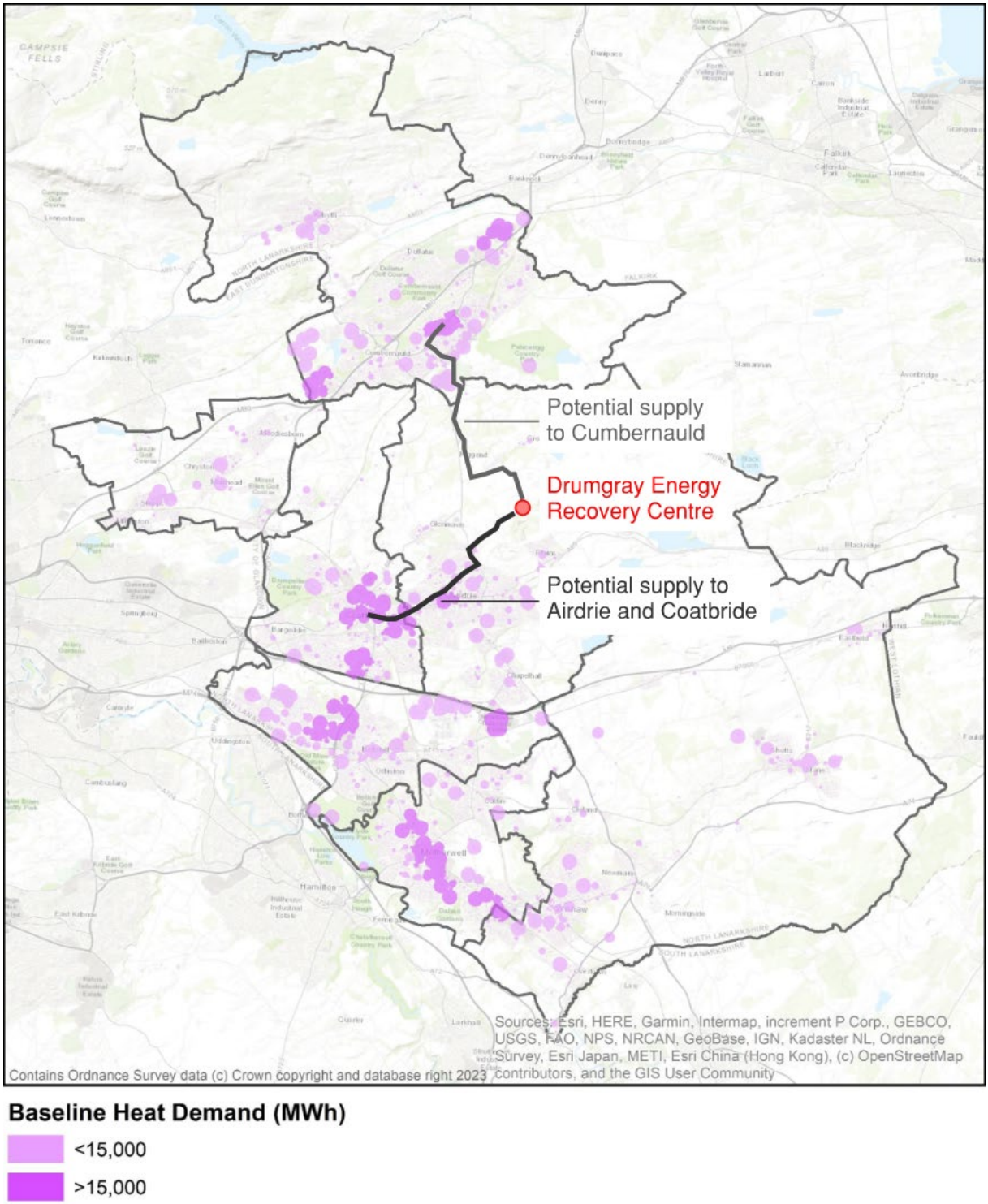


Figure 29: Energy from waste heat network options



Other sources

The council will coordinate through the LHEES forum to identify if any service areas have projects which could affect the viability of the heat network option or their project. For example

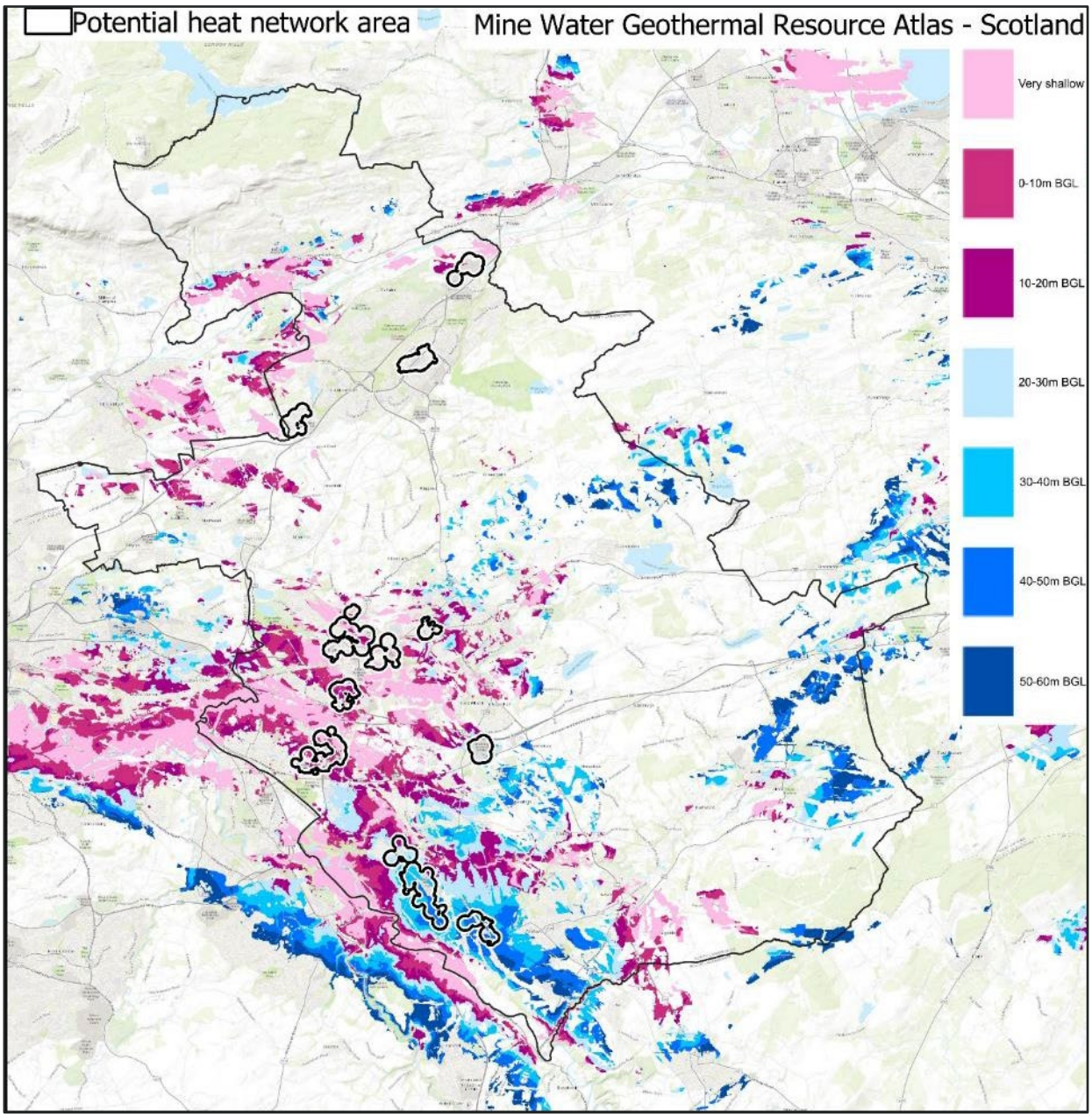
- Active travel routes being developed
- New developments through which the pipework could be routed
- Regeneration projects including Town Centre redevelopments
- Any Glasgow City Region projects
- Housing projects or changes to the council's estate

Other heat sources

North Lanarkshire has multiple potential sources for large scale heat pump systems which could be considered as part of detailed feasibility studies.

1) Mine water geothermal – many parts or North Lanarkshire have mine workings at a range of depths and there is potential for heat to be extracted from mine-water. See Figure 30.
2) Surface water – the River Clyde is close to the Motherwell heat network opportunity area Motherwell_1_4000. There are a number of other surface water bodies which could be considered however for heat networks of substantial scale it is likely to be necessary to have a significant flow of water to avoid cooling the water source in winter.
3) Air

Figure 30: Mine water geothermal potential in heat network areas



Options for sourcing renewable electricity from either existing installations, particularly wind farms, or installation of new wind and solar installations, will be considered as part of heat network feasibility. This can reduce the cost of electricity and contribute to the viability of heat network opportunities.

7.7 Low Carbon Heat – Other Than District Heating

For 94% of domestic properties and 89% of non-domestic properties in North Lanarkshire it is likely that a local solution will provide a more economic solution than district heating. There may be other factors which mean district heating become the most viable solution for more properties, for example locations where grid constraints inhibit the development of local solutions and in these circumstances District Heating be the most viable solution in a larger percentage share. These local solutions will be either a communal heat network or an individual heating system. There are a range of other low carbon heating technologies which may be more suitable and are discussed below.

7.7.1 Low Carbon Heating Technologies

A list of technologies is outlined in section 4.2

Each property owner will make decisions on the technology which is suitable for their property. This analysis seeks to predict what will be found to be the most suitable technology and for which property. While heat pumps are likely to be the most suitable heating system (7.7.3), technologies such as electric heating and biomass will be appropriate to some specific properties and other technologies such as hydrogen should not be ruled out entirely at this stage, as they may have a role to play in future LHEES iterations.

7.7.2 Individual or Communal Heat Pump Systems

It is possible for a single dwelling to have its own heating system, for a whole building to have a single heat pump system or for many buildings to be connected into district heating schemes.

This Strategy considers communal heat pump systems – both where a single heat pump heats a whole building or where a network of heat pumps shares a single heat source, sometimes referred to as a 5th generation heat network, as having similar energy efficiency requirements as individual heat pump systems. Therefore, they are considered as a single grouping for the purposes of this Strategy.

In practice, whether it is practical to install an air source or ground source heat pump in a flat depends upon several site-specific factors including available space, noise, visual impact and other planning restrictions. Conversely for a communal system to be installed, the agreement of multiple property owners may be required which is complex.

Similarly, each property owner can decide to make their own compromises between installation cost, disruption and operating cost. It is usually possible to achieve lower operating costs by using larger radiators. For the purpose of this Strategy, a property has been deemed suitable for an individual or communal heat pump system if it is likely to achieve a good operating efficiency[16].

Higher temperature heat pumps can be used which remove some practical limitations such as using a shared heating/hot water system to avoid each property needing a hot water cylinder. However, there is a trade-off as they have lower efficiencies (lower COP) and therefore are considered as one of several alternative solutions which have been grouped together as “other”.

Heat pumps extract heat from the air, water or ground using electricity. The main source of heat, therefore, is naturally occurring and the input of electricity is considered low carbon, since its associated emissions are reducing alongside the decarbonisation of the electricity grid, which is aiming to be carbon neutral by 2035. The efficiency of heat pumps is variable and is highest in thermally efficient buildings with larger radiators. At worst case, heat pumps should operate 2.8 times more efficiently than direct electrical heating and 3.3 times more efficient than gas boilers.

[16] The energy used by a heat pump depends upon the coefficient of performance which is related to the water temperature in the heating system at design conditions. Designing heating systems at lower water temperatures allows higher COP when providing space heating but requires larger radiators. The criteria chosen is intended to be such that a heat pump could be installed and be expected to achieve a COP of 3, however confirming this for an individual property would require a detailed calculation at design stage.

For any heat source which uses electricity, including heat pumps, electricity tariffs can have a significant effect on the cost of operating them. Some tariffs with specific lower cost periods can be used but can require more intervention from the household to change settings compared to tariffs with the same price at all times. It is important that householders have access to good advice on selecting the appropriate tariffs for their needs and the needs of any members of their households.

7.7.3 Assessing Suitability for Heat Pumps

This section estimates how many properties in North Lanarkshire would be suitable for heat pumps based on the Home Analytics dataset. Every property would have to have more detailed assessment to confirm its suitability. A study from the UK Government showed that most property types were indeed suitable for heat pumps[17].

There is not an agreed benchmark for assessing the suitability of each property for heat pumps in domestic properties. In practice, the limiting factor as to whether a low temperature heat pump could be used for space heating is a sufficiency of space to have radiators which are big enough to heat each room at the low radiator temperatures desired for efficient heat pump operation. The DESNZ Electrification of Heat Demonstration project[18] report, conducted by Energy Systems Catapult, concluded:

> *"The project has not identified any particular type or age of property that cannot have a successful heat pump installation. The suggestion that there are particular home archetypes in Britain that are "unsuitable" for heat pumps is not supported by project experience and data."*[19]

However, in practice properties with high heat demand per square meter (low energy efficiency) are more likely to be challenging to install a low temperature heat pump and achieve adequate operating costs. High temperature heat pumps can be used but have higher running costs than low temperature heat pumps.

For the purposes of this Strategy, therefore criterion for the suitability of individual heat pumps is that the property must have a predicted heat demand per square metre of property of less than 160 kWh/m^2/year which equates to approximately 3 W/m^{2}K and 2,200 heating degree days or approximately 75 W/m^2 of peak heat demand. In reality, each property is different.

Table 14 shows that out of the 161,150 domestic properties in North Lanarkshire, 70,172 could be already suitable for new heat pumps installations without additional fabric measures. This is not to say that fabric measures are not useful in these properties (they would have the effect of reducing the heat pump system cost and improve its running efficiency), just that waiting for fabric measures should not be a reason to delay heat pump roll-out to those properties.

After completing the most cost-effective energy efficiency measures, the number of heat pump suitable properties increases to the majority across North Lanarkshire, and going a step further, completing even those energy efficiency measures which are not as cost-effective, further increases the number of suitable properties.

Another criterion considered is to allow for standard domestic heat pumps operating on a single-phase power supply. Single-phase heat pumps are typically limited to 15 kW thermal power, which will equate to approximately 35,000 kWh/y of heat demand. Virtually all properties meet this criterion (Table 14).

Using these criteria can then help to identify and target the specific properties that are most in need of additional energy efficiency upgrades, including those which are not as cost-effective.

The maps in Appendix E illustrate the distribution of those properties which are ready for heat pumps, those which require cost-effective fabric intervention and those which need deeper intervention or alternative solutions. The measures considered cost-effective in this scenario are:

- Loft insulation;
- Wall insulation, except external insulation where it supplements another type of wall insulation; and
- Double glazing only where it is replacing single glazing.

A further scenario was considered with the addition of external wall insulation to properties which already have another type of wall insulation (internal/cavity). See 8.1.8 for further discussion.

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[17] An Energy System Catapult electrification of heat project in the UK finds all housing types are suitable for heat pumps.

[18] Electrification of Heat Demonstration Project: winning bids, case studies and project data - GOV.UK (www.gov.uk)

[19] All housing types are suitable for heat pumps, finds Electrification of Heat project - Energy Systems Catapult

There are other challenges with locating heat pumps – such as finding a suitable location on the outside of flats or installing hot water cylinders in properties without cylinders.

While the majority of installations are currently air-to-water heat pumps, other types of heat pumps could be chosen and this Strategy does not determine which type of heat pump is most viable for individual buildings. Shared-loop and larger communal heat pump systems can be more suitable for flats, where locating a heat pump and hot water cylinder in or on each property is challenging.

Table 14: Heat pump suitability

Heat Pump Suitability	Properties currently suitable	Suitable after cost-effective energy efficiency measures < 160kWh/m^2/y	Suitable with further efficiency measures <160kWh/m^2/y
No. of Properties < 160kWh/m^2/y	70,174	99,435	117,094
No. of Properties < 35,000kWh/y	160,317	160,886	160,939
< 160kWh/m^2/y and < 35,000kWh/y	70,172	99,435	117,094

Comparing the total number of properties with the number suitable after fabric insulation measures have been installed, including external wall insulation on properties with cavity wall insulation already leaves around 44,056 properties which are apparently less likely to be suitable for heat pumps. A building-by-building assessment may find otherwise or identify other improvements which could increase the feasibility of heat pumps, such as other energy efficiency measures beyond the standard windows, walls and loft upgrades in this analysis. For the remainder, other low carbon options will need to be applied depending on demand and location, these options might be electric heating or biomass and, in some cases, hybrid biomass/ heat pump or 3-phase heat pumps.

7.8 Mixed-Tenure, Mixed-Use and Historic

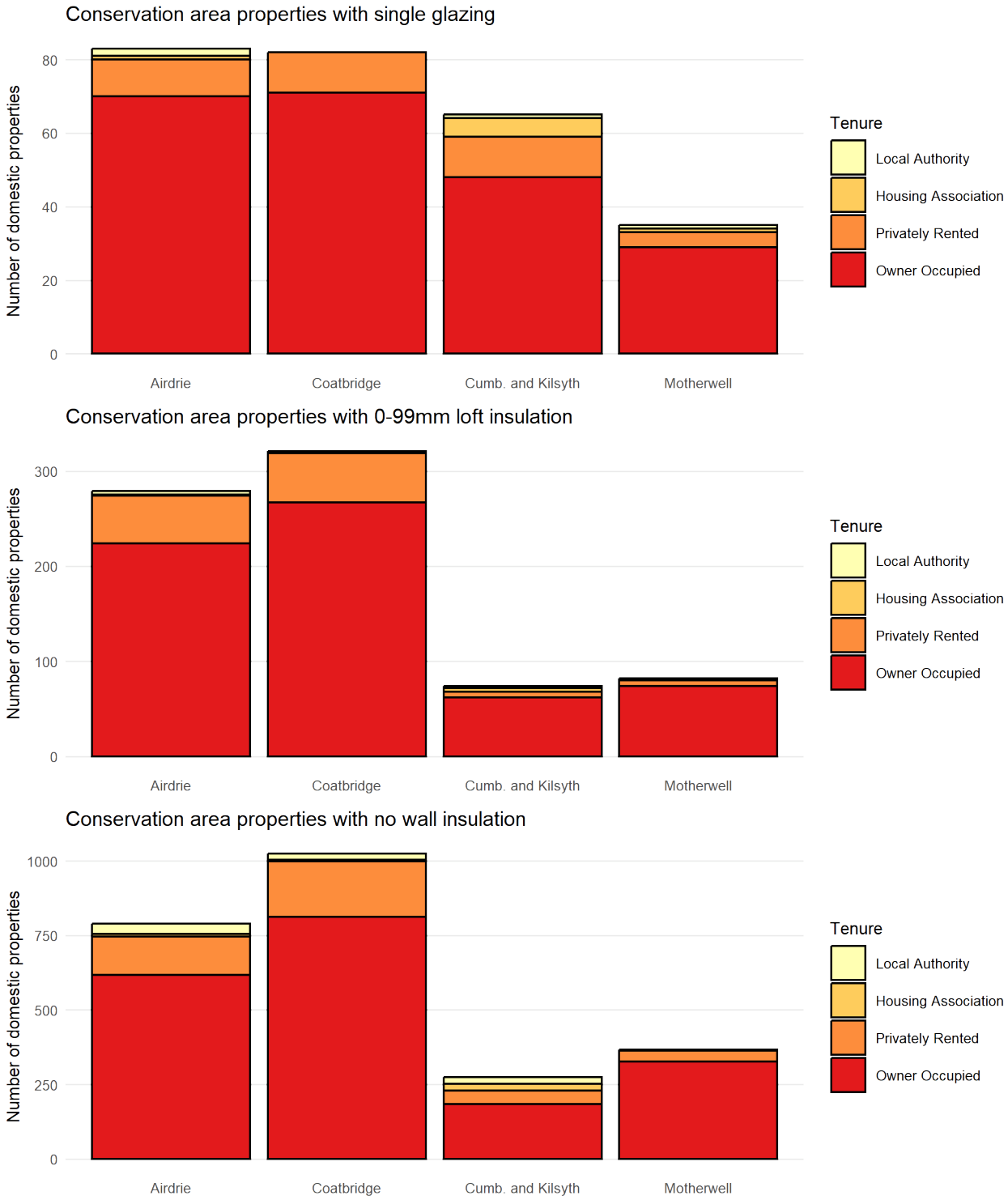
Listed buildings can be challenging with respect to energy efficiency improvements, the siting of, for example, air source heat pumps external to the building and the connection to new district heating pipework.

There are around 300 listed domestic properties (data for non-domestic is not available). Only 32% have EPCs rated C or better, with 8% being F or G. This is less favourable than typical domestic property but not extreme. There are a small number of listed buildings and they are clustering in the centre of Airdrie and in Pather in Wishaw so they should be considered with respect to heat zoning in those two strategic zones.

Like listed buildings, conservation areas represent a particular challenge regarding the introduction of energy efficiency measures and low carbon heat measures. For example, conservation areas are excluded from certain permitted development rights. This can result in properties requiring permission for works that may not have required planning permission if located in a different area. Conservation areas are also more likely to include traditional building types. Energy efficiency measures and low carbon heat sources tend to be more time consuming, challenging or costly to install, if they are possible at all.

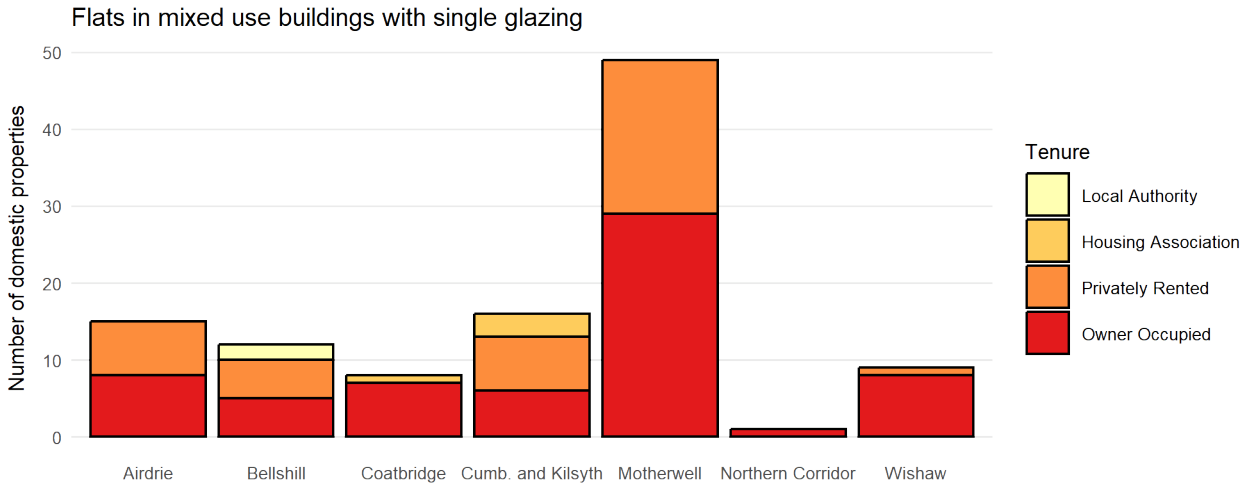
The energy efficiency intervention data in Figure 15 has been revisited with a focus on properties in conservation areas – see Figure 31. There are a little over 3,000 domestic properties in conservation areas (around 2% of the homes in North Lanarkshire) with the vast majority being owner occupied. The conservation areas only appear in four of the strategic zones but are likely only to be of significant interest in Airdrie and Coatbridge. The same focus on loft insulation as in other domestic properties is valid.

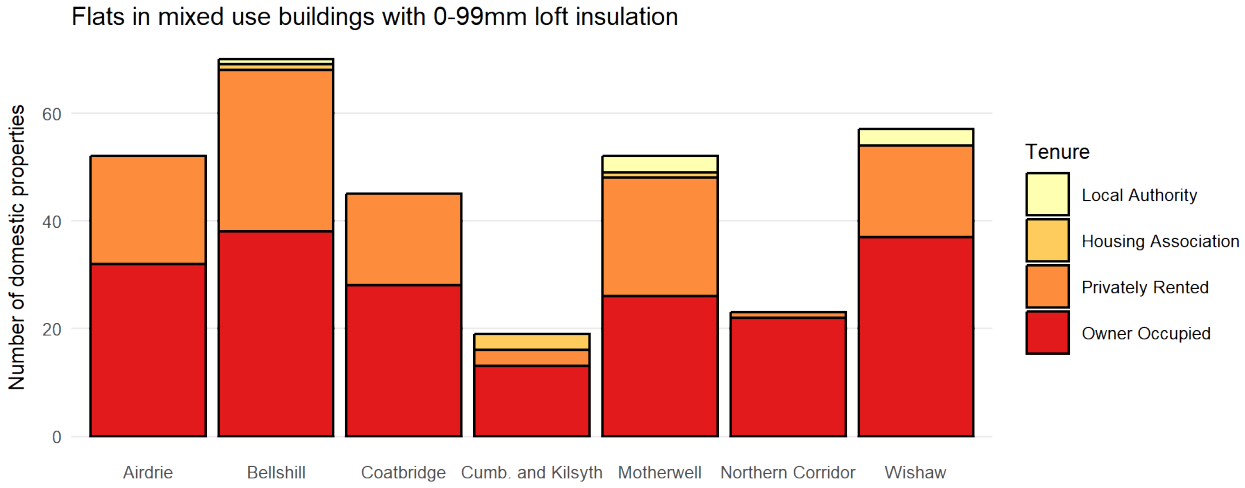
Figure 31: Conservation area properties requiring upgrades to glazing, loft and wall insulation

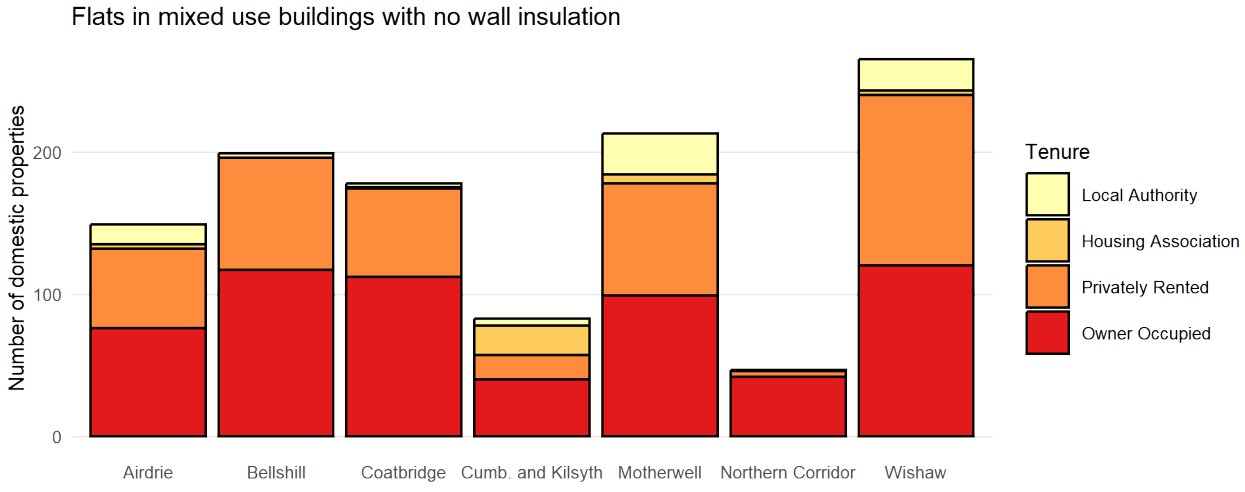


Around 1,700 domestic properties (1% of total) are recorded as flats in mixed-use buildings. The potential energy efficiency interventions for these properties are laid out in Figure 32. Almost all these properties are owner occupied or privately rented. As with the general stock, wall insulation appears to be key for this typology. However of the approximately 1,100 flats predicted to have uninsulated walls, 858 have solid stone walls (presumably tenement flats above shops) so this is not an easy route to improved energy efficiency.

Figure 32: Domestic properties in mixed-use buildings requiring upgrades to glazing, loft and wall insulation







7.9 Building-Level Heat Decarbonisation

In terms of decarbonisation and reducing fuel poverty across the region, Table 15 shows how each key measure can contribute to each locality.

The potential for heat networks in North Lanarkshire is around 6% of domestic properties, which are mostly in Coatbridge and Motherwell.

Most buildings are suitable for heat pumps after insulation measures have been considered. Many properties in a potential heat network zones may also be suitable for heat pumps.

Combining the suitability of these two measures leaves the remaining buildings which would require further investigation on the best steps forward to decarbonise them, as discussed in Section 7.6.9.

Table 15: Impact of measures on domestic buildings by Strategic Zone

Strategic Zone	Number of Properties	Current Heat Demand (MWh/y)	Potential Heat Network Properties	Suitable for a Heat Pump	Not Suitable for a Heat Network or Heat Pump and Not Using Biomass	Not Suitable for Heat Network or Heat Pump (%)
All North Lanarkshire	161,150	1,957,100	9,099	117,094	41,904	26%
Airdrie	25,439	323,800	636	17,318	7,944	31%
Bellshill	20,218	233,700	244	16,083	4,083	20%
Coatbridge	23,902	268,600	4,153	18,337	4,677	20%
Cumbernauld and Kilsyth	30,173	384,900	897	20,706	9,165	30%
Motherwell	25,641	284,900	3,168	19,898	5,011	20%
Northern Corridor	10,381	131,318	-	7,078	3,303	32%
Wishaw	25,243	328,223	-	17,534	3,303	13%

8. Delivery Areas

8.1 Spatial Approach

8.1.1 Purpose

This section sets out how interventions could be prioritised and to identify specific areas for possible action. It considers the characteristics of the North Lanarkshire buildings using a spatial approach and shows differences between areas of North Lanarkshire with respect to the LHEES considerations. This approach identifies areas where delivery actions can be targeted.

Specifically, this is to allow locations to be identified for any future area-based funding mechanism. By setting out a range of metrics this allows the specific objectives of Council policy or funding scheme rules to be used to identify areas most suitable for that action.

The analysis set out in this report is conducted at a higher spatial granularity than in the Strategy to allow targeting of delivery actions.

8.1.2 Domestic Energy Efficiency

The attributes of each home were taken from the Home Analytics data; this contains information on the construction of each building and the suitability for a range of energy efficiency measures. In order to identify areas where insulation measures have the potential to reduce heat demands and improve energy efficiency, the weightings were used as set out in Appendix F. The score for each data zone was calculated using a version of the LHEES Baseline Tool, adapted to provide outputs at Delivery Area resolution.

The Weighted Scores are distributed unevenly across North Lanarkshire with higher scores indicating poorer energy efficiency and a greater potential for demand reduction (Figure 33, Figure 34 and details in Table 23 in Appendix B). There are a small number of zones with significantly worse scores, suggesting that there is value in addressing energy efficiency measures in specific geographical areas.

Those with the highest scores are a priority but they cannot necessarily be treated similarly since, for example, Sunnyside and Cliftonville-04 is exclusively in the private sector while Forgewood-03 has a significant number of properties in the ownership of housing associations. This points to a need to address the problems both by this spatial zoning and by targeting properties by tenure and technical intervention; for example, a possible lack of wall insulation is the biggest contributing factor to the Weighted Score in each top Delivery Area.

Figure 33: Map of Weighted Energy Efficiency Score – Data Zone Level

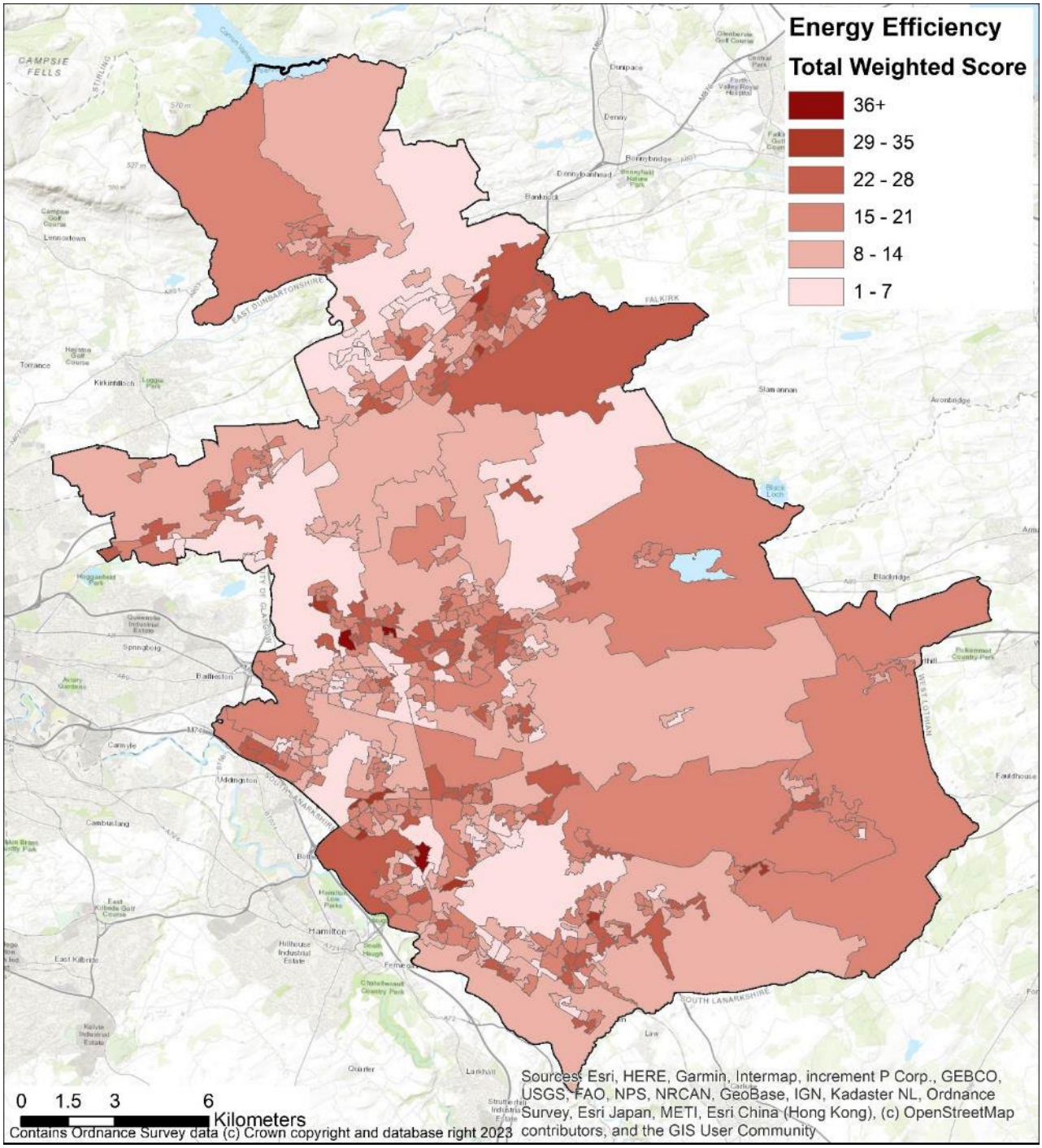
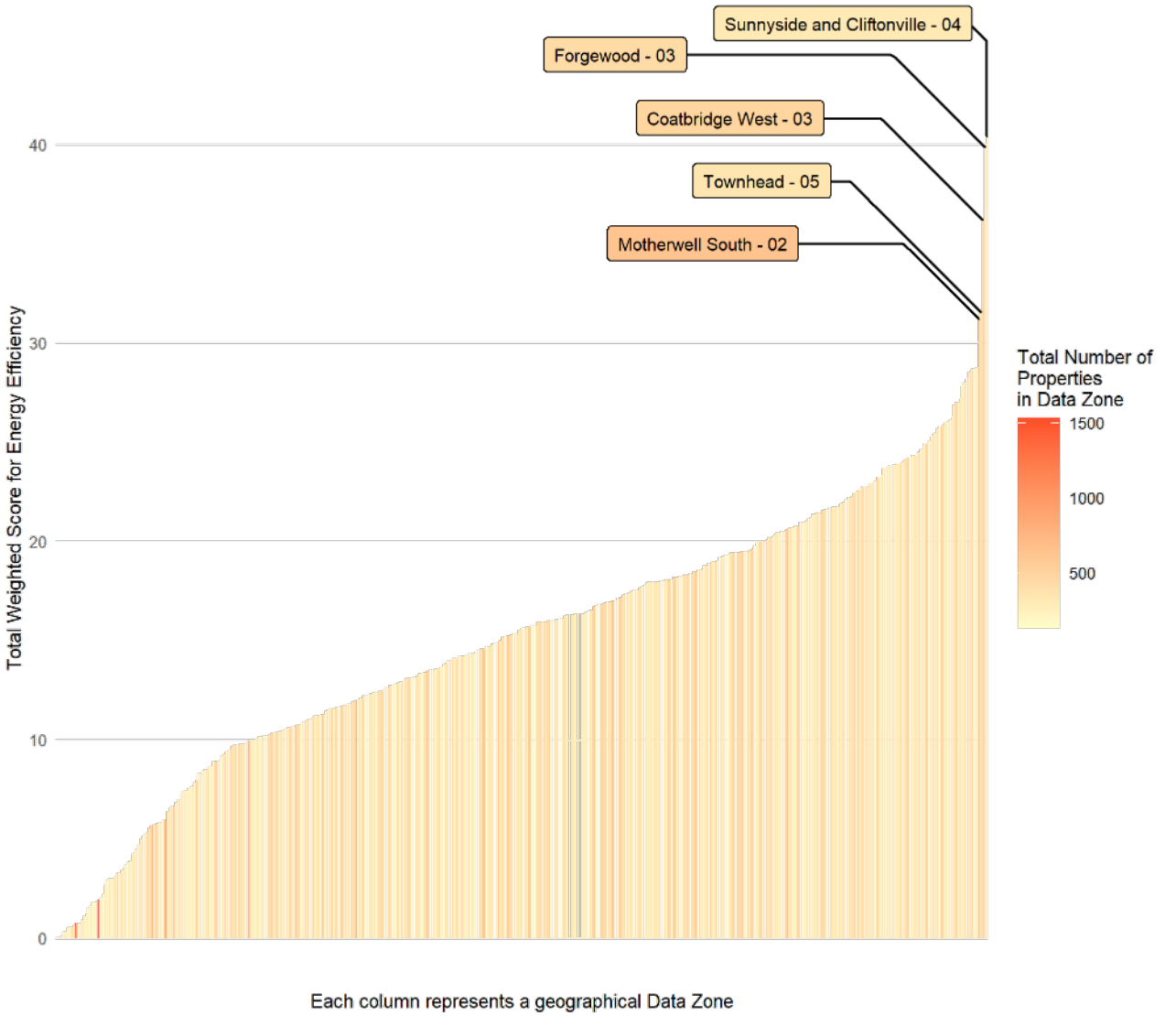


Figure 34: Histogram of Weighted Energy Efficiency Score – Data Zone Level



8.1.3 Energy Efficiency as a Driver for Fuel Poverty

This section considers where energy efficiency measures have the potential to reduce fuel poverty. The analysis uses a weighted score as set out in Appendix B

At Intermediate Zone level (Figure 64Appendix A) the highest weighted score was 23 for Motherwell South. At Data Zone level, the highest score is 32.3 for Forgewood-03 and it is clear that a handful of Zones stand out as being particularly in fuel poverty, which indicates a need to prioritise them but there is less of a difference between the other zones suggests that geography may not be the sole mode of prioritisation (Figure 35Table 24Appendix B).

It is evident from Table 24 that uninsulated walls are common in these areas but there is significant variation amongst the other indicators. Notably, the areas with highest fuel poverty levels do not necessarily receive the highest weighted score. This is because the highest ranked zones are those with the greatest potential for energy efficiency improvements to reduce fuel poverty.

Figure 35: Map of Energy Efficiency as a Driver of Fuel Poverty – Data Zone Level

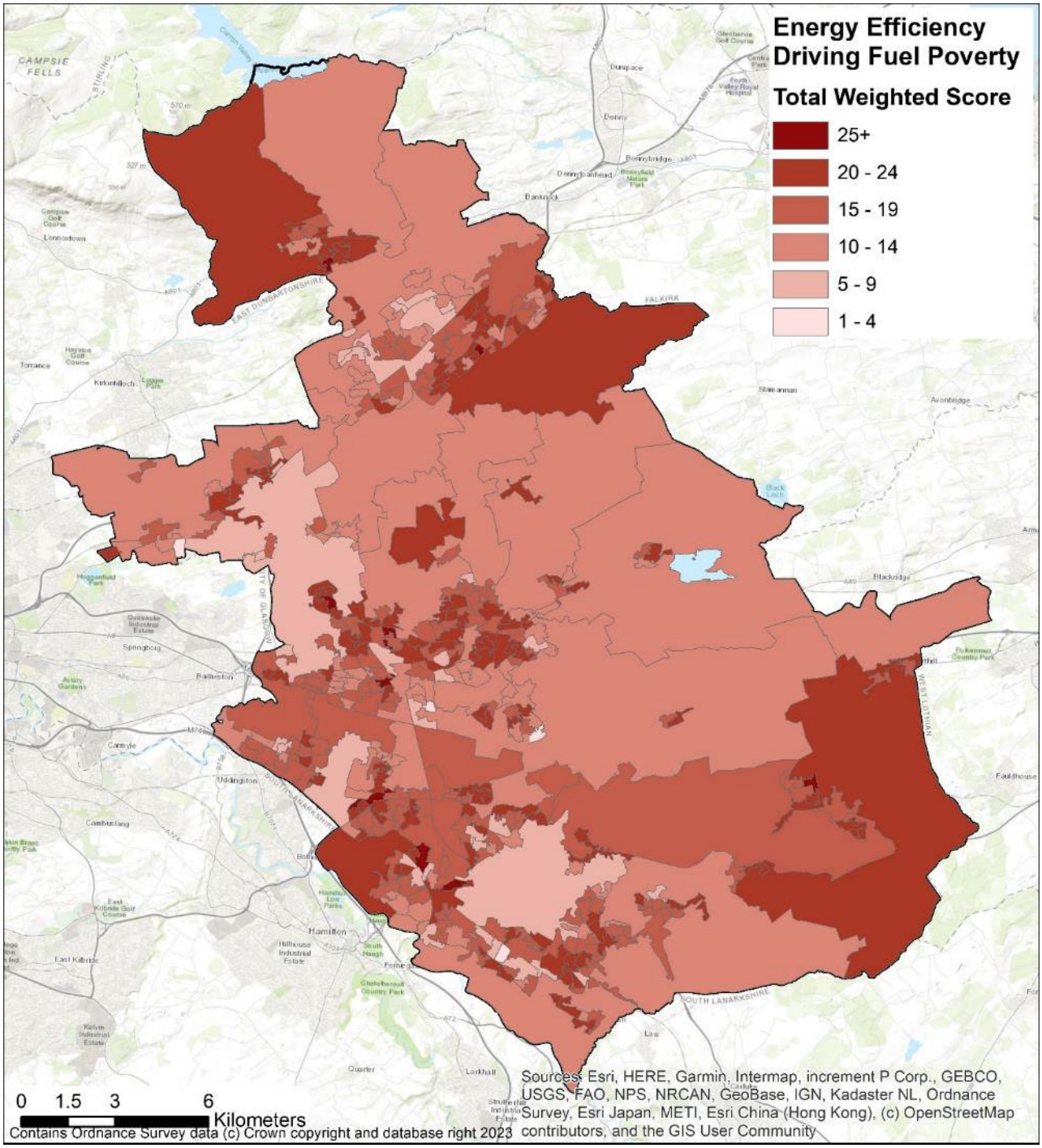
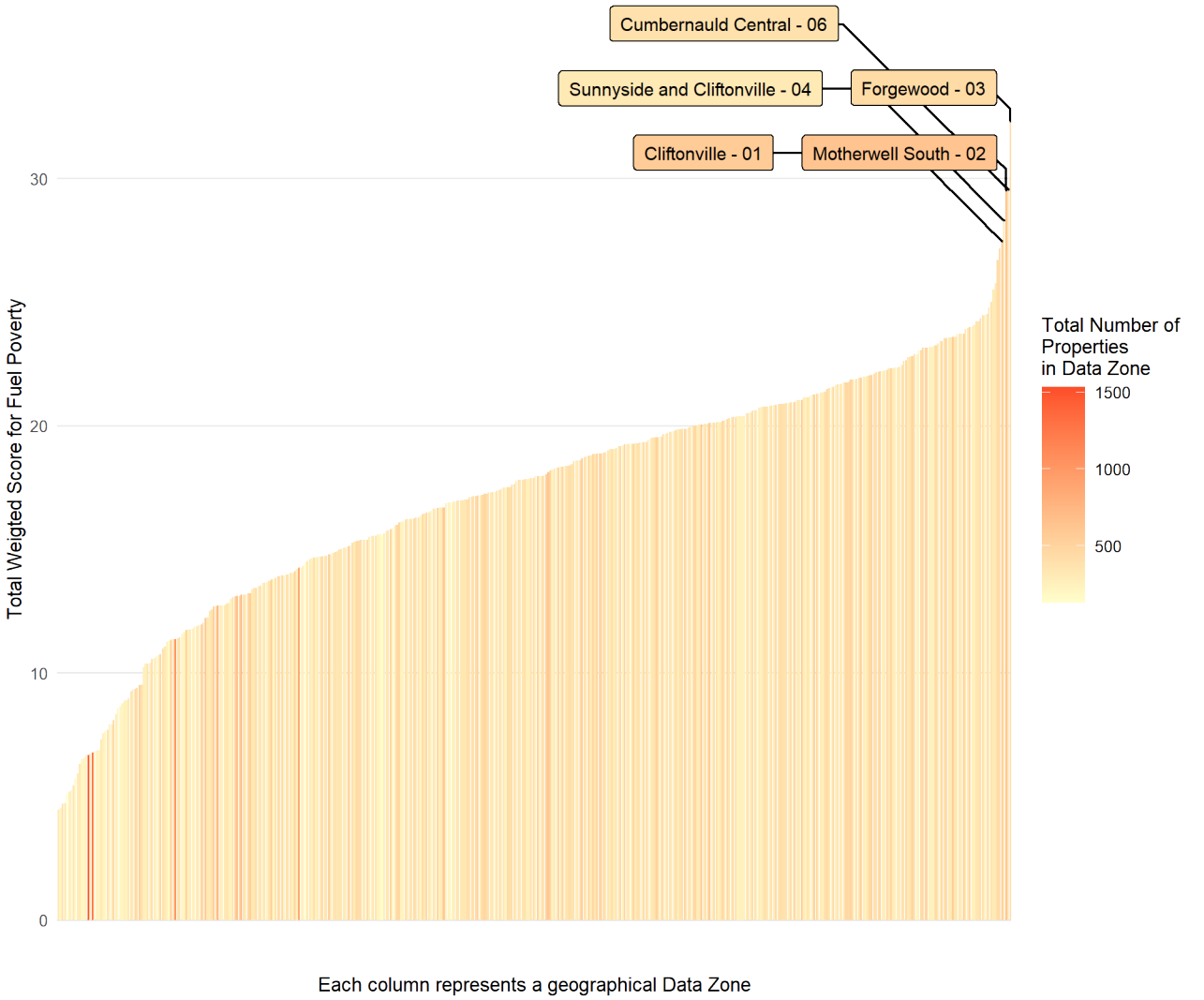


Figure 36: Histogram of Weighted Fuel Poverty Score – Data Zone Level



8.1.4 Mixed-Tenure, Mixed-Use and Historical

Mixed-tenure and mixed-use properties have unique challenges for the implementation of interventions as they have multiple stakeholders to engage with that may have conflicting interests. Mixed-tenure buildings are those which have multiple properties of the same use, whereas mixed-use buildings will have multiple properties in the same buildings that have different use profiles and are not all residential, such as a shop with a flat above it.

8.1.4.1 Mixed-Tenure

It is apparent that there is a wide variation in the number of mixed-tenure buildings between data zones (Figure 37 and Figure 38). This ownership type will require specialised engagement, funding and delivery strategies in order to implement the necessary energy efficiency measures. The technical solutions themselves will also potentially differ, since this group includes the range from high flats to sandstone tenements. A dedicated working group to resolve the unique challenges of mixed-tenure buildings may be the best course of action to make progress on the properties that may have multiple stakeholders and heating profiles. The prioritisation of zones will be dependent on the prioritisation identified for energy efficiency measures as much as on the order presented here.

Figure 37: Map of Mixed-Tenure Properties – Data Zone Level

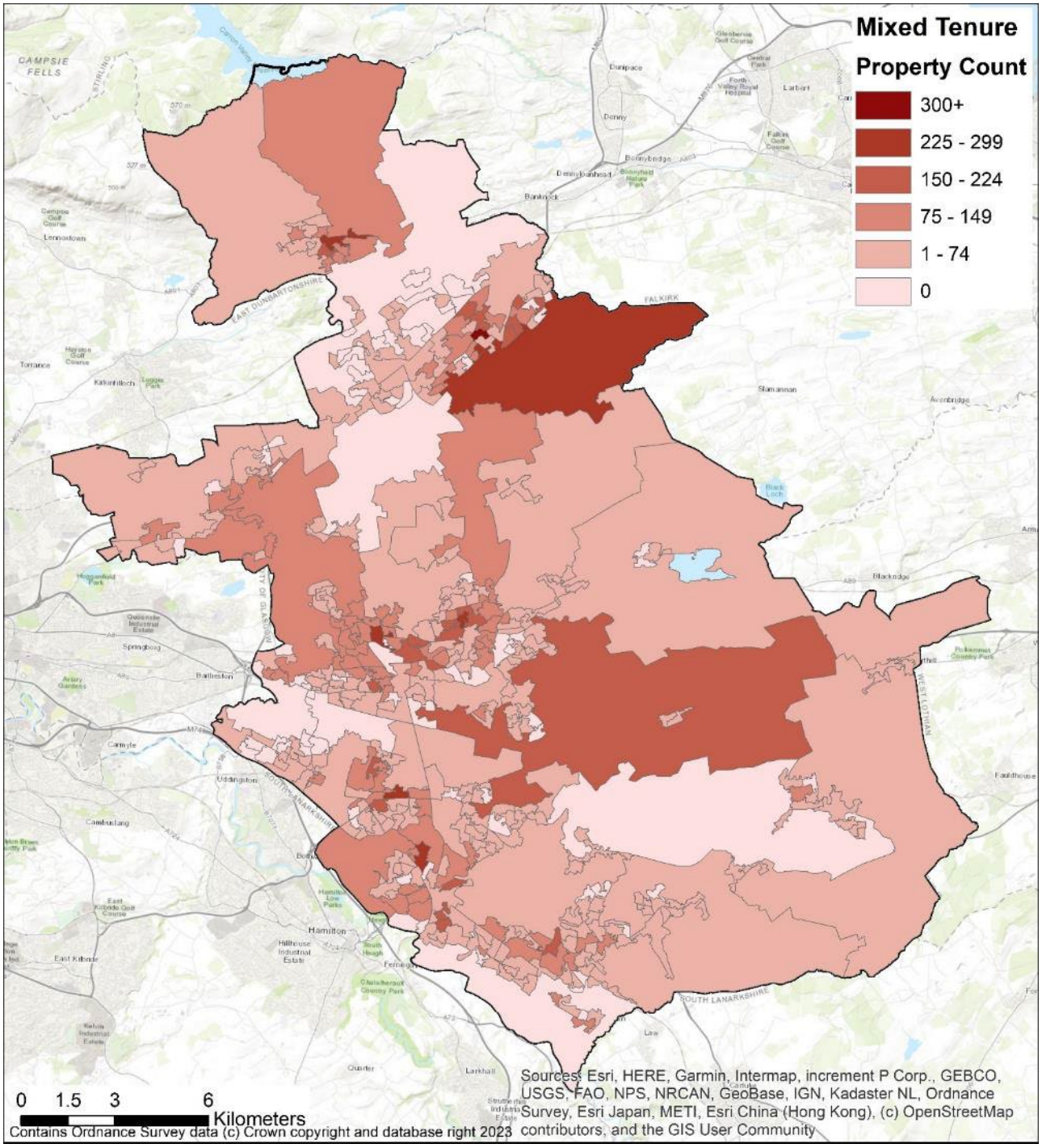
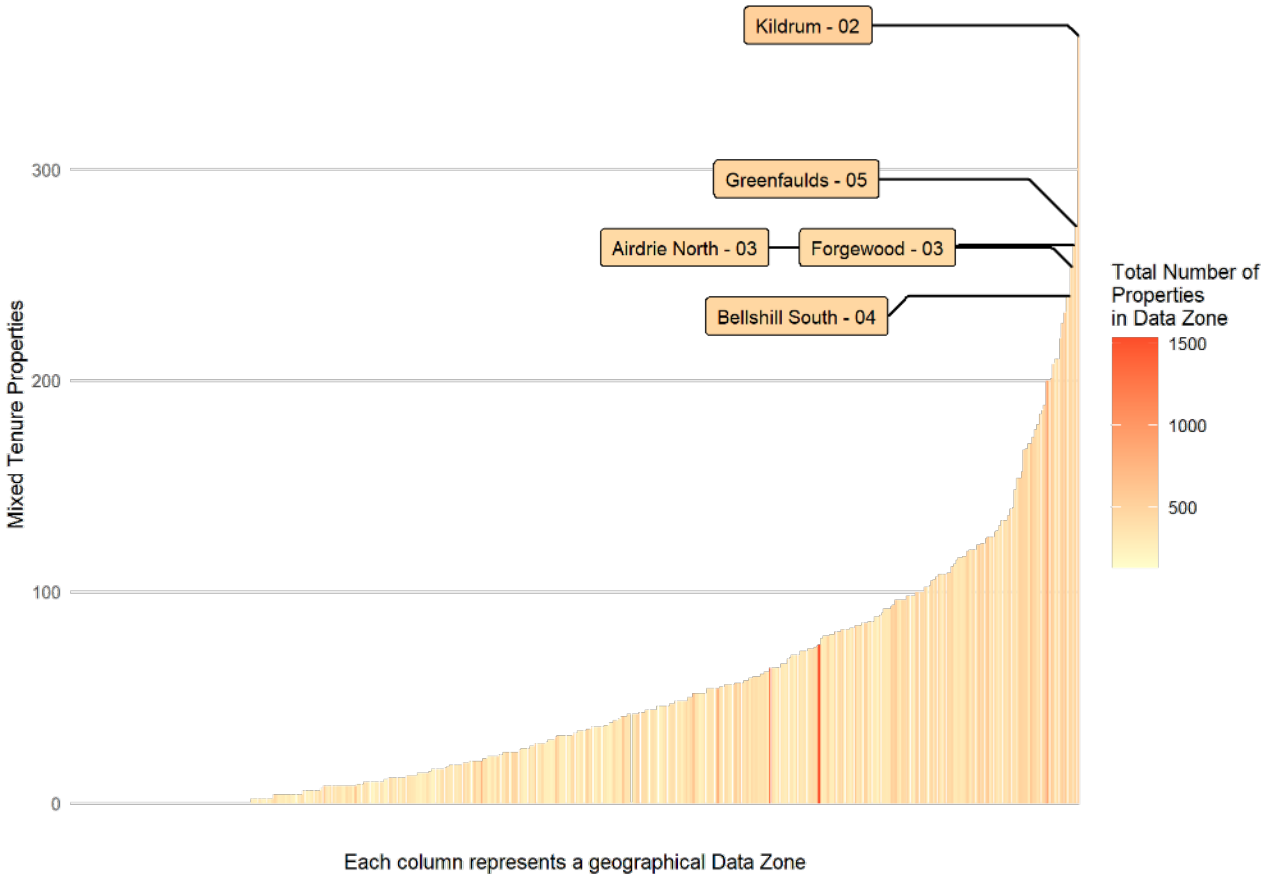


Figure 38: Histogram of Number of Mixed-Tenure Buildings – Data Zone Level



8.1.4.2 Conservation Areas and Listed Buildings

Relatively few Data Zones have homes within conservation areas (Figure 39). The top two zones (Figure 40) also appear amongst the worst performing Zones according to Energy Efficiency Score and so it is clear that properties in at least some conservation areas will be priorities and that appropriate solutions will need to be rolled out in the first LHEES delivery period.

Figure 39: Mapped Domestic Properties within Conservation Area by Data Zone

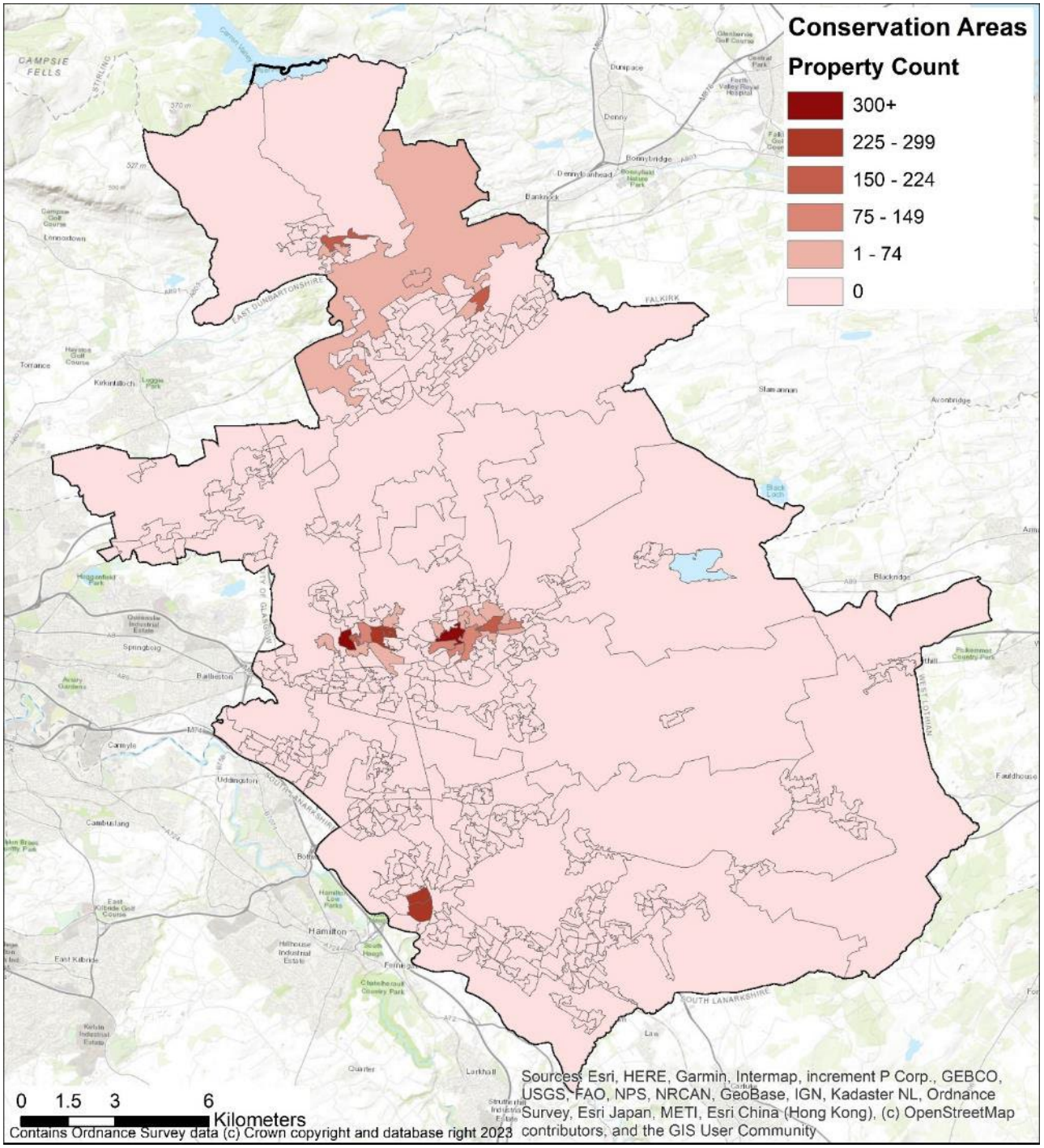
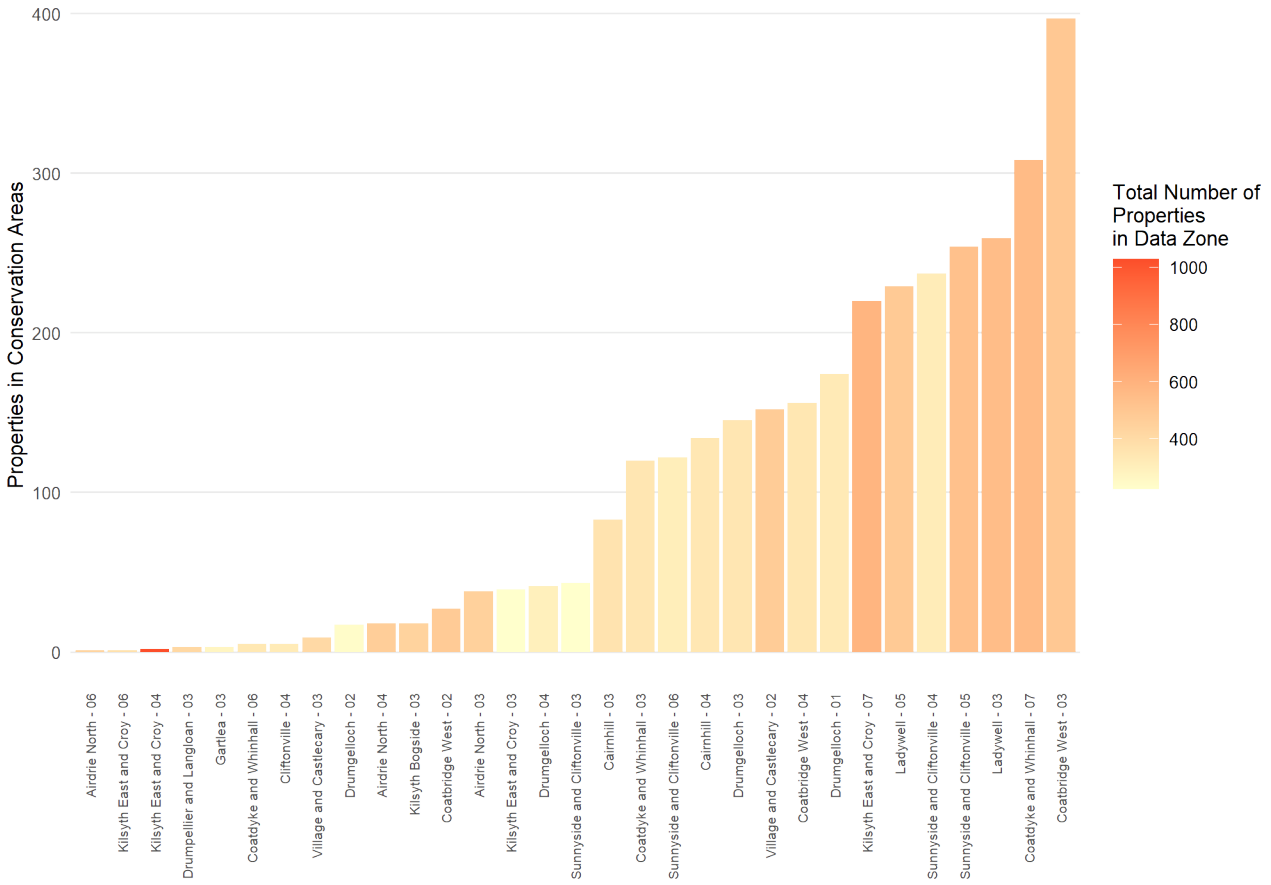


Figure 40: Domestic Properties in Conservation Areas by Data Zones Histogram



Again, there are very few listed domestic properties (Figure 41 and Figure 42). While the top Data Zone will not be prioritised based on energy efficiency, the second, Village and Castlecary-02 is one of the top energy efficiency priority zones. Consequently, as in the conservation areas, the special strategies for this building type will have to be delivered during the first LHEES delivery phase.

Figure 41: Mapped Listed Domestic Properties by Data Zone

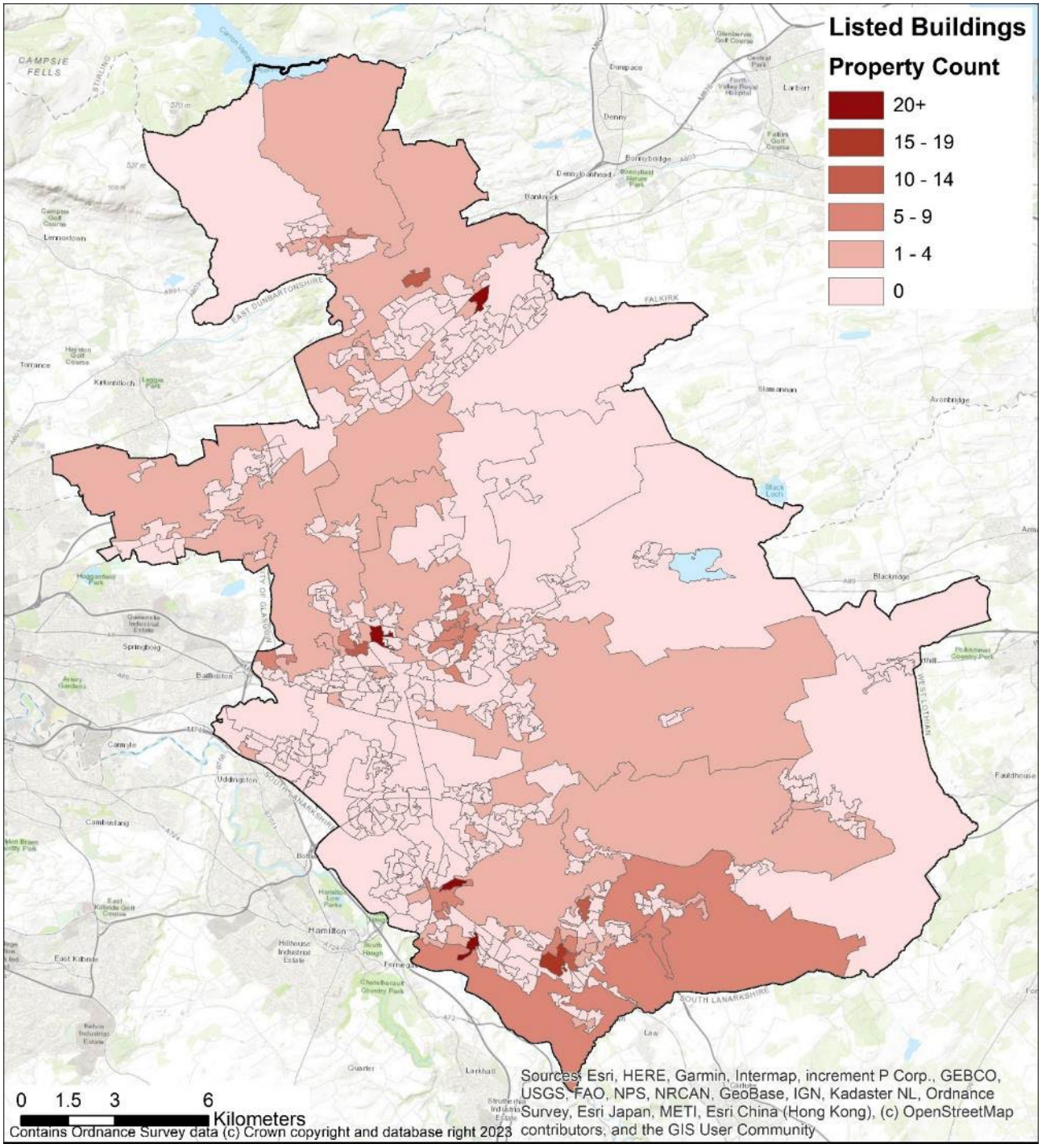
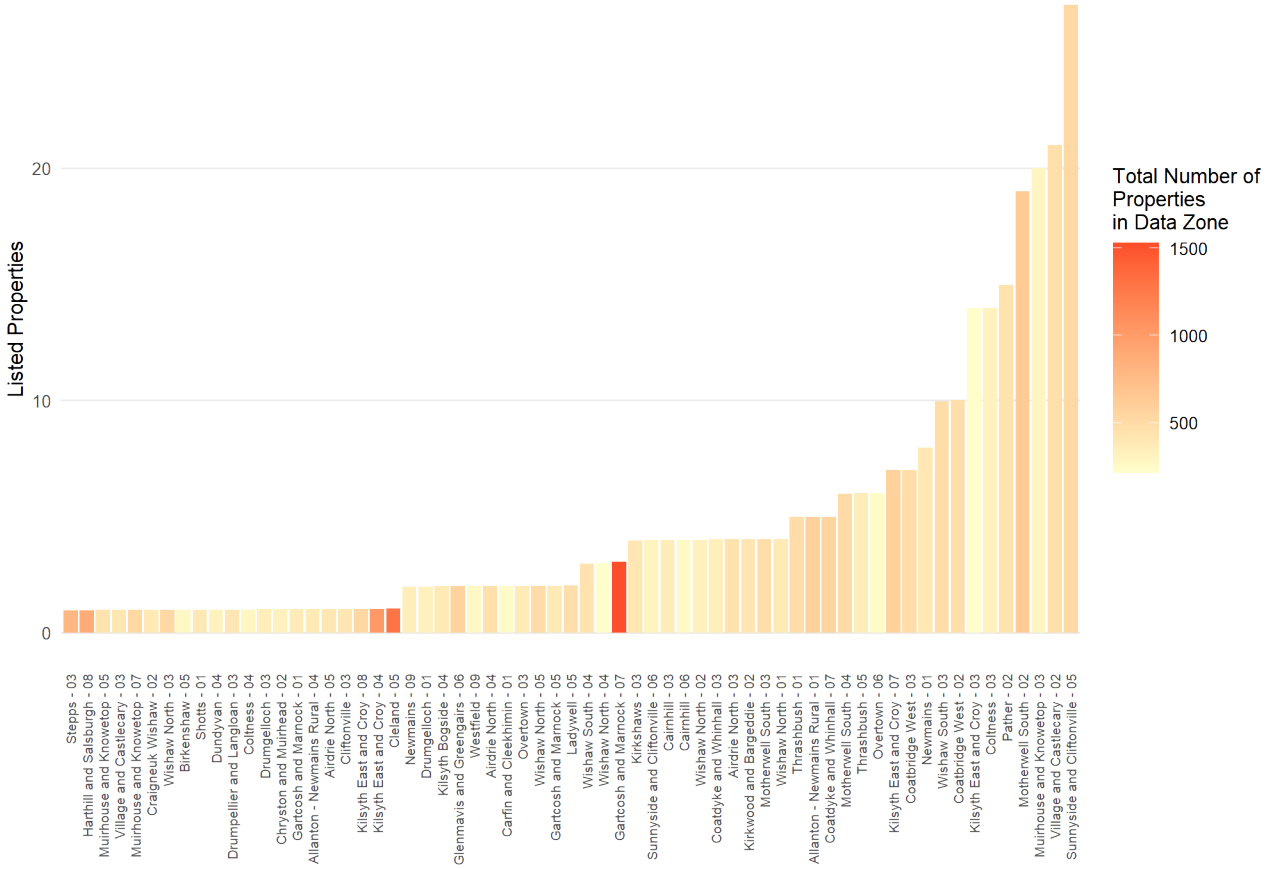


Figure 42: Listed Domestic Properties by Data Zone Histogram



8.1.5 Fuel Poverty – Absolute

The fuel poverty indicator analysis used in the baseline tool was supplemented with additional analysis based on the heat demands and fuel type presented in the Home Analytics dataset and the subsequent cost to the heat each property based on the utility prices given in Table 16. This building-level analysis was aggregated to intermediate zone and is intended to provide an indication of how affordable it is to heat houses in each area and is not a detailed prediction.

Table 16: Fuel prices used in fuel poverty analysis

Fuel	Autumn 2023 Price Cap
Electricity Rate	£0.270
Mains Gas	£0.070
Oil	£0.116
LPG	£0.119
Biomass/Solid	£0.068
Standing Charges	
Mains Gas	£0.45
Electricity	£0.27

The number of homes in each income decile are given in Table 17. 71% of homes are in decile Five or lower. The 10 least affordable Intermediate Geography Zones, those with the fewest percentage of homes which could be affordably heated by households in income decile Five or lower, are listed in in Table 18.

Table 17: Number of homes by SIMD income decile

Income Decile	Number of homes	Percentage of homes by income decile
One	22,127	13.7%
Two	32,910	20.4%
Three	23,890	14.8%
Four	20,839	12.9%
Five	14,239	8.8%
Six	7,308	4.5%
Seven	15,114	9.4%
Eight	10,037	6.2%
Nine	13,349	8.3%
Ten	1,337	0.8%

Table 18: Percentage of homes which could be affordably heated by households in income decile five or lower

Intermediate Geography Zone	Percentage of homes which could be affordably heated by households in income decile five or lower
Greenfaulds	56%
Motherwell South	57%
Ladywell	62%
Glenmavis and Greengairs	64%
Cliftonville	65%
Stepps	65%
Allanton – Newmains Rural	66%
Carrickstone	68%
Harthill and Salsburgh	68%
Kildrum	69%

8.1.6 Social Impact of Multiple Deprivation

The Local Heat and Energy Efficiency Strategy and Delivery Plan considers fuel poverty where it can be reduced through energy efficiency measures. Understanding which locations have higher rates of overall deprivation as well as specifically income deprivation, can inform decisions on areas of focus.

Figure 43: Map of overall SIMD deciles

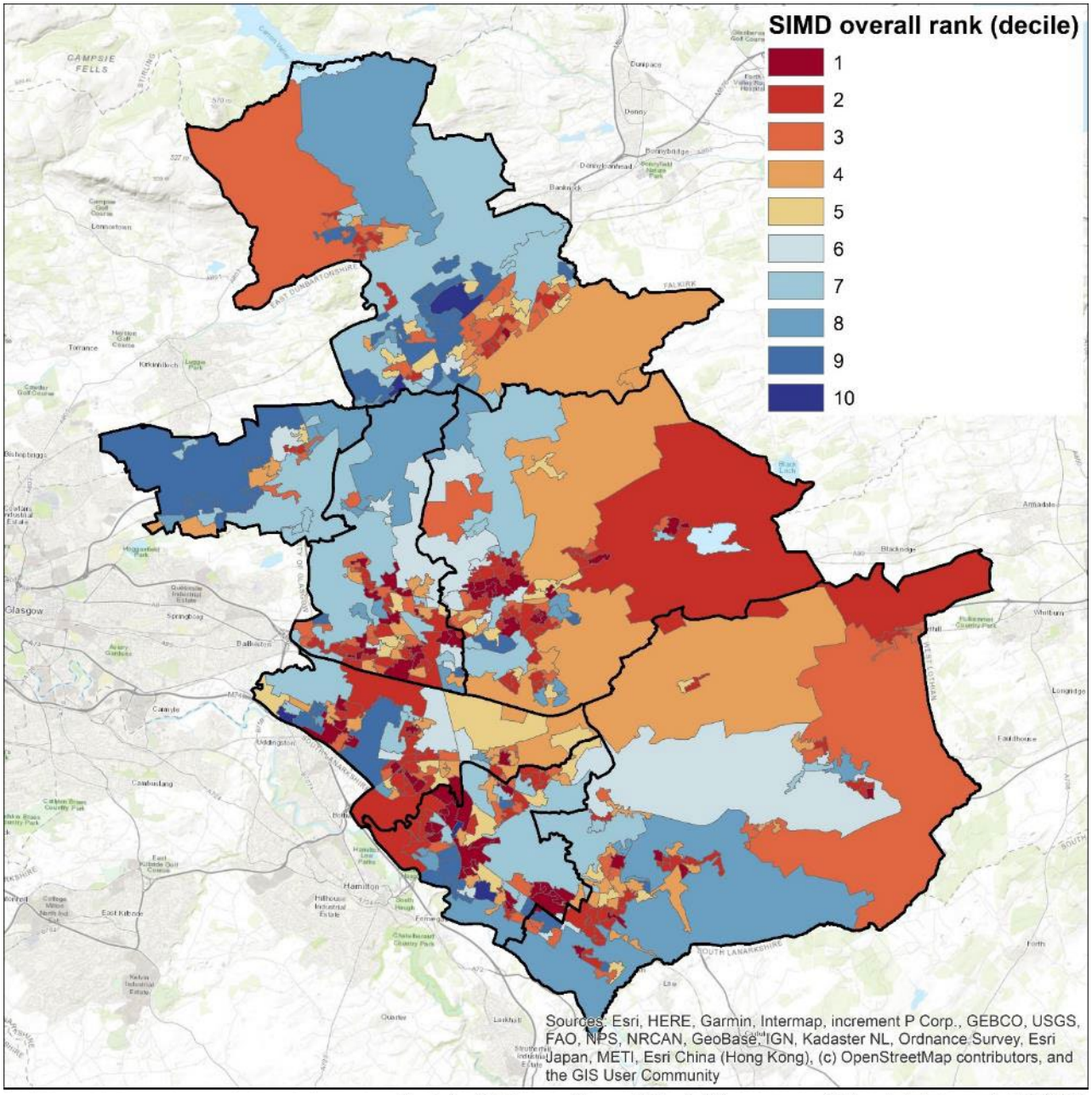
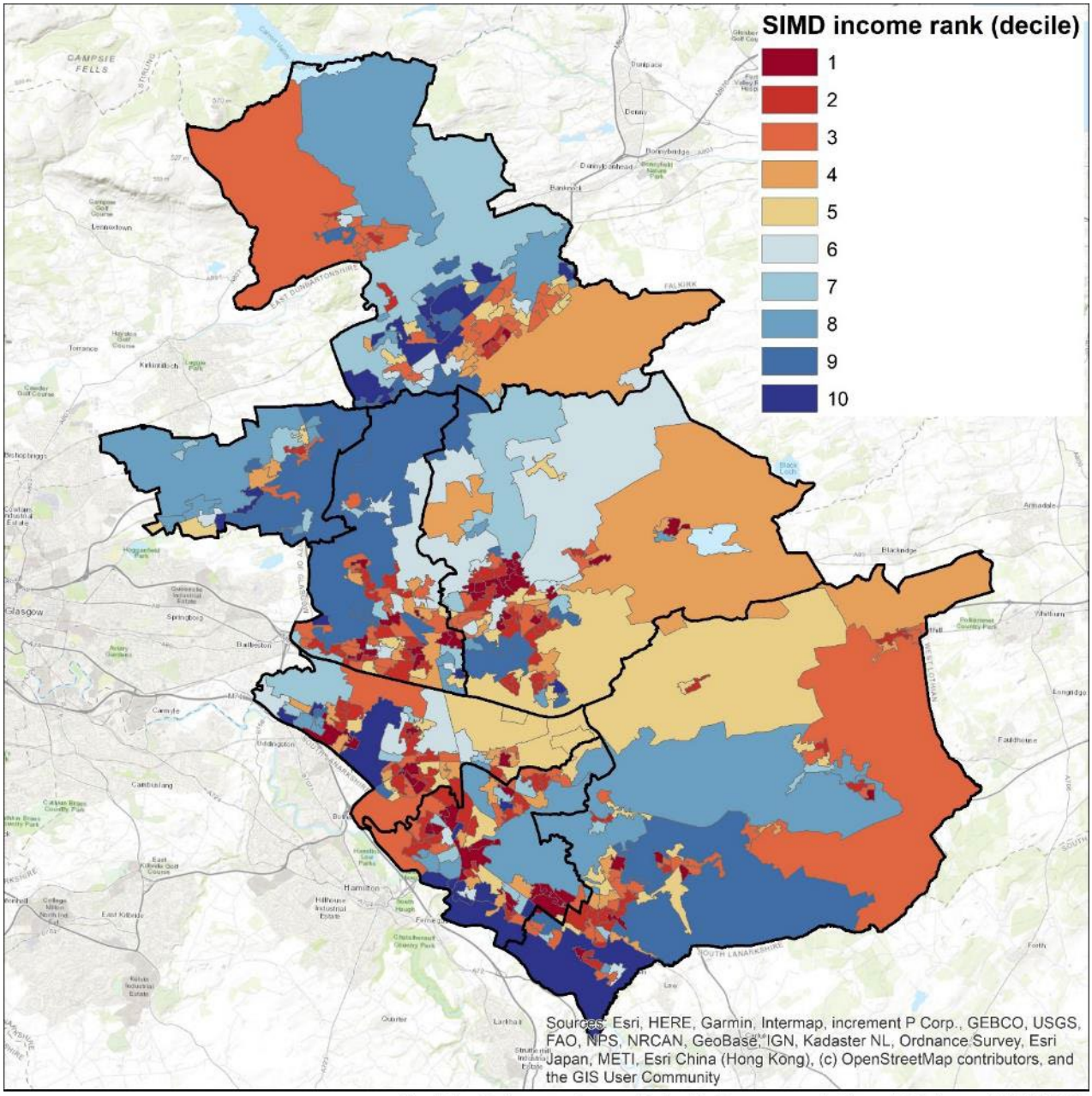


Figure 44: Map of income SIMD deciles



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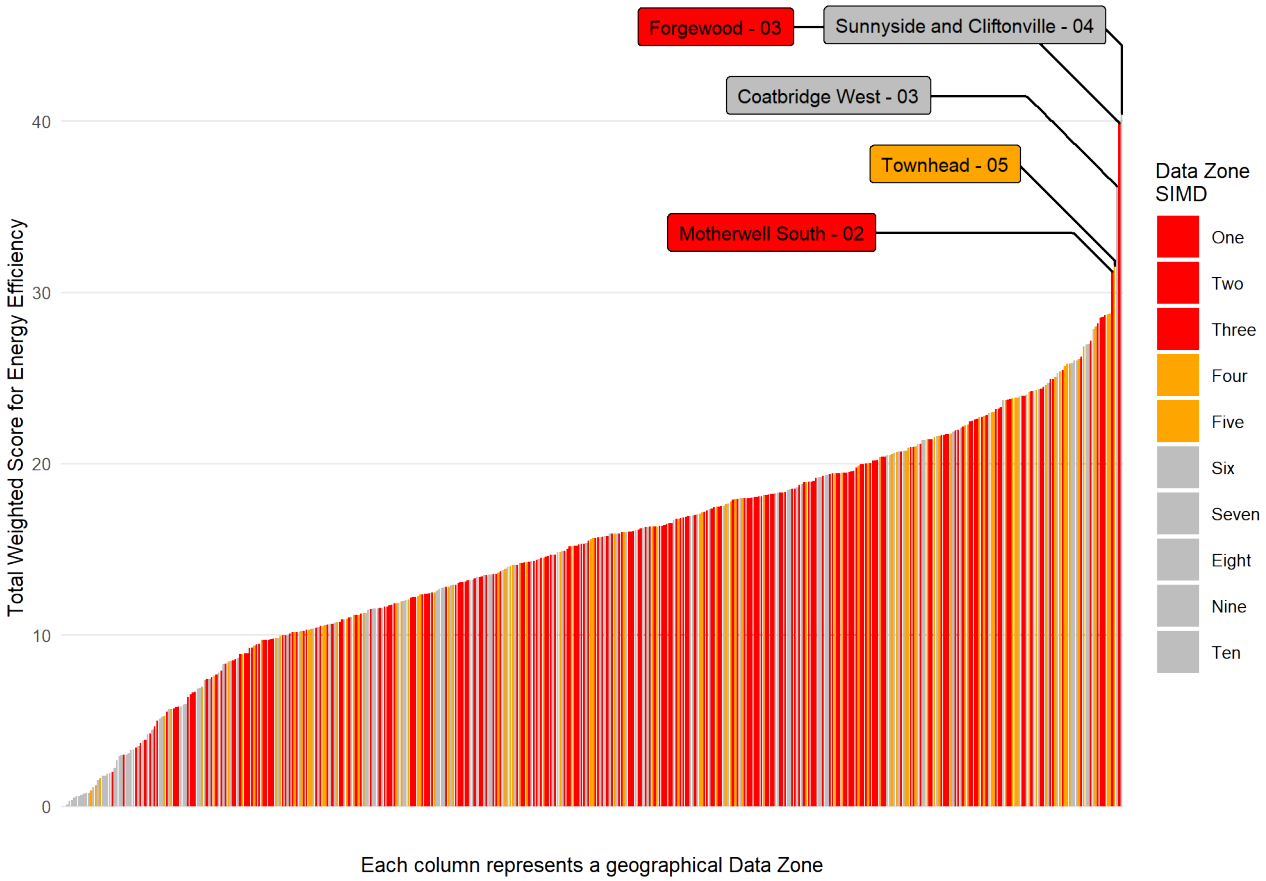
8.1.7 Overlaying Multiple Considerations

The analysis has generated various rankings for the purpose of determining where to start with interventions. The Weighted Energy Efficiency Score and Fuel Poverty rankings are, thanks to the latter being based on the former, very highly correlated (correlation = 0.75) and could be used interchangeably with similar outcomes. However, SIMD and income ranks are not correlated at all with the Weighted Energy Efficiency Score (correlation = 0.12). Figure 45 highlights that the data zone with the worst energy performance is one which is relatively affluent, so addressing funding towards fuel consumption reductions would not universally address the issue of real-world fuel poverty.

These observations suggest that prioritisation approaches need to take account of multiple factors, addressed in 8.2.3.

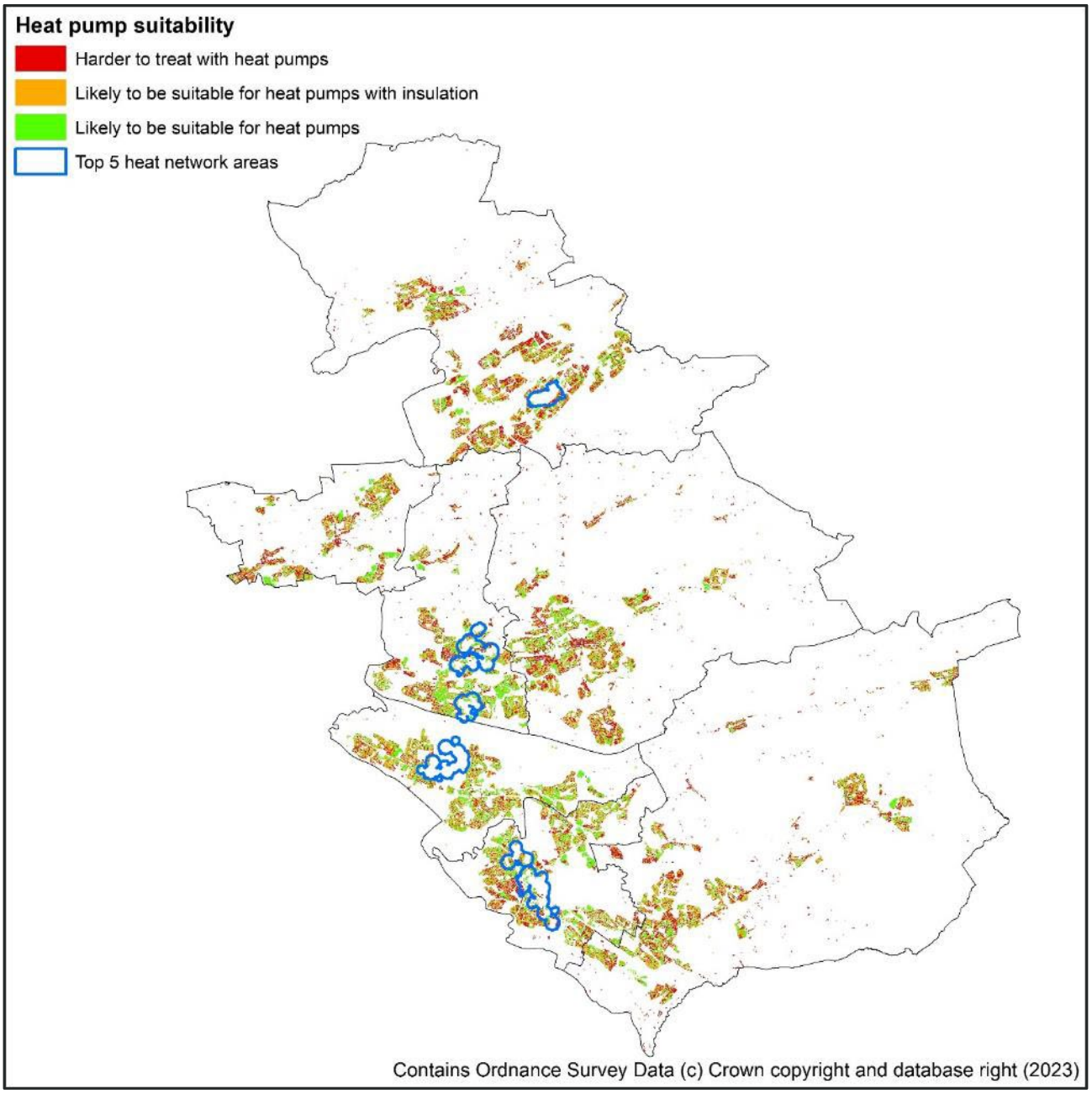
Figure 45: Data Zones ranked by Weighted Energy Efficiency Score and coloured by SIMD decile



8.1.8 Heat Pump Suitability

Heat pumps are suitable for the majority of homes in North Lanarkshire. Figure 46 shows where homes can be retrofitted with heat pumps but without additional energy efficiency measures, where additional measures would be required and where heat pumps are unlikely to be a simple solution.

Figure 46: Heat pump suitability and potential heat network areas



(More detailed maps are provided in Appendix E.)

Low temperature solutions may be possible by solving challenges for a specific building type. Other technologies such as air-to-air heat pumps may have specific applications such as small flats with few rooms.

There are a range of possible solutions depending upon the building type, however when combining the heat network analysis with the potential for heat pumps this shows where there are clusters of properties which are likely to be hard to treat.

Further analysis of these clusters could be considered to identify which solution is most appropriate for that specific area. It may be that none of the possible solutions are ideal. In this case, engaging with stakeholders and understanding the specific needs of building owners and households is going to be particularly important.

8.2 Technology-Led Approach

8.2.1 Purpose

As an alternative to the spatial approach, the interventions in this section are grouped by tenure, who owns the property, as well as other factors which would affect the viability and benefit of specific technologies. This would allow alternative means of targeting properties for interventions, either by the Council in its own properties or to assist other stakeholders in identifying changes they can make to their properties.

8.2.2 Logic for Technology Grouping

In addition to considering the data on each building's construction, type and insulation levels by data zone, analysis was carried out based on the other attributes which are important to how measures could be implemented and who would make those decisions. In this section, therefore, the interventions are grouped by tenure and the fuel being displaced to aggregate the interventions in an alternative way. This allows comparison of costs and benefits of installing different measures to be considered for a specific tenure.

The Council can play a different role in encouraging the installation of energy efficiency and low carbon heat sources in different tenures, meaning this analysis is intended to inform decisions throughout the next 5 years.

Energy efficiency measures are considered key interventions to help both reduction of fuel poverty and decarbonisation by reducing heat demands leading to lower carbon emissions. In addition, the implementation of energy efficiency measures improves the operational effectiveness and the sizing requirement of heat pumps.

There are two heating technologies which have the most potential to contribute to decarbonisation and could reduce fuel poverty. District heat networks are a key technology in areas with higher heat density makes them viable and in some new build estates. The second option, which is the main route forward for buildings across North Lanarkshire, is installation of heat pumps either for a specific dwelling or a communal system serving a number of dwellings, such as a block of flats.

There are a range of technologies which could be considered for properties less suitable to heat networks or conventional air-to-water heat pump technologies. These include biomass, direct electric heating, air-to-air heat pumps, and high-temperature or 3-phase air-to-water heat pumps.

8.2.3 Intervention Categories

The data on each individual property has been assessed and the measures that each property is suitable for has been estimated. They are grouped according to LHEES consideration and tenure.

The potential interventions are grouped by the factors which would affect their implementation. As such, Table 19 forms a list from which actions can be selected rather than a list being committed to at this stage.

An individual property may appear multiple times in Table 19 if it requires multiple interventions. It is possible that, due to programming, the multiple interventions would take place at the same time but that is not an imperative i.e., all the windows in a data zone could be upgraded at a separate time to loft insulation. Details of each of these possible interventions are set out in Appendix H.

Table 19: Intervention summary table

Intervention Reference	LHEES Consideration	Tenure	Energy Efficiency Measure	Displaced Fuel	NLC Action	Number of Properties	Notes
1	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Loft insulation	n/a	3.1 Upgrade all insulation to 300 mm mineral wool (or equivalent)	<34,951	There should be an economy of scale
2	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Wall insulation	n/a	4.1 Assess priority 4.2 Assess feasibility 4.3 Install cavity or cladding insulation	2	Low volume = Low impact
3	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Glazing upgrade	n/a	3.1 Assess priority 3.2 Install double-glazing	26	Low volume = low impact
4	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Heat pump installation	Electricity	4.1 Survey properties for wet heating system installation requirements. 4.2 Install ASHP	4,605	Cost for retrofitting will be variable. There should be an economy of scale.
5	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Heat pump installation	Oil/ LPG	5.1 Install ASHP	44	
6	1) On gas grid 4) Poor building energy efficiency 5) Fuel Poverty Resulting from poor building energy efficiency	Local Authority	Heat pump installation	Gas	6.1 install ASHP	37,837	May only improve fuel poverty if the gas meter and standing charge removed.
7	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Heat pump installation	Solid	7.1 Survey for requirement for wet heating system 7.2 Install ASHP	67	
8	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Local Authority	Heat pump installation	Biomass	8.1 Survey for requirement for wet heating system 8.2 Install ASHP	2	Low priority with wrt. Carbon, poverty and volume
9	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Loft insulation	n/a		<2,370	

Intervention Reference	LHEES Consideration	Tenure	Energy Efficiency Measure	Displaced Fuel	NLC Action	Number of Properties	Notes
10	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Wall insulation	n/a		1,464	
11	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Glazing upgrade	n/a		235	
12	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Heat pump	Electricity		868	
13	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Heat pump	Oil/LPG		14	
14	2) On-gas grid buildings 4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Heat pump	Gas		8,182	May only improve fuel poverty if the gas meter and standing charge removed.
15	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Housing Association	Heat pump	Solid		2	Low volume = Low impact
16	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Loft insulation	n/a		<41,159	
17	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Wall insulation	n/a		34,992	
18	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Glazing upgrade	n/a		3,601	
19	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Heat pump	Electricity		4,616	

Intervention Reference	LHEES Consideration	Tenure	Energy Efficiency Measure	Displaced Fuel	NLC Action	Number of Properties	Notes
20	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Heat pump	Oil/LPG		1,662	
21	2) On-gas grid buildings 4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Heat pump	Gas		90,271	May only improve fuel poverty if the gas meter and standing charge removed.
22	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Heat pump	Solid		187	
23	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Owner occupied	Heat pump	Biomass		44	Low priority wrt. carbon
24	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Loft insulation	n/a		5,329	
25	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Wall insulation	n/a		5,770	
26	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Glazing upgrade	n/a		625	
27	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Heat pump	Electricity		1,472	
28	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Heat pump	Oil/LPG		190	
29	2) On-gas grid buildings 4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Heat pump	Gas		10,209	May only improve fuel poverty if the gas meter and standing charge removed.

Intervention Reference	LHEES Consideration	Tenure	Energy Efficiency Measure	Displaced Fuel	NLC Action	Number of Properties	Notes
30	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Heat pump	Solid		12	
31	4) Poor building energy efficiency 5) Poor building energy efficiency as a driver for fuel poverty	Privately rented	Heat pump	Biomass		2	
32	6) Mixed-tenure, mixed-use and historic buildings	Mixed	All	-	32.1 Map which of the above interventions apply to mixed-tenure		
33	6) Mixed-tenure, mixed-use and historic buildings	Historic	All	-	33.1 Map which of the above interventions apply to mixed-tenure		

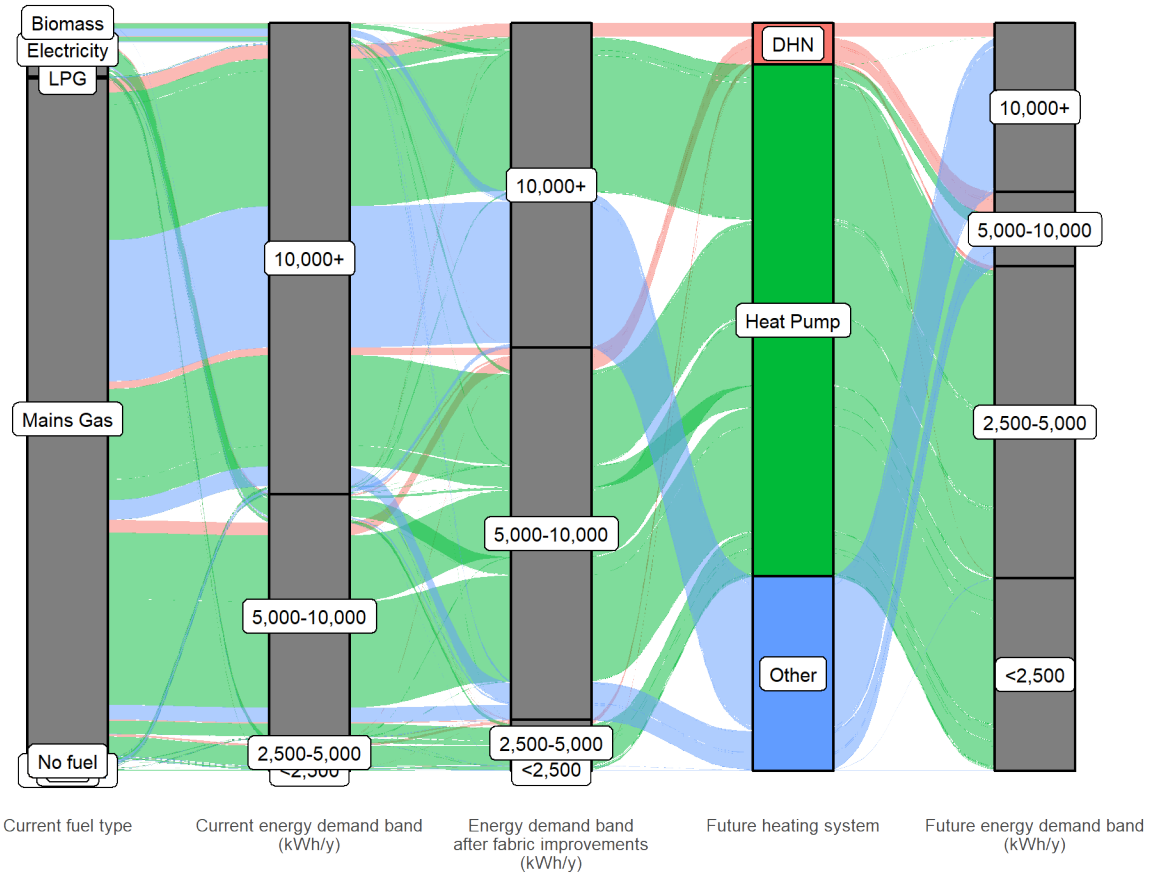
9. Decarbonisation Pathways for North Lanarkshire

The analysis shows that for North Lanarkshire to meet the two main objectives – decarbonising heat and reducing fuel poverty caused by poor energy efficiency – a combination of measures is required and possible.

9.1 Decarbonisation of Heat Pathway

The journey to the decarbonisation of each domestic property in North Lanarkshire is shown in Figure 47. The first column shows the proportions of properties which begin with each fuel source. The second groups the properties by their total heat demand, in kWh/year. The third column assumes reasonable energy efficiency measures have been applied and groups the properties by their improved heat demand. The suitability of each property for each of the low carbon heat measures is then shown. This assumes all 5 heat network zones listed are developed but doesn't consider further expansion. It can be clearly seen the high proportion of properties for which heat pumps are the most suitable technology. Finally, the column on the right shows the energy imported to the property to meet heat demand. For heat networks, this is simply heat purchased. For electric heating and heat pumps it is units of electricity. This strategy does not determine what will incentivise this transition.

Figure 47: Decarbonisation and energy efficiency pathway



The shifting of individual properties down from one energy demand band to the next in Figure 47 is visualised in Figure 48 where the comparison of heat pumps to direct electric heating shows how effective heat pumps will be in reducing the risk of fuel poverty.

At a local authority level, Figure 49 shows how interventions in and shifting demand of individual properties could reduce the total heat energy consumption in North Lanarkshire. It is also evident in Figure 48 and Figure 49 that heat pumps on their own make a bigger difference to energy demand than fabric improvements but fabric improvements have a role in both demand reduction and in making homes suitable for heat pumps (8.1.8).

Figure 48: Shifting energy demand by fabric improvement and heat pump installation

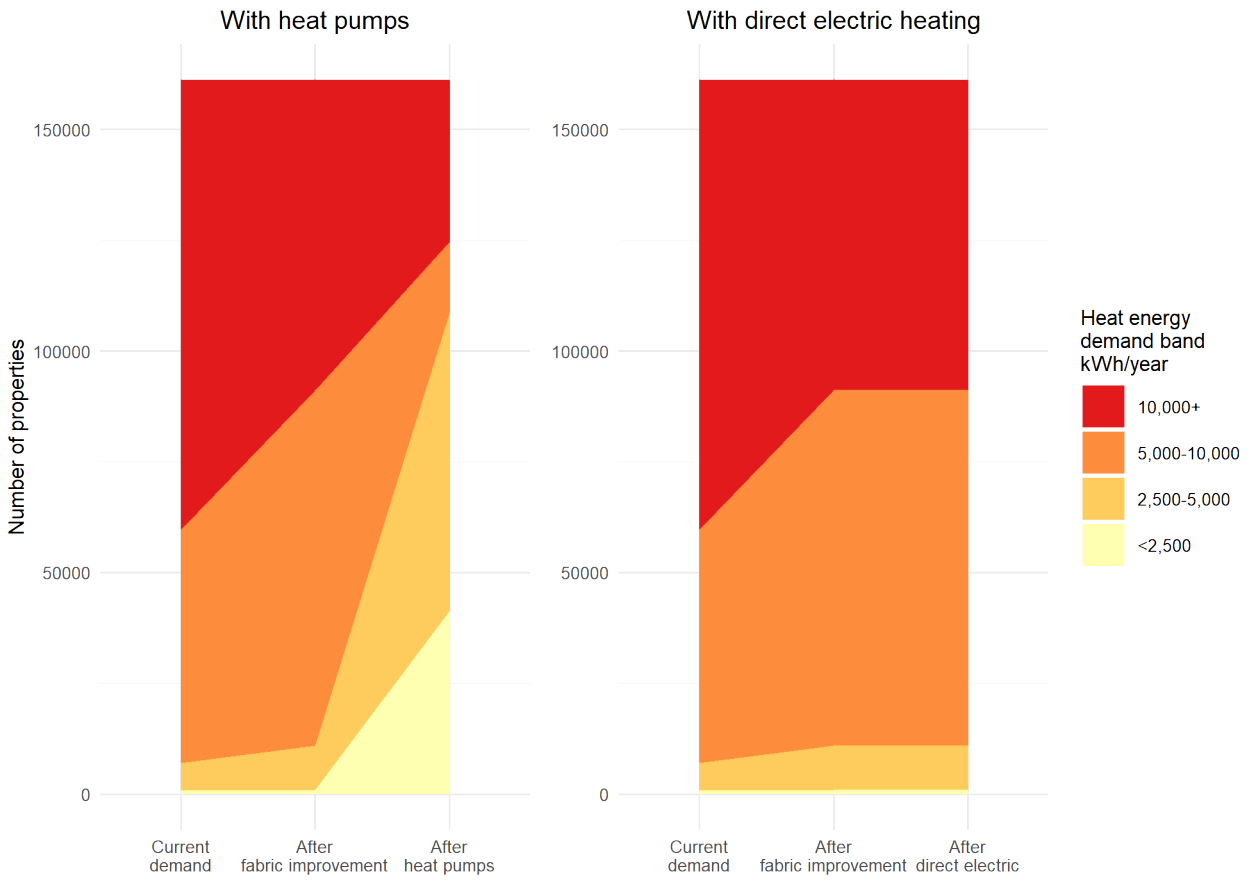
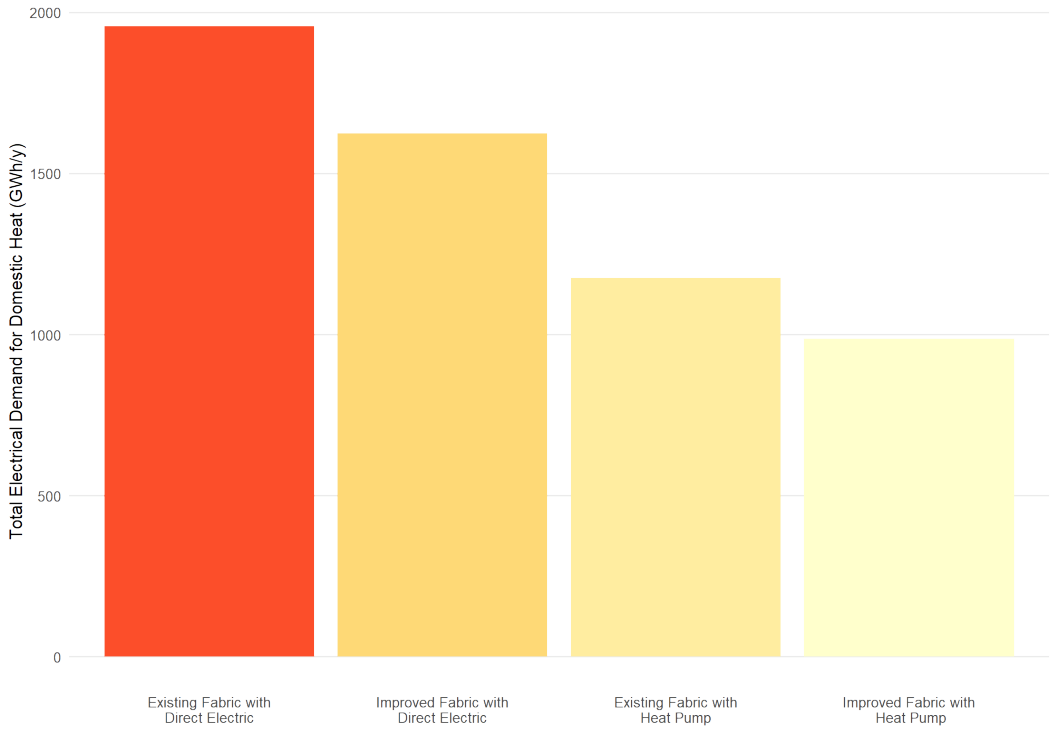


Figure 49: Total electricity demand reduction by measure



9.2 Fuel Poverty

Reducing the heat demand of the buildings through installing energy efficiency measures is clearly important as it can both reduce the demand for heat, and therefore the remaining heat to be decarbonised, as well as reducing the cost for those at risk of fuel poverty. This section examines the properties in the areas with lowest SIMD to illustrate the combined effect of energy efficiency and low carbon heating on the amount of energy that the household would have to pay for, to fully heat their home. The cost of that energy would then affect their bills and contribute to whether they were in fuel poverty.

Figure 50: Effect of actions in all properties in SIMD 1 areas – energy efficiency and heat pumps

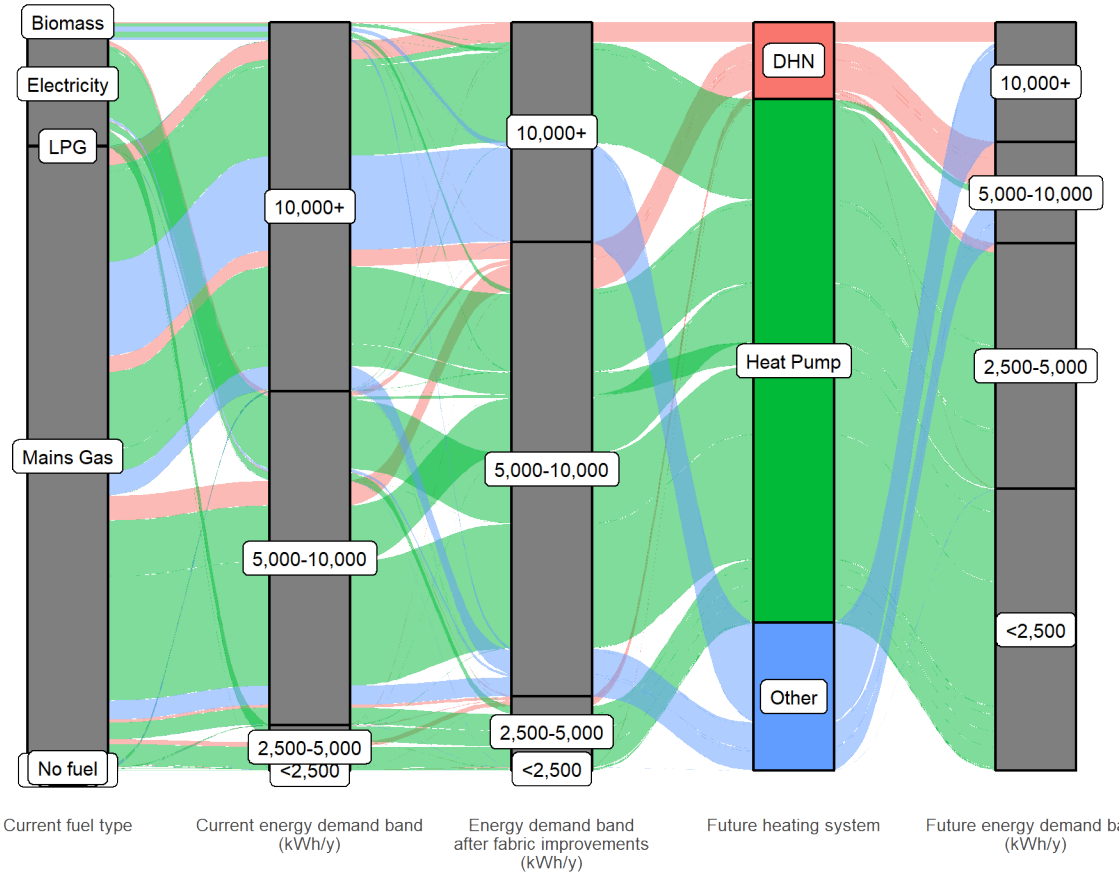
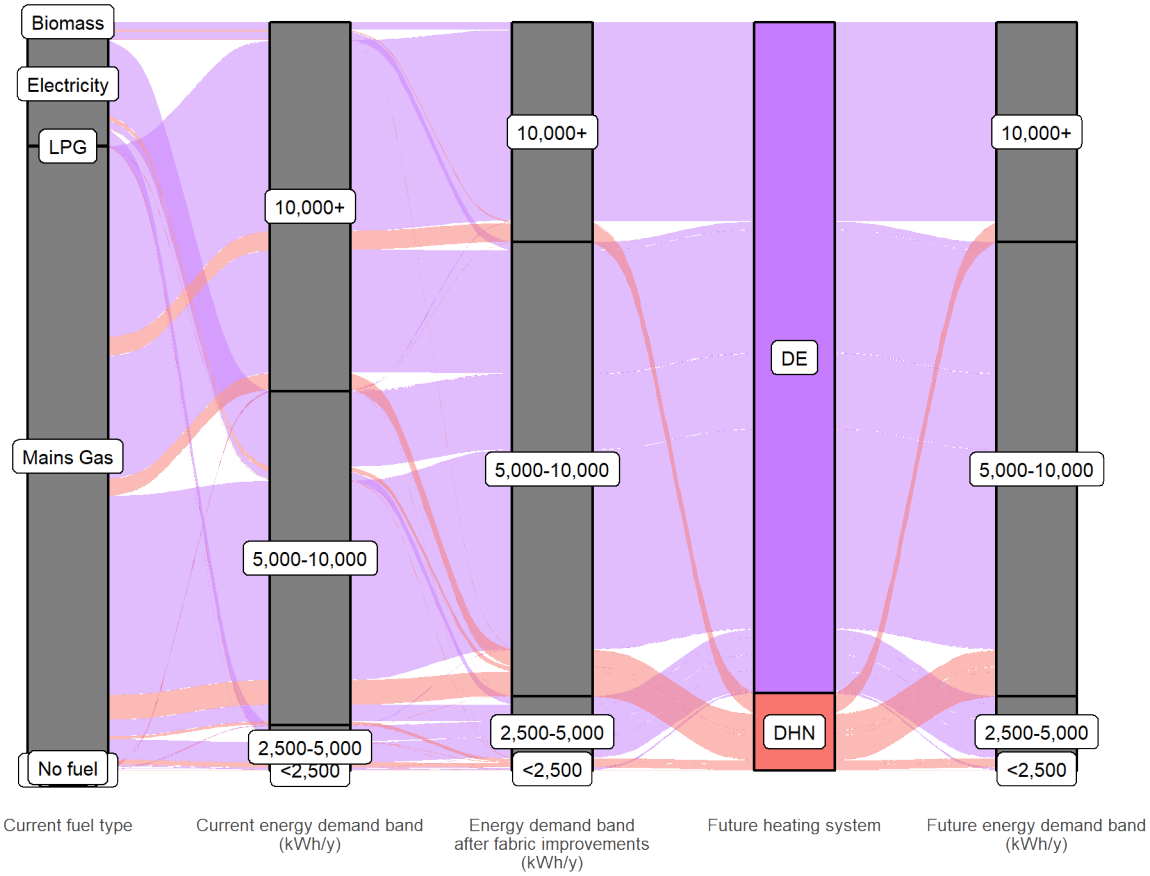


Figure 50 shows the decarbonisation journeys for all properties in areas which have a SIMD score of 1, the most deprived areas. This shows the main heating fuel they use at present, the number of the properties in each energy demand band (kWh/year) and then the numbers in each band after energy efficiency measures are installed.

Installing energy efficiency measures significantly reduces the number of properties with heat demand of over 10,000 kWh/year. Most properties would end up with heating demands between 5,000 and 10,000 kWh/year.

The properties are then allocated the most cost-effective low carbon heat source and the resulting energy consumption is shown on the right.

Figure 51: Effect of actions in all properties in SIMD 1 areas – energy efficiency and electric heating



By comparison, if direct electric heating is preferred instead of heat pumps in these properties, there are significantly more properties which would need to use 10,000 kWh/year of electricity or more than if heat pumps were installed, more properties in the 5,000 to 10,000 kWh/year category and significantly fewer in the lower two categories – this is due to the effective efficiencies of the systems.

There may be differences in the electricity tariffs between these scenarios which would need to be considered in any direct comparison of options for a specific intervention. However, for the purposes of this Strategy, heat pumps are considered the preferred solution to minimise fuel poverty, in properties where district heating is not an option.

Other factors

There are several factors which affect fuel poverty and outlining the effect of energy efficiency measures in improving fuel poverty is complex. Household income after housing costs has a significant effect but is out of scope of this Strategy.

Unheated homes

The Scottish Housing Condition Survey 2019[20] states:

> *23% of fuel poor and 28% of extreme fuel poor say that their heating keeps them warm enough in winter "only sometimes" or "never",*

For these households, reducing the heat demand through insulation both reduces how much it would cost them to heat their home, should they be able to do so, and limits the temperature to which the property will fall in any periods when they do not or are unable to heat it. For those at highest risk of not heating their homes the decision as to whether to focus capital spend on additional insulation measures or lower cost heating systems is therefore complex.

[20] 5 Energy Perceptions - Scottish house condition survey: 2019 key findings - gov.scot (www.gov.scot)

With insulation measures, there are a range of measures which have different costs and energy reductions and there is no single approach suitable for all buildings or situations. The Delivery Plan outlines the various considerations to support insulating properties.

9.3 Heat Networks

Heat networks have a role to play in the future of heat in North Lanarkshire. Heat networks can be either district heating schemes which are strategic scale developments where multiple buildings are connected, smaller heat networks, within a single campus or communal heating systems in a specific building. Within this Strategy, the phrase “heat networks” refers to district heating schemes where multiple buildings are connected by underground pipework.

The maps in Appendix D highlight several areas which may prove suitable and where there are the conditions to warrant further investigation such as the centres of Motherwell, Coatbridge and Cumbernauld.

The suitability of the buildings for connection to heat networks is not known. Further work such as Building Assessment Reports (BARs)[21] and engagement with stakeholders is important to inform future decisions on these sites.

Even in the zones where heat networks are an option, there are differences between the domestic properties which are most likely to be suitable, such as blocks of flats, and properties which are less likely to be suitable, such as detached houses[22].

Therefore, due to both the limited proportion of properties in areas where heat networks are likely to be viable and there being properties unlikely to be suitable for connection, it is essential that the Strategy considers other low carbon heat sources in parallel.

This does not preclude heat networks being developed to their full potential and it may be that a phased approach to heat networks and district heating could see smaller networks initially focus on the most viable properties with further expansion later.

9.4 Individual and Communal Heat Pumps

Of the technologies currently available to supply low carbon heat, heat pumps have been assessed to be currently suitable for most buildings. Heat pump deployment, and the role they play in decarbonising buildings, must lead to a cost of heat that is comparable to natural gas boilers and user experience of operating the systems has to be positive. There are examples of people having bad experiences living with heat pumps and while there are equally many good experiences, it is essential to understand what is required for heat pumps to meet the needs of residents. To ensure that the heat pump systems installed are of good quality and perform as expected, the sharing of good practice and case studies is emphasised.

NLC will work with internal stakeholders to consider the most appropriate low carbon heating system for properties that it owns as well as working closely with social landlords to share the latest information on issues such as: good practice; communication with tenants prior to installation; sharing information with tenants on how to operate systems which have been installed; peer to peer support within the community; the role of the advice services in supporting tenants.

It is essential that there is a supply chain and workforce which can install the technologies set out above. NLC will consider what actions it could take to encourage a local supply chain of low carbon heating installers.

While it is for each property owner to make their own decision on the heating system they prefer, there is a role for NLC in ensuring that accurate and up-to date information is available to households, tenants, landlords and owner occupiers to support decision making. This is likely to including signposting to national advice schemes operated by Scottish Government or UK Government.

Finally, for any new technology ensuring quality of installation is important to ensure that it meets the needs of households, tenants and property owners. The Council will work with stakeholders to identify any role that NLC

[21] Heat networks: Building Assessment Report (BAR) guidance - gov.scot (www.gov.scot)

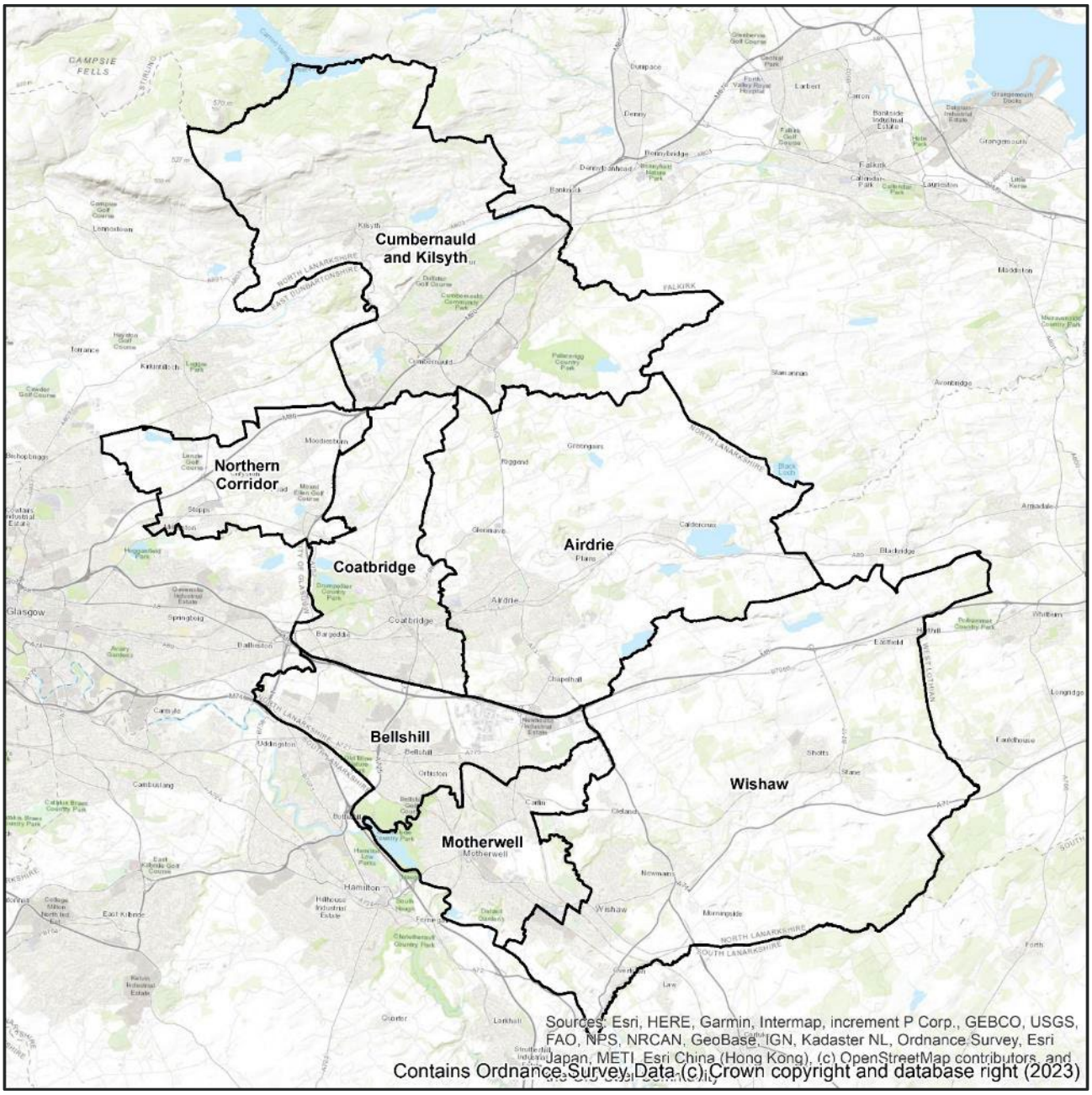
[22] Detached houses may be considered to be less suitable to connect due to the individual sections of pipework that are required to connect the buildings to the network, on a linear heat density approach, the longer the connecting pipework, the “harder” the pipework has to work to satisfy loads.

can play in ensuring the quality of installations as well as referring to national schemes such as the Microgeneration Certification Scheme.

10. Strategic Zones and Pathways

10.1 Strategic Zones

Figure 52: Strategic zones



10.2 Airdrie

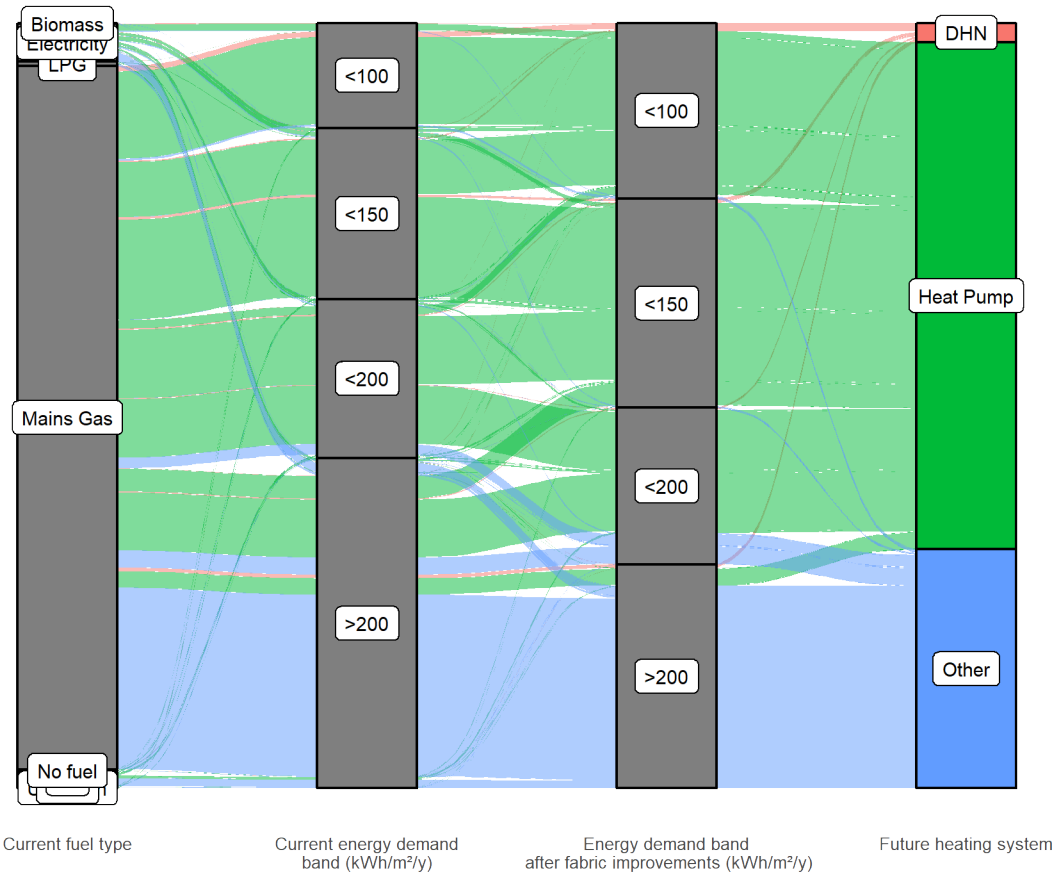
Figure 53 shows all domestic properties within Airdrie and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

The majority of properties in the Airdrie area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

The pathway shows the proportion of domestic properties which are within the potential heat network area. While no final decision has been made on heat network zones, the area in Airdrie appears less viable than others and more sensitive to changes in a small number of buildings. Its inclusion here shows that even if heat networks were to be developed, it would represent a relatively small proportion of existing buildings. If the

regeneration of the town centre were to include connection of new domestic buildings to a future heat network, then this area could be more viable.

Figure 53: Decarbonisation pathway for domestic properties in Airdrie



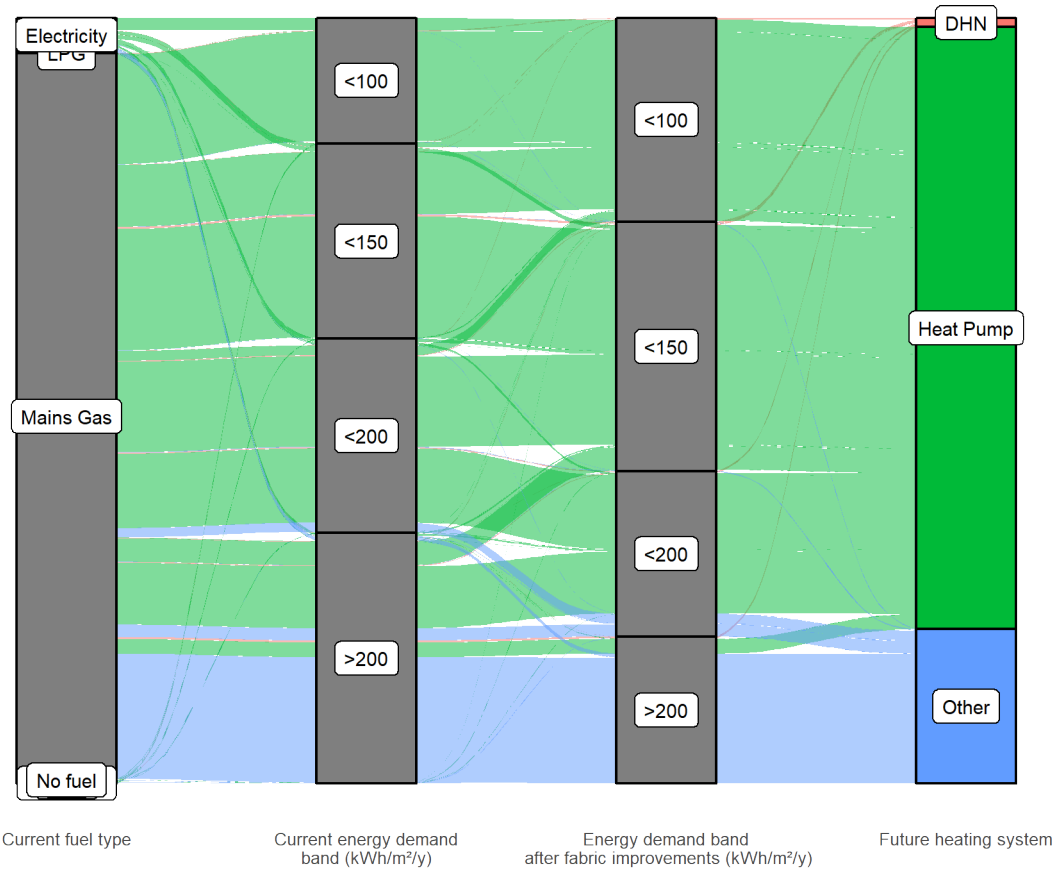
10.3 Bellshill

Figure 54 shows all domestic properties within Bellshill and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

Most properties in the Bellshill area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

This diagram includes domestic properties which are within the heat network zones discussed in 7.6.7 above. However, as discussed in that section there is lower confidence that a heat network is viable in this area than in Bellshill Coatbridge and Cumbernauld.

Figure 54: Decarbonisation pathway for domestic properties in the Bellshill



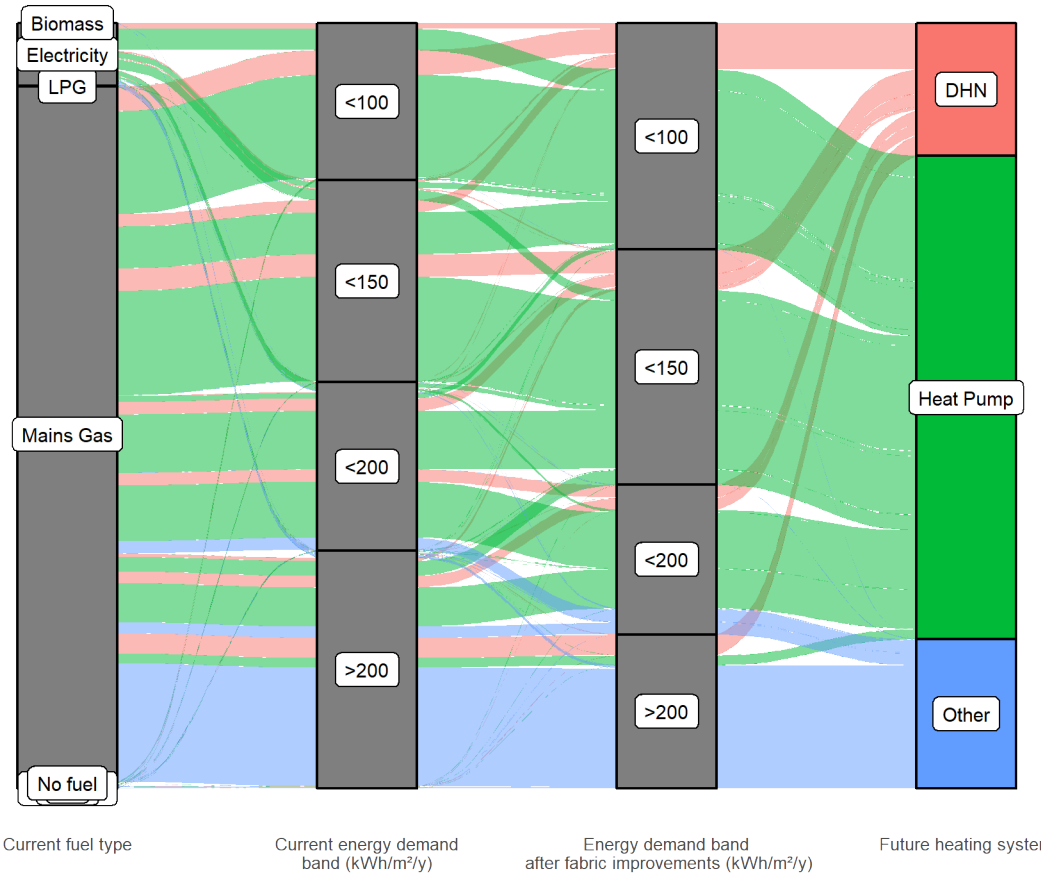
10.4 Coatbridge

Figure 55 shows all domestic properties within Coatbridge and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

The majority of properties in the Coatbridge area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

The heat network area in Coatbridge includes a higher proportion of domestic properties than other Strategic zones. This pathway assumes that all the properties in the area connect, in reality there may be some for which more detailed investigation shows that individual low carbon heat sources are more viable. The purpose of its inclusion in this pathway is to illustrate the potential importance of heat networks to decarbonising heat in Coatbridge.

Figure 55: Decarbonisation pathway for domestic properties in Coatbridge



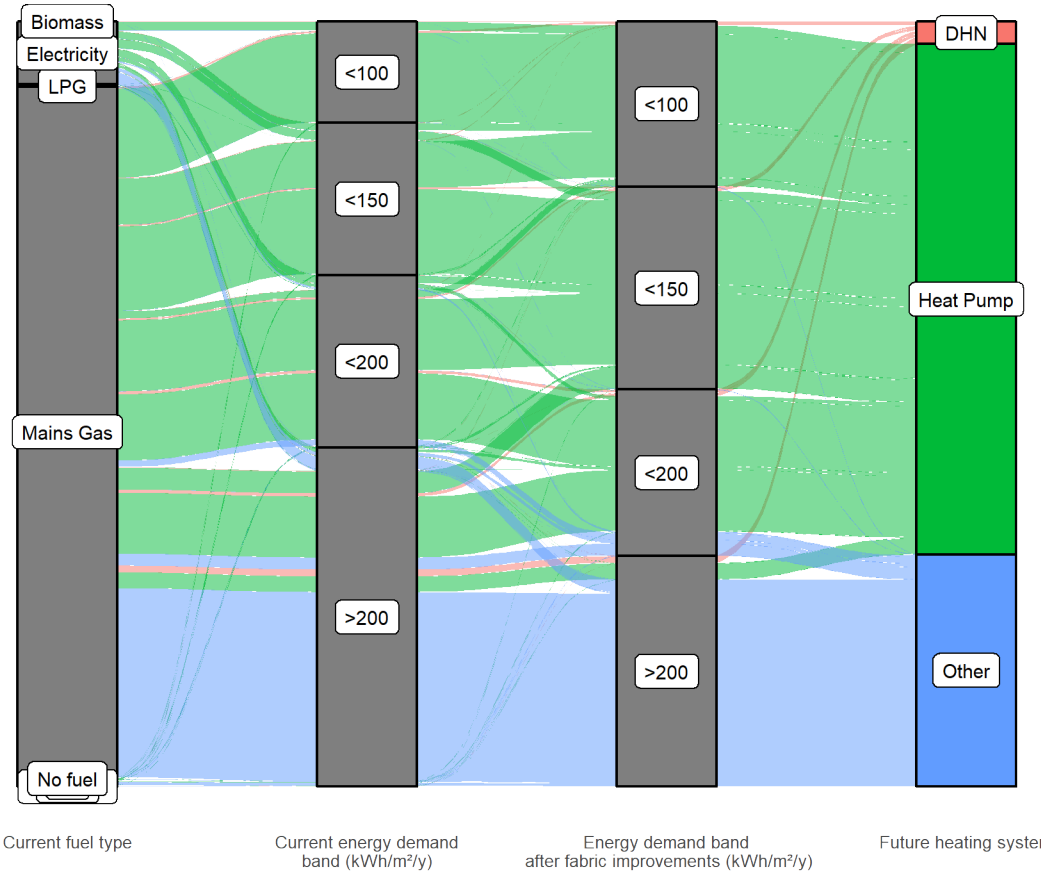
10.5 Cumbernauld and Kilsyth

Figure 56 shows all domestic properties within Cumbernauld and Kilsyth and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

Most properties in the Cumbernauld and Kilsyth area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

A Heat network area in Cumbernauld was identified and while there are fewer domestic properties than in Coatbridge, the redevelopment of the area may allow more of the new properties to be connected in the town centre regeneration area which are not included in this analysis.

Figure 56: Decarbonisation pathway for domestic properties in Cumbernauld and Kilsyth



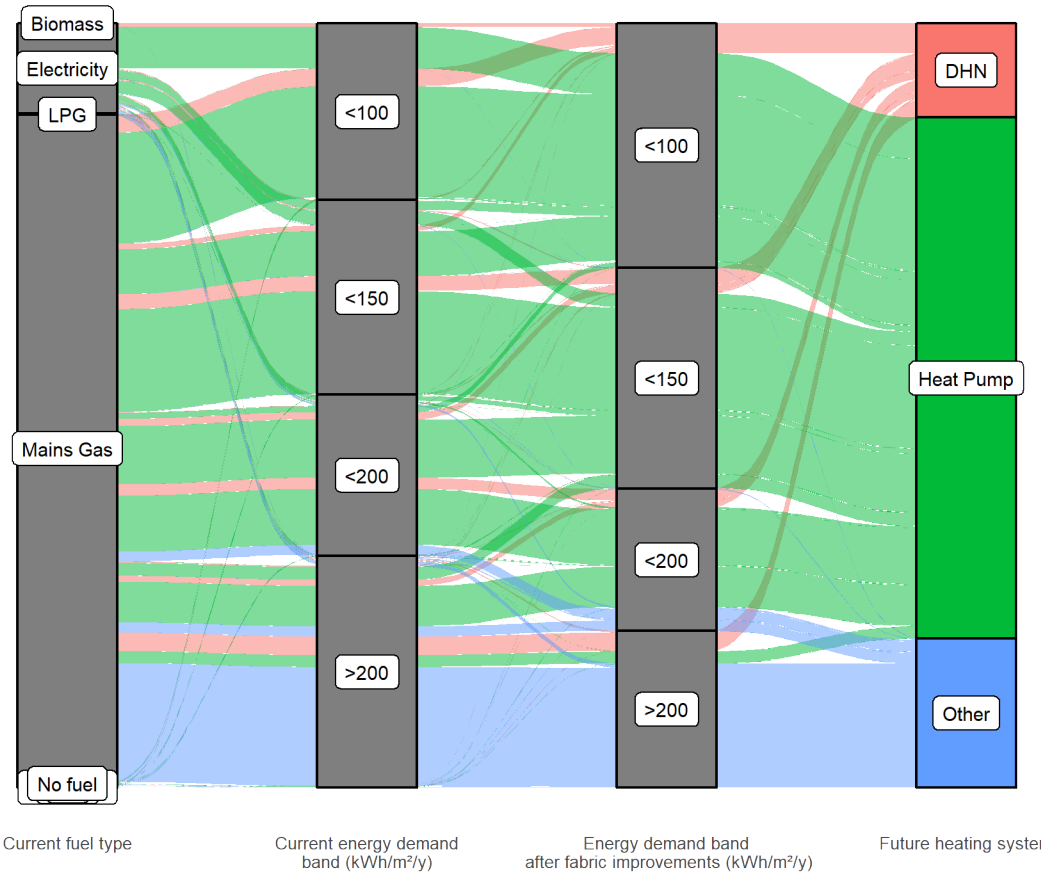
10.6 Motherwell

Figure 57 shows all domestic properties within Motherwell and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

The majority of properties in the Motherwell area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

The heat network opportunity area in Motherwell covers a significant area, however there is a smaller proportion of domestic properties within Motherwell than in Coatbridge. This is due to the distance between the buildings which form anchor loads, such as schools or other public buildings, and the surrounding houses. A combination of new developments within and adjacent to the heat network area as well as the connection of either the high flats or any future housing developed on these sites would significantly increase the number of domestic properties supplied. Once developed, a heat network could also be expanded to supply low carbon heat to the hard-to-treat properties around the centre of Motherwell.

Figure 57: Decarbonisation pathway for domestic properties in Motherwell

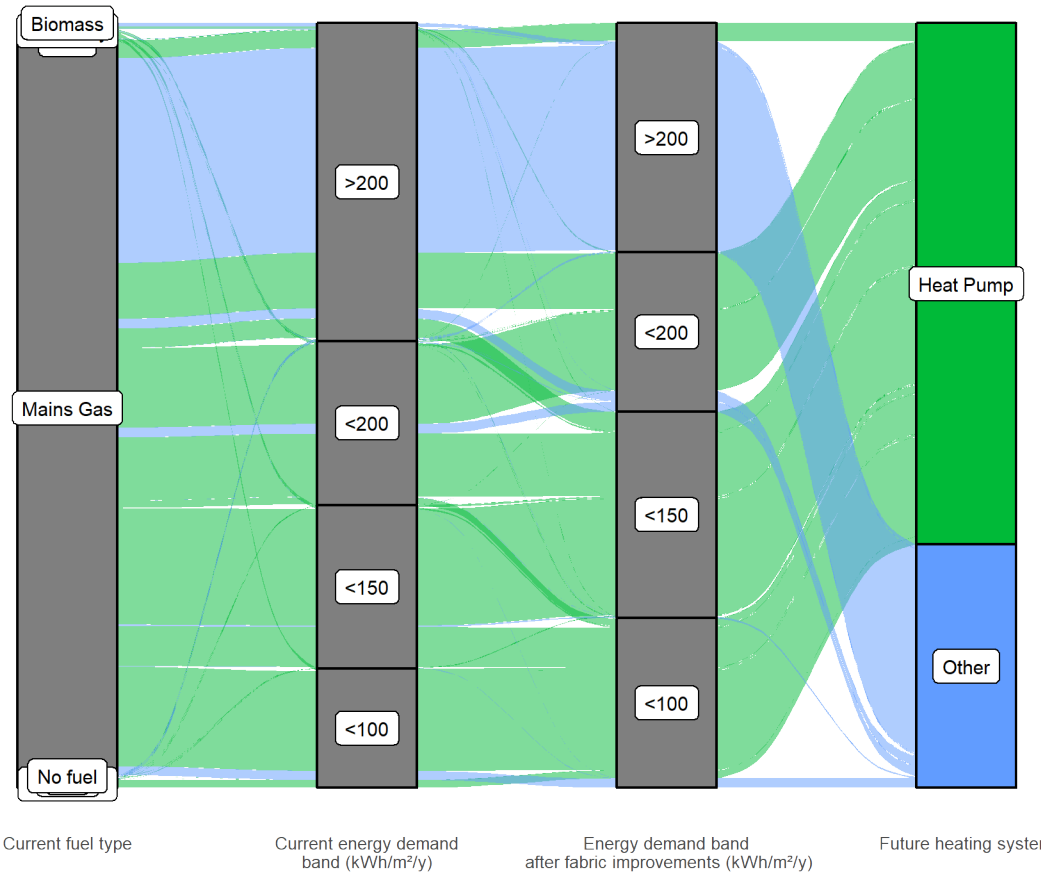


10.7 Northern Corridor

Figure 58 shows all domestic properties within Northern Corridor and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

The majority of properties in the Northern Corridor area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

Figure 58: Decarbonisation pathway for domestic properties in the Northern Corridor

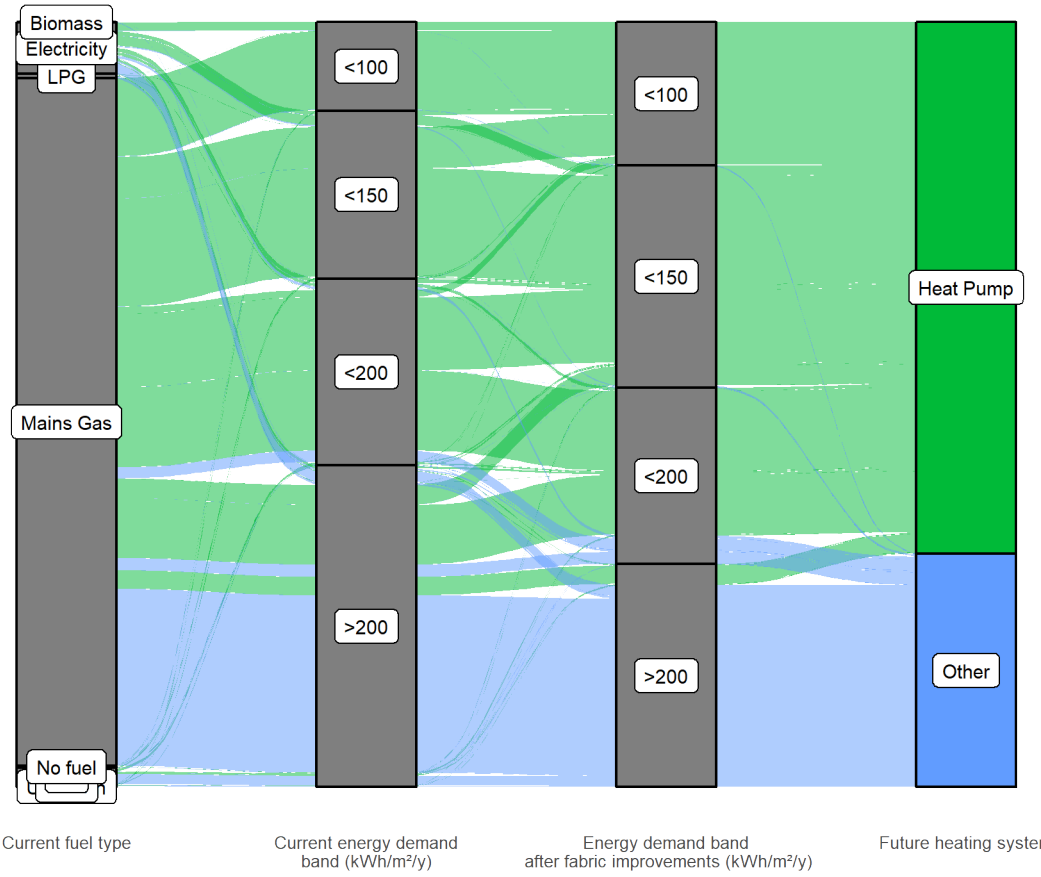


10.8 Wishaw

Figure 59 shows all domestic properties within Wishaw and, from the left, the heating fuel each uses today, the energy demand of the property per unit of floor area, the energy demand after the application of reasonable energy efficiency measures and finally the most suitable heating technology for each property at present.

The majority of properties in the Wishaw area are suitable for heat pumps but the impact of energy efficiency measures is modest, reflecting the EPC rating spread (Figure 13).

Figure 59: Decarbonisation pathway for domestic properties in Wishaw



10.9 Non-domestic Properties

The non-domestic stock was characterised in 6.1.2 and the following conclusions could be drawn:

- The majority of properties are heated by either electricity or gas (Figure 8) – and electricity will eventually decarbonise itself;
- The majority of the smallest properties are heated electrically (Figure 9) – and the remainder will likely suit small air-to-air-heat pump systems; and
- The majority of properties are either in the oldest or youngest age categories (Figure 10).

Strategically, then, the focus is on gas-heated properties greater than 100m^2. Common building types in this category include Retail and Finance, Restaurants and Cafes, Offices and Workshops, and Non-residential Institutions (Figure 60). By estimated heat demand, over two thirds of demand is attributed to General Industrial, Storage or Distribution, and Offices and Workshops (Figure 61) so these should be the target of decarbonisation efforts.

These buildings tend to be urban and may find themselves in or adjacent to areas identified as potential heat network zone (Figure 62).

The conclusions are caveated by the known discrepancies in the base data's estimate of heat demand.

Figure 60: Larger, gas-heated non-domestic properties by use type

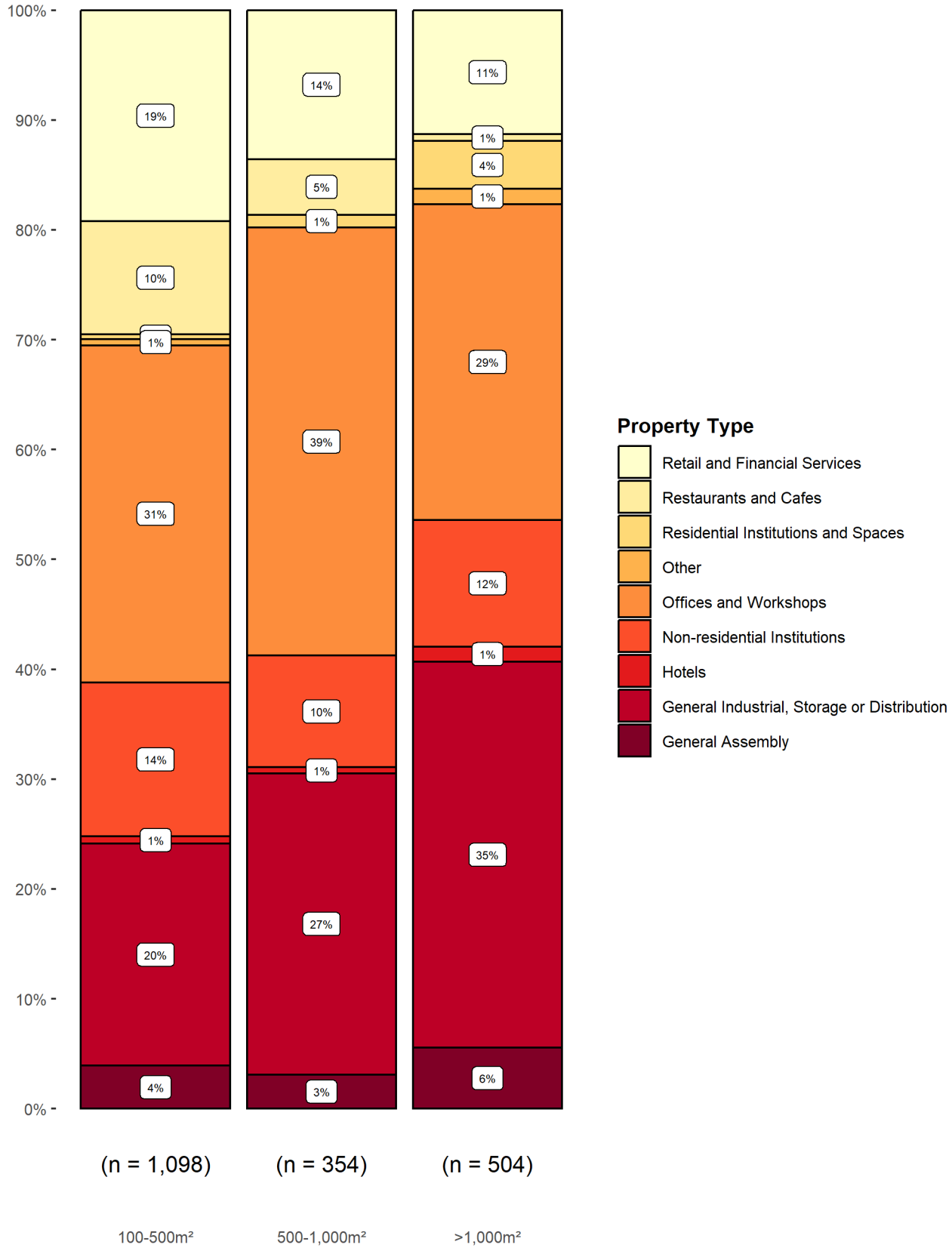


Figure 61: Space heating demand in larger, non-domestic, gas-heated buildings by type

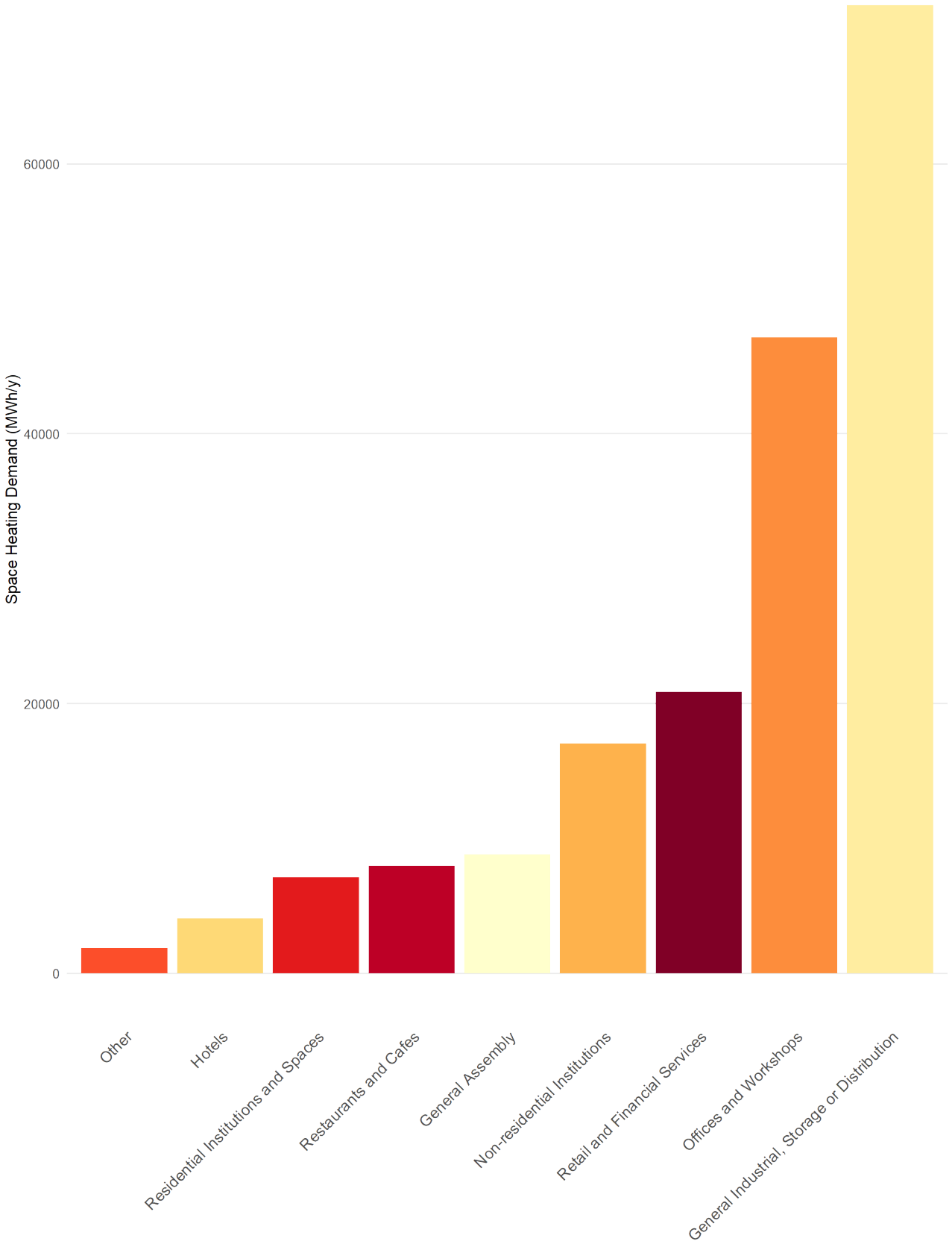
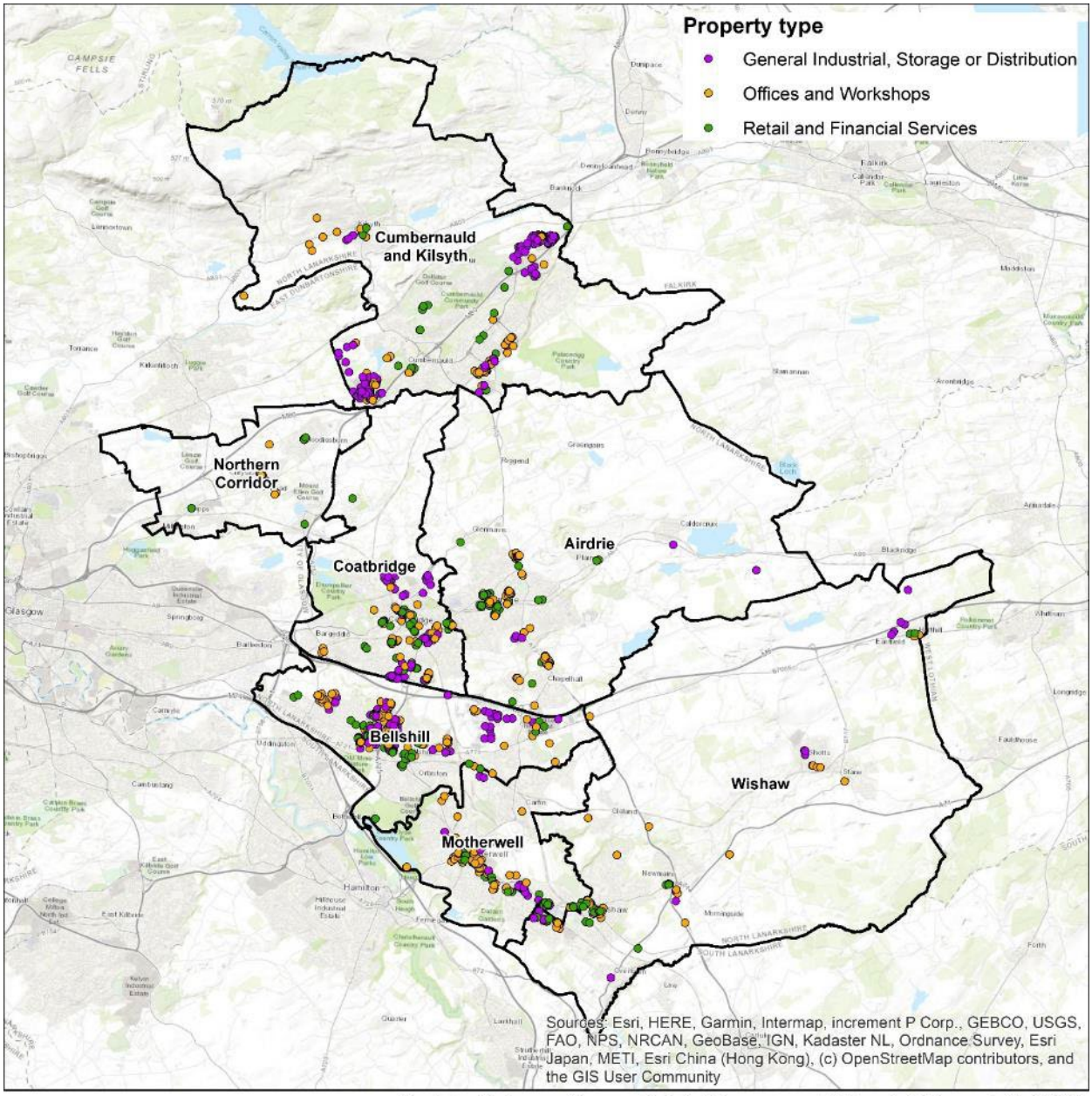


Figure 62: Map with top non-domestic, gas-heated energy consuming types



11. Conclusions

The strategy finds that there are technologies available now which would enable most of our buildings to be low carbon and use less heat. Those technologies can contribute to a reduction in fuel poverty, which can sit alongside the other actions that North Lanarkshire are taking to reduce the rate and impact of poverty overall.

However, we are in a period of financial challenges and the transition cannot be fully funded by the Council. The funds that the Council has available will be prioritised to maximise the reduction of fuel poverty, using the information set out in this Strategy.

It will be for individual homeowners, businesses, and landlords to decide what is best for them and their buildings. This strategy seeks to understand which options are likely to be available for most buildings and which buildings are going to be harder to treat. This allows the Council to track progress, advocate for funding, identify stakeholders and consult with them to find out how these barriers can be overcome.

The targets the Council has been set of decarbonising heat and reducing fuel poverty are very challenging. While significant unanswered questions remain, this strategy shows North Lanarkshire Council's knowledge and ability to act in collaboration with the UK Government, Scottish Government and the people of North Lanarkshire to solve these challenges and to continue making progress.

North Lanarkshire Council will coordinate, though the LHEES Working Group, where investments are being considered by the Council which could align with LHEES priorities or consider the findings of this strategy.

North Lanarkshire Council will take the following strategic approach to fulfilling the obligations of the LHEES:

1) Insulate buildings where practical.
2) Support development of district heating networks where they can provide reliable low carbon heat at a reasonable cost.
3) Encourage deployment of individual or communal heat pump systems which deliver reliable heat at a reasonable cost.
4) Decarbonise the Council's non-domestic buildings:
    a. In areas where district heating may be an option – consider being a customer or a supplier of heat.
    b. In areas where district heating unlikely – identify alternative decarbonisation pathways.
5) Work with businesses to develop their decarbonisation plans.
6) Support economic development and inward investment through identification of heat opportunity areas.

The measures included in this scenario are outlined in more detail in the Delivery Plan. It shows that while applying these energy efficiency measures significantly reduces heat demand, in this case shown as bands of total heat demand (kWh/year), there are properties which continue to have moderate heat demands. These properties could either be treated with energy efficiency measures which cost more to install or a number of other interventions, but more detailed investigation is required to understand these specific homes and their needs.

The limiting factor on whether a heat network is a suitable heating technology is a geospatial one (i.e., the buildings need to be within the heat network boundaries identified). There may be some properties where there are physical restrictions preventing district heating and similarly more detailed feasibility could envelop additional properties within the heat network boundaries. Many of these properties would be suitable for other low carbon heating if district heating proves not to be viable or if heating systems need replaced prior to a district heating scheme being developed.

As set out in Section 7.7.3, heat pumps are considered the most favourable low carbon heating technology for buildings which are not in district heating areas (i.e., most buildings within the NLC area). The criterion on which a property is considered suitable is also set out in that section.

Even with energy efficiency measures, approximately 9% of properties are not likely to be suitable for either district heating or heat pumps. While there may be specific solutions for these properties, the data available does not allow detailed identification within the scope of this report and factors such as tenure, property heat demand and location will affect the optimal solution for each household and property owner.

Options could include:

- Higher temperature heat pump systems (systems supplying at > c. 60 °C – typically suited to larger demands, but still operating at COPs above 2.5);
- Low temperature heat pump systems with active radiators (low temperature fan coil units – these are higher cost units);
- Direct electric heating;
- Biomass, in specific circumstances; and
- Communal heating systems – using one of the technologies above.

The heat network analysis is focused on large centralised systems, but smaller heat networks of a cluster of buildings or communal systems could still be considered for campus sites or where a single organisation owns multiple buildings.

Appendices

Appendix A Analysis of Core Indicators by Intermediate Zone

In this section, data is broken down by Intermediate Zone and analysed, which allows targets to be more easily identified within the constraints of data accuracy discussed earlier.

Domestic Energy Efficiency

The Home Analytics tool calculates a weighted energy efficiency score, which takes the frequency of 3 metrics, (low loft insulation thickness, a lack of wall insulation and a lack of double- / triple-glazing) across the building stock in a zone and weights them (by default, each is equally weighted) and then sums the 3 values to get a total energy efficiency score. A high score equates to poor energy efficiency in aggregate across the zone.

Table 20 ranks the top 12 intermediate zones on overall weighted score for energy efficiency. The maximum possible score (i.e., if every home in the zone had no loft or wall insulation and single glazing) is 100 so these scores are not high. It is also notable that the spread across the zones is not wide (Figure 63) suggesting that there are no grounds to prioritise interventions in one geographic area over another.

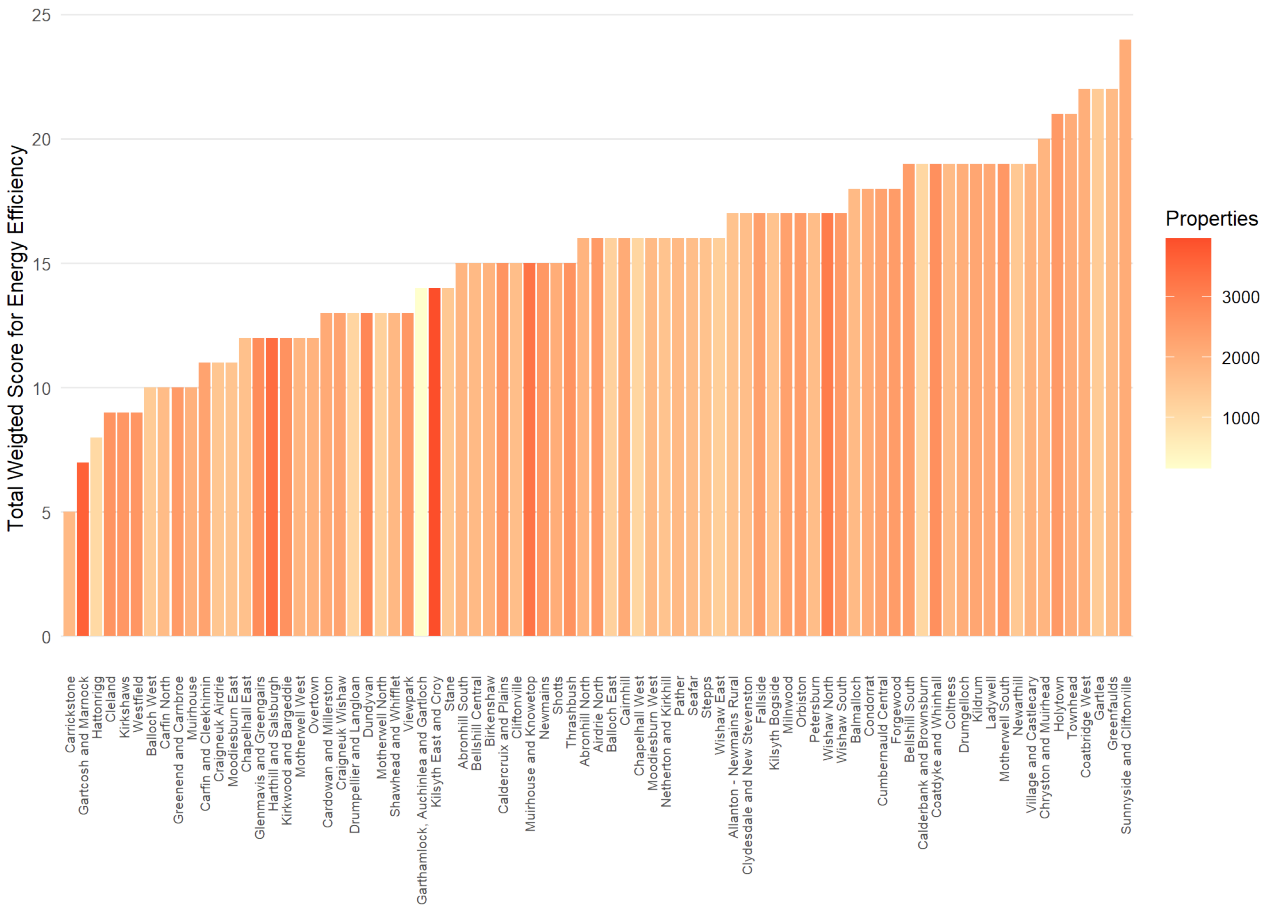
Wall insulation appears to be the most obvious target for improvement with the number of houses requiring an intervention ranging from 36% to 61% in these 12 zones (contrast with 4% to 14% for loft insulation). This would appear to be more of an issue in the private housing stock since most of NLC's stock have wall insulation (6.1.1).

Table 20: Domestic energy efficiency – ranking by highest weighted score

	Zones with highest total weighted score	Total weighted score	Number of potential interventions identified	Number of properties in zone
1	Sunnyside and Cliftonville	24	1,534	2,087
2	Greenfaulds	22	1,163	1,729
3	Gartlea	22	905	1,337
4	Coatbridge West	22	1,306	2,009
5	Townhead	21	1,337	2,078
6	Holytown	21	1,591	2,504
7	Chryston and Muirhead	20	1,137	1,870
8	Coatdyke and Whinhall	19	1,572	2,689
9	Ladywell	19	1,249	2,167
10	Newarthill	19	832	1,447
11	Motherwell South	19	1,451	2.520
12	Kildrum	19	1,264	2,203

There are a total of 79 zones. A further 5 zones have a score of 19.

Figure 63: Weighted Energy Efficiency Scores



Domestic Fuel Poverty

The Home Analytics tool calculates a weighted energy efficiency score, which takes the frequency of 5 metrics, (low loft insulation thickness, a lack of wall insulation, a lack of double- / triple-glazing, number of households in fuel poverty and the number of households in extreme poverty) across the building stock in a zone and weights them (by default, the construction parameters are weighted 16.7%, with fuel poverty at 50% and extreme poverty removed by a weighting of zero) and then sums the 5 values to get a total fuel poverty score. A high score equates to extensive fuel poverty as a result of poor energy efficiency across the zone.

This measure is intended to highlight homes where a lack of energy efficiency is a driver of fuel poverty and is not an outright measure of fuel poverty.

The ranking of the top 12 zones where energy efficiency is a driver for fuel poverty is shown in Table 21. The default weightings are used and, if specific interventions to tackle fuel poverty are to be prioritised during later stages of LHEES, then it may be appropriate to re-calculate these weighted scores based on the type of intervention planned. As expected, given the energy efficiency metrics used, there is, like the energy efficiency data, a narrow spread of scores across all the zones (Figure 64).

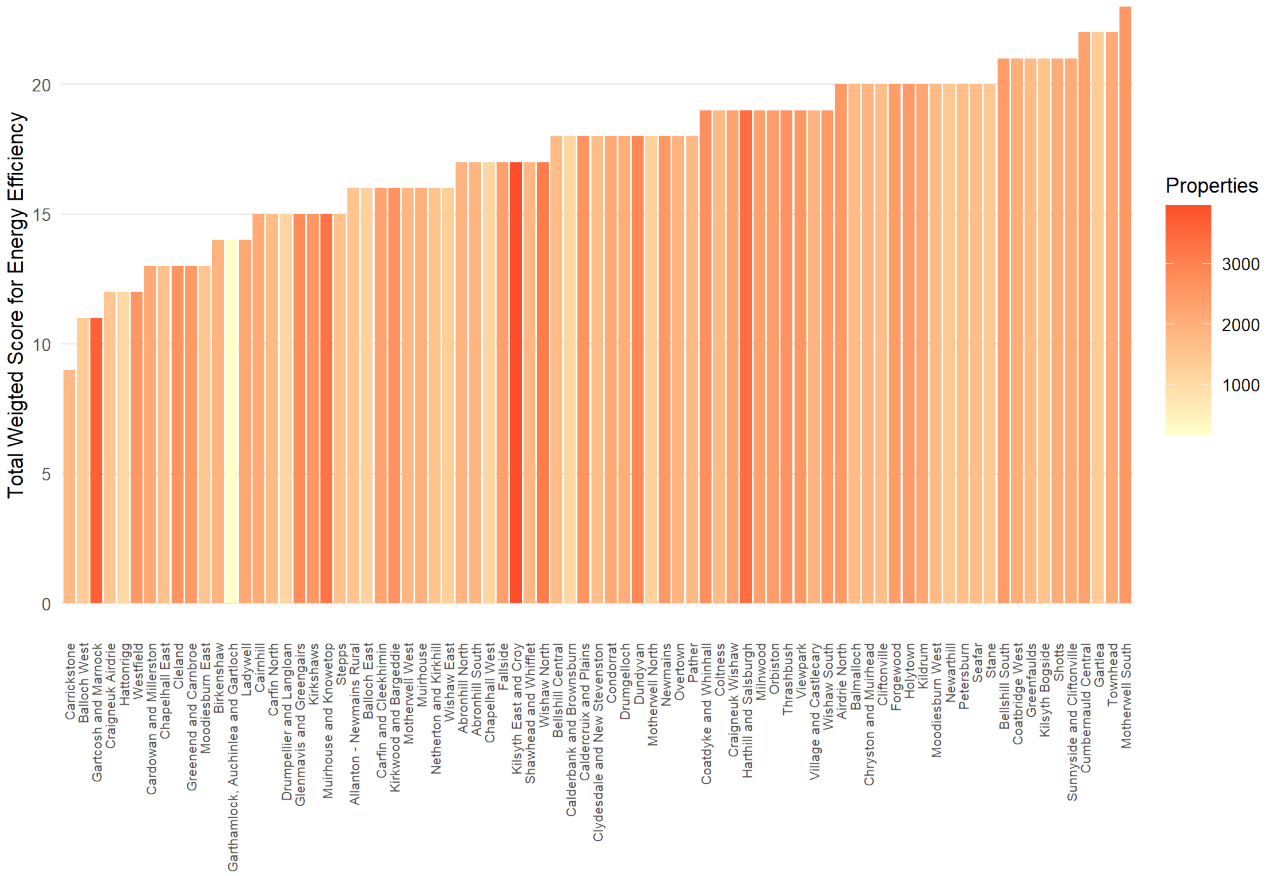
Table 21: Domestic fuel poverty resulting from poor energy efficiency – highest ranked zones (default weightings)

	Zones with highest total weighted score	Total weighted score	Number of properties in zone
1	Motherwell South	23	2,520
2	Cumbernauld Central	22	2,313
3	Townhead	22	2,078
4	Gartlea	22	1,377

	Zones with highest total weighted score	Total weighted score	Number of properties in zone
5	Sunnyside and Cliftonville	21	2,087
6	Greenfaulds	21	1,729
7	Bellshill South	21	2,414
8	Coatbridge West	21	2,009
9	Kilsyth Bogside	21	1,563
10	Shotts	21	2,061
11	Balmalloch	20	1,754
12	Kildrum	20	2,203

There are a total of 79 zones. A further 10 zones have a score of 20.

Figure 64: Weighted scores for fuel poverty resulting from poor energy efficiency



Domestic Buildings and the Gas Grid

Being on or off the existing gas grid are considerations within the LHEES process because this influences the likely future supply and decarbonisation of heat. On-grid buildings are likely to be currently using a fuel which is not getting less carbon intensive but are likely to have wet heating systems, suitable for heat network connections or heat pumps. Off-grid buildings are likely to be using a fuel which is getting closer to carbon neutral but not likely to have a wet system suitable for an electricity-saving upgrade to heat pumps. Of the off-grid properties, more use direct electrical heating than boilers. While these properties do not have water-based heating systems, they are more likely to both reduce their energy consumption and running cost by switching to a heat pump than properties using lower cost energy sources. As such heat pumps in these properties could contribute to fuel poverty reduction but not necessarily towards net zero targets.

Table 22 details the heating systems associated with domestic properties on and off the gas grid. Almost all the on-grid homes have boilers and, physical situation aside, are likely to be able to be connected to heat networks or heat pumps. However, given the energy efficiency status of the housing stock (Figure 6 and Table 20) and the age (Figure 6) it is likely that interventions to reduce heat losses and adjust heating systems to operate at lower temperatures will be required to allow heat pump installations in places where there are unlikely to be heat networks.

The highest density of off-grid homes is in the centre of Motherwell, this could be explained by the tower blocks in this area. More detailed examination is appropriate to confirm if this is the case, since a town centre may be attractive as a heat-network zone, these properties may not currently be ready for a heat connection.

Table 22: Domestic heating systems on and off the gas grid

Heating System	On grid		Off grid	
	Count	Percentage	Count	Percentage
Communal	558	>1%	99	1%
Heat pump	513	>1%	621	5%
Boiler	144,569	97%	3,280	28%
Room heater	1,193	>1%	2,300	20%
Storage heater	1,661	1.1%	4,884	42%
Other or none	792	>1%	391	3%

Communal heating systems refer to a heating system which provides heat to multiple properties within the same building.

Appendix B Analysis of Core Indicators by Data Zone

Energy Efficiency

Table 23: Energy Efficiency Weighted Scores and Interventions by Data Zones

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Sunnyside and Cliftonville - 04	25%	12%	85%	40.4
Forgewood - 03	11%	41%	68%	39.9
Coatbridge West - 03	26%	5%	78%	36.2
Townhead - 05	17%	10%	67%	31.6
Motherwell South - 02	9%	41%	44%	31.2
Orbiston - 04	9%	5%	72%	28.8
Allanton - Newmains Rural - 03	16%	5%	65%	28.7
Bellshill South - 05	25%	15%	46%	28.7
Coltness - 01	16%	18%	52%	28.6
Village and Castlecary - 02	18%	6%	62%	28.5
Cumbernauld Central - 06	1%	11%	73%	28.2
Wishaw North - 06	17%	14%	54%	28.0
Fallside - 05	18%	4%	62%	27.9
Townhead - 04	4%	20%	59%	27.2
Abronhill North - 06	6%	5%	71%	27.0
Ladywell - 05	18%	4%	60%	27.0
Greenfaulds - 03	5%	1%	75%	26.9
Gartlea - 02	12%	2%	66%	26.2
Coatdyke and Whinhall - 03	15%	5%	59%	26.1
Shotts - 05	11%	5%	63%	26.0
Fallside - 07	19%	2%	57%	26.0
Condorrat - 03	7%	2%	69%	25.9
Chryston and Muirhead - 03	18%	9%	50%	25.8
Sunnyside and Cliftonville - 03	16%	1%	61%	25.8
Drumgelloch - 03	17%	1%	59%	25.7
Kilsyth Bogside - 02	6%	2%	69%	25.4
Kildrum - 04	11%	5%	60%	25.4
Birkenshaw - 04	26%	1%	50%	25.3
Greenfaulds - 04	2%	2%	72%	25.0
Coatdyke and Whinhall - 07	12%	5%	58%	24.9
Caldercruix and Plains - 04	11%	0%	64%	24.9
Coatdyke and Whinhall - 05	9%	2%	64%	24.7
Cardowan and Millerston - 05	15%	12%	47%	24.6
Pather - 03	11%	8%	55%	24.5
Calderbank and Brownsburn - 03	9%	4%	60%	24.4
Holytown - 01	11%	3%	60%	24.3
Seafar - 04	25%	2%	46%	24.3
Wishaw East - 04	15%	2%	56%	24.2

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Forgewood - 01	5%	7%	61%	24.2
Holytown - 03	10%	6%	56%	24.2
Westfield - 02	6%	2%	65%	24.0
Dundyvan - 03	9%	2%	61%	24.0
Coatbridge West - 04	16%	1%	55%	23.9
Balloch East - 01	2%	1%	70%	23.9
Cairnhill - 05	12%	2%	58%	23.9
Coatdyke and Whinhall - 04	10%	2%	60%	23.8
Cleland - 02	14%	2%	55%	23.8
Petersburn - 01	16%	0%	55%	23.8
Thrashbush - 04	12%	0%	59%	23.8
Sunnyside and Cliftonville - 06	10%	8%	53%	23.7
Cairnhill - 04	12%	8%	51%	23.7
Gartlea - 05	7%	5%	58%	23.3
Sunnyside and Cliftonville - 01	3%	2%	65%	23.2
Wishaw South - 03	10%	6%	54%	23.2
Milnwood - 05	9%	11%	50%	23.0
Newarthill - 02	12%	5%	53%	23.0
Drumgelloch - 01	17%	5%	47%	22.9
Motherwell North - 03	30%	4%	34%	22.8
Kildrum - 03	21%	4%	44%	22.8
Muirhouse - 02	3%	5%	61%	22.7
Newarthill - 01	10%	8%	51%	22.7
Chapelhall West - 02	11%	4%	54%	22.6
Carfin and Cleekhimin - 07	14%	7%	46%	22.6
Overtown - 03	12%	3%	53%	22.5
Wishaw South - 04	14%	3%	50%	22.5
Muirhouse and Knowetop - 08	10%	7%	50%	22.3
Newmains - 01	12%	5%	50%	22.2
Cliftonville - 03	10%	3%	54%	22.2
Village and Castlecary - 01	4%	5%	58%	22.1
Netherton and Kirkhill - 05	5%	19%	43%	22.0
Drumgelloch - 02	7%	1%	58%	21.9
Drumpellier and Langloan - 03	10%	5%	51%	21.9
Holytown - 06	12%	7%	47%	21.8
Chapelhall East - 04	8%	4%	54%	21.7
Gartlea - 03	8%	3%	55%	21.7
Wishaw North - 05	11%	5%	49%	21.7
Cumbernauld Central - 05	2%	5%	59%	21.7
Balmalloch - 01	10%	2%	54%	21.6
Stepps - 01	19%	1%	44%	21.6
Greenfaulds - 05	4%	4%	58%	21.6
Abronhill North - 03	4%	5%	56%	21.4

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Kilsyth East and Croy - 06	14%	2%	49%	21.4
Chapelhall East - 02	6%	2%	57%	21.4
Birkenshaw - 05	16%	4%	44%	21.4
Holytown - 02	17%	3%	45%	21.4
Newmains - 09	17%	9%	38%	21.2
Shotts - 01	13%	2%	49%	21.2
Glenmavis and Greengairs - 02	8%	1%	54%	21.0
Calderbank and Brownsburn - 04	8%	1%	54%	21.0
Petersburn - 04	5%	1%	57%	21.0
Milnwood - 04	9%	14%	40%	20.9
Chryston and Muirhead - 05	12%	12%	38%	20.8
Balloch East - 02	1%	5%	57%	20.8
Craigneuk Airdrie - 05	8%	0%	54%	20.7
Muirhouse and Knowetop - 06	11%	3%	48%	20.7
Muirhouse and Knowetop - 09	16%	6%	41%	20.7
Clydesdale and New Stevenston - 04	6%	3%	54%	20.6
Wishaw South - 01	11%	9%	42%	20.6
Glenmavis and Greengairs - 04	9%	2%	51%	20.5
Birkenshaw - 07	21%	2%	38%	20.5
Balmalloch - 04	14%	3%	44%	20.4
Bellshill South - 02	13%	29%	20%	20.4
Milnwood - 03	9%	8%	45%	20.4
Petersburn - 03	9%	1%	52%	20.2
Cumbernauld Central - 04	0%	11%	50%	20.2
Holytown - 05	6%	11%	44%	20.2
Pather - 02	11%	5%	44%	20.0
Condorrat - 01	7%	2%	52%	20.0
Shawhead and Whifflet - 02	7%	1%	53%	20.0
Abronhill South - 02	8%	1%	51%	20.0
Holytown - 07	6%	12%	42%	20.0
Holytown - 04	5%	12%	44%	19.9
Moodiesburn West - 04	9%	7%	43%	19.8
Sunnyside and Cliftonville - 05	11%	3%	45%	19.6
Viewpark - 01	13%	8%	38%	19.5
Airdrie North - 03	11%	5%	43%	19.5
Townhead - 03	8%	2%	49%	19.5
Orbiston - 01	3%	0%	55%	19.5
Motherwell South - 01	10%	4%	45%	19.5
Kirkwood and Bargeddie - 02	11%	0%	47%	19.5
Abronhill South - 01	3%	1%	54%	19.5
Coltness - 04	13%	14%	32%	19.5
Bellshill South - 03	11%	6%	42%	19.4
Thrashbush - 05	15%	3%	40%	19.4

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Cairnhill - 01	1%	4%	55%	19.4
Balmalloch - 03	8%	1%	49%	19.3
Viewpark - 05	21%	19%	17%	19.3
Greenfaulds - 02	2%	1%	55%	19.2
Stepps - 02	11%	6%	41%	19.2
Balmalloch - 06	13%	3%	42%	19.2
Kilsyth East and Croy - 02	4%	1%	52%	19.0
Petersburn - 02	9%	1%	47%	19.0
Gartlea - 01	3%	1%	52%	18.9
Kilsyth East and Croy - 05	5%	1%	52%	18.9
Wishaw South - 05	6%	6%	46%	18.9
Greenfaulds - 01	6%	3%	47%	18.8
Cumbernauld Central - 03	1%	9%	47%	18.8
Ladywell - 02	8%	1%	47%	18.6
Craigneuk Wishaw - 04	5%	14%	37%	18.6
Bellshill South - 01	24%	18%	14%	18.5
Ladywell - 03	11%	5%	40%	18.5
Thrashbush - 06	6%	2%	48%	18.5
Motherwell South - 05	8%	5%	42%	18.4
Chryston and Muirhead - 02	11%	9%	35%	18.3
Airdrie North - 06	4%	1%	50%	18.3
Coltness - 05	21%	2%	32%	18.3
Muirhouse and Knowetop - 05	8%	4%	43%	18.3
Thrashbush - 02	5%	3%	47%	18.3
Townhead - 01	11%	2%	42%	18.3
Forgewood - 02	6%	8%	41%	18.2
Kildrum - 02	19%	1%	34%	18.2
Moodiesburn West - 05	12%	3%	40%	18.2
Airdrie North - 05	10%	1%	43%	18.1
Coatbridge West - 02	4%	3%	47%	18.1
Gartlea - 04	4%	7%	43%	18.1
Clydesdale and New Stevenston - 02	9%	19%	26%	18.0
Kirkwood and Bargeddie - 04	6%	4%	44%	18.0
Kildrum - 01	10%	4%	41%	18.0
Townhead - 06	3%	7%	45%	18.0
Coltness - 03	9%	14%	31%	18.0
Seafar - 05	4%	2%	48%	18.0
Gartcosh and Marnock - 05	16%	3%	35%	18.0
Motherwell North - 01	15%	5%	34%	18.0
Abronhill North - 02	19%	1%	34%	17.9
Drumgelloch - 05	9%	1%	44%	17.9
Wishaw North - 08	16%	9%	29%	17.8
Carfin North - 02	10%	9%	34%	17.7

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Cliftonville - 02	4%	6%	43%	17.7
Chryston and Muirhead - 01	8%	4%	41%	17.5
Caldercruix and Plains - 06	3%	0%	49%	17.5
Netherton and Kirkhill - 04	11%	6%	36%	17.5
Sunnyside and Cliftonville - 02	5%	2%	46%	17.5
Caldercruix and Plains - 08	13%	5%	34%	17.4
Village and Castlecary - 03	6%	1%	45%	17.4
Allanton - Newmains Rural - 04	20%	2%	30%	17.3
Dundyvan - 02	4%	4%	44%	17.3
Bellshill Central - 01	8%	10%	33%	17.2
Wishaw East - 03	9%	3%	40%	17.1
Holytown - 08	14%	6%	32%	17.1
Condorrat - 06	5%	1%	45%	17.0
Kilsyth East and Croy - 07	6%	6%	39%	17.0
Moodiesburn East - 04	8%	1%	42%	17.0
Bellshill South - 06	2%	2%	47%	16.9
Bellshill Central - 03	10%	13%	28%	16.9
Chapelhall West - 01	11%	0%	39%	16.9
Airdrie North - 04	10%	2%	39%	16.8
Craigneuk Wishaw - 02	2%	1%	48%	16.8
Muirhouse and Knowetop - 03	7%	11%	34%	16.8
Newarthill - 03	11%	10%	30%	16.8
Cardowan and Millerston - 04	17%	1%	32%	16.7
Bellshill Central - 02	7%	22%	20%	16.5
Caldercruix and Plains - 02	11%	1%	37%	16.5
Townhead - 07	8%	1%	40%	16.5
Kirkwood and Bargeddie - 03	6%	1%	42%	16.4
Pather - 04	12%	11%	26%	16.4
Newmains - 04	9%	14%	26%	16.4
Drumgelloch - 04	12%	1%	36%	16.3
Pather - 05	6%	7%	36%	16.3
Newmains - 08	11%	13%	26%	16.3
Thrashbush - 03	5%	2%	43%	16.3
Stane - 01	13%	1%	35%	16.3
Kilsyth Bogside - 03	9%	1%	39%	16.3
Fallside - 06	3%	2%	45%	16.3
Stane - 02	7%	8%	34%	16.2
Motherwell West - 04	11%	7%	31%	16.1
Motherwell West - 03	5%	0%	43%	16.1
Stane - 03	13%	2%	34%	16.1
Cleland - 03	10%	3%	35%	16.0
Seafar - 02	8%	4%	36%	16.0
Orbiston - 05	4%	3%	42%	16.0

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Wishaw North - 03	7%	7%	35%	16.0
Kilsyth Bogside - 01	6%	1%	41%	16.0
Fallside - 02	9%	2%	37%	15.9
Moodiesburn West - 01	9%	11%	28%	15.9
Overtown - 01	6%	1%	42%	15.9
Netherton and Kirkhill - 01	14%	4%	30%	15.9
Balmalloch - 02	9%	2%	37%	15.9
Townhead - 02	8%	5%	35%	15.8
Balloch West - 04	1%	1%	47%	15.8
Carfin North - 01	5%	7%	35%	15.7
Ladywell - 04	13%	2%	32%	15.7
Condorrat - 02	5%	5%	38%	15.7
Caldercruix and Plains - 01	10%	3%	34%	15.7
Milnwood - 02	5%	7%	35%	15.6
Wishaw North - 02	10%	2%	35%	15.6
Allanton - Newmains Rural - 02	6%	5%	35%	15.5
Calderbank and Brownsburn - 01	2%	1%	44%	15.4
Milnwood - 01	5%	3%	38%	15.3
Greenend and Carnbroe - 05	3%	1%	43%	15.3
Glenmavis and Greengairs - 05	8%	1%	38%	15.3
Cliftonville - 01	1%	3%	42%	15.2
Harthill and Salsburgh - 04	11%	5%	30%	15.2
Wishaw North - 01	7%	5%	34%	15.2
Shotts - 04	8%	9%	29%	15.2
Orbiston - 07	12%	6%	27%	15.0
Fallside - 04	4%	2%	39%	14.9
Greenend and Carnbroe - 02	2%	0%	43%	14.9
Orbiston - 06	10%	8%	26%	14.9
Chryston and Muirhead - 04	11%	3%	31%	14.8
Coatbridge West - 05	13%	0%	31%	14.7
Cairnhill - 06	8%	0%	35%	14.7
Milnwood - 06	11%	7%	25%	14.7
Harthill and Salsburgh - 01	20%	2%	22%	14.6
Cleland - 01	14%	8%	21%	14.6
Dundyvan - 01	11%	0%	32%	14.5
Caldercruix and Plains - 07	5%	2%	36%	14.5
Abronhill North - 05	9%	0%	35%	14.4
Newmains - 02	5%	5%	33%	14.4
Newmains - 03	7%	12%	25%	14.3
Greenend and Carnbroe - 06	14%	1%	28%	14.3
Coatdyke and Whinhall - 02	2%	0%	41%	14.3
Birkenshaw - 06	9%	7%	26%	14.2
Westfield - 04	10%	2%	31%	14.2

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Harthill and Salsburgh - 03	7%	1%	35%	14.2
Shawhead and Whifflet - 04	13%	1%	29%	14.2
Balmalloch - 05	8%	2%	32%	14.1
Wishaw East - 01	3%	4%	35%	14.1
Cardowan and Millerston - 03	12%	7%	23%	14.1
Village and Castlecary - 05	8%	0%	34%	14.0
Condorrat - 05	3%	1%	38%	14.0
Cairnhill - 02	6%	1%	35%	13.9
Garthamlock, Auchinlea and Gartloch - 05	0%	0%	42%	13.8
Moodiesburn East - 02	9%	10%	22%	13.7
Clydesdale and New Stevenston - 03	5%	5%	32%	13.6
Coatdyke and Whinhall - 06	7%	1%	33%	13.6
Carfin and Cleekhimin - 02	9%	6%	25%	13.6
Kilsyth Bogside - 04	5%	1%	35%	13.5
Balloch West - 03	3%	4%	34%	13.5
Orbiston - 03	12%	12%	17%	13.5
Kilsyth East and Croy - 08	7%	2%	31%	13.5
Kirkshaws - 05	5%	1%	35%	13.4
Harthill and Salsburgh - 02	5%	2%	33%	13.4
Balloch West - 05	0%	3%	37%	13.4
Dundyvan - 04	4%	1%	35%	13.3
Moodiesburn East - 05	27%	2%	10%	13.2
Ladywell - 01	5%	6%	29%	13.2
Moodiesburn West - 03	7%	12%	21%	13.2
Balloch East - 03	3%	4%	33%	13.1
Motherwell South - 03	7%	3%	29%	13.1
Newarthill - 04	11%	3%	26%	13.1
Viewpark - 04	12%	10%	17%	13.0
Cumbernauld Central - 02	14%	2%	23%	12.9
Calderbank and Brownsburn - 02	6%	2%	32%	12.9
Carrickstone - 02	1%	1%	38%	12.9
Harthill and Salsburgh - 07	9%	1%	29%	12.8
Moodiesburn West - 02	11%	12%	15%	12.8
Craigneuk Airdrie - 02	4%	0%	35%	12.8
Glenmavis and Greengairs - 03	19%	0%	18%	12.7
Gartcosh and Marnock - 02	5%	2%	31%	12.7
Cairnhill - 03	9%	2%	27%	12.6
Abronhill North - 04	4%	2%	32%	12.5
Motherwell West - 02	7%	8%	23%	12.5
Airdrie North - 02	9%	2%	26%	12.4
Fallside - 03	3%	2%	32%	12.4
Clydesdale and New Stevenston - 01	4%	23%	11%	12.4
Harthill and Salsburgh - 05	7%	2%	28%	12.4

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Village and Castlecary - 04	15%	3%	19%	12.4
Kirkshaws - 07	15%	1%	21%	12.3
Kirkwood and Bargeddie - 07	14%	1%	22%	12.2
Newmains - 07	9%	2%	26%	12.2
Craigneuk Wishaw - 01	4%	3%	30%	12.2
Abronhill South - 04	2%	1%	33%	12.1
Greenend and Carnbroe - 03	4%	3%	30%	12.0
Stepps - 03	8%	2%	26%	12.0
Wishaw East - 02	11%	7%	17%	12.0
Carfin and Cleekhimin - 03	6%	8%	22%	11.9
Balloch East - 04	3%	2%	31%	11.8
Motherwell West - 05	12%	5%	19%	11.8
Craigneuk Wishaw - 06	3%	6%	27%	11.8
Viewpark - 06	9%	12%	14%	11.7
Shotts - 02	4%	4%	27%	11.7
Seafar - 01	5%	3%	27%	11.7
Hattonrigg - 03	11%	2%	22%	11.6
Muirhouse - 05	3%	5%	28%	11.6
Kilsyth East and Croy - 03	6%	9%	20%	11.6
Allanton - Newmains Rural - 01	8%	2%	25%	11.5
Chapelhall West - 03	5%	2%	28%	11.5
Motherwell North - 02	12%	6%	16%	11.5
Overtown - 02	4%	1%	30%	11.5
Muirhouse and Knowetop - 07	2%	5%	28%	11.3
Wishaw North - 07	5%	18%	11%	11.3
Shawhead and Whifflet - 03	5%	0%	29%	11.2
Birkenshaw - 03	7%	10%	17%	11.2
Newmains - 06	11%	3%	20%	11.2
Drumgelloch - 06	5%	0%	28%	11.2
Westfield - 01	1%	2%	31%	11.1
Viewpark - 03	7%	13%	13%	11.0
Westfield - 03	5%	3%	25%	10.9
Bellshill Central - 04	4%	2%	28%	10.9
Seafar - 03	0%	2%	31%	10.9
Milnwood - 07	5%	4%	24%	10.8
Kirkshaws - 03	10%	0%	22%	10.8
Glenmavis and Greengairs - 06	5%	2%	25%	10.7
Kirkwood and Bargeddie - 09	9%	1%	21%	10.7
Condorrat - 04	2%	3%	27%	10.6
Cumbernauld Central - 01	6%	2%	24%	10.6
Viewpark - 07	8%	10%	13%	10.6
Chapelhall East - 05	6%	0%	26%	10.5
Dundyvan - 08	5%	1%	26%	10.5

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Gartcosh and Marnock - 01	10%	0%	22%	10.4
Kirkwood and Bargeddie - 06	9%	1%	21%	10.4
Craigneuk Airdrie - 04	7%	0%	24%	10.4
Viewpark - 02	6%	6%	19%	10.4
Coatbridge West - 01	5%	0%	26%	10.3
Thrashbush - 01	4%	1%	26%	10.3
Kirkshaws - 06	8%	1%	22%	10.2
Abronhill South - 05	9%	1%	21%	10.2
Chapelhall East - 03	2%	1%	28%	10.2
Bellshill South - 04	4%	2%	25%	10.2
Wishaw North - 04	8%	7%	15%	10.2
Thrashbush - 07	4%	2%	24%	10.1
Carfin and Cleekhimin - 06	8%	1%	21%	10.1
Netherton and Kirkhill - 02	1%	1%	29%	10.0
Petersburn - 05	3%	0%	27%	10.0
Orbiston - 02	8%	8%	15%	10.0
Harthill and Salsburgh - 08	18%	0%	12%	9.9
Carrickstone - 01	1%	3%	26%	9.8
Kildrum - 05	3%	1%	26%	9.8
Forgewood - 06	10%	5%	15%	9.8
Gartcosh and Marnock - 04	7%	0%	22%	9.8
Muirhouse and Knowetop - 01	6%	3%	21%	9.7
Motherwell South - 04	3%	5%	22%	9.7
Airdrie North - 01	14%	1%	15%	9.7
Westfield - 05	2%	2%	24%	9.7
Kirkwood and Bargeddie - 05	8%	1%	19%	9.5
Abronhill South - 03	7%	2%	20%	9.4
Dundyvan - 05	2%	1%	25%	9.4
Wishaw South - 06	5%	6%	18%	9.2
Craigneuk Airdrie - 01	2%	0%	26%	9.2
Coltness - 02	5%	6%	16%	8.9
Greenend and Carnbroe - 04	2%	1%	24%	8.9
Shotts - 03	4%	4%	19%	8.9
Craigneuk Wishaw - 05	6%	2%	19%	8.9
Overtown - 06	5%	1%	19%	8.7
Drumpellier and Langloan - 02	4%	2%	21%	8.6
Kirkwood and Bargeddie - 08	9%	1%	16%	8.5
Caldercruix and Plains - 05	8%	2%	16%	8.5
Forgewood - 05	3%	3%	19%	8.5
Drumpellier and Langloan - 01	1%	1%	23%	8.3
Gartcosh and Marnock - 03	6%	0%	19%	8.3
Muirhouse - 04	1%	7%	16%	7.9
Netherton and Kirkhill - 03	6%	2%	15%	7.8

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Muirhouse and Knowetop - 04	0%	2%	21%	7.7
Carfin and Cleekhimin - 04	3%	6%	14%	7.6
Dundyvan - 07	6%	0%	17%	7.6
Cleland - 04	6%	1%	16%	7.4
Overtown - 05	3%	17%	2%	7.4
Hattonrigg - 01	4%	0%	18%	7.4
Hattonrigg - 02	7%	3%	11%	7.0
Dundyvan - 06	5%	0%	15%	6.9
Cairnhill - 07	3%	2%	16%	6.9
Shawhead and Whifflet - 01	5%	0%	15%	6.7
Harthill and Salsburgh - 06	5%	0%	15%	6.7
Wishaw South - 07	4%	8%	7%	6.5
Abronhill North - 01	6%	2%	11%	6.4
Kilsyth East and Croy - 04	3%	1%	14%	6.0
Wishaw South - 02	1%	1%	16%	5.9
Muirhouse - 03	5%	2%	11%	5.8
Stane - 04	6%	1%	11%	5.8
Carfin North - 04	8%	0%	9%	5.8
Kirkshaws - 04	2%	2%	13%	5.7
Glenmavis and Greengairs - 01	1%	0%	15%	5.7
Cardowan and Millerston - 02	2%	3%	12%	5.7
Carfin North - 03	2%	2%	13%	5.5
Coatdyke and Whinhall - 01	2%	2%	12%	5.3
Fallside - 01	4%	1%	11%	5.2
Motherwell West - 01	1%	4%	10%	5.1
Caldercruix and Plains - 03	4%	0%	11%	5.0
Forgewood - 07	1%	0%	13%	4.7
Moodiesburn East - 03	3%	3%	8%	4.5
Craigneuk Wishaw - 03	4%	3%	6%	4.3
Thrashbush - 08	0%	1%	11%	4.2
Petersburn - 06	1%	3%	7%	3.9
Birkenshaw - 02	2%	1%	9%	3.8
Kirkshaws - 02	1%	1%	9%	3.7
Balloch West - 01	0%	0%	10%	3.5
Overtown - 04	6%	0%	4%	3.4
Westfield - 09	1%	0%	9%	3.3
Pather - 01	3%	1%	6%	3.3
Greenend and Carnbroe - 01	0%	1%	8%	3.1
Carrickstone - 05	2%	0%	7%	3.0
Carfin and Cleekhimin - 01	1%	5%	3%	3.0
Cliftonville - 04	2%	2%	5%	3.0
Gartcosh and Marnock - 06	1%	1%	7%	3.0
Muirhouse and Knowetop - 02	3%	0%	5%	2.7

Data zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Total Weighted Score for Energy Efficiency
Moodiesburn East - 01	3%	1%	4%	2.2
Kirkshaws - 01	0%	1%	5%	2.0
Gartcosh and Marnock - 07	3%	0%	3%	1.9
Birkenshaw - 01	2%	0%	4%	1.9
Westfield - 07	0%	1%	5%	1.8
Westfield - 08	1%	0%	4%	1.8
Westfield - 06	1%	1%	3%	1.6
Carrickstone - 03	1%	1%	4%	1.5
Newmains - 05	3%	0%	1%	1.2
Balloch West - 02	0%	0%	3%	1.1
Carrickstone - 04	0%	0%	3%	0.9
Craigneuk Airdrie - 03	1%	0%	2%	0.8
Carfin and Cleekhimin - 05	1%	0%	1%	0.8
Cleland - 05	1%	0%	1%	0.7
Carrickstone - 06	1%	1%	0%	0.6
Chapelhall East - 01	1%	0%	1%	0.6
Forgewood - 04	0%	0%	2%	0.6
Motherwell North - 04	1%	0%	1%	0.5
Kirkwood and Bargeddie - 01	0%	0%	0%	0.4
Greenend and Carnbroe - 07	0%	1%	0%	0.3
Cardowan and Millerston - 01	0%	0%	0%	0.1
Kilsyth East and Croy - 01	0%	0%	0%	0.0
Muirhouse - 01	0%	0%	0%	0.0

Fuel Poverty

Table 24: Fuel Poverty Weighted Scores by Data Zones

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Forgewood - 03	11%	41%	68%	25%	8%	32.3
Cumbernauld Central - 06	1%	11%	73%	32%	24%	29.6
Motherwell South - 02	9%	41%	44%	28%	24%	29.5
Sunnyside and Cliftonville - 04	25%	12%	85%	17%	0%	28.3
Cliftonville - 01	1%	3%	42%	40%	49%	27.5
Bellshill South - 05	25%	15%	46%	26%	10%	27.2
Dundyvan - 03	9%	2%	61%	30%	20%	26.7
Kilsyth Bogside - 02	6%	2%	69%	27%	8%	25.8
Townhead - 04	4%	20%	59%	24%	6%	25.5
Shotts - 04	8%	9%	29%	35%	25%	25.0
Greenfaulds - 03	5%	1%	75%	23%	7%	24.8
Coltness - 01	16%	18%	52%	21%	0%	24.5
Shotts - 05	11%	5%	63%	24%	7%	24.5
Cumbernauld Central - 05	2%	5%	59%	28%	15%	24.5
Motherwell South - 05	8%	5%	42%	31%	31%	24.4
Townhead - 05	17%	10%	67%	17%	0%	24.2
Seafar - 04	25%	2%	46%	25%	6%	24.2
Balmalloch - 04	14%	3%	44%	28%	14%	24.1
Caldercruix and Plains - 04	11%	0%	64%	24%	0%	24.0
Orbiston - 01	3%	0%	55%	29%	11%	24.0
Motherwell North - 03	30%	4%	34%	25%	7%	24.0
Viewpark - 05	21%	19%	17%	29%	16%	23.9
Kildrum - 02	19%	1%	34%	30%	17%	23.7
Gartlea - 02	12%	2%	66%	22%	0%	23.7
Petersburn - 04	5%	1%	57%	27%	7%	23.7
Thrashbush - 02	5%	3%	47%	30%	21%	23.7
Pather - 03	11%	8%	55%	23%	1%	23.6
Coatdyke and Whinhall - 07	12%	5%	58%	23%	2%	23.6
Greenfaulds - 04	2%	2%	72%	23%	5%	23.6
Bellshill South - 02	13%	29%	20%	27%	5%	23.6
Coatbridge West - 03	26%	5%	78%	12%	0%	23.6
Stane - 02	7%	8%	34%	31%	19%	23.5
Coatbridge West - 02	4%	3%	47%	29%	19%	23.4
Orbiston - 04	9%	5%	72%	19%	0%	23.4
Holytown - 05	6%	11%	44%	27%	6%	23.3
Kilsyth Bogside - 03	9%	1%	39%	31%	16%	23.3

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Motherwell North - 01	15%	5%	34%	29%	13%	23.2
Petersburn - 02	9%	1%	47%	28%	2%	23.2
Allanton - Newmains Rural - 03	16%	5%	65%	18%	0%	23.2
Greenfaulds - 05	4%	4%	58%	25%	12%	23.2
Caldercruix and Plains - 06	3%	0%	49%	29%	19%	23.2
Village and Castlecary - 02	18%	6%	62%	18%	0%	23.2
Muirhouse - 05	3%	5%	28%	35%	36%	23.0
Sunnyside and Cliftonville - 03	16%	1%	61%	21%	0%	23.0
Balmalloch - 01	10%	2%	54%	25%	7%	22.9
Overtown - 03	12%	3%	53%	24%	4%	22.9
Wishaw South - 03	10%	6%	54%	23%	2%	22.8
Stane - 03	13%	2%	34%	30%	18%	22.8
Thrashbush - 04	12%	0%	59%	22%	0%	22.8
Airdrie North - 06	4%	1%	50%	27%	12%	22.6
Sunnyside and Cliftonville - 01	3%	2%	65%	23%	0%	22.6
Kilsyth East and Croy - 06	14%	2%	49%	24%	4%	22.5
Petersburn - 03	9%	1%	52%	25%	1%	22.4
Newmains - 04	9%	14%	26%	29%	12%	22.4
Moodiesburn West - 02	11%	12%	15%	32%	17%	22.3
Moodiesburn West - 04	9%	7%	43%	25%	8%	22.3
Shawhead and Whifflet - 02	7%	1%	53%	25%	3%	22.3
Moodiesburn West - 03	7%	12%	21%	32%	21%	22.3
Craigneuk Wishaw - 04	5%	14%	37%	26%	4%	22.3
Calderbank and Brownsburn - 03	9%	4%	60%	21%	1%	22.2
Drumgelloch - 02	7%	1%	58%	23%	1%	22.2
Bellshill South - 03	11%	6%	42%	25%	10%	22.2
Cumbernauld Central - 04	0%	11%	50%	25%	6%	22.2
Cleland - 02	14%	2%	55%	21%	1%	22.2
Dundyvan - 08	5%	1%	26%	34%	24%	22.1
Kilsyth East and Croy - 02	4%	1%	52%	26%	9%	22.1
Airdrie North - 03	11%	5%	43%	25%	7%	22.0
Chryston and Muirhead - 02	11%	9%	35%	26%	8%	22.0
Petersburn - 01	16%	0%	55%	21%	0%	22.0
Forgewood - 02	6%	8%	41%	26%	8%	22.0
Forgewood - 01	5%	7%	61%	20%	1%	21.9
Overtown - 05	3%	17%	2%	36%	22%	21.9

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Clydesdale and New Stevenston - 02	9%	19%	26%	26%	7%	21.9
Gartlea - 05	7%	5%	58%	21%	0%	21.9
Cliftonville - 03	10%	3%	54%	22%	4%	21.9
Chryston and Muirhead - 03	18%	9%	50%	18%	0%	21.9
Pather - 02	11%	5%	44%	24%	4%	21.8
Chryston and Muirhead - 05	12%	12%	38%	23%	5%	21.8
Coatdyke and Whinhall - 03	15%	5%	59%	18%	0%	21.7
Balmalloch - 06	13%	3%	42%	25%	10%	21.7
Bellshill South - 01	24%	18%	14%	25%	10%	21.7
Coatbridge West - 04	16%	1%	55%	20%	0%	21.7
Townhead - 07	8%	1%	40%	27%	15%	21.6
Kildrum - 03	21%	4%	44%	21%	2%	21.6
Calderbank and Brownsburn - 04	8%	1%	54%	23%	0%	21.5
Newmains - 09	17%	9%	38%	22%	0%	21.5
Condorrat - 03	7%	2%	69%	18%	0%	21.5
Craigneuk Wishaw - 02	2%	1%	48%	26%	1%	21.4
Chapelhall West - 02	11%	4%	54%	21%	0%	21.4
Wishaw North - 06	17%	14%	54%	15%	0%	21.3
Townhead - 03	8%	2%	49%	24%	1%	21.3
Motherwell South - 03	7%	3%	29%	30%	21%	21.3
Carfin and Cleekhimin - 07	14%	7%	46%	20%	1%	21.3
Gartlea - 01	3%	1%	52%	24%	2%	21.3
Cumbernauld Central - 03	1%	9%	47%	24%	7%	21.2
Drumgelloch - 03	17%	1%	59%	17%	0%	21.1
Glenmavis and Greengairs - 02	8%	1%	54%	22%	11%	21.1
Cleland - 03	10%	3%	35%	27%	8%	21.1
Kilsyth East and Croy - 05	5%	1%	52%	24%	6%	21.0
Thrashbush - 03	5%	2%	43%	26%	4%	21.0
Newarthill - 02	12%	5%	53%	20%	0%	21.0
Wishaw North - 05	11%	5%	49%	21%	0%	21.0
Bellshill Central - 02	7%	22%	20%	25%	2%	20.9
Village and Castlecary - 03	6%	1%	45%	25%	6%	20.9
Viewpark - 01	13%	8%	38%	23%	1%	20.9
Overtown - 04	6%	0%	4%	38%	31%	20.9
Carfin North - 02	10%	9%	34%	24%	1%	20.9
Holytown - 03	10%	6%	56%	18%	0%	20.9
Kilsyth Bogside - 01	6%	1%	41%	26%	10%	20.9

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Harthill and Salsburgh - 06	5%	0%	15%	35%	32%	20.9
Kildrum - 04	11%	5%	60%	17%	0%	20.8
Milnwood - 03	9%	8%	45%	22%	1%	20.8
Cardowan and Millerston - 05	15%	12%	47%	17%	0%	20.8
Holytown - 06	12%	7%	47%	20%	1%	20.8
Caldercruix and Plains - 02	11%	1%	37%	25%	3%	20.8
Cleland - 01	14%	8%	21%	27%	16%	20.8
Harthill and Salsburgh - 03	7%	1%	35%	28%	10%	20.8
Kirkwood and Bargeddie - 03	6%	1%	42%	25%	7%	20.7
Moodiesburn East - 02	9%	10%	22%	28%	14%	20.7
Kirkwood and Bargeddie - 04	6%	4%	44%	24%	4%	20.6
Seafar - 02	8%	4%	36%	26%	9%	20.6
Muirhouse - 02	3%	5%	61%	19%	5%	20.6
Sunnyside and Cliftonville - 06	10%	8%	53%	18%	0%	20.5
Netherton and Kirkhill - 05	5%	19%	43%	19%	1%	20.5
Pather - 05	6%	7%	36%	25%	1%	20.5
Cairnhill - 05	12%	2%	58%	18%	0%	20.4
Milnwood - 05	9%	11%	50%	18%	0%	20.4
Gartlea - 04	4%	7%	43%	23%	1%	20.4
Carfin and Cleekhimin - 02	9%	6%	25%	27%	10%	20.4
Glenmavis and Greengairs - 05	8%	1%	38%	26%	11%	20.4
Abronhill South - 02	8%	1%	51%	21%	3%	20.4
Gartlea - 03	8%	3%	55%	20%	0%	20.3
Thrashbush - 05	15%	3%	40%	22%	1%	20.3
Bellshill Central - 03	10%	13%	28%	24%	3%	20.3
Townhead - 06	3%	7%	45%	23%	1%	20.2
Wishaw South - 04	14%	3%	50%	18%	2%	20.2
Fallside - 02	9%	2%	37%	25%	2%	20.1
Holytown - 07	6%	12%	42%	21%	1%	20.1
Abronhill North - 06	6%	5%	71%	14%	0%	20.1
Shotts - 01	13%	2%	49%	20%	1%	20.1
Stane - 04	6%	1%	11%	35%	25%	20.1
Kilsyth East and Croy - 07	6%	6%	39%	24%	5%	20.1
Coatdyke and Whinhall - 04	10%	2%	60%	17%	0%	20.1
Newarthill - 03	11%	10%	30%	24%	1%	20.1
Chapelhall East - 04	8%	4%	54%	19%	0%	20.1
Harthill and Salsburgh - 01	20%	2%	22%	26%	8%	20.0
Harthill and Salsburgh - 05	7%	2%	28%	28%	14%	20.0

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Drumgelloch - 05	9%	1%	44%	23%	0%	20.0
Airdrie North - 04	10%	2%	39%	24%	3%	20.0
Motherwell West - 04	11%	7%	31%	24%	2%	20.0
Coltness - 04	13%	14%	32%	21%	0%	20.0
Kildrum - 01	10%	4%	41%	22%	4%	19.9
Abronhill North - 03	4%	5%	56%	19%	0%	19.9
Milnwood - 04	9%	14%	40%	19%	1%	19.9
Greenend and Carnbroe - 05	3%	1%	43%	25%	4%	19.9
Wishaw South - 01	11%	9%	42%	19%	0%	19.9
Craigneuk Airdrie - 05	8%	0%	54%	20%	0%	19.8
Newmains - 01	12%	5%	50%	18%	1%	19.8
Condorrat - 02	5%	5%	38%	24%	4%	19.8
Allanton - Newmains Rural - 02	6%	5%	35%	24%	6%	19.8
Caldercruix and Plains - 07	5%	2%	36%	25%	10%	19.7
Stepps - 02	11%	6%	41%	21%	1%	19.7
Fallside - 05	18%	4%	62%	12%	0%	19.6
Newarthill - 01	10%	8%	51%	17%	0%	19.6
Harthill and Salsburgh - 04	11%	5%	30%	24%	6%	19.6
Townhead - 02	8%	5%	35%	24%	1%	19.5
Bellshill Central - 01	8%	10%	33%	22%	1%	19.5
Wishaw South - 05	6%	6%	46%	21%	0%	19.5
Orbiston - 03	12%	12%	17%	26%	5%	19.5
Pather - 04	12%	11%	26%	23%	1%	19.5
Coatdyke and Whinhall - 05	9%	2%	64%	15%	0%	19.4
Condorrat - 01	7%	2%	52%	19%	1%	19.3
Chapelhall West - 01	11%	0%	39%	22%	0%	19.3
Harthill and Salsburgh - 07	9%	1%	29%	26%	15%	19.3
Carfin North - 01	5%	7%	35%	23%	2%	19.3
Seafar - 05	4%	2%	48%	21%	3%	19.3
Newmains - 02	5%	5%	33%	25%	4%	19.3
Abronhill South - 01	3%	1%	54%	20%	3%	19.3
Holytown - 04	5%	12%	44%	19%	0%	19.3
Orbiston - 07	12%	6%	27%	24%	4%	19.3
Chapelhall East - 02	6%	2%	57%	18%	0%	19.2
Viewpark - 03	7%	13%	13%	27%	9%	19.2
Balmalloch - 03	8%	1%	49%	20%	0%	19.2
Kirkwood and Bargeddie - 02	11%	0%	47%	19%	0%	19.2
Coltness - 03	9%	14%	31%	21%	1%	19.2

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Muirhouse and Knowetop - 08	10%	7%	50%	16%	1%	19.1
Harthill and Salsburgh - 02	5%	2%	33%	25%	6%	19.1
Airdrie North - 05	10%	1%	43%	20%	1%	19.1
Viewpark - 06	9%	12%	14%	26%	9%	19.0
Townhead - 01	11%	2%	42%	20%	1%	19.0
Birkenshaw - 04	26%	1%	50%	13%	0%	18.9
Cumbernauld Central - 02	14%	2%	23%	25%	6%	18.9
Sunnyside and Cliftonville - 05	11%	3%	45%	19%	0%	18.9
Milnwood - 06	11%	7%	25%	23%	1%	18.9
Motherwell South - 01	10%	4%	45%	19%	2%	18.9
Cairnhill - 04	12%	8%	51%	14%	0%	18.9
Ladywell - 05	18%	4%	60%	11%	0%	18.9
Abronhill North - 02	19%	1%	34%	20%	1%	18.8
Muirhouse - 04	1%	7%	16%	30%	22%	18.8
Muirhouse and Knowetop - 03	7%	11%	34%	21%	7%	18.7
Milnwood - 01	5%	3%	38%	22%	2%	18.7
Shotts - 02	4%	4%	27%	26%	7%	18.7
Cumbernauld Central - 01	6%	2%	24%	27%	7%	18.6
Muirhouse and Knowetop - 09	16%	6%	41%	17%	0%	18.6
Fallside - 07	19%	2%	57%	12%	0%	18.6
Balmalloch - 05	8%	2%	32%	23%	4%	18.6
Cliftonville - 02	4%	6%	43%	20%	0%	18.4
Craigneuk Wishaw - 06	3%	6%	27%	25%	3%	18.4
Motherwell West - 05	12%	5%	19%	25%	2%	18.4
Holytown - 01	11%	3%	60%	13%	0%	18.4
Thrashbush - 01	4%	1%	26%	27%	9%	18.4
Dundyvan - 02	4%	4%	44%	20%	0%	18.3
Village and Castlecary - 05	8%	0%	34%	23%	2%	18.3
Seafar - 03	0%	2%	31%	26%	9%	18.3
Drumgelloch - 01	17%	5%	47%	14%	0%	18.3
Newmains - 07	9%	2%	26%	24%	0%	18.2
Moodiesburn West - 01	9%	11%	28%	21%	1%	18.2
Fallside - 04	4%	2%	39%	22%	0%	18.1
Motherwell South - 04	3%	5%	22%	27%	19%	18.0
Newarthill - 04	11%	3%	26%	23%	1%	18.0
Motherwell North - 02	12%	6%	16%	25%	4%	18.0
Kirkwood and Bargeddie - 07	14%	1%	22%	24%	5%	18.0

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Greenend and Carnbroe - 04	2%	1%	24%	27%	3%	18.0
Netherton and Kirkhill - 04	11%	6%	36%	19%	0%	17.9
Caldercruix and Plains - 01	10%	3%	34%	20%	0%	17.9
Gartcosh and Marnock - 05	16%	3%	35%	18%	2%	17.9
Newmains - 03	7%	12%	25%	22%	2%	17.9
Newmains - 08	11%	13%	26%	19%	0%	17.8
Viewpark - 04	12%	10%	17%	23%	0%	17.8
Greenfaulds - 01	6%	3%	47%	17%	1%	17.8
Clydesdale and New Stevenston - 01	4%	23%	11%	23%	2%	17.8
Kirkshaws - 05	5%	1%	35%	23%	0%	17.8
Drumgelloch - 04	12%	1%	36%	20%	1%	17.8
Balmalloch - 02	9%	2%	37%	20%	0%	17.6
Airdrie North - 02	9%	2%	26%	23%	1%	17.6
Moodiesburn West - 05	12%	3%	40%	17%	0%	17.5
Netherton and Kirkhill - 01	14%	4%	30%	19%	1%	17.5
Westfield - 02	6%	2%	65%	12%	0%	17.5
Balloch East - 03	3%	4%	33%	22%	3%	17.5
Craigneuk Wishaw - 03	4%	3%	6%	31%	15%	17.4
Condorrat - 06	5%	1%	45%	18%	0%	17.4
Orbiston - 02	8%	8%	15%	25%	0%	17.4
Orbiston - 06	10%	8%	26%	20%	1%	17.3
Overtown - 01	6%	1%	42%	19%	1%	17.3
Dundyvan - 04	4%	1%	35%	22%	1%	17.3
Muirhouse and Knowetop - 01	6%	3%	21%	25%	2%	17.3
Stepps - 01	19%	1%	44%	13%	0%	17.3
Shotts - 03	4%	4%	19%	26%	9%	17.2
Holytown - 08	14%	6%	32%	18%	0%	17.2
Milnwood - 07	5%	4%	24%	24%	1%	17.2
Wishaw North - 08	16%	9%	29%	17%	0%	17.2
Dundyvan - 01	11%	0%	32%	20%	1%	17.2
Shawhead and Whifflet - 04	13%	1%	29%	20%	1%	17.1
Allanton - Newmains Rural - 04	20%	2%	30%	17%	0%	17.1
Carfin and Cleekhimin - 03	6%	8%	22%	22%	0%	17.1
Coltness - 02	5%	6%	16%	25%	4%	17.0
Coatbridge West - 05	13%	0%	31%	20%	0%	17.0
Coatdyke and Whinhall - 06	7%	1%	33%	21%	0%	17.0
Wishaw South - 06	5%	6%	18%	25%	2%	17.0

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Airdrie North - 01	14%	1%	15%	24%	2%	17.0
Thrashbush - 06	6%	2%	48%	16%	0%	17.0
Coatdyke and Whinhall - 02	2%	0%	41%	20%	0%	16.9
Village and Castlecary - 01	4%	5%	58%	12%	0%	16.9
Craigneuk Wishaw - 05	6%	2%	19%	25%	1%	16.9
Kirkwood and Bargeddie - 06	9%	1%	21%	24%	2%	16.9
Wishaw East - 04	15%	2%	56%	10%	0%	16.9
Clydesdale and New Stevenston - 04	6%	3%	54%	13%	0%	16.7
Shawhead and Whifflet - 03	5%	0%	29%	22%	1%	16.7
Balloch East - 01	2%	1%	70%	10%	0%	16.7
Craigneuk Wishaw - 01	4%	3%	30%	21%	3%	16.7
Birkenshaw - 07	21%	2%	38%	13%	0%	16.6
Glenmavis and Greengairs - 04	9%	2%	51%	13%	0%	16.6
Holytown - 02	17%	3%	45%	12%	0%	16.5
Carfin and Cleekhimin - 06	8%	1%	21%	23%	0%	16.5
Gartcosh and Marnock - 04	7%	0%	22%	23%	2%	16.5
Forgewood - 07	1%	0%	13%	28%	6%	16.5
Drumpellier and Langloan - 03	10%	5%	51%	11%	0%	16.4
Balloch East - 02	1%	5%	57%	12%	0%	16.3
Forgewood - 06	10%	5%	15%	23%	0%	16.3
Wishaw East - 02	11%	7%	17%	21%	0%	16.3
Wishaw East - 03	9%	3%	40%	16%	1%	16.3
Sunnyside and Cliftonville - 02	5%	2%	46%	15%	0%	16.2
Muirhouse and Knowetop - 06	11%	3%	48%	12%	0%	16.2
Kirkwood and Bargeddie - 09	9%	1%	21%	22%	1%	16.2
Wishaw North - 01	7%	5%	34%	18%	0%	16.2
Craigneuk Airdrie - 01	2%	0%	26%	23%	7%	16.1
Milnwood - 02	5%	7%	35%	17%	0%	16.1
Bellshill South - 04	4%	2%	25%	22%	1%	16.1
Kirkshaws - 06	8%	1%	22%	22%	3%	16.0
Thrashbush - 07	4%	2%	24%	22%	4%	16.0
Wishaw North - 04	8%	7%	15%	22%	3%	15.8
Motherwell West - 02	7%	8%	23%	19%	1%	15.8
Abronhill South - 03	7%	2%	20%	22%	3%	15.8
Fallside - 03	3%	2%	32%	19%	0%	15.7
Newmains - 06	11%	3%	20%	20%	0%	15.7

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Abronhill North - 05	9%	0%	35%	17%	0%	15.6
Calderbank and Brownsburn - 02	6%	2%	32%	19%	0%	15.6
Wishaw South - 07	4%	8%	7%	25%	4%	15.6
Wishaw North - 02	10%	2%	35%	16%	0%	15.6
Drumpellier and Langloan - 02	4%	2%	21%	23%	1%	15.5
Petersburn - 05	3%	0%	27%	21%	0%	15.5
Chryston and Muirhead - 01	8%	4%	41%	14%	0%	15.5
Kirkshaws - 03	10%	0%	22%	20%	2%	15.4
Greenfaulds - 02	2%	1%	55%	12%	0%	15.4
Kirkwood and Bargeddie - 05	8%	1%	19%	21%	0%	15.4
Viewpark - 02	6%	6%	19%	21%	0%	15.4
Clydesdale and New Stevenston - 03	5%	5%	32%	17%	1%	15.4
Stane - 01	13%	1%	35%	15%	0%	15.3
Moodiesburn East - 04	8%	1%	42%	14%	0%	15.3
Balloch East - 04	3%	2%	31%	19%	0%	15.3
Coatbridge West - 01	5%	0%	26%	20%	1%	15.2
Wishaw North - 03	7%	7%	35%	15%	0%	15.1
Birkenshaw - 05	16%	4%	44%	9%	0%	15.1
Viewpark - 07	8%	10%	13%	20%	0%	15.1
Kirkwood and Bargeddie - 08	9%	1%	16%	22%	0%	15.0
Cairnhill - 02	6%	1%	35%	16%	0%	15.0
Muirhouse and Knowetop - 04	0%	2%	21%	22%	0%	14.9
Westfield - 04	10%	2%	31%	16%	0%	14.9
Kirkshaws - 01	0%	1%	5%	28%	6%	14.8
Chryston and Muirhead - 04	11%	3%	31%	15%	0%	14.8
Kilsyth East and Croy - 08	7%	2%	31%	16%	0%	14.8
Wishaw North - 07	5%	18%	11%	18%	0%	14.7
Abronhill North - 04	4%	2%	32%	17%	0%	14.7
Gartcosh and Marnock - 02	5%	2%	31%	17%	0%	14.7
Birkenshaw - 03	7%	10%	17%	18%	0%	14.7
Kirkshaws - 02	1%	1%	9%	26%	5%	14.7
Caldercruix and Plains - 08	13%	5%	34%	12%	0%	14.7
Bellshill South - 06	2%	2%	47%	13%	0%	14.7
Greenend and Carnbroe - 02	2%	0%	43%	15%	0%	14.6
Westfield - 03	5%	3%	25%	18%	0%	14.6
Kirkshaws - 07	15%	1%	21%	17%	0%	14.5

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Garthamlock, Auchinlea and Gartloch - 05	0%	0%	42%	16%	0%	14.5
Seafar - 01	5%	3%	27%	17%	0%	14.3
Motherwell West - 03	5%	0%	43%	13%	0%	14.3
Harthill and Salsburgh - 08	18%	0%	12%	19%	3%	14.3
Abronhill South - 04	2%	1%	33%	17%	1%	14.2
Dundyvan - 05	2%	1%	25%	19%	0%	14.1
Fallside - 06	3%	2%	45%	12%	0%	14.0
Coltness - 05	21%	2%	32%	10%	0%	14.0
Orbiston - 05	4%	3%	42%	12%	0%	14.0
Kirkshaws - 04	2%	2%	13%	22%	2%	14.0
Dundyvan - 07	6%	0%	17%	21%	1%	14.0
Cardowan and Millerston - 03	12%	7%	23%	14%	1%	13.9
Kildrum - 05	3%	1%	26%	18%	1%	13.9
Muirhouse and Knowetop - 05	8%	4%	43%	10%	0%	13.9
Cairnhill - 03	9%	2%	27%	15%	0%	13.9
Cairnhill - 01	1%	4%	55%	9%	0%	13.8
Ladywell - 03	11%	5%	40%	9%	0%	13.8
Abronhill South - 05	9%	1%	21%	17%	1%	13.7
Birkenshaw - 06	9%	7%	26%	13%	0%	13.7
Ladywell - 02	8%	1%	47%	9%	0%	13.7
Petersburn - 06	1%	3%	7%	23%	0%	13.6
Condorrat - 04	2%	3%	27%	17%	0%	13.5
Village and Castlecary - 04	15%	3%	19%	15%	0%	13.5
Glenmavis and Greengairs - 03	19%	0%	18%	14%	0%	13.4
Forgewood - 05	3%	3%	19%	19%	0%	13.4
Balloch West - 04	1%	1%	47%	11%	0%	13.4
Cardowan and Millerston - 04	17%	1%	32%	10%	0%	13.2
Abronhill North - 01	6%	2%	11%	20%	1%	13.2
Netherton and Kirkhill - 02	1%	1%	29%	17%	0%	13.2
Kilsyth Bogside - 04	5%	1%	35%	13%	0%	13.2
Glenmavis and Greengairs - 01	1%	0%	15%	21%	7%	13.2
Greenend and Carnbroe - 06	14%	1%	28%	12%	0%	13.1
Shawhead and Whifflet - 01	5%	0%	15%	20%	0%	13.1
Glenmavis and Greengairs - 06	5%	2%	25%	16%	0%	13.1
Moodiesburn East - 05	27%	2%	10%	13%	0%	13.1
Carfin and Cleekhimin - 04	3%	6%	14%	18%	0%	13.0

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Hattonrigg - 03	11%	2%	22%	14%	0%	12.8
Drumpellier and Langloan - 01	1%	1%	23%	17%	0%	12.8
Condorrat - 05	3%	1%	38%	12%	0%	12.7
Wishaw East - 01	3%	4%	35%	12%	0%	12.7
Dundyvan - 06	5%	0%	15%	19%	0%	12.7
Stepps - 03	8%	2%	26%	14%	0%	12.7
Hattonrigg - 02	7%	3%	11%	19%	0%	12.7
Drumgelloch - 06	5%	0%	28%	14%	0%	12.7
Calderbank and Brownsburn - 01	2%	1%	44%	10%	0%	12.5
Chapelhall East - 05	6%	0%	26%	15%	0%	12.5
Balloch West - 03	3%	4%	34%	11%	0%	12.2
Ladywell - 04	13%	2%	32%	9%	0%	12.2
Westfield - 05	2%	2%	24%	15%	0%	12.0
Bellshill Central - 04	4%	2%	28%	13%	0%	12.0
Cleland - 04	6%	1%	16%	17%	0%	11.9
Hattonrigg - 01	4%	0%	18%	17%	0%	11.9
Kilsyth East and Croy - 03	6%	9%	20%	12%	0%	11.9
Cairnhill - 06	8%	0%	35%	9%	0%	11.8
Craigneuk Airdrie - 02	4%	0%	35%	11%	0%	11.8
Caldercruix and Plains - 05	8%	2%	16%	15%	0%	11.7
Carfin North - 04	8%	0%	9%	18%	0%	11.7
Ladywell - 01	5%	6%	29%	10%	0%	11.6
Balloch West - 05	0%	3%	37%	10%	0%	11.6
Chapelhall West - 03	5%	2%	28%	12%	0%	11.4
Greenend and Carnbroe - 03	4%	3%	30%	11%	0%	11.4
Kilsyth East and Croy - 04	3%	1%	14%	17%	2%	11.4
Carrickstone - 02	1%	1%	38%	10%	0%	11.4
Allanton - Newmains Rural - 01	8%	2%	25%	11%	0%	11.3
Overtown - 02	4%	1%	30%	11%	0%	11.3
Westfield - 01	1%	2%	31%	12%	0%	11.2
Caldercruix and Plains - 03	4%	0%	11%	17%	0%	11.1
Gartcosh and Marnock - 01	10%	0%	22%	12%	0%	11.0
Craigneuk Airdrie - 04	7%	0%	24%	11%	0%	10.8
Chapelhall East - 03	2%	1%	28%	11%	0%	10.7
Carrickstone - 01	1%	3%	26%	12%	0%	10.7
Gartcosh and Marnock - 03	6%	0%	19%	13%	0%	10.6
Cardowan and Millerston - 02	2%	3%	12%	16%	0%	10.6

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Balloch West - 02	0%	0%	3%	20%	7%	10.4
Carrickstone - 04	0%	0%	3%	20%	3%	10.4
Overtown - 06	5%	1%	19%	12%	0%	10.4
Westfield - 06	1%	1%	3%	19%	1%	10.2
Motherwell West - 01	1%	4%	10%	14%	0%	9.5
Muirhouse and Knowetop - 07	2%	5%	28%	8%	0%	9.5
Coatdyke and Whinhall - 01	2%	2%	12%	14%	0%	9.4
Carfin North - 03	2%	2%	13%	13%	0%	9.3
Muirhouse - 03	5%	2%	11%	13%	0%	9.3
Moodiesburn East - 03	3%	3%	8%	14%	0%	9.3
Cairnhill - 07	3%	2%	16%	11%	0%	9.0
Carfin and Cleekhimin - 01	1%	5%	3%	15%	0%	8.9
Motherwell North - 04	1%	0%	1%	17%	2%	8.9
Netherton and Kirkhill - 03	6%	2%	15%	10%	0%	8.8
Wishaw South - 02	1%	1%	16%	12%	0%	8.6
Gartcosh and Marnock - 06	1%	1%	7%	14%	0%	8.6
Muirhouse and Knowetop - 02	3%	0%	5%	14%	0%	8.3
Pather - 01	3%	1%	6%	13%	0%	8.1
Fallside - 01	4%	1%	11%	11%	0%	7.9
Balloch West - 01	0%	0%	10%	12%	0%	7.9
Greenend and Carnbroe - 01	0%	1%	8%	12%	0%	7.7
Moodiesburn East - 01	3%	1%	4%	13%	0%	7.6
Thrashbush - 08	0%	1%	11%	11%	0%	7.5
Cliftonville - 04	2%	2%	5%	12%	0%	7.3
Birkenshaw - 02	2%	1%	9%	10%	0%	6.9
Westfield - 09	1%	0%	9%	10%	0%	6.8
Westfield - 07	0%	1%	5%	12%	0%	6.8
Cleland - 05	1%	0%	1%	13%	0%	6.8
Newmains - 05	3%	0%	1%	12%	0%	6.7
Gartcosh and Marnock - 07	3%	0%	3%	11%	0%	6.7
Carrickstone - 05	2%	0%	7%	10%	0%	6.7
Westfield - 08	1%	0%	4%	11%	0%	6.5
Carrickstone - 03	1%	1%	4%	12%	0%	6.5
Carfin and Cleekhimin - 05	1%	0%	1%	12%	0%	6.3
Kirkwood and Bargeddie - 01	0%	0%	0%	11%	0%	5.9
Forgewood - 04	0%	0%	2%	11%	0%	5.7
Carrickstone - 06	1%	1%	0%	10%	0%	5.4
Birkenshaw - 01	2%	0%	4%	9%	0%	5.2

Data Zone	Percentage of lofts with less than 99mm insulation	Percentage of windows which are single glazed	Percentage of walls which are uninsulated	Households in fuel poverty (fuel bill >10% of income after housing)	Households in extreme fuel poverty (fuel bill >20% of income after housing)	Total Weighted Score
Craigneuk Airdrie - 03	1%	0%	2%	10%	0%	5.2
Kilsyth East and Croy - 01	0%	0%	0%	10%	0%	5.1
Cardowan and Millerston - 01	0%	0%	0%	9%	0%	4.7
Chapelhall East - 01	1%	0%	1%	9%	0%	4.7
Greenend and Carnbroe - 07	0%	1%	0%	9%	0%	4.5
Muirhouse - 01	0%	0%	0%	9%	0%	4.5

Appendix C Off-gas grid and On-gas grid

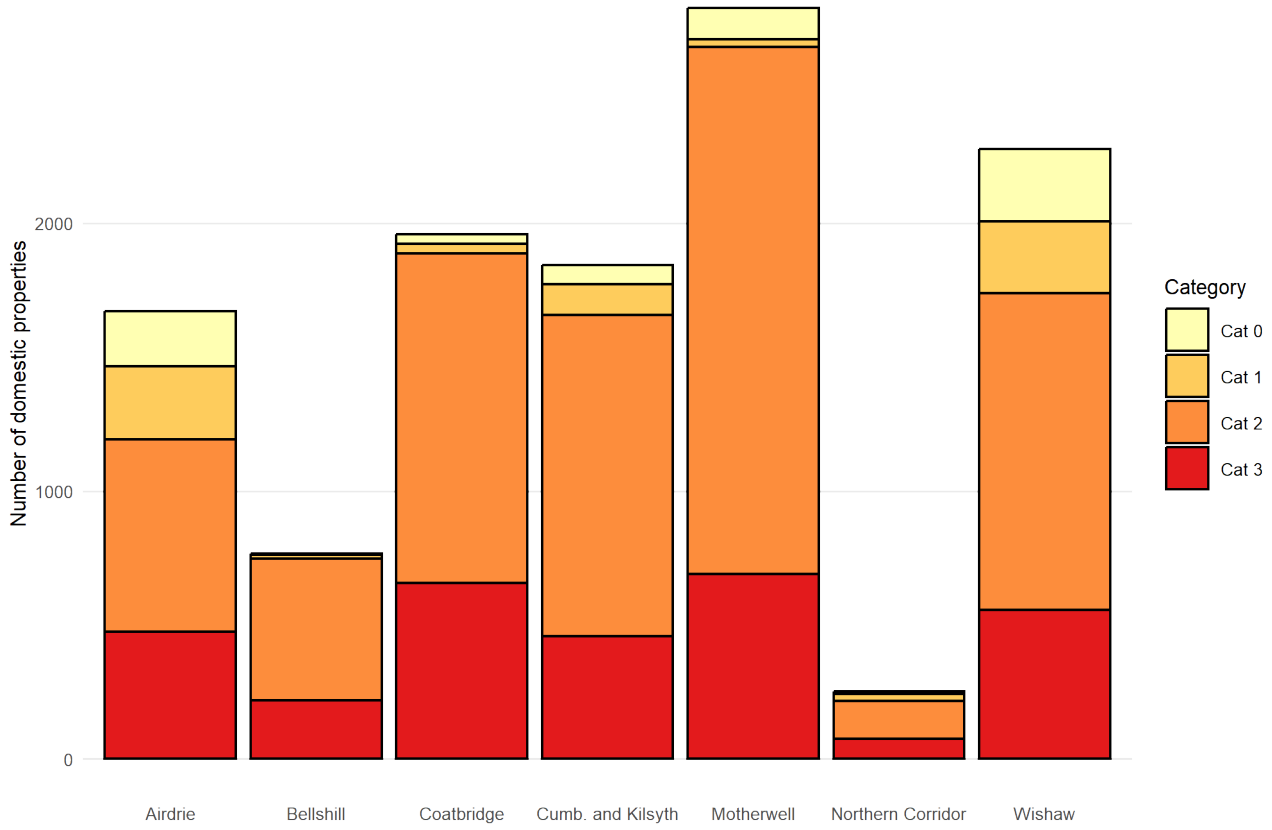
The domestic baseline tool outlines a method of categorising properties based on their suitability for heat pumps. While this report uses an alternative methodology as set out in section 7.7.3, this appendix sets out the findings of the methodology set out in the baseline tool.

Off-gas grid

The Domestic Baseline Tool categorises individual properties according to how difficult it will be to transition each property to a low carbon heat source. This is based on several factors including, for example, the existing heating system, listed status and the existing fabric. Category 0 properties are already low carbon, Category 1 properties make use of a heat pump with minimal changes to the existing building and Category 2 properties could transition with modest changes. Category 3 properties may require such substantial changes that other electrical or biomass heat sources may be more suitable.

Figure 65 shows that most off-grid properties sit in Category 2, meaning that there is a potential challenge to convert these to efficient heat-pump systems.

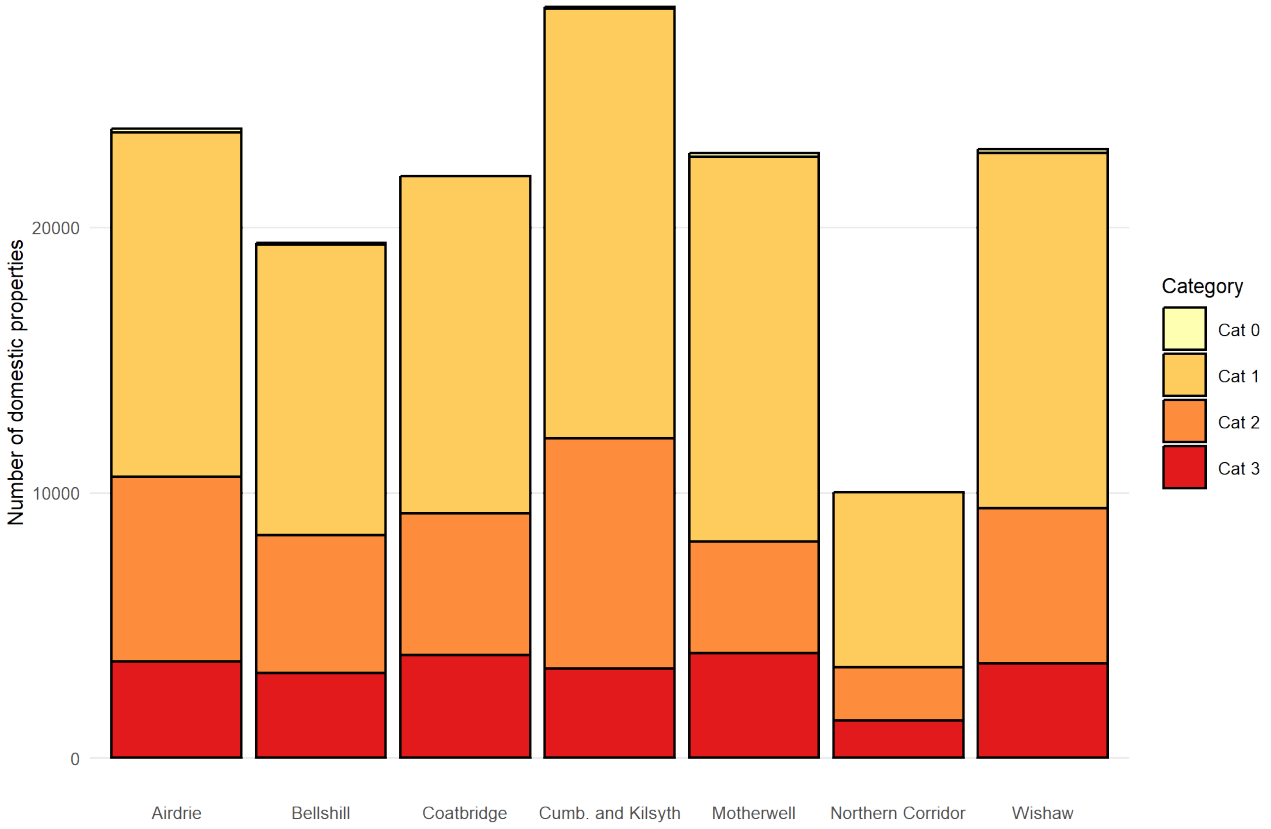
Figure 65: Heat transition categories for off-gas grid domestic properties



On-gas grid

On-gas grid buildings are similarly categorised by the Domestic Baseline Tool although it might be expected that more on-grid properties will find themselves in areas with heat networks and a connection to these rather than heat pumps might be likely. Most properties are in Categories 1 and 2 and so lend themselves to transition (Figure 66).

Figure 66: Heat transition categories for on-gas grid domestic properties



Appendix D Heat Network Zone Maps

The areas which were found to be viable are shown in the following maps:

Figure 67: North Lanarkshire Potential Heat Network Zone – Baseline

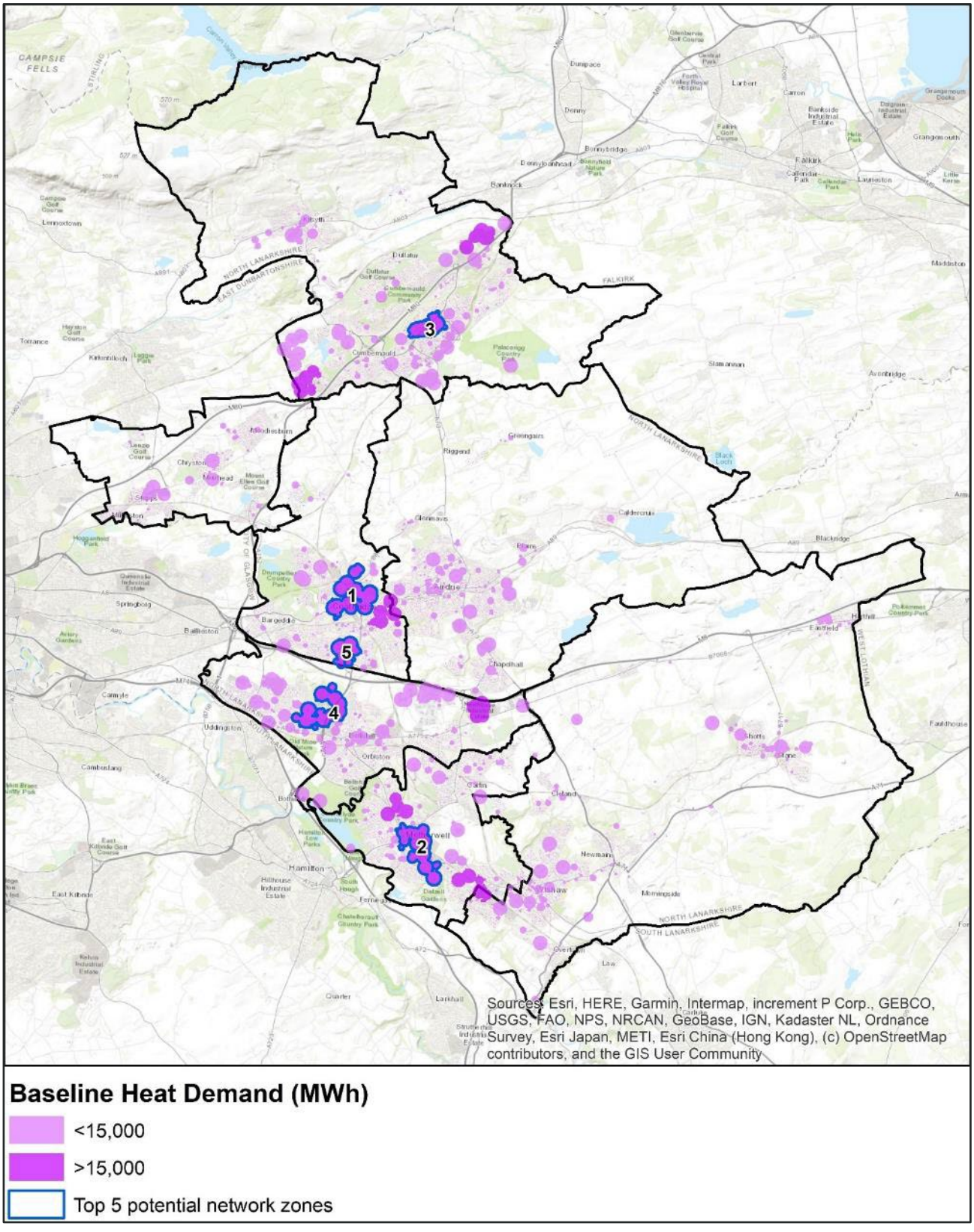


Figure 68: North Lanarkshire Potential Heat Zone – Stringent

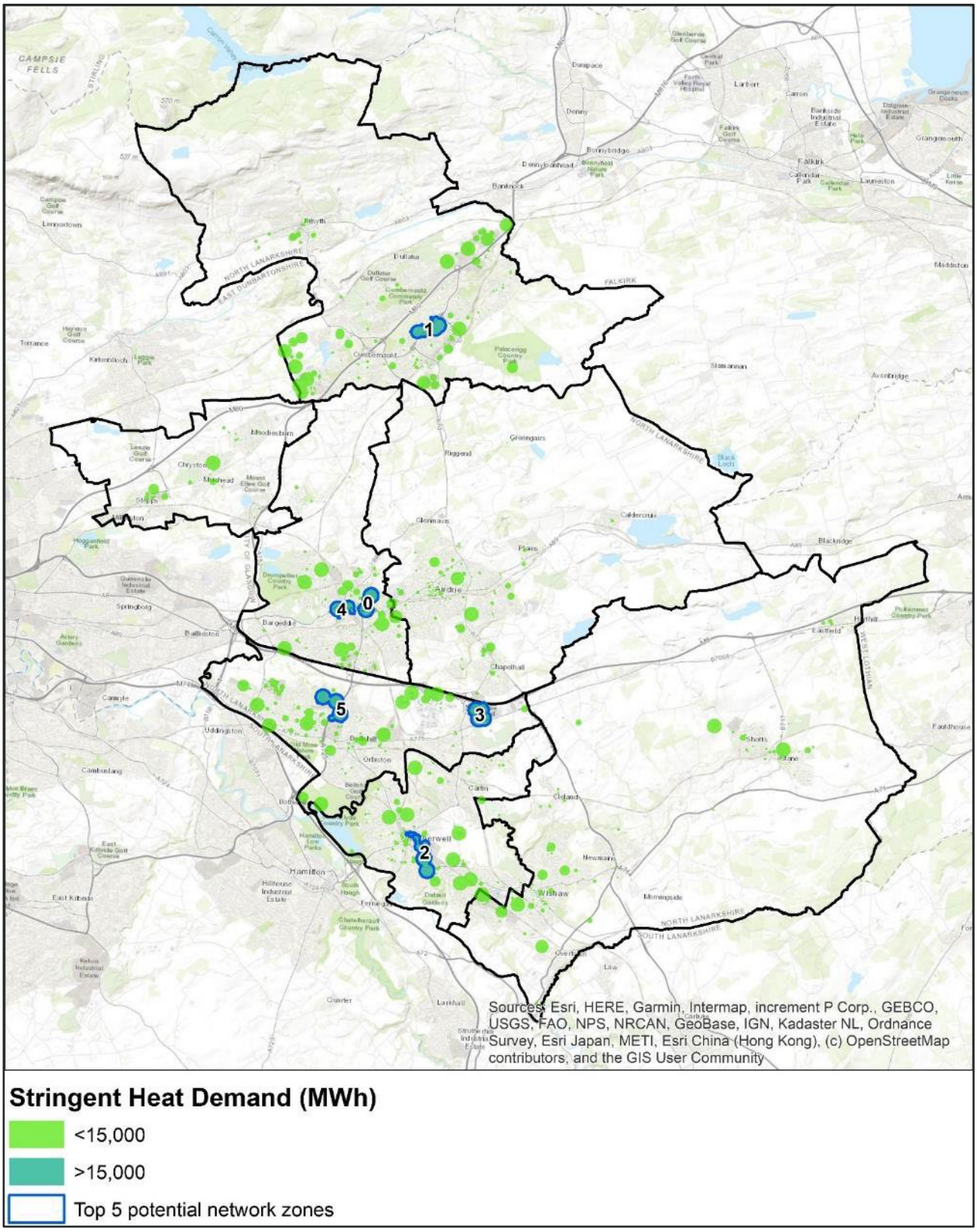


Figure 69: Heat network zone opportunity – Cumbernauld North area – Baseline

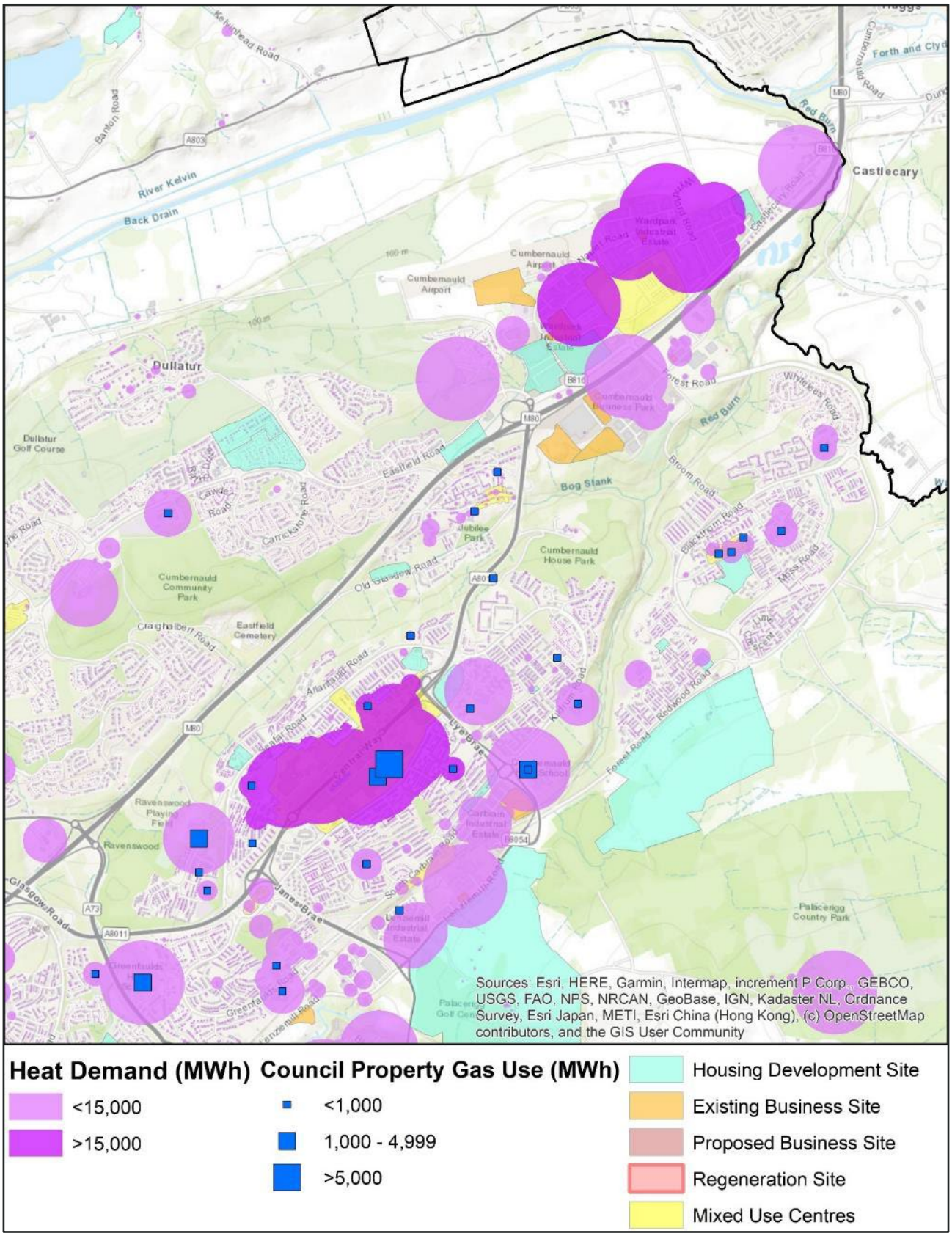


Figure 70: Heat network zone opportunity – Cumbernauld North area – Stringent

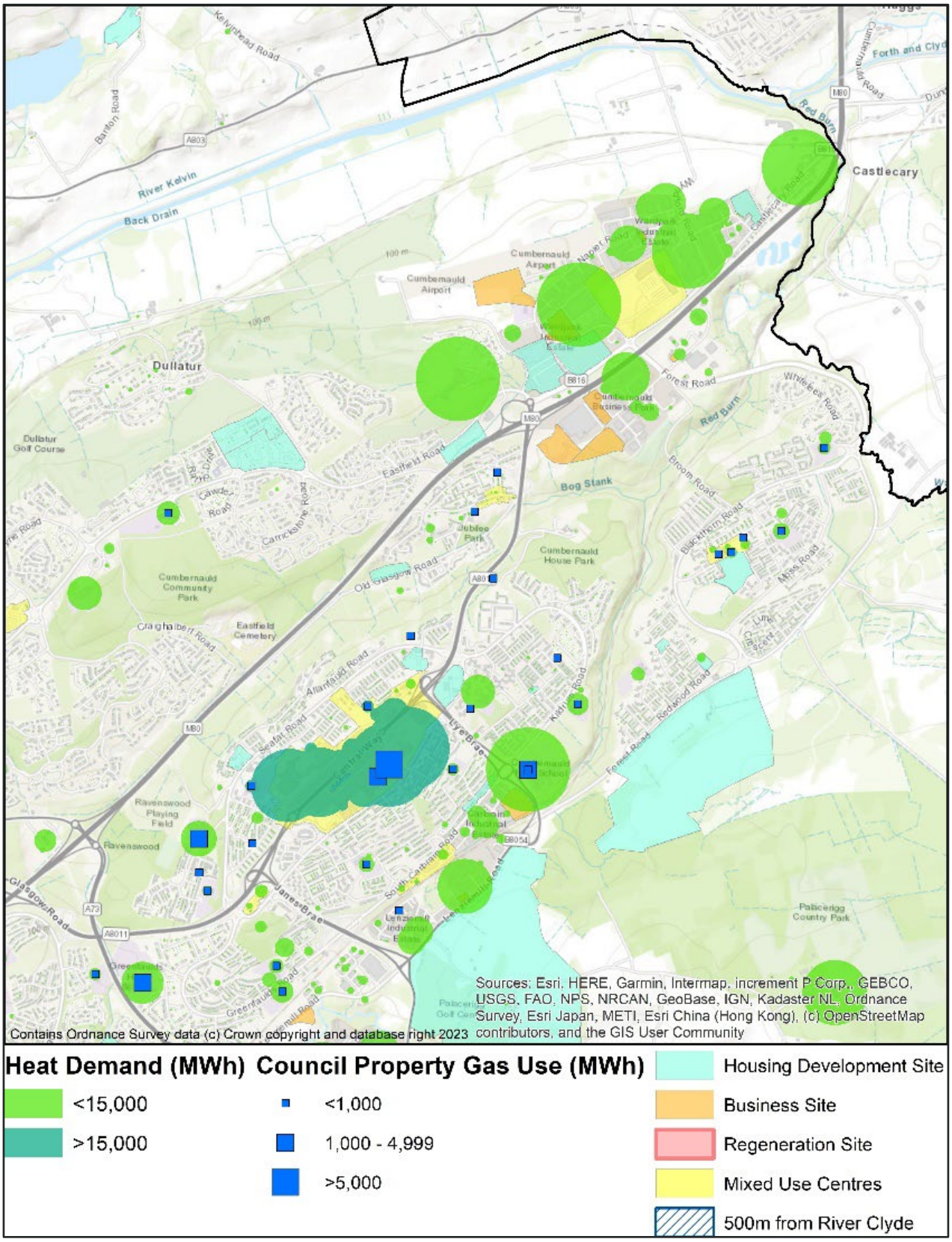


Figure 71: Heat network zone opportunity – Cumbernauld South area - baseline

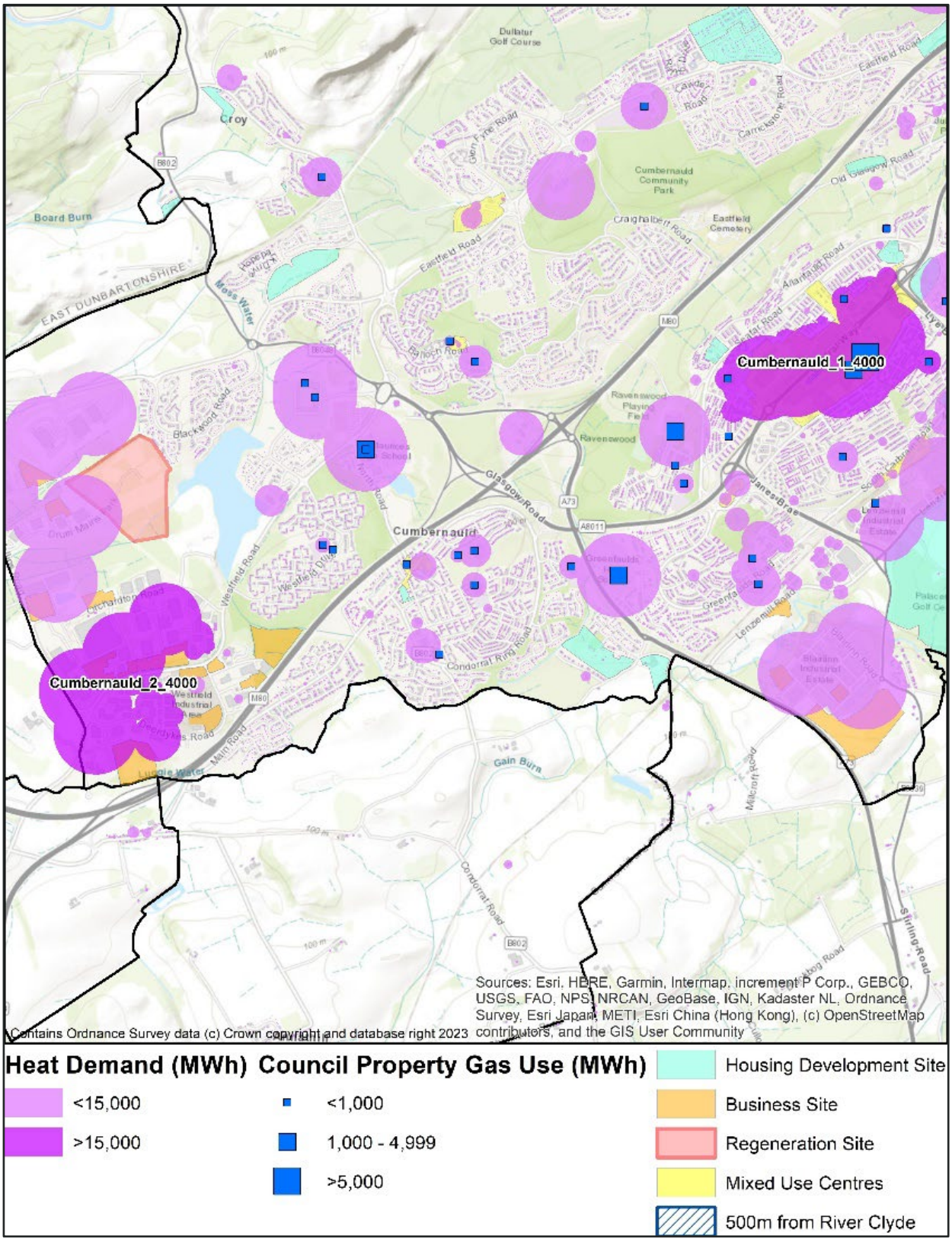


Figure 72: Heat network zone opportunity - Cumbernauld South Area - Stringent

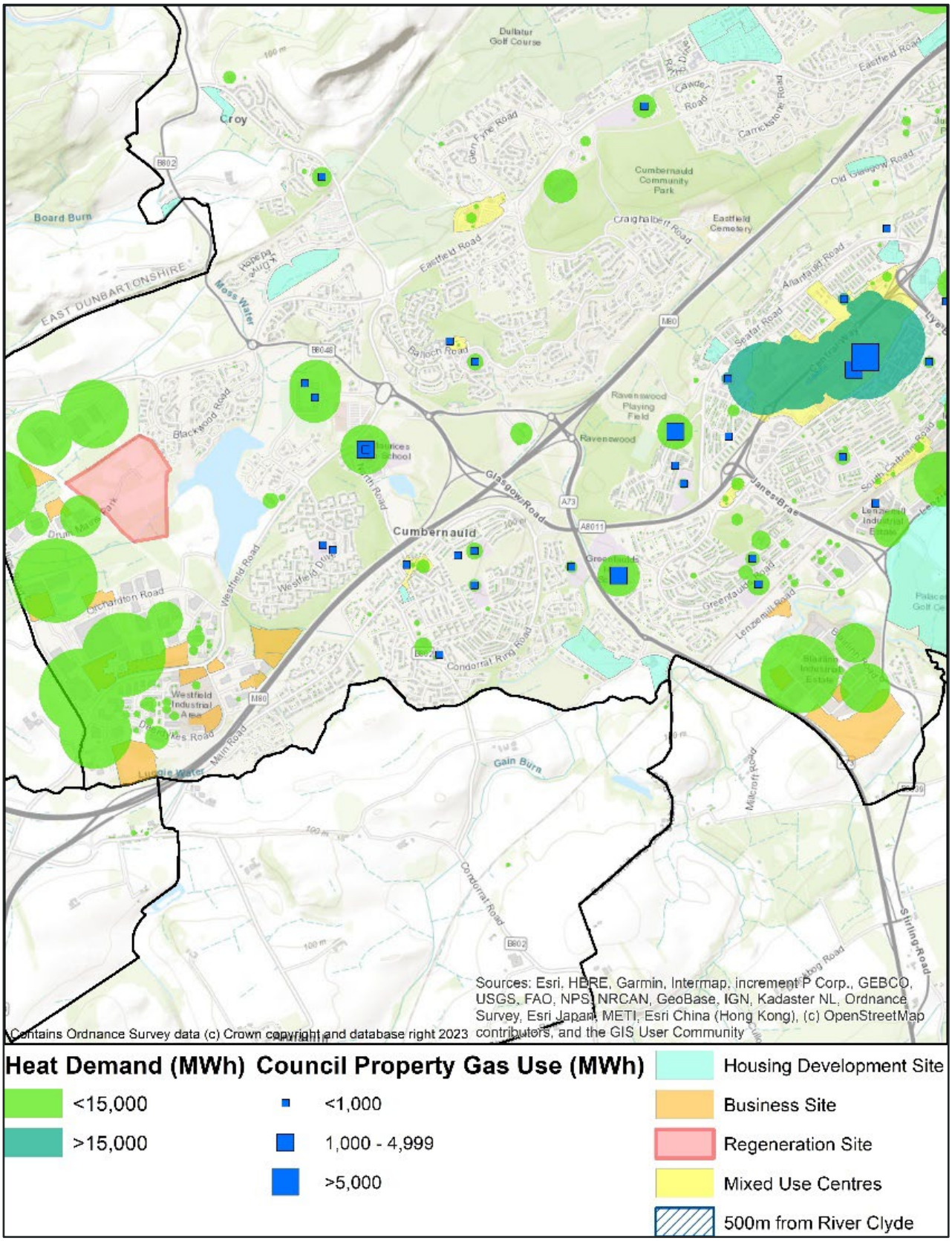


Figure 73: Heat network zone opportunity – Coatbridge, Airdrie and Bellshill – Baseline

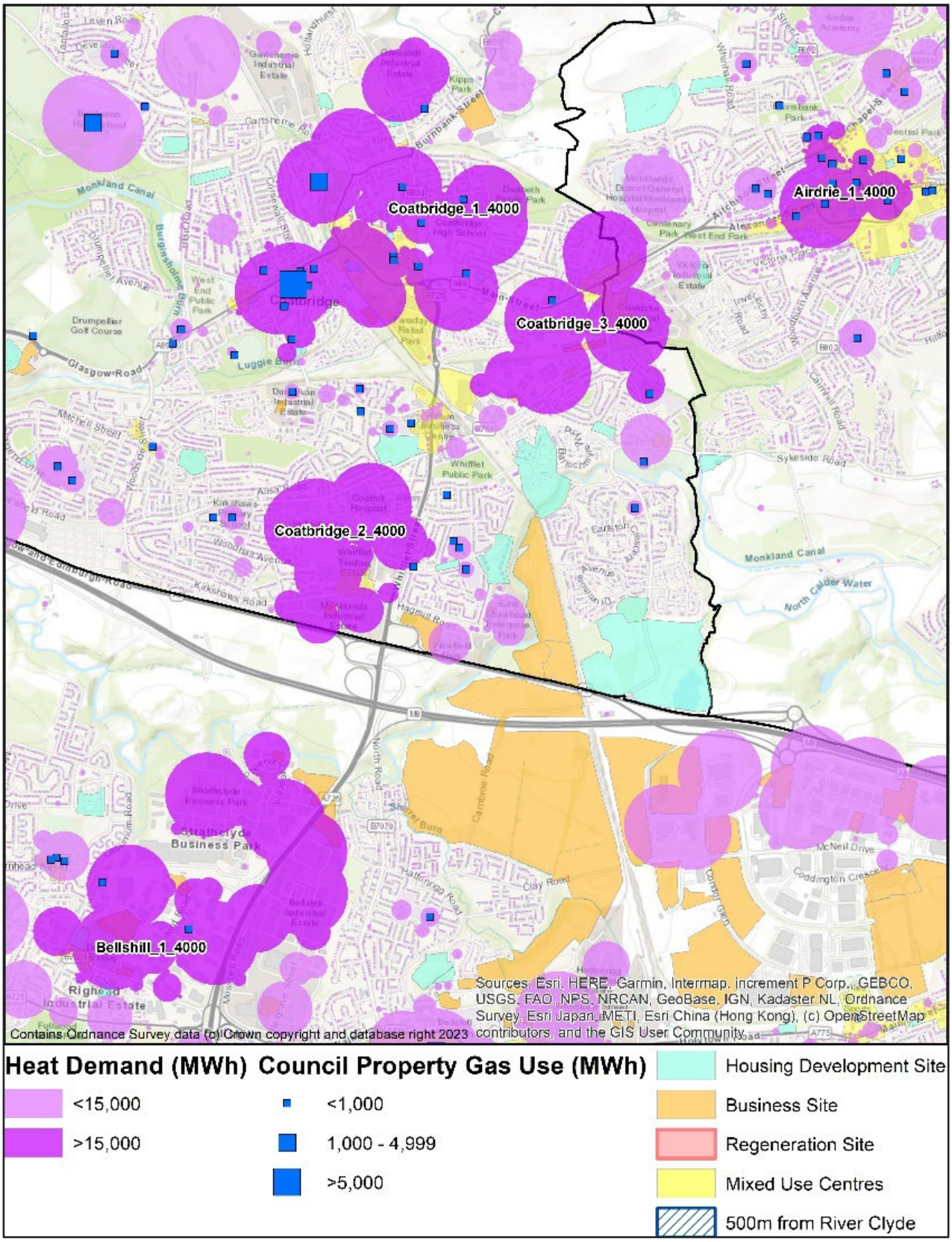


Figure 74: Heat network zone opportunity – Coatbridge, Airdrie and Bellshill – Stringent

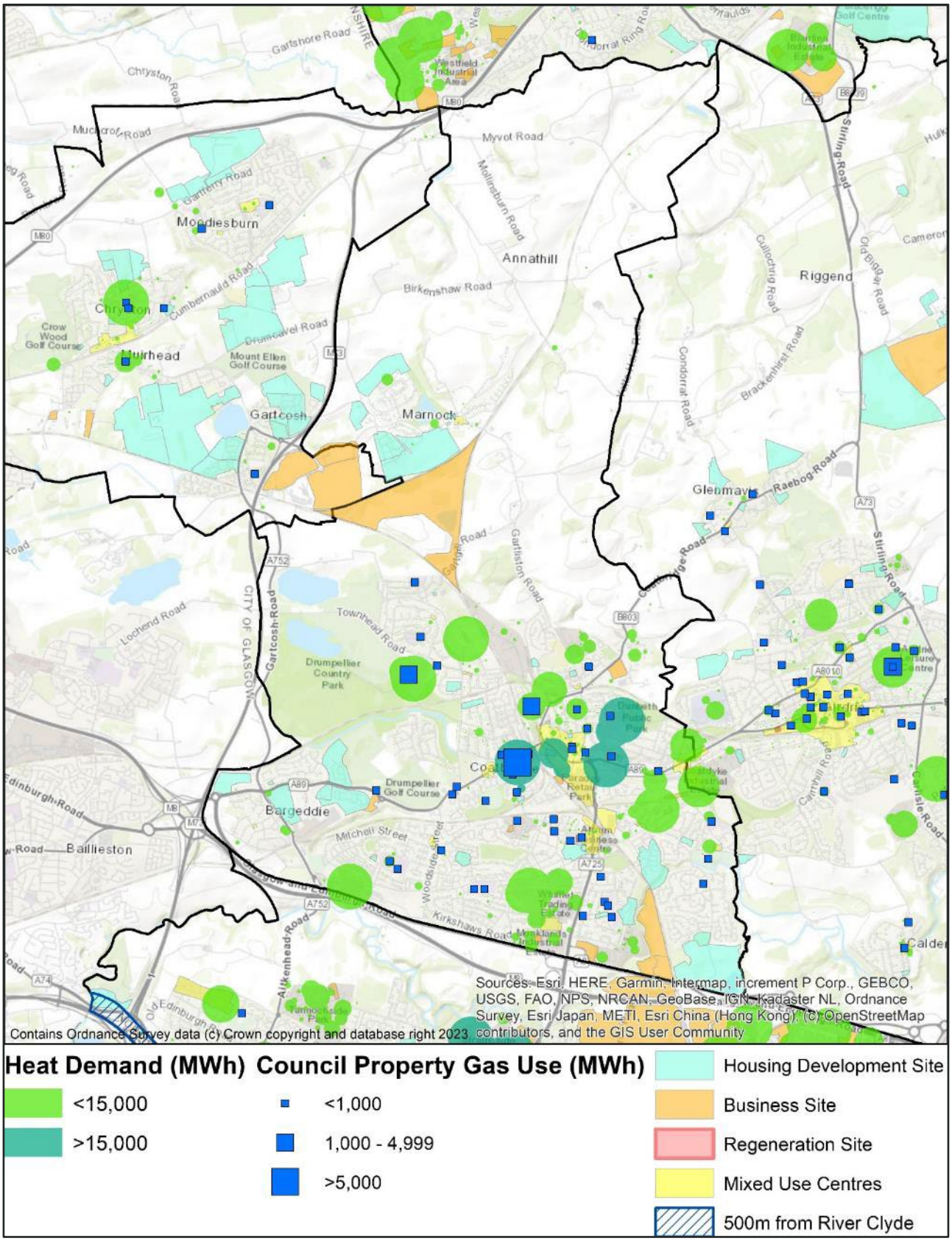


Figure 75: Heat network zone opportunity – Motherwell – Baseline

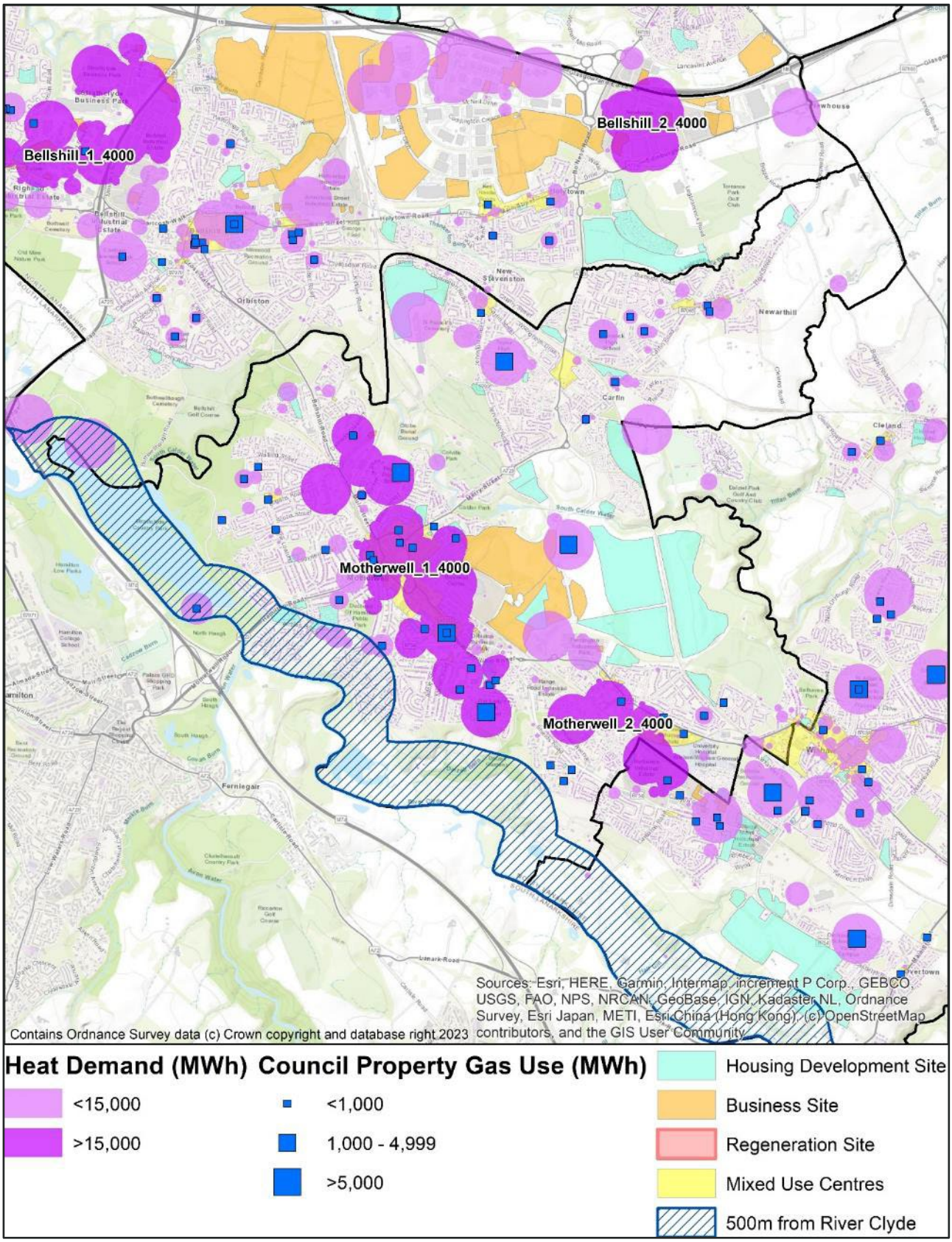


Figure 76: Heat network zone opportunity – Motherwell – Stringent

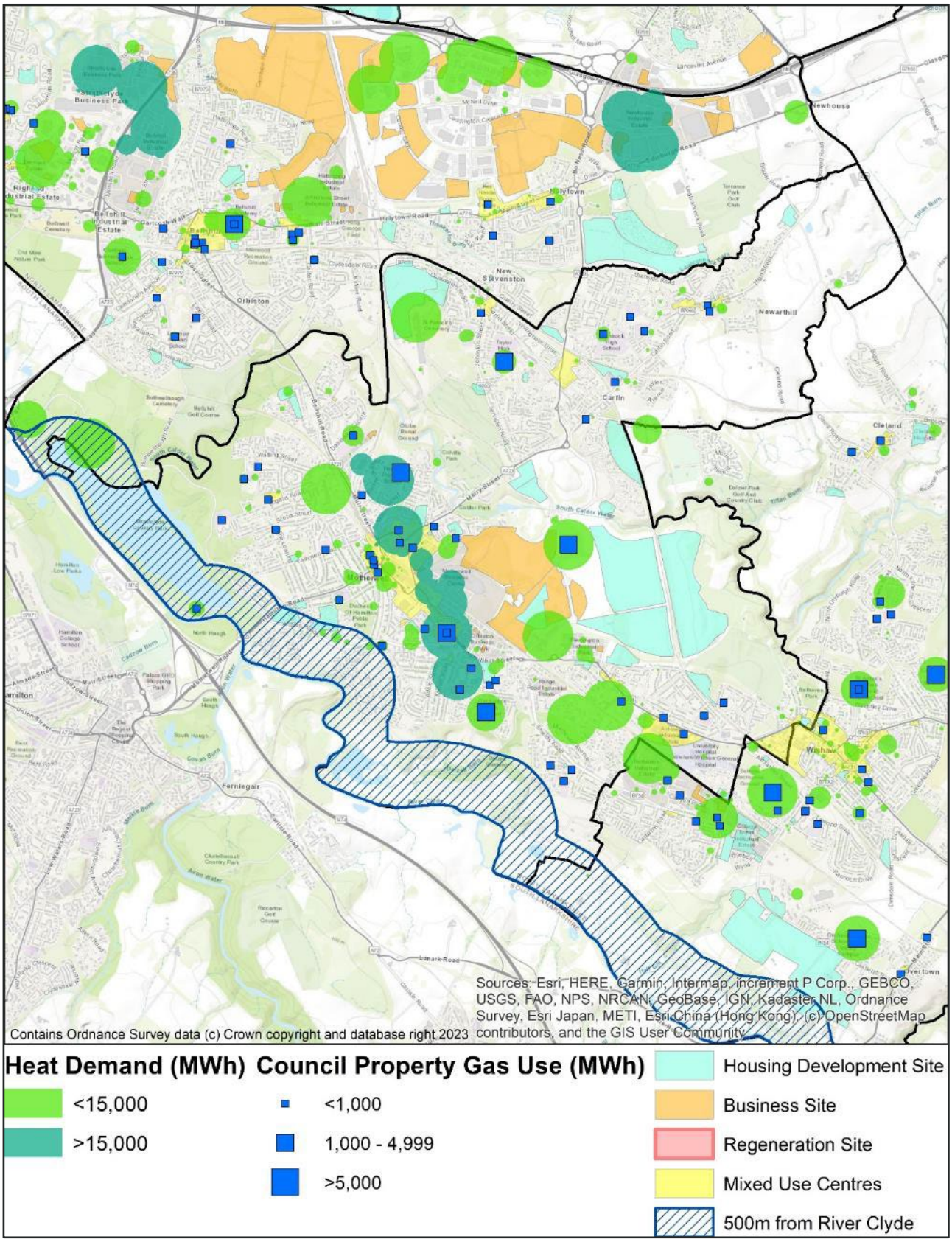


Figure 77: Heat network zone opportunity – Newhouse – Baseline

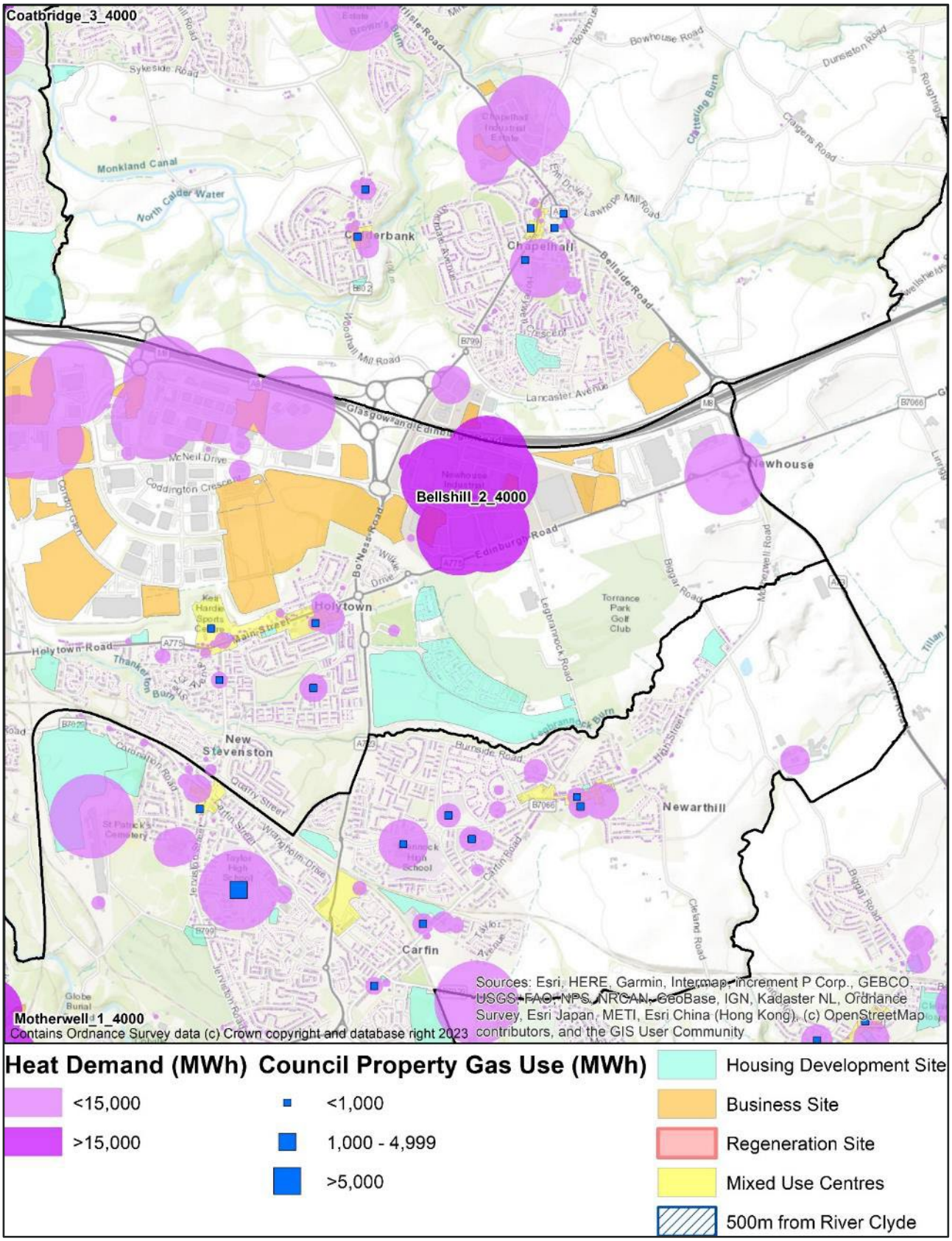
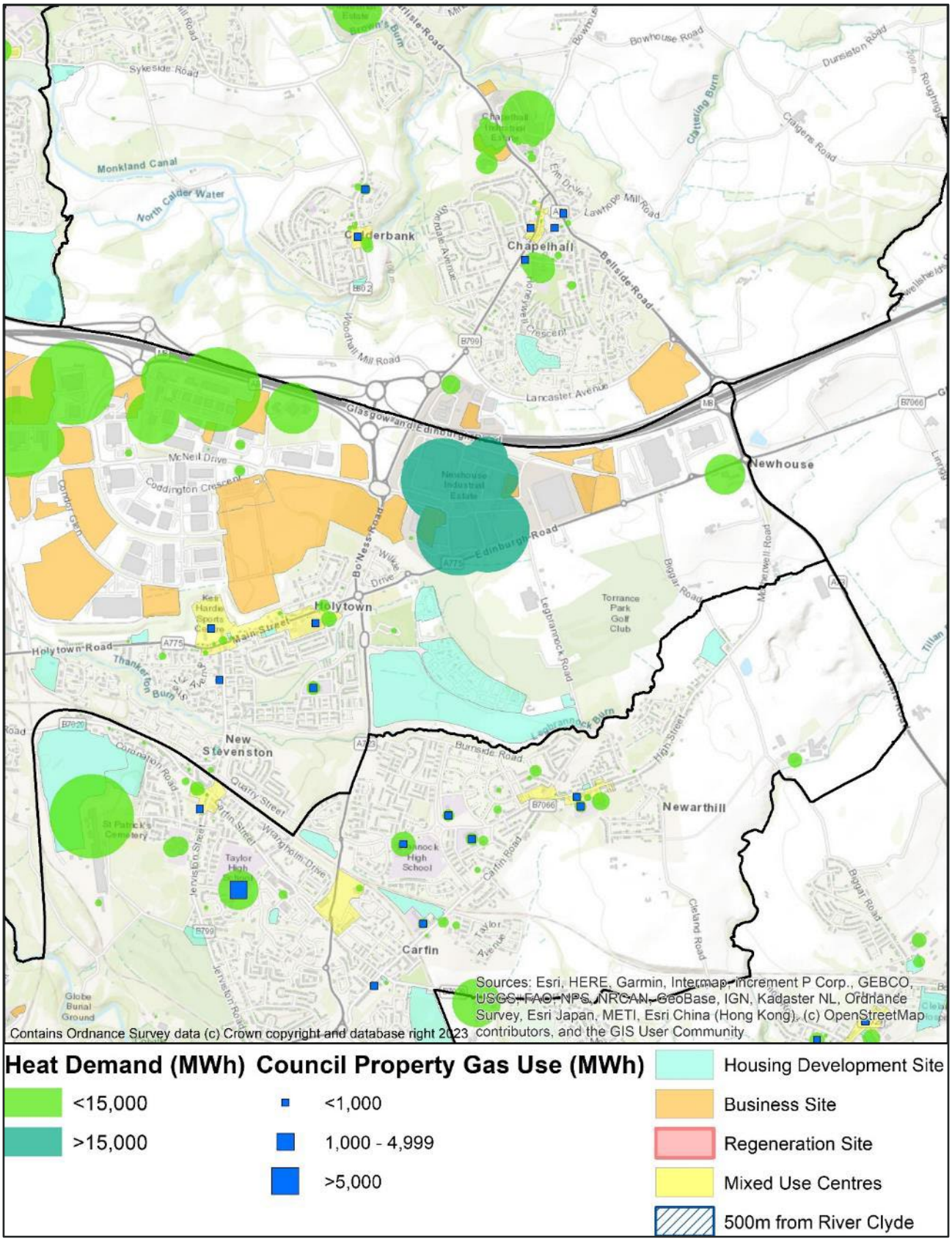


Figure 78: heat network zone opportunity - Newhouse - Stringent



Appendix E Heat Pump Suitability Maps

Figure 79: Domestic property heat pump suitability – North Lanarkshire

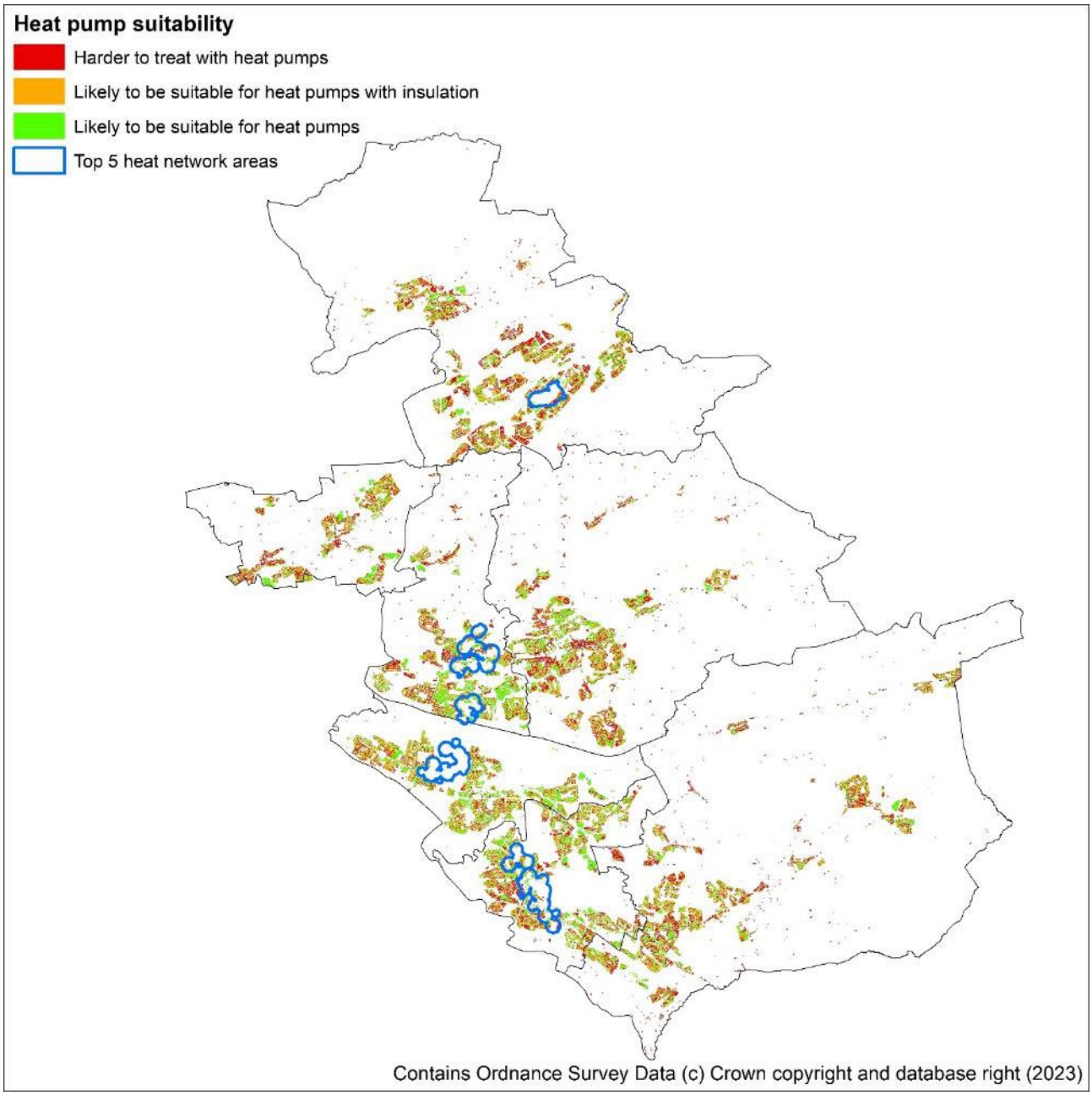
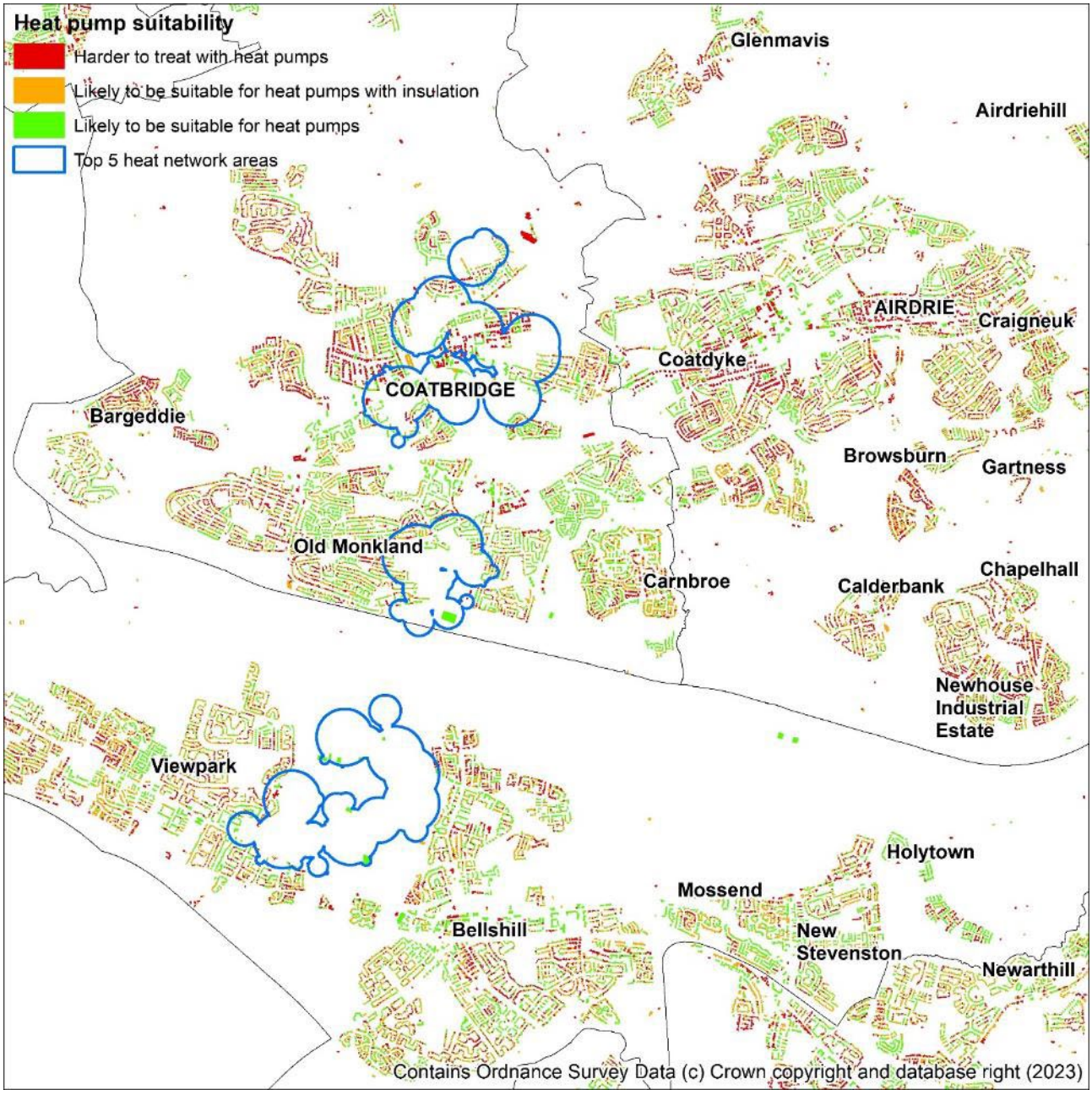
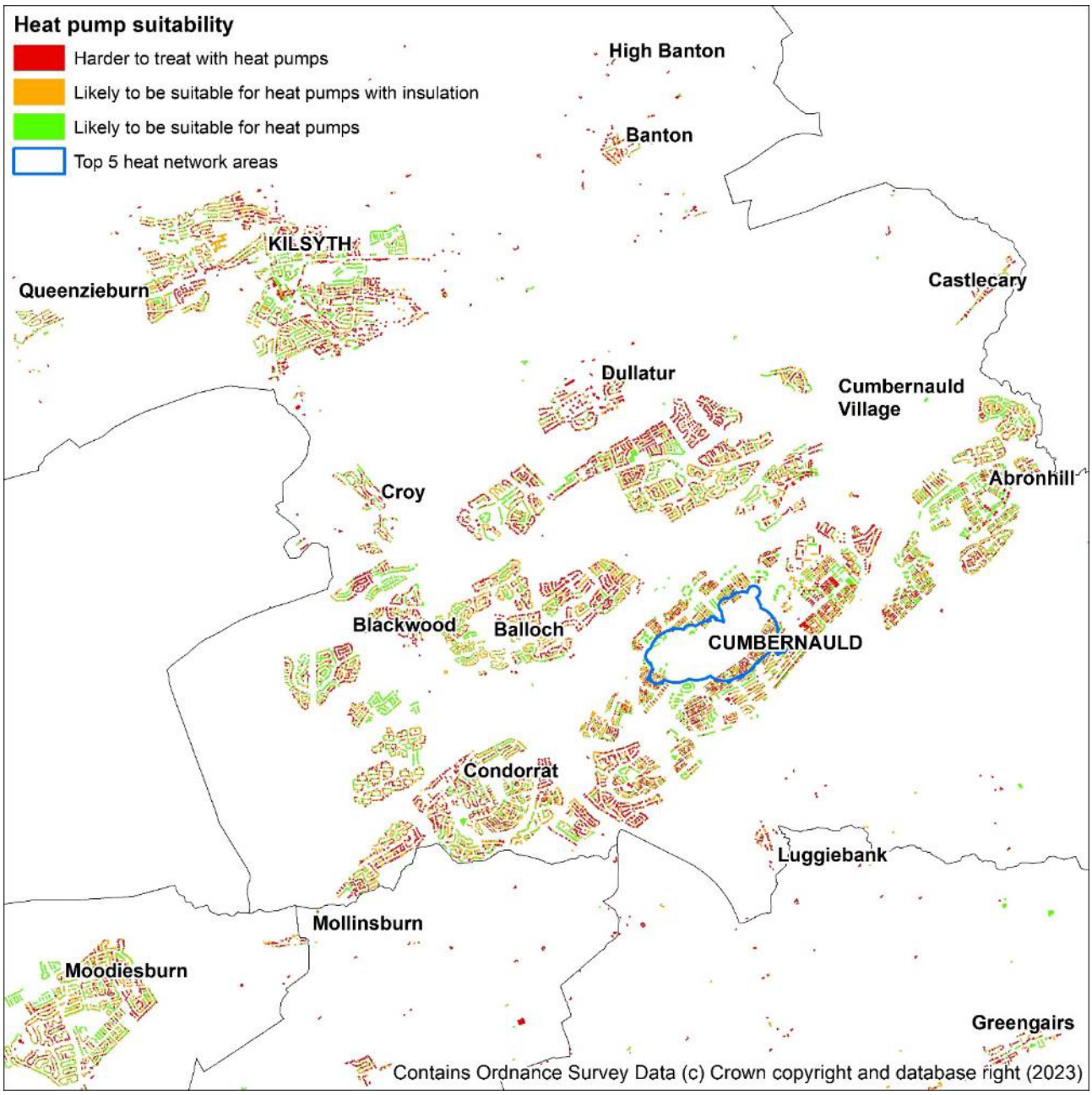
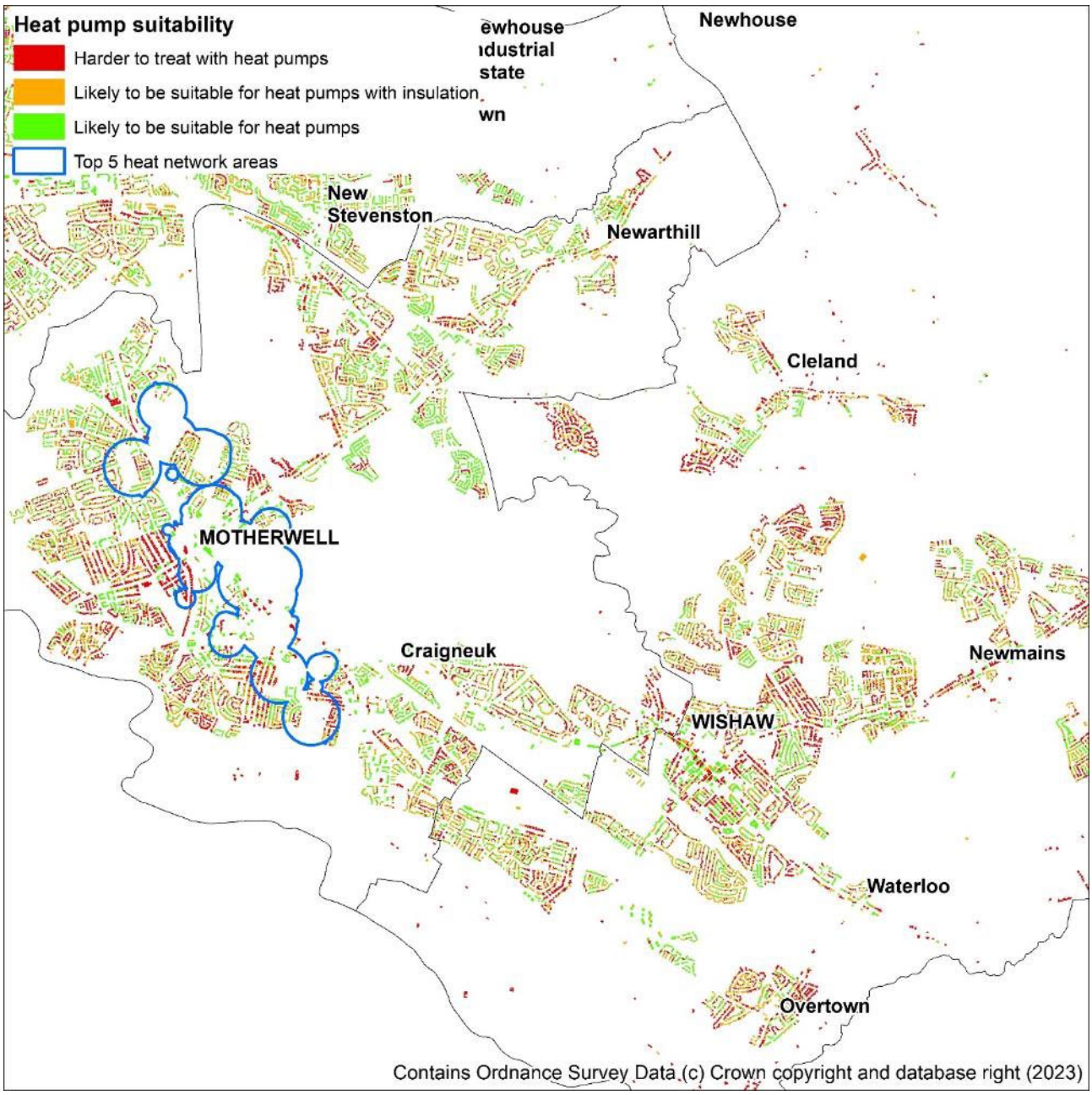
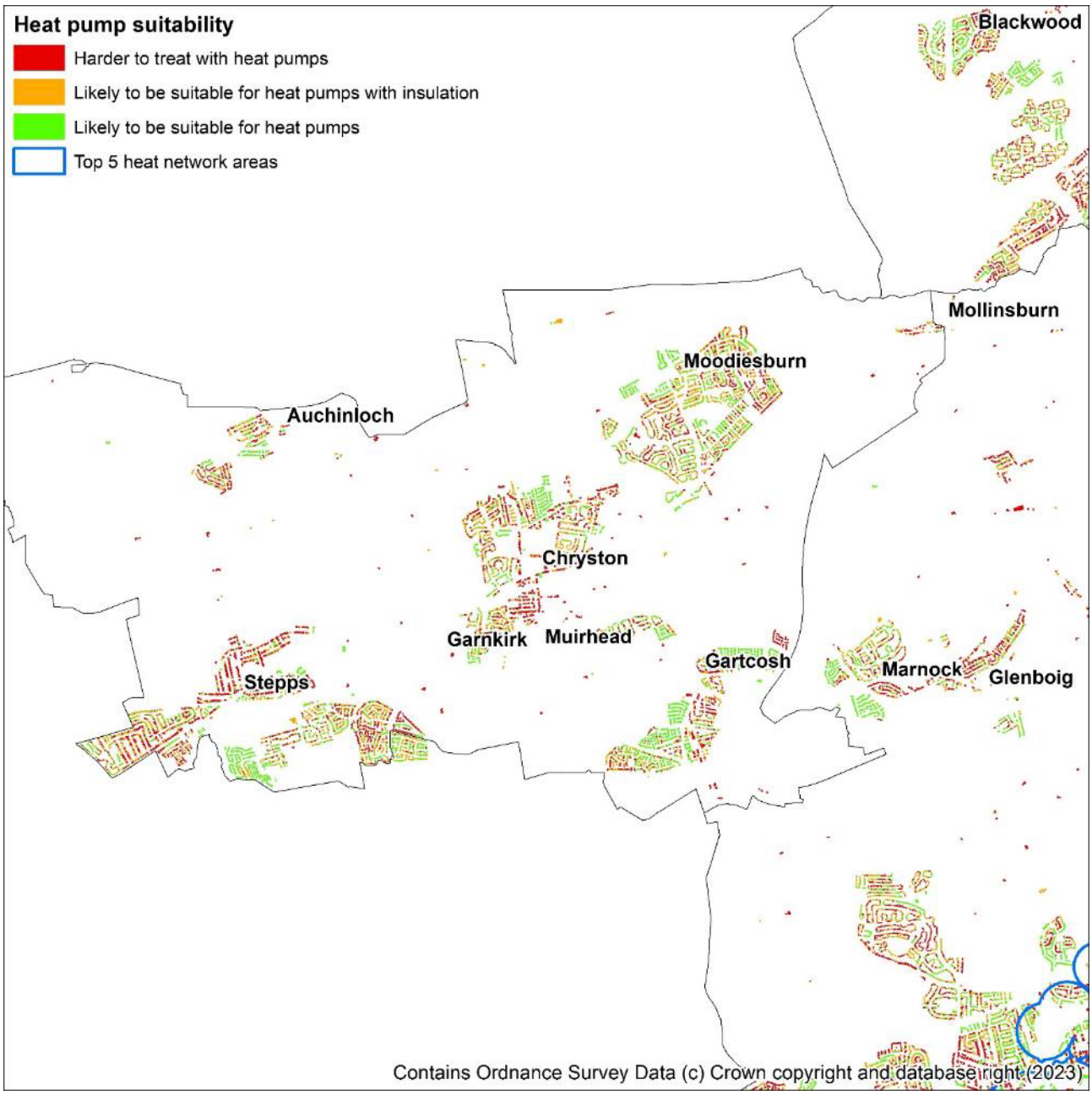


Figure 80: Domestic property heat pump suitability – Airdrie, Coatbridge, Bellshill




Heat pump suitability
Harder to treat with heat pumps
Likely to be suitable for heat pumps with insulation
Likely to be suitable for heat pumps
Top 5 heat network areas
High Banton
Banton
KILSYTH
Queenzieburn
Castlecary
Dullatur
Cumbernauld Village
Abronhill
Croy
Blackwood
Balloch
CUMBERNAULD
Condorrat
Luggiebank
Mollinsburn
Moodiesburn
Greengairs
Contains Ordnance Survey Data (c) Crown copyright and database right (2023)


Heat pump suitability
Harder to treat with heat pumps
Likely to be suitable for heat pumps with insulation
Likely to be suitable for heat pumps
Top 5 heat network areas
ewhouse
ıdustrial
state
wn
Newhouse
New
Stevenston
Newarthill
Cleland
MOTHERWELL
Craigneuk
Newmains
WISHAW
Waterloo
Overtown
Contains Ordnance Survey Data (c) Crown copyright and database right (2023)


Heat pump suitability
Harder to treat with heat pumps
Likely to be suitable for heat pumps with insulation
Likely to be suitable for heat pumps
Top 5 heat network areas
Blackwood
Mollinsburn
Moodiesburn
Auchinloch
Chryston
Garnkirk
Muirhead
Stepps
Gartcosh
Marnock
Glenboig
Contains Ordnance Survey Data (c) Crown copyright and database right (2023)

Appendix F Engagement and Consultation

Several consultation opportunities were held over the course of developing the draft strategy and delivery plan and at a later stage following publication of the draft strategy on the council's website. A range of methods were employed. This included in-person and online consultation opportunities.

Early engagement opportunities were held following generation of initial delivery areas with a range of internal stakeholders. Subsequent consultation and engagement opportunities were held with a wider range of stakeholders following finalisation of delivery areas prior to the publication of the draft strategy and delivery plan. This included:

- Registered Social Landlords
- Private landlords
- Public Sector organisations
- Tenants and Residents
- Third and Voluntary Sector organisations
- The general public and other businesses

An online survey accompanied the draft strategy and delivery plan and feedback from this informed the final strategy and delivery plan. Further information on the consultation can be found in the consultation summary report.

Appendix G Default Indicators

Theme	Indicator	Criteria	Weighting	Description	Data source. if known
Building energy efficiency	Loft insulation	<100mm (prediction) (Yes)	33.33%	Binary identifier. Used to identify properties with a low energy efficiency, properties with no or minimal loft insulation.	Home Analytics
	Single glazed windows	Binary (Yes)	33.33%	Binary identifier. Used to identify properties with a low energy efficiency, properties with single glazed windows.	Home Analytics
	Wall insulation prediction (all construction types)	Binary (Uninsulated)	33.33%	Binary identifier. Used to identify properties with a low energy efficiency, properties with uninsulated walls.	Home Analytics
Additional example Indicators that could be used to support Delivery Level Area identification as part of LHEES Stage 4 and Delivery Plan	Tenure type	User defined		Four types; housing association, owner/ occupier, private rented, local authority. User can filter by interest.	Home Analytics
	Building age	User defined		Defined in six age brackets. User can filter by interest.	Home Analytics
	Non-traditional build design type	Solid wall (binary)		User can filter by interest.	Home Analytics
	EPC Rating	E, F or G		User can filter by interest.	Home Analytics
Indicators of fuel poverty	Probability of fuel poverty	% likelihood	50.00%	50% is default but set to 0% if extreme fuel poverty is to be analysed.	Home Analytics
	Probability of extreme fuel poverty	% likelihood	0.00%	0% is a default Weighting applied. User can adjust balance by selecting 0% or 50% to switch analysis focus between fuel poverty or extreme fuel poverty.	Home Analytics
Building energy efficiency	Loft insulation	<100mm (prediction) (Yes)	16.67%	Poor energy efficiency Indicators sum to 50% of overall Weighting, each have an equal Weighting.	Home Analytics
	Single glazed windows	Binary (Yes)	16.67%		Home Analytics

Theme	Indicator	Criteria	Weighting	Description	Data source. if known
	Wall insulation prediction (all construction types)	Binary (Uninsulated)	16.67%		Home Analytics
Additional example Indicators that could be used to support Delivery Level Area identification as part of LHEES Stage 4 and Delivery Plan	Tenure type	User defined		Four types; housing association, owner/ occupier, private rented, local authority. User can filter by interest.	Home Analytics
	Building age	User defined		Defined in six age brackets. User can filter by interest.	Home Analytics
	Non-traditional build design type	Solid wall (binary)		User can filter by interest.	Home Analytics
	EPC Rating	E, F or G		User can filter by interest.	Home Analytics

Appendix H Intervention Details

This appendix includes forms to be used to develop potential areas of intervention. They contain the information that is known at this stage and fields are blank for completion at a later stage, for those interventions which are taken forward.

On- and Off-gas Grid

Intervention	1
Action Summary	1.1 Survey properties with missing data. 1.2 Install low carbon heating in off-gas grid buildings.
LHEES Considerations	1 Off- gas grid
Background	
Action Champion	
Internal stakeholders	
External stakeholders	
Property numbers	11,575
Technical considerations	
Skills Considerations	
Economic considerations	
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	
Monitoring and evaluation	

Intervention	2
Action Summary	2.1 Survey properties with missing data. 2.2 Install low carbon heating in off-gas grid buildings.
LHEES Considerations	2 On- gas grid
Background	
Action Champion	
Internal stakeholders	
External stakeholders	
Property numbers	149,286
Technical considerations	
Skills Considerations	
Economic considerations	
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	
Monitoring and evaluation	

Local Authority Interventions

Intervention Reference	3
Action Summary	3.1 Survey properties with missing data. 3.2 Upgrade all insulation to 300 mm mineral wool (or equivalent)
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Loft insulation is important in reducing heat loss and hence heat demand and bills. NLC's building stock data details the depth of insulation in the lofts of most properties. In many properties, this is less than 300mm, which is considered economically reasonable and technically effective. There is an opportunity to reduce heat demand by retrofitting all properties to take the insulation up to 250mm mineral wool (or equivalent).
Action Champion	
Internal stakeholders	
External stakeholders	Tenants Suppliers/ installers
Property numbers	Airdrie- 4,388, Bellshill- 3,619, Coatbridge- 5,156, Cumbernauld and Kilsyth- 2,755, Motherwell- 6,088, Northern Corridor- 1,033, Wishaw- 4,470.
Technical considerations	This is an established technology with several vendors and no supply bottlenecks.
Skills Considerations	This is an established practice with no specific skills requirement
Economic considerations	This is a low-cost investment with a lifespan exceeding that of the building.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	Works should be inspected on completion. The action champion shall maintain the property database and ensure that the "loft insulation thickness" is updated after each batch of inspections. The action champion shall report back to the LHEES team with lessons learned for other actions.

Intervention Reference	4
Action Summary	4.1 Assess priority 4.2 Assess feasibility 4.3 Install cavity or cladding insulation
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Wall insulation is important in reducing heat loss and hence heat demand and bills. NLC's building stock data suggests that only 2 properties lack either external insulated cladding or cavity wall insulation. However, some installations are quite old and details of material or thickness are not included. Assessing the effectiveness and need for increased insulation, perhaps by thermal imaging survey, would be useful.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers
Property numbers	
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	Works should be inspected on completion. The action champion shall maintain the property database and ensure that the "wall insulation" is updated after each batch of inspections.

Intervention Reference	4
	The action champion shall report back to the LHEES team with lessons learned for other actions.

Intervention Reference	5
Action Summary	3.1 Assess priority 3.2 Assess feasibility 2.3 Install double glazing
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Double glazing is important in reducing heat loss and hence heat demand and bills. NLC's building stock data suggests few properties lack double glazing but a review of the age of existing installations would be wise since new glazing may still be able to halve the heat loss compared to older double glazing.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers
Property numbers	26
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	Works should be inspected on completion. The action champion shall maintain the property database and ensure that the "glazing type" is updated after each batch of inspections. The action champion shall report back to the LHEES team with lessons learned for other actions.

Intervention Reference	6
Action Summary	6.1 Survey properties for wet heating installation requirements 6.2 Install ASHP
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing electric heating systems with ASHPs can reduce heating electricity consumption by 2 to 3-fold but requires a wet heating system to be installed.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers DNO
Property numbers	Airdrie- 392, Bellshill- 121, Coatbridge- 1245, Cumbernauld and Kilsyth- 211, Motherwell- 2086, Northern Corridor- 13, Wishaw- 537.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	Works should be inspected on completion. Performance across the year in the first completed projects should be closely monitored to ensure that the ASHPs work as they ought to, or require adjustments to settings, and to ensure that the users are comfortable interacting with the controls.

Intervention Reference	7
Action Summary	7.1 Install ASHP
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing oil or LPG boilers with ASHPs will significantly reduce carbon emissions and cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers DNO
Property numbers	Airdrie- 8, Bellshill- 2, Coatbridge- 10, Cumbernauld and Kilsyth- 2, Motherwell- 3, Northern Corridor- 1, Wishaw- 18.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	Works should be inspected on completion. Performance across the year in the first completed projects should be closely monitored to ensure that the ASHPs work as they ought to, or require adjustments to settings, and to ensure that the users are comfortable interacting with the controls.

Intervention Reference	8
Action Summary	8.1 Install ASHP 8.2 Install electric cooker 8.3 Disconnect from gas network
LHEES Considerations	1 On gas grid 4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing gas boilers with ASHPs will reduce carbon emissions and switching to electric cooking to disconnect from the gas grid and avoid gas standing charges would reduce energy costs.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers DNO
Property numbers	Airdrie- 6,493, Bellshill- 5,933, Coatbridge- 6,246, Cumbernauld and Kilsyth- 3,826, Motherwell- 6,301, Northern Corridor- 1,681, Wishaw- 7,357.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	Works should be inspected on completion. Performance across the year in the first completed projects should be closely monitored to ensure that the ASHPs work as they ought to, or require adjustments to settings, and to ensure that the users are comfortable interacting with the controls.

Intervention Reference	9
Action Summary	9.1 Survey properties for wet heating installation requirements 9.2 Install ASHP
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing solid fuel (coal) heating systems with ASHPs can reduce carbon footprint and heat costs.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers DNO
Property numbers	Airdrie- 16, Bellshill- 12, Coatbridge- 6, Cumbernauld and Kilsyth- 5, Motherwell- 3, Northern Corridor- 7, Wishaw- 18.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	Works should be inspected on completion. Performance across the year in the first completed projects should be closely monitored to ensure that the ASHPs work as they ought to, or require adjustments to settings, and to ensure that the users are comfortable interacting with the controls.

Intervention Reference	10
Action Summary	10.1 Survey properties for wet heating installation requirements 10.2 Install ASHP
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing biomass heating systems with ASHPs will eventually reduce carbon footprint and may reduce the cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	NLAN's tenants Suppliers/ installers DNO
Property numbers	Cumbernauld and Kilsyth- 1, Wishaw- 1.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	The first priority will be vacant properties during transition between tenants. Next, the properties will be prioritised by data zone SIMD to cover multiple properties in the same locale in order to maximise installation time efficiency.
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	Works should be inspected on completion. Performance across the year in the first completed projects should be closely monitored to ensure that the ASHPs work as they ought to, or require adjustments to settings, and to ensure that the users are comfortable interacting with the controls.

Housing Association Interventions

Intervention Reference	11
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Loft insulation is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers
Property numbers	Airdrie- 278, Bellshill- 279, Coatbridge- 188, Cumbernauld and Kilsyth- 633, Motherwell- 547, Northern Corridor- 49, Wishaw- 396.
Technical considerations	This is an established technology with several vendors and no supply bottlenecks.
Skills Considerations	This is an established practice with no specific skills requirement
Economic considerations	This is a low-cost investment with a lifespan exceeding that of the building.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	12
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Wall insulation is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers
Property numbers	Airdrie- 181, Bellshill- 87, Coatbridge- 179, Cumbernauld and Kilsyth- 582, Motherwell- 193, Northern Corridor- 20, Wishaw- 222.
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	13
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Double glazing is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers
Property numbers	Airdrie- 13, Bellshill- 43, Coatbridge- 70, Cumbernauld and Kilsyth- 43, Motherwell- 18, Northern Corridor- 8, Wishaw- 40.
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	14
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing electric heating systems with ASHPs can reduce heating electricity consumption by 2 to 3-fold but requires a wet heating system to be installed.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers DNO
Property numbers	Airdrie- 39, Bellshill- 73, Coatbridge- 29, Cumbernauld and Kilsyth- 335, Motherwell- 170, Northern Corridor- 1, Wishaw- 221.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	15
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing oil or LPG boilers with ASHPs will significantly reduce carbon emissions and cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers DNO
Property numbers	Airdrie- 1, Bellshill- 1, Coatbridge- 2, Cumbernauld and Kilsyth- 2, Motherwell- 2, Northern Corridor- 3, Wishaw- 3.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	16
Action Summary	
LHEES Considerations	1 On gas grid 4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing gas boilers with ASHPs will reduce carbon emissions and switching to electric cooking to disconnect from the gas grid and avoid gas standing charges would reduce energy costs.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers DNO
Property numbers	Airdrie- 1,051, Bellshill- 859, Coatbridge- 1,020, Cumbernauld and Kilsyth- 2,429, Motherwell- 1,452, Northern Corridor- 208, Wishaw- 1,173.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	17
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing solid fuel (coal) heating systems with ASHPs can reduce carbon footprint and heat costs.
Action Champion	
Internal stakeholders	
External stakeholders	HAs HA tenants Suppliers/ installers DNO
Property numbers	Bellshill- 1, Cumbernauld and Kilsyth- 1
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Owner Occupied Interventions

Intervention Reference	18
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Loft insulation is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers
Property numbers	Airdrie- 6,876, Bellshill- 5,336, Coatbridge- 5,540, Cumbernauld and Kilsyth- 8,592, Motherwell- 5,366, Northern Corridor- 3,294, Wishaw- 6,155.
Technical considerations	This is an established technology with several vendors and no supply bottlenecks.
Skills Considerations	This is an established practice with no specific skills requirement
Economic considerations	This is a low-cost investment with a lifespan exceeding that of the building.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	19
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Wall insulation is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers
Property numbers	Airdrie- 6,100, Bellshill- 4,580, Coatbridge- 4,734, Cumbernauld and Kilsyth- 7,738, Motherwell- 4,416, Northern Corridor- 2,208, Wishaw- 5,216.
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	20
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Double glazing is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers
Property numbers	Airdrie- 332, Bellshill- 707, Coatbridge- 324, Cumbernauld and Kilsyth- 540, Motherwell- 679, Northern Corridor- 331, Wishaw- 688.
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	21
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing electric heating systems with ASHPs can reduce heating electricity consumption by 2 to 3-fold but requires a wet heating system to be installed.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers DNO
Property numbers	Airdrie- 656, Bellshill- 555, Coatbridge- 493, Cumbernauld and Kilsyth- 1398, Motherwell- 575, Northern Corridor- 172, Wishaw- 767.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	22
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing oil or LPG boilers with ASHPs will significantly reduce carbon emissions and cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	Owner Suppliers/ installers DNO
Property numbers	Airdrie- 554, Bellshill- 36, Coatbridge- 83, Cumbernauld and Kilsyth- 261, Motherwell- 80, Northern Corridor- 44, Wishaw- 604.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	23
Action Summary	
LHEES Considerations	1 On gas grid 4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing gas boilers with ASHPs will reduce carbon emissions and switching to electric cooking to disconnect from the gas grid and avoid gas standing charges would reduce energy costs.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers DNO
Property numbers	Airdrie- 14,088, Bellshill- 11,201, Coatbridge- 12,822, Cumbernauld and Kilsyth- 18,860, Motherwell- 12,939, Northern Corridor- 7,520, Wishaw- 12,841.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	24
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing solid fuel (coal) heating systems with ASHPs can reduce carbon footprint and heat costs.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers DNO
Property numbers	Airdrie- 36, Bellshill- 14, Coatbridge- 16, Cumbernauld and Kilsyth- 33, Motherwell- 14, Northern Corridor- 12, Wishaw- 60.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	25
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing biomass heating systems with ASHPs will eventually reduce carbon footprint and may reduce the cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Suppliers/ installers DNO
Property numbers	Airdrie- 15, Coatbridge- 5, Cumbernauld and Kilsyth- 1, Motherwell- 1, Northern Corridor- 3, Wishaw- 16.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Privately Rented Interventions

Intervention Reference	26
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Loft insulation is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers
Property numbers	Airdrie- 1,029, Bellshill- 642, Coatbridge- 819, Cumbernauld and Kilsyth- 1,034, Motherwell- 737, Northern Corridor- 287, Wishaw- 781.
Technical considerations	This is an established technology with several vendors and no supply bottlenecks.
Skills Considerations	This is an established practice with no specific skills requirement
Economic considerations	This is a low-cost investment with a lifespan exceeding that of the building.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	27
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Wall insulation is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers
Property numbers	Airdrie- 867, Bellshill- 698, Coatbridge- 893, Cumbernauld and Kilsyth- 1,516, Motherwell- 786, Northern Corridor- 243, Wishaw- 767.
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	28
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Double glazing is important in reducing heat loss and hence heat demand and bills.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers
Property numbers	Airdrie- 53, Bellshill- 109, Coatbridge- 48, Cumbernauld and Kilsyth- 117, Motherwell- 178, Northern Corridor- 38, Wishaw- 82.
Technical considerations	There are several established technologies with several vendors and no supply bottlenecks.
Skills Considerations	These are established practices with no specific skills requirement
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2
Monitoring and evaluation	

Intervention Reference	29
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing electric heating systems with ASHPs can reduce heating electricity consumption by 2 to 3-fold but requires a wet heating system to be installed.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers DNO
Property numbers	Airdrie- 1, Bellshill- 1, Coatbridge- 2, Cumbernauld and Kilsyth- 2, Motherwell- 2, Northern Corridor- 3, Wishaw- 3.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	30
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing oil or LPG boilers with ASHPs will significantly reduce carbon emissions and cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	Owner Tenants Suppliers/ installers DNO
Property numbers	Airdrie- 65, Bellshill- 6, Coatbridge- 19, Cumbernauld and Kilsyth- 40, Motherwell- 3, Northern Corridor- 6, Wishaw- 51.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	31
Action Summary	
LHEES Considerations	1 On gas grid 4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing gas boilers with ASHPs will reduce carbon emissions and switching to electric cooking to disconnect from the gas grid and avoid gas standing charges would reduce energy costs.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers DNO
Property numbers	Airdrie- 1,752, Bellshill- 1,161, Coatbridge- 1,616, Cumbernauld and Kilsyth- 2,116, Motherwell- 1,682, Northern Corridor- 563, Wishaw- 1,319.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	32
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing solid fuel (coal) heating systems with ASHPs can reduce carbon footprint and heat costs.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers DNO
Property numbers	Airdrie- 3, Coatbridge- 1, Cumbernauld and Kilsyth- 1.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Intervention Reference	33
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency
Background	Replacing biomass heating systems with ASHPs will eventually reduce carbon footprint and may reduce the cost of heat.
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers DNO
Property numbers	Motherwell- 2.
Technical considerations	This is an established technology with several vendors. Each house (or house type) will require a unique design for the installation and various small building works and associated disruption.
Skills Considerations	The ASHP installation requires an installer, certified by the supplier.
Economic considerations	The level of investment, if required, could vary significantly between buildings.
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and Appendix E
Monitoring and evaluation	

Mixed-Tenure Interventions

Intervention Reference	34
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency 6 Mixed-tenure, mixed-use and historic buildings
Background	
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers DNO
Property numbers	
Technical considerations	
Skills Considerations	
Economic considerations	
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and 8.1.4
Monitoring and evaluation	

Interventions in historic buildings

Intervention Reference	35
Action Summary	
LHEES Considerations	4 Poor building energy efficiency 5 Fuel poverty resulting from poor building energy efficiency 6 Mixed-tenure, mixed-use and historic buildings
Background	
Action Champion	
Internal stakeholders	
External stakeholders	Owners Tenants Suppliers/ installers DNO
Property numbers	
Technical considerations	
Skills Considerations	
Economic considerations	
Prioritisation	
External Funding Opportunities	
Internal Funding Allocation	
Links to existing projects	
Time	
Action Plan	
Geospatial	Refer to 8.1.2 and 8.1.4
Monitoring and evaluation	