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Energy and Low Carbon Heat

LHEES Capacity Building Workshop

Non-Domestic Approach – Overview and Demonstration

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LHEES Capacity Building Workshop

Non-Domestic Approach - Agenda

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Welcome and Introduction

Aims of the Non-Domestic Approach capacity building workshop:

*LHEES should: - Cover the **full building stock** within the local authority, including the domestic and **non-domestic sectors**, so far **as reasonably possible**;* (Guidance, par 1.11)

- Understand the GIS and baselining approach for non-domestic buildings in LHEES
- Provide information on limitations and uncertainties
- How the method can inform strategy and next steps
- To provide an opportunity for local authority Q&A / feedback on this approach

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Summary of LHEES Stages and Priority areas and LHEES Stage 1

- LHEES Considerations & Structure

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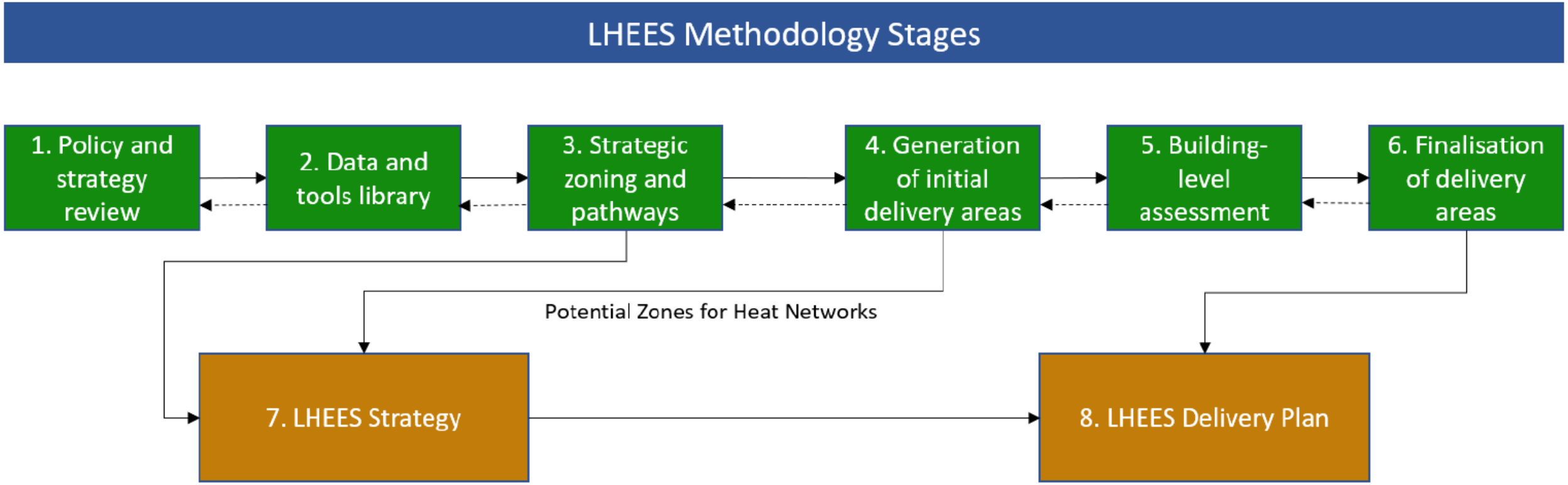
LHEES Structure and Stages



LHEES Considerations – non-domestic

	No.	LHEES Consideration	Non-domestic Analysis
Heat decarbonisation	1	Off-gas grid buildings	Building-level heat decarbonisation is considered collectively across on- and off-gas grid areas
	2	On-gas grid buildings	
	3	Heat networks	Considered from the perspective of connection suitability, based on typology and other factors Heat demand density analysis to identify Potential Zones is carried out separately – see the Detailed Practitioner Approach for Heat Networks
Energy efficiency and other outcomes	4	Poor building energy efficiency	Not considered due to the lack of information on building fabric / insulation levels within the Core data Some context on fabric improvement potential and heating system control is provided by typology
	5	Poor building energy efficiency as a driver for fuel poverty	N/A
	6	Mixed-tenure, mixed-use and historic buildings	Considered separately in the mixed-tenure, mixed-use and historic buildings Detailed Practitioner Approach

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Stage 1 – Policy and Strategy Review

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Stage 1 – Policy and Strategy Review

Purpose

Supports review of local policy in national context

Sets out Indicators, Criteria and Weightings for the LHEES Priorities

Supports capture and mapping of key internal and external stakeholders, as well as funding resources available

Approach

- Policy and Strategy Review Excel template supports completion of Stage 1
- Partially pre-populated, for local authority review, completion and expansion
- Suggestions on approach to use included within Methodology

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LHEES Stage 2 – Data and tools library

- Data and Tools Library
- Non-Domestic Analytics Dataset

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Stage 2 – Data and Tools Library

Purpose

Identifies and documents most appropriate data and information to support the LHEES analysis

Approach

- Data and Tools Library (Excel template) supports completion of Stage 2
- Library captures data requirements of LHEES collectively – data categorised based on use
  - Core data
  - Alternative data
  - Supplementary data

Stage 2 – Non-domestic analytics: what is it?

- New dataset provided by Energy Savings Trust
- The non-domestic sector equivalent to Home Analytics
- Combines multiple datasets, including Ordnance Survey and Non-Domestic EPC data
- Contains a large volume of fields but the level of detail is not as great as Home Analytics.
- Information about insulation and construction type is very limited/not available.
- Key information includes:
    - UPRNs/parent UPRNs
    - Building use
    - Property age
    - Floor area
    - Main fuel type
    - Primary heating system
    - Secondary heating system
    - Heat demand
    - Space heat demand
    - Hot water demand
    - Urban/rural 8-fold classification

Stage 2 – information used

- **UPRNs/parent UPRNs** – includes location information and helps align with other LHEES priorities and datasets.
- **Building use** – used to inform building typologies, which is key to understanding the make up of the non-domestic sector and how this links to LHEES considerations
- **Property age** – can provide an indication of construction method and gives insight into likely need for improvements
- **Floor area** – insights into likely energy use, provides information to breakdown the building stock and can link directly to regulations, which often have floor area thresholds
- **Main fuel type** – helps to prioritise properties and understand stock characteristics
- **Primary heating system** – insight into potential technical solutions
- **Secondary heating system** – insight into potential technical solutions
- **Heat demand** – helps categorise buildings, building targeting and impact of changes
- **Space heat demand** – improved understanding of heat demand
- **Hot water demand** – improved understanding of heat demand
- **Urban/rural 8-fold classification** – understand the geography of non-domestic stock

Stage 2 – Non-domestic analytics: accuracy?

- Far fewer non-domestic EPCs (~15% coverage in 2020) than domestic.
- Additional complication of non-domestic properties being less homogenous.
- Infilling is thus easier for Home Analytics and the base data to draw on is larger, hence the difference in accuracy.
- It is an early iteration so **accuracy is likely to improve over time** – better underlying data will help.
- Data was compared to the Scotland Heat Map and showed a poor match – this is very noticeable with point level data.
- For **heat network modelling the SHM** is still the **preferred data source**.
- For local authority assets better information will already be in place.
- Provides an initial basis for improved understanding but **accuracy should be kept in mind**.

Stage 2 – Non-domestic analytics: use

- Provides a standardised data set for **characterisation of non-domestic building stock**.
- The approach focuses on splitting non-domestic properties into different key **typologies** based on use (e.g. retail, offices and education).
- **Less focus on precise identification of interventions** than domestic properties
- This typology-based analysis is complimented by additional data fields, which can be used to investigate further sub-groupings of interest.
- Given the lack of information and data confidence to identify intervention options at a strategic level, typologies are combined with indicators (e.g. main fuel type) to **create property groups**.
- These can be used to support various actions, for example, **engagement activity within an LHEES Delivery Plan**.
- For heat demand may wish to refer to SHM, for other factors Non-domestic Analytics adds insights – there are **alignment issues between the datasets**. For large sites this can be due to where demand is attributed.

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LHEES Stage 3 – Strategic zoning and pathways

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Stage 3 – Strategic Zoning and Pathways

Purpose

Support local authorities to understand current energy efficiency and heat decarbonisation performance of the building stock in their area

Complete analysis to enable local authorities to support understanding in relation to two of the LHEES Considerations:

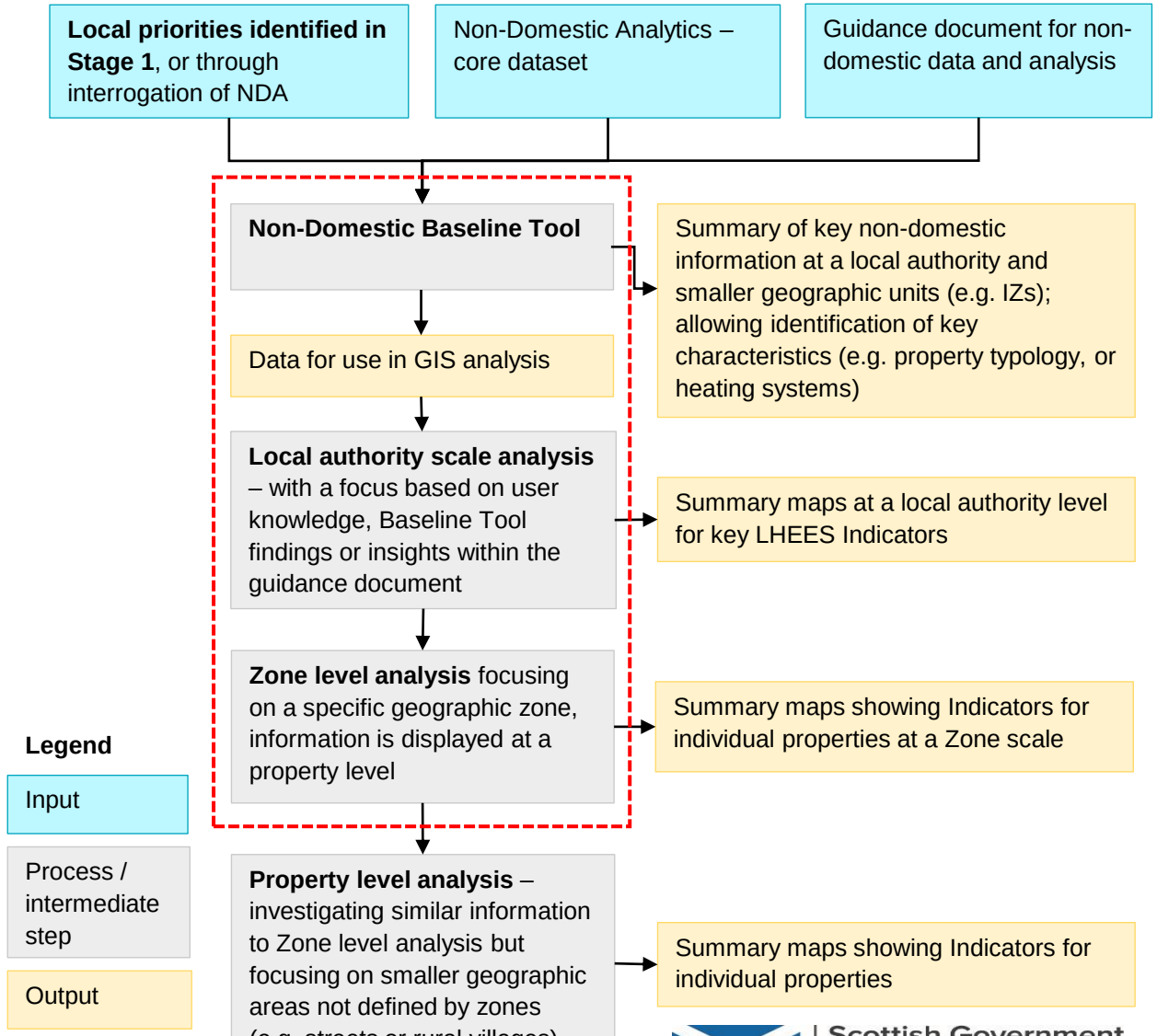
- Heat Decarbonisation – split between building efficiency and building level heating systems
- Heat Networks – complementary information to main analysis

Approach

- Non-Dom. Baseline Tool (Excel) supports input, manipulation and presentation of data
- Tool presents summary statistics for LHEES Considerations based on Stage 1 Indicators
- Tool ranks Strategic Zones (i.e. Wards, IZs and DZs as well as LA) based on their performance for the Heat Decarbonisation LHEES Consideration, providing high-level targeting

Purpose of strategic zone analysis

- The approach presented is an optional piece.
- Priorities will change depending on specific aspirations.
- Focus can be on a variety of factors – e.g. geographic, fuel type or building use.
- The session will focus on providing worked examples.



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Stage 3 – Non-Domestic Baseline Tool overview

- Format & limitations
- Tool structure
- Section overviews

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Non-Domestic Baseline Tool – Format and Limitations

Format

- Excel – ease of use, access and compatibility
- Provide strategic overview and characterisation of non-domestic stock
- Provide understanding of building typologies and other categories

Limitations

- Non-domestic information only (domestic stock has a separate tool) – data from Non-Domestic Analytics only
- Limited number of considerations (2) – due to low detail of building information
- Flexibility in use constrained by Excel format

Use of the methodology document alongside the baseline tool

- Suggest using the report alongside the tool to give context to data.
- Provides an overview of characteristics of different typologies and how these can be considered in the context of different priorities.
- Provides a summary of different indicators and how these can be considered in the context of different priorities.
- These are initial items to consider and are rough guidance as there is extensive variation in the non-domestic building stock.

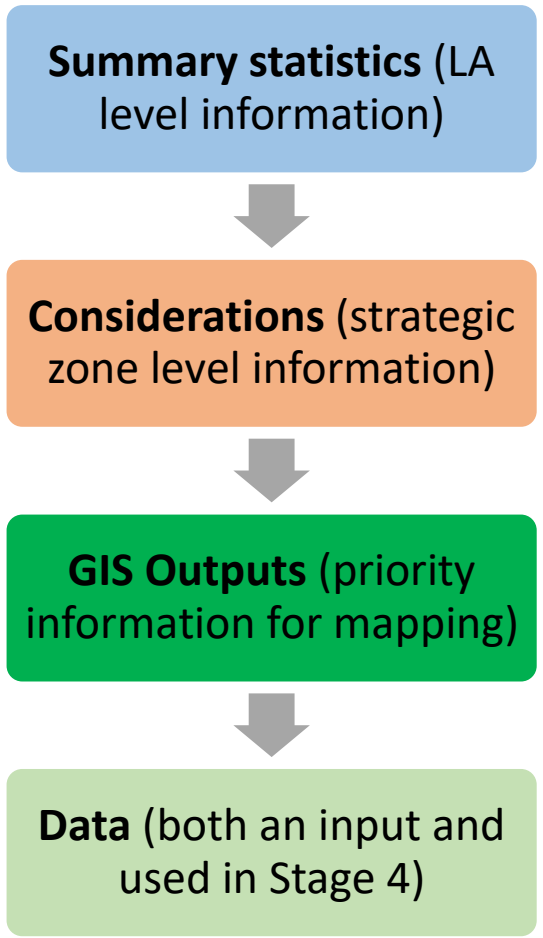
*Example **typology table** for building efficiency*

Typology	Context
Cafes, pubs, restaurants and takeaways	This typology covers a very wide number of buildings of different ages so will vary. There are quite a large mix of ownership types across this typology will also create variation in ease of adoption. Ventilation is often one of the key energy efficiency measures to consider in this sector, as it is a large energy user in industrial kitchens.
Clubs and community centres	Building controls have a much larger impact on savings than fabric improvements for this typology. One reason for this is issue around occupancy, as the buildings can have inconsistent use levels having good control of the heating system can create large savings.

*Example **indicator table** for building efficiency*

Indicator	Key characteristics
Property age	This can be a proxy for fabric efficiency and ease of improvement. Post 1983 buildings should generally be of higher efficiency, 1949-1983 will have a high share of cavity walls (which if uninsulated are cheap to improve), earlier properties will have a mix of construction type with pre 1919 having a high portion of solid brick or stone – which are more expensive to improve.

Non-Domestic Baseline tool structure



- Non-Domestic Baseline tool has four ***key*** elements:
  - **Summary statistics** – high-level overview of the non-domestic building stock for the whole LA or examined for one strategic zone of interest.
  - **Considerations** – these examine heat networks for a whole LA, or the heat decarbonisation pathways at a strategic zone.
  - **Outputs** – summary of information for visualisation in GIS. Support data export for use in GIS for use later in LHEES Stage 4.
  - **Data** – Store of the Non-domestic Analytics dataset. Includes input data, also has several additional tabs that carry out background analysis
- Accompanying report outlines how to use the tool and set up data ready for GIS visual analysis.
- LHEES Considerations are predominately not split out (exception of heat networks) as information is not detailed enough
- Focus on character of building stock rather than precise LHEES priorities – accompanying report provide context for priorities

Baseline tool walkthrough

- Run through the baseline tool for the two LHEES Considerations:
  - Heat Networks
  - Heat Decarbonisation
- Detailed breakdown can be found in Section 5 of the Non-Dom Approach document.
- Outputs from each section provided:
  1. Data entry and use
  2. Local authority level non-domestic building stock characterisation
  3. Consideration analysis
  4. GIS export
- Walkthrough will allow the user to:
  - Increase familiarity with the tool, giving understanding of what level of information is provided and potential uses.
  - Using the tool to identify high priority strategic areas.

Note – tool created using pivot tables rather than macros

Non-Domestic Baseline tool structure

Non-Domestic Baseline Tool

Version 4.0 - September 2022

Tool Overview:

The Non-Domestic Baseline Tool can be used to provide a strategic overview of the non-d
typologies and by other criteria, such as age, heating system type or floor area category. T
some flexible functionality to explore groupings of interest further, in the context of the LH
LHEES Methodology, but given the limitations in the data available for the non-domestic s
on building use (e.g. retail, offices and education) and considering these alongside other I
and / or total heat demand information for user-selected groupings, rather than suggestin
provides further detail and context to support use of the tool.

Tool Sections:

Section 1: Summary statistics. Provides the user with a summary dashboard and a high-le
whole local authority area. The Geographic Unit Summary allows the same statistics and g
Data Zone or Ward).

Section 2: Considerations. Provides an overview of the non-domestic data in the context
property suitability for heat network connection across the local authority, by typology and
Indicators relating to the LHEES building level heat decarbonisation. The data does not all
building energy efficiency and building-level heating systems. Data can be viewed at a loc
resolutions the different geographic areas can be ranked by property count and heat dema
example, a geographic area explored in the Geographical Unit Summary tab. It is useful to
Approach'.

Section 3: GIS Outputs. Includes a summary of the default information for visualisation in
export for use in GIS.

Section 4: Data. Store of the Non-domestic Analytics dataset. This is an unedited version

Section 5: Analysis. These tabs are where processing tasks are automatically carried out.
account change in the input data.

"Document Guide"

Tab Breakdown:

Summary Statistics:

Document Guide | >> | Stock Summary | Geographical Unit Summary | >>>

Considerations & GIS Output:

Heat Networks Template | Heat Decarbonisation Template | >>>> | GIS Output | >>>>>

Data & Analysis:

Data Input | Analysis Tab | Analysis Tab Ref | Typology_definitions

References:

Stock_Summary_Ref | Geographical_Unit_Summary_Ref | Typology_LHEES_HN_Ref | Geographical_area_HD_Ref

Non-Domestic Baseline tool structure

>> | Stock Summary | Geographical Unit Summary | >>>

Summary Statistics:

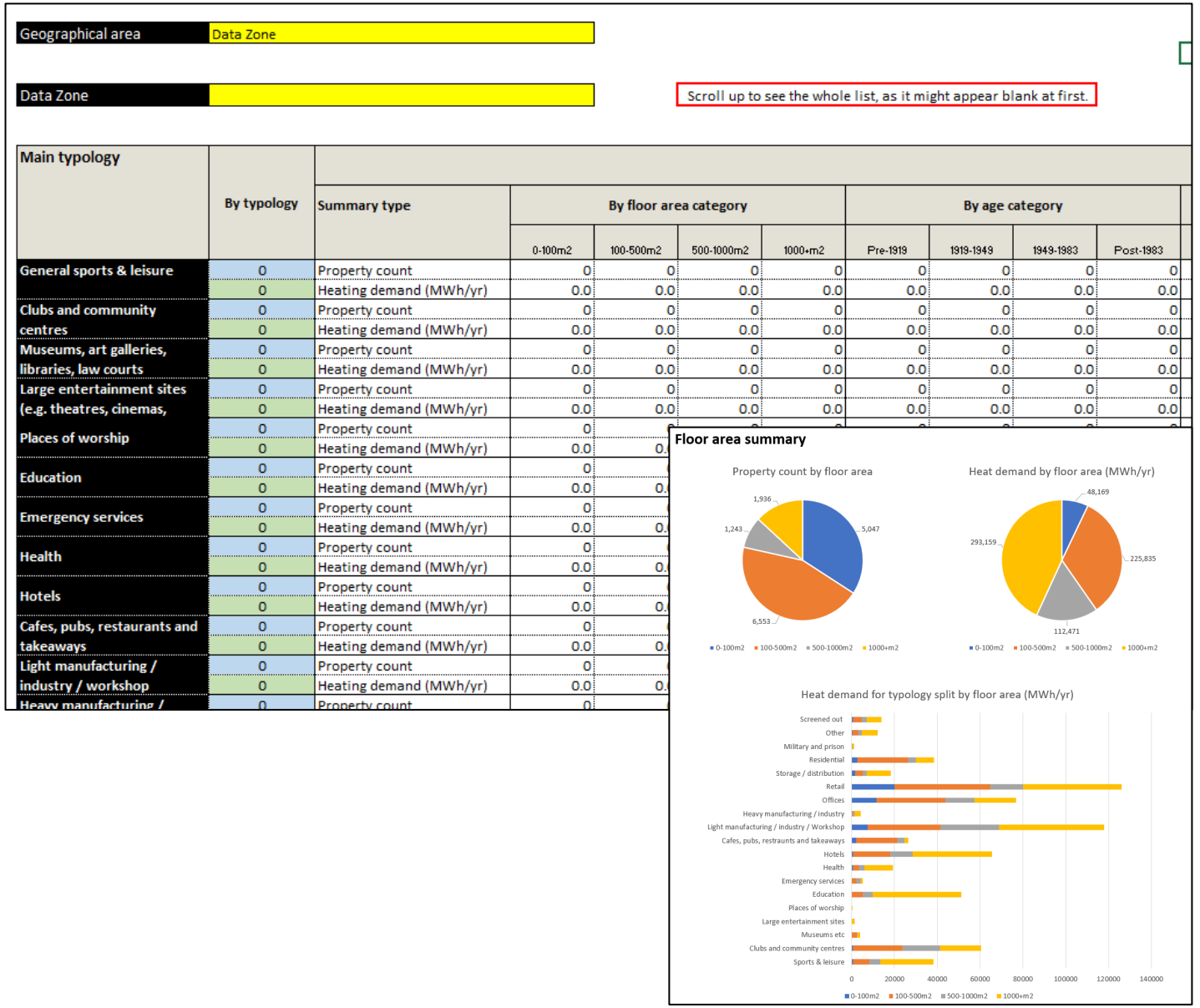
- Overview of the non-domestic building stock
- Count and Heat Demand Analysis
- Various stock characteristics
- Tabulated and graphical results

Stock Summary:

- Whole LA

Geographical Unit Summary:

- Selected Area, e.g. LA, Intermediate Zone, Data Zone or Ward



Geographical area	Data Zone
Data Zone	

Scroll up to see the whole list, as it might appear blank at first.

Main typology	By typology	Summary type	By floor area category				By age category			
			0-100m2	100-500m2	500-1000m2	1000+m2	Pre-1919	1919-1949	1949-1983	Post-1983
General sports & leisure	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clubs and community centres	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Museums, art galleries, libraries, law courts	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large entertainment sites (e.g. theatres, cinemas,	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Places of worship	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Education	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Emergency services	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Health	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Hotels	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Cafes, pubs, restaurants and takeaways	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Light manufacturing / industry / workshop	0	Property count	0							
	0	Heating demand (MWh/yr)	0.0	0.						
Heavy manufacturing /	0	Property count	0							

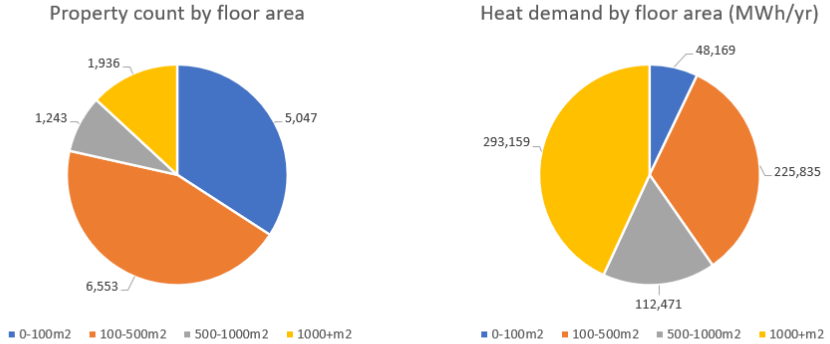
Non-Domestic Baseline tool structure

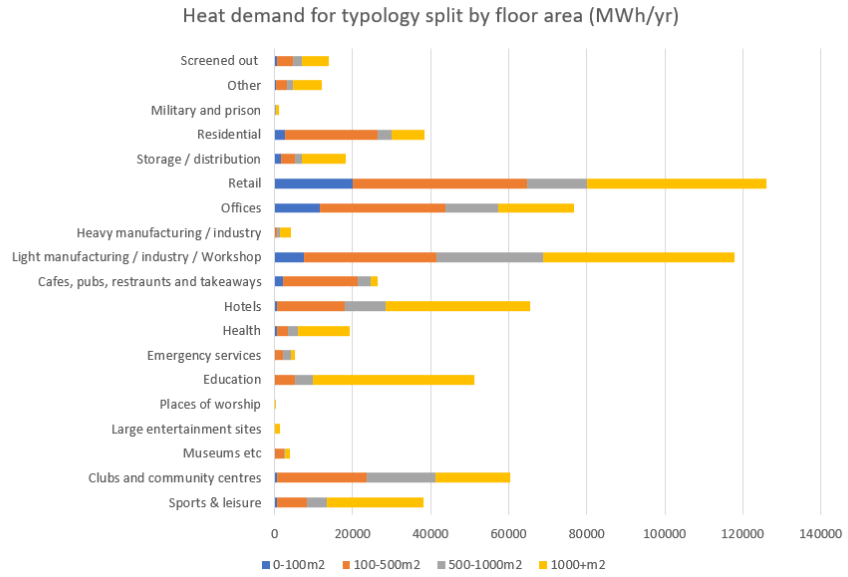
Geographical area	Data Zone
Data Zone	

Scroll up to see the whole list, as it might appear blank at first.

Main typology	By typology	Summary type	By floor area category				By age category			
			0-100m2	100-500m2	500-1000m2	1000+m2	Pre-1919	1919-1949	1949-1983	Post-1983
General sports & leisure	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clubs and community centres	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Museums, art galleries, libraries, law courts	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large entertainment sites (e.g. theatres, cinemas,	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Places of worship	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Education	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emergency services	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Health	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hotels	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cafes, pubs, restaurants and takeaways	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light manufacturing / industry / workshop	0	Property count	0	0	0	0	0	0	0	0
	0	Heating demand (MWh/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heavy manufacturing /	0	Property count	0	0	0	0	0	0	0	0

Floor area summary





Non-Domestic Baseline tool structure

>>> | Heat Networks Template | Heat Decarbonisation Template | >>>>

Considerations:

- Analysis of two considerations
- Heat Networks & Heat Decarbonisation

Heat Networks Template:

- Interrogation of non-domestic property suitability for heat network connection by typology and for key Indicators.
- Analysis at LA level only
- Allows user Prioritisation and selection of fields
- Property Summaries and Multi-Indicator Summaries for Selected field values

Heat Network Suitability

Suitability categories	Number of properties	Heat Demand (MWh/yr)
"High Suitability" properties		0
"Medium Suitability" properties		0
"Low Suitability" properties		0
"Screened Out" properties		0

a. Heat Network Suitability - Property Selection

	Property selection	
1	*Overall HN suitability*	(All)
2	*Main typology category*	(All)
3	*Heating Demand Category*	(All)
4	*Floor area category*	(All)
5	*Property age category*	(All)

b. Heat Network Suitability - Property Summaries

	Property selection		Number of selected properties per category	Heat demand of selected properties per category (MWh/yr)
1	*Suitability category*	All suitabilities		0
2	*Main typology category*	All typologies		0
3	*Heating demand category*	All heat demand levels		0
4	*Floor area category*	All floor area categories		0
5	*Property age category*	All property age categories		0

c. Multi-Indicator Summaries for Selected Properties

	Number of properties for combined selections	Heat demand for combined selections (MWh/yr)
All suitabilities - All typologies	26,964	0
All suitabilities - All typologies - All heat demand levels	26,964	0
All suitabilities - All typologies - All heat demand levels - All floor area categories	26,964	0
All suitabilities - All typologies - All heat demand levels - All floor area categories - All property age categories	26,964	0

Space heating
Hot water

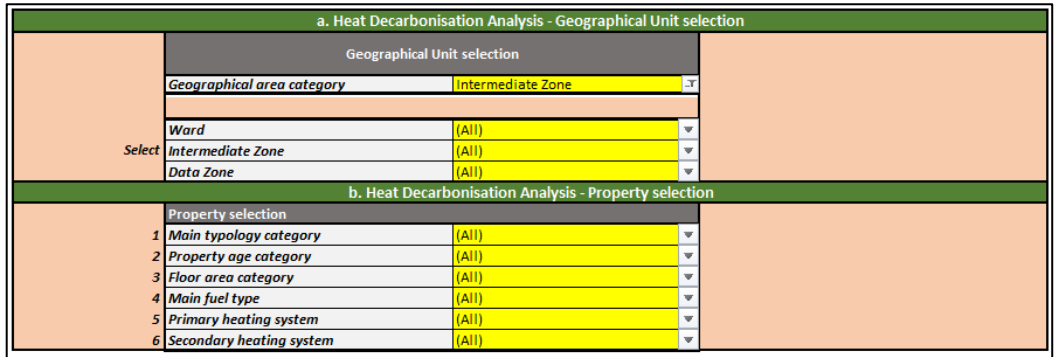
Non-Domestic Baseline tool structure

Energy and Low Carbon Heat

>>> | Heat Networks Template | Heat Decarbonisation Template | >>>>

Heat Decarbonisation Template:

- Allows data to be examined by typology and for key building level heat decarbonisation Indicators.
- The data does not allow detailed technical analysis, instead key characteristics are highlighted for context exploration.
- Can be viewed at a local authority level, Intermediate Zone, Data Zone or Ward.
- Areas can be ranked by property count and heat demand to help focus on specific areas of interest.
- Allows user Prioritisation and selection of fields
- Property Summaries and Multi-Indicator Summaries for Selected field values

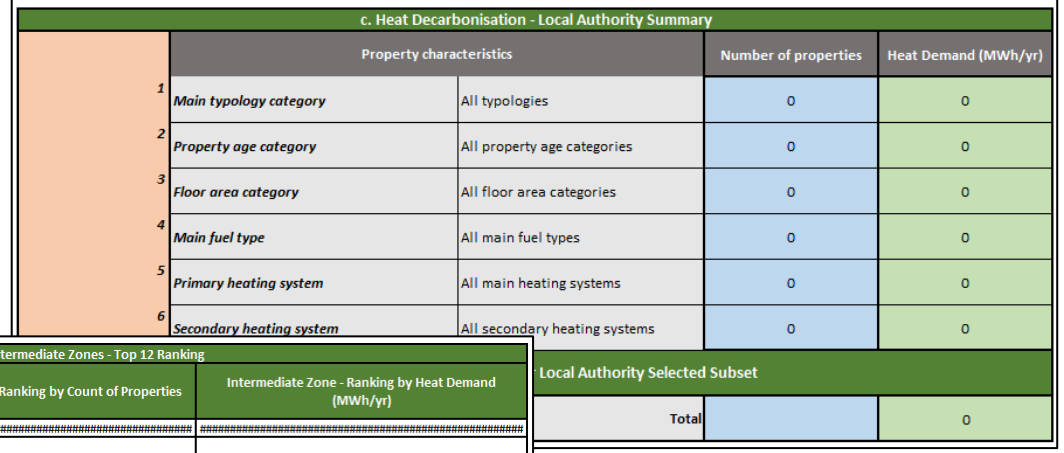


a. Heat Decarbonisation Analysis - Geographical Unit selection

	Geographical Unit selection	
	Geographical area category	Intermediate Zone
	Ward	(All)
Select	Intermediate Zone	(All)
	Data Zone	(All)

b. Heat Decarbonisation Analysis - Property selection

	Property selection	
1	Main typology category	(All)
2	Property age category	(All)
3	Floor area category	(All)
4	Main fuel type	(All)
5	Primary heating system	(All)
6	Secondary heating system	(All)

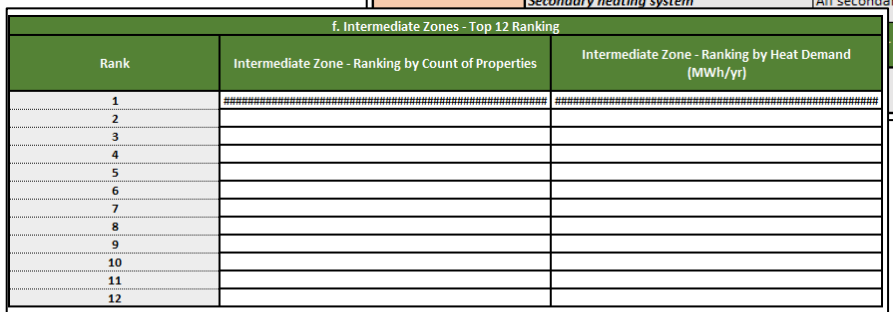


c. Heat Decarbonisation - Local Authority Summary

	Property characteristics		Number of properties	Heat Demand (MWh/yr)
1	Main typology category	All typologies	0	0
2	Property age category	All property age categories	0	0
3	Floor area category	All floor area categories	0	0
4	Main fuel type	All main fuel types	0	0
5	Primary heating system	All main heating systems	0	0
6	Secondary heating system	All secondary heating systems	0	0

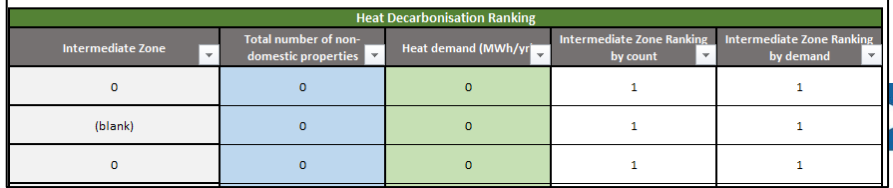
Local Authority Selected Subset

Total		0



f. Intermediate Zones - Top 12 Ranking

Rank	Intermediate Zone - Ranking by Count of Properties	Intermediate Zone - Ranking by Heat Demand (MWh/yr)
1	##########	##########
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		



Heat Decarbonisation Ranking

Intermediate Zone	Total number of non-domestic properties	Heat demand (MWh/yr	Intermediate Zone Ranking by count	Intermediate Zone Ranking by demand
0	0	0	1	1
(blank)	0	0	1	1
0	0	0	1	1

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Non-Domestic Baseline tool structure

>>>> | GIS Output | >>>>> | Data Input | Analysis Tab | Analysis Tab Ref | Typology_definitions

GIS Output:

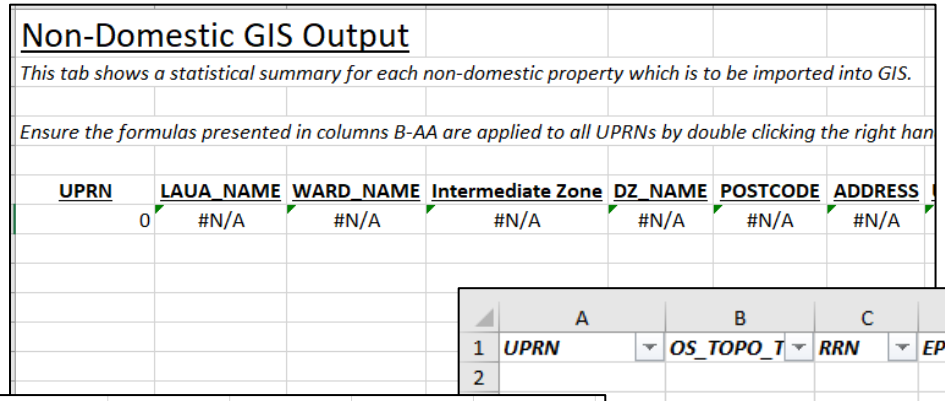
- Summary of the default information for visualisation in GIS.
- Information is provided for each non-domestic property.
- Save as .csv file to export for use in GIS.

Data Input:

- Data import tab in format of the Non-Domestic Analysis dataset (unedited)
- Store of the Non-Domestic Analytics dataset for calculations

Analysis:

- Solely for processing tasks that are automatically carried out.
- Users are unlikely to need to view these.

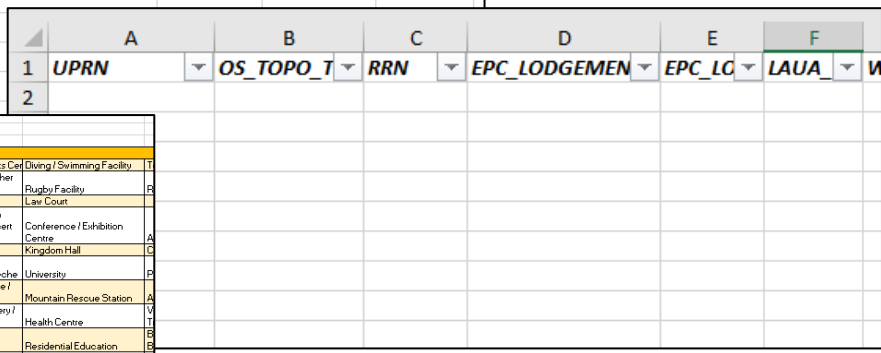


Non-Domestic GIS Output

This tab shows a statistical summary for each non-domestic property which is to be imported into GIS.

Ensure the formulas presented in columns B-AA are applied to all UPRNs by double clicking the right han

UPRN	LAUA_NAME	WARD_NAME	Intermediate Zone	DZ_NAME	POSTCODE	ADDRESS
0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A



	A	B	C	D	E	F
1	UPRN	OS_TOPO_T	RRN	EPC_LODGEMEN	EPC_LC	LAUA_
2						

Typology allocation based on OS Property Description

Typology					
General sports & leisure	Indoor / Outdoor Leisure / Sp	Leisure - Applicable to recre	Activity / Leisure / Sports Cer	Diving / Swimming Facility	T
Clubs and community centres	Racquet Sports Facility	Church Hall / Religious Meeting Place / Hall	Public / Village Hall / Other Community Facility	Rugby Facility	R
Museums, art galleries, libraries, law c	Library	Art Centre / Gallery	Museum / Gallery	Law Court	
Large entertainment sites (e.g. theatres, cinemas, conference centres)	Theatre	Cinema	Conference / Exhibition Centre / Theatre / Concert Hall	Conference / Exhibition Centre	A
Places of worship	Church	Place Of Worship	Chapel	Kingdom Hall	C
Education	Preparatory / First / Primary / Infant / Junior / Middle	Secondary / High School	Children's Nursery / Crèche	University	P
Emergency services	Emergency / Rescue Service	Fire Station	Police / Transport Police / Station	Mountain Rescue Station	A
Health	Dentist	Medical	General Practice Surgery / Clinic	Health Centre	V T
Hotels	Hotel / Motel / Boarding / Guest House	Hotel/Motel	Care / Nursing Home	Residential Education	B B
Cafes, pubs, restaurants and takeaw	Restaurant / Cafeteria	Public House / Bar / Nightclub	Fast Food Outlet / Takeaway (Hot / Cold)	Other Licensed Premise / Vendor	L C
Light manufacturing / industry / Works	manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Workshop / Light Industrial	Servicing Garage	Manufacturing	R
Heavy manufacturing / industry	Mineral / Ore Working / Quarry / Mine	Factory/Manufacturing	Printing Works	Dairy Processing	C
Offices	Office	Office / Work Studio	Central Government Service	Local Government Service	B
Retail	Shop / Showroom	Retail	Bank / Financial Service	Retail Service Agent	M
Storage / distribution	Warehouse / Store / Storage Depot	Wholesale Distribution	Goods Freight Handling / Terminal	Road Freight Transport	G
Residential	Dwelling	Self Contained Flat (Includes Maisonette / Apartment)	Holiday Let/Accomodation/Short-Term Let Other Than CH01	Residential	T
Military and prison	Navy	Army	Military	Air Force	A
Other	Agricultural	Horticulture	Animal Centre	Farm / Non-Residential Associated Building	B
Screened out	Property Shell	Parent Shell	Unclassified	Tourist Information Signage	V

Commercial subdivision typologies

Typology	PROPERTY_TYPE			
Offices	Offices and Workshops			
Storage / distribution	General Industrial, Storage or Distribution			
Cafes, pubs, restaurants and	Restaurants and Cafes			
Hotels	Hotels			
Retail	Non-residential Institutions	Residential Institutions and Spaces	Retail and Financial Services	Other
General sports & leisure	General Assembly			

ZERO WASTE SCOTLAND | Energy and Low Carbon Heat

Stage 3 – Non-Domestic Baseline Tool walkthrough

- Data entry and use
- Non-domestic building stock characterisation
- Consideration analysis
- Data export

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ZERO WASTE SCOTLAND

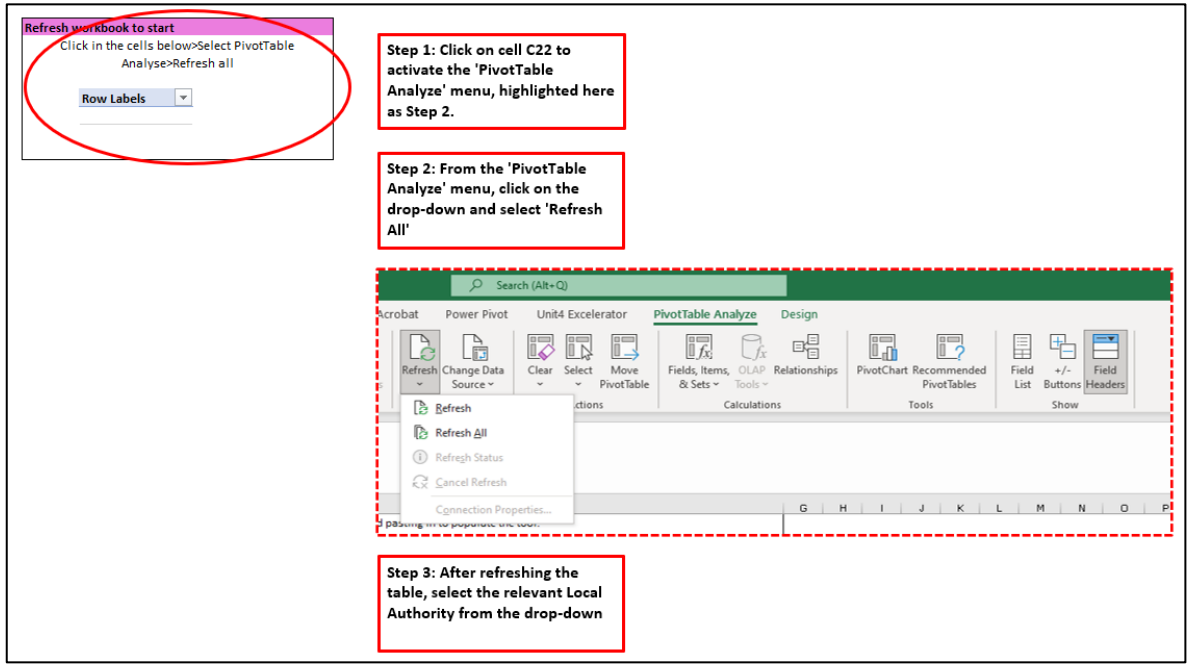
Energy and Low Carbon Heat

Data Entry and Use

Data import and Tool preparation

Data entry and use

1. Paste NDA into “Data Input” tab
   - Unedited Non-Domestic Analysis (NDA) dataset
   - No need to copy and paste the column headings
   - Developed using NDA version 1.1.
2. Refresh Excel Data Tables
   - Outlined in “Document Guide” tab
   - To ensure all tables within the workbook will update automatically
   - The ‘Analysis Tab’ will be automatically populated when the input data is entered and references updated. Solely for processing tasks that are automatically carried out.



ZERO WASTE SCOTLAND

Energy and Low Carbon Heat

2) Stock Characterisation

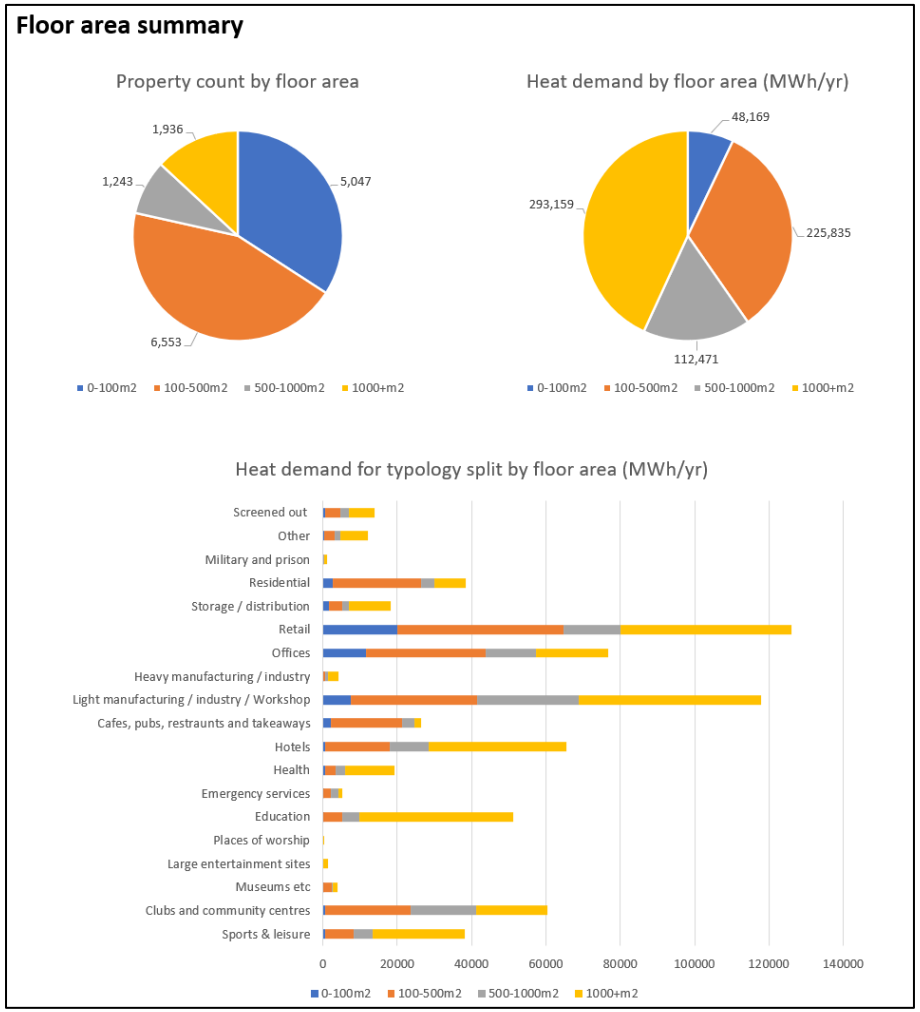
Local authority and other geographical area summary dashboards

Key indicators summary

Characterisation Indicators:

- **Main typology** (19 classes) – simplification of the Ordinance Class Description (over 200 classes)
- **Floor Area Category**
- **Age Category**
- **Heating System Fuel Type**
- **Urban Rural Classification**
- **Space Heating Demand Level**
- **Hot Water Demand Level**
- **Heat Network Suitability** – combination scoring based upon building typology, heat demand and heating system type

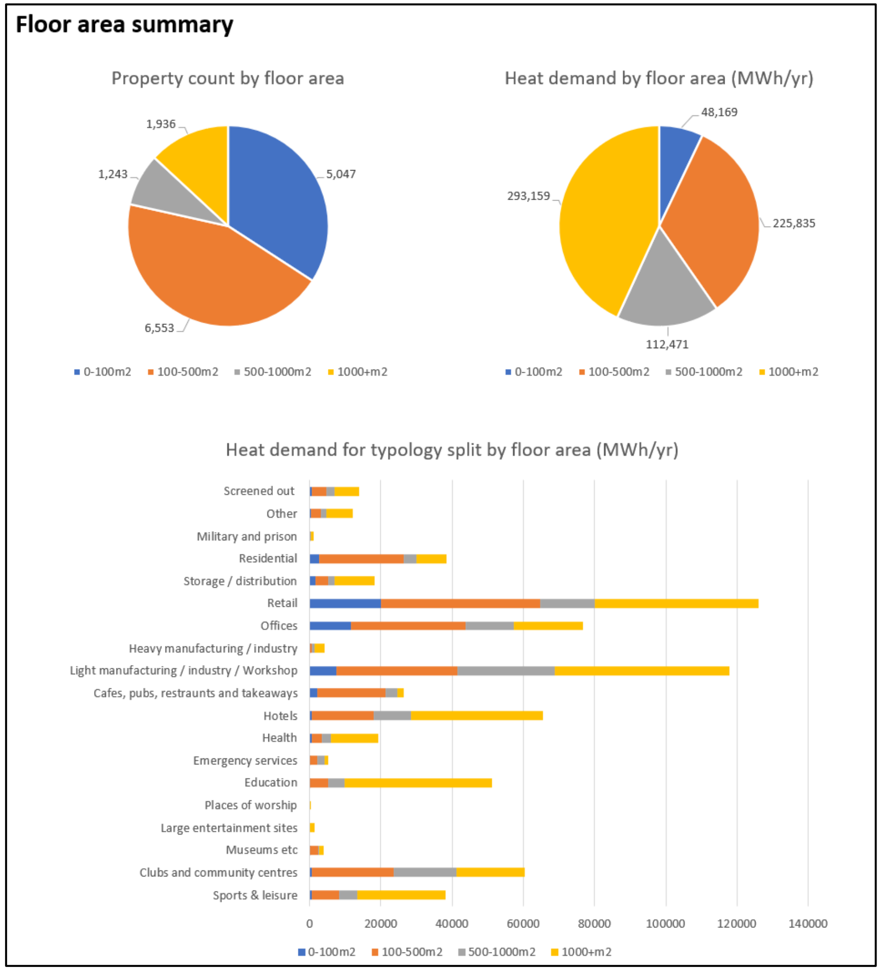
- It provides tabulated information as well as graphs summarising key indicators and characteristics.
- It aims to provide an overview of the factors which will impact the different LHEES Considerations.



Energy and Low Carbon Heat

Tool tabs: Stock Summary

1. No User Actions Required
   - Summary of Building Stock
   - Automatically populated for the ***WHOLE local authority***
   - Breakdowns of property counts and heating demands per Indicator versus typology
   - Tabulated results and indicator visualisations in graphical format



Non-domestic building stock summary

Local authority	Fife

Main typology	By typology	Summary type	By floor area category: 0-100m2	100-500m2	500-1000m2	1000+m2	By age category: Pre-1919	1919-1945	1945-1989	Post-1989	By heating system fuel type: Electricity	Mains Gas	Other	Oil	By urban rural 8-fold: 2 - Other Urban Area	6 - Accessible Rural	3 - Accessible Small Town						By space heat demand level: <7000 kWh/yr	7000-20000 kWh/yr	20000-60000 kWh/yr	>60000 kWh/yr	By hot water demand level: <300 kWh/yr	300-1200 kWh/yr	1200-6000 kWh/yr	>6000 kWh/yr
General sports & leisure	379	Property count	41	148	47	143	128	34	70	147	240	104	21	14	169	169	41	0	0	0	0	0	46	44	89	200	54	75	39	211
	38,259	Heating demand (MWh/yr)	462	7,666	5,222	24,909	13,939	3,483	5,842	14,996	22,695	12,611	2,124	829	16,952	12,578	8,728	0	0	0	0	0	189	775	4,664	32,631	780	2,534	2,569	32,375
Clubs and community centres	874	Property count	52	541	170	111	430	68	168	208	446	386	17	25	455	275	144	0	0	0	0	0	582	0	0	292	53	390	204	227
	60,373	Heating demand (MWh/yr)	467	23,170	17,499	19,237	29,265	4,313	12,252	14,543	22,785	35,326	1,128	1,135	38,302	12,840	9,232	0	0	0	0	0	419	2,987	11,367	45,600	407	10,747	15,695	33,524
Museums, art galleries, libraries, law courts	50	Property count	6	33	3	8	23	5	13	9	16	32	1	1	28	14	8	0	0	0	0	0	30	0	0	20	6	15	15	14
	3,800	Heating demand (MWh/yr)	43	2,364	275	1,119	1,830	478	597	895	876	2,867	53	4	2,559	496	745	0	0	0	0	0	19	160	466	3,156	51	595	1,483	1,670
Large entertainment sites (e.g. theatres, cinemas, conference centres)	5	Property count	0	0	0	5	2	1	1	1	0	4	1	0	5	0	0	0	0	0	0	0	2	0	0	3	0	0	1	4
	1,229	Heating demand (MWh/yr)	0	0	0	1,229	234	187	17	791	0	1,212	17	0	1,229	0	0	0	0	0	0	0	0	17	0	1,212	0	0	17	1,212
Places of worship	1	Property count	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	117	Heating demand (MWh/yr)	0	0	0	117	0	117	0	0	117	0	0	0	117	0	0	0	0	0	0	0	0	0	0	117	0	0	0	117
Education	384	Property count	10	103	50	221	185	33	76	90	187	177	9	11	240	92	52	0	0	0	0	0	171	0	0	213	13	45	80	246
	51,244	Heating demand (MWh/yr)	70	5,046	4,576	41,552	24,105	4,578	10,898	11,663	19,043	29,686	1,992	523	33,174	8,747	9,324	0	0	0	0	0	119	816	3,373	46,936	109	962	5,581	44,592
Emergency services	44	Property count	6	24	5	9	9	1	11	23	15	27	0	2	27	5	12	0	0	0	0	0	22	0	0	22	2	15	7	20
	5,229	Heating demand (MWh/yr)	55	2,058	2,016	1,100	1,127	16	1,355	2,732	723	4,279	0	227	3,933	374	923	0	0	0	0	0	15	45	437	4,731	6	911	348	3,965
Health	206	Property count	45	79	28	54	75	15	62	54	103	98	1	4	144	27	35	0	0	0	0	0	137	0	0	69	35	61	50	60
	19,229	Heating demand (MWh/yr)	486	3,020	2,436	13,287	4,252	1,696	9,107	4,173	8,392	10,748	54	34	14,716	1,566	2,947	0	0	0	0	0	115	570	2,114	16,430	281	1,560	3,772	13,615
Hotels	437	Property count	43	220	58	116	248	31	51	107	232	168	21	16	203	188	46	0	0	0	0	0	235	0	0	202	27	92	21	297
	65,407	Heating demand (MWh/yr)	478	17,362	10,528	37,040	38,925	4,464	5,187	16,831	20,857	34,982	5,720	3,848	34,463	23,807	7,137	0	0	0	0	0	207	525	4,881	59,794	210	2,847	1,171	61,178
Cafes, pubs, restaurants and takeaways	550	Property count	150	361	27	12	303	48	100	99	283	230	7	30	387	83	80	0	0	0	0	0	430	0	0	120	88	111	75	276
	26,296	Heating demand (MWh/yr)	2,000	19,383	3,145	1,769	13,508	3,303	4,750	4,736	7,817	17,505	336	639	19,406	3,685	3,205	0	0	0	0	0	631	2,809	8,738	14,118	764	1,916	1,628	21,989
Light manufacturing / industry / workshop	2,670	Property count	585	1,315	359	411	486	103	774	1,307	791	863	80	936	1,915	502	253	0	0	0	0	0	2,136	0	0	534	528	1,095	692	355
	117,883	Heating demand (MWh/yr)	7,454	33,991	27,474	48,964	17,021	3,482	35,517	61,862	30,658	55,712	2,919	28,593	84,992	22,726	10,164	0	0	0	0	0	3,974	8,938	23,040	81,931	5,461	23,744	43,448	45,231
Heavy manufacturing / industry	43	Property count	3	17	6	17	7	2	10	24	16	14	5	8	29	12	2	0	0	0	0	0	24	0	0	19	4	13	11	15
	4,255	Heating demand (MWh/yr)	31	537	778	2,909	454	128	1,129	2,544	919	2,186	756	394	3,649	477	129	0	0	0	0	0	24	127	348	3,756	60	319	1,337	2,540
Offices	2,678	Property count	1,269	1,088	172	149	1,036	172	469	1,001	1,323	1,124	102	129	1,900	498	280	0	0	0	0	0	2,367	0	0	311	913	1,055	524	186
	76,683	Heating demand (MWh/yr)	11,665	32,009	13,751	19,258	30,269	9,196	12,615	24,603	26,038	45,696	2,420	2,528	56,251	11,784	8,648	0	0	0	0	0	4,567	10,639	17,792	43,685	6,719	25,867	22,629	21,469
Retail	4,747	Property count	2,330	1,787	219	411	2,401	419	847	1,080	3,271	989	46	441	3,219	861	667	0	0	0	0	0	4,278	0	0	469	1950	1,560	789	448
	126,094	Heating demand (MWh/yr)	19,881	44,845	15,330	46,039	50,612	9,411	24,654	41,417	69,213	44,102	1,993	10,787	86,722	24,527	14,845	0	0	0	0	0	8,046	22,594	28,856	66,598	15,658	29,258	36,866	44,312
Storage / distribution	425	Property count	188	128	23	86	35	4	171	215	70	109	8	238	275	97	53	0	0	0	0	0	341	0	0	84	54	184	115	72
	18,264	Heating demand (MWh/yr)	1,506	3,693	1,723	11,341	1,900	401	3,625	12,336	4,588	7,327	876	5,472	11,429	5,089	1,746	0	0	0	0	0	919	576	2,167	14,602	1,206	2,907	3,947	10,203
Residential	812	Property count	219	502	29	62	417	47	94	254	473	239	19	81	223	485	104	0	0	0	0	0	662	0	0	150	125	361	51	275
	38,395	Heating demand (MWh/yr)	2,654	23,707	3,682	8,351	20,626	2,855	4,123	10,791	15,751	16,025	2,228	4,390	9,692	24,953	3,750	0	0	0	0	0	758	2,161	11,525	23,951	820	9,580	2,643	25,351
Military and prison	14	Property count	0	6	3	5	4	2	5	3	5	8	0	1	10	1	3	0	0	0	0	0	6	0	0	8	0	5	5	4
	996	Heating demand (MWh/yr)	0	188	262	546	328	156	273	239	239	752	0	5	738	37	221	0	0	0	0	0	8	13	134	841	0	201	357	438
Other	200	Property count	41	85	15	59	75	4	30	91	147	21	13	19	20	172	8	0	0	0	0	0	133	0	0	67	40	69	27	64
	12,070	Heating demand (MWh/yr)	393	2,631	1,597	7,449	4,743	119	1,941	5,267	7,307	2,058	2,196	510	2,104	9,319	647	0	0	0	0	0	263	770	1,040	9,997	389	1,336	1,783	8,561
Screened out	260	Property count	59	116	29	56	91	19	52	98	158	63	7	32	133	99	28	0	0	0	0	0	198	0	0	62	59	94	61	46
	13,809	Heating demand (MWh/yr)	524	4,165	2,175	6,945	3,501	1,103	3,770	5,435	6,808	4,873	452	1,676	8,178	4,771	860	0	0	0	0	0	403	1,017	2,631	9,758	655	2,387	3,722	7,045
Total Count	**14,779**		**5,047**	**6,553**	**1,243**	**1,936**	**5,955**	**1,009**	**3,004**	**4,811**	**7,777**	**4,656**	**358**	**1,988**	**9,383**	**3,580**	**1,816**	**0**	**0**	**0**	**0**	**0**	**4,388**	**3,867**	**3,135**	**3,389**	**3,951**	**2,821**	**2,767**	**5,240**
Total Heat demand (MWh/yr)	**679,633**		**48,169**	**225,835**	**112,471**	**293,159**	**256,639**	**49,487**	**137,653**	**235,855**	**264,827**	**327,947**	**25,265**	**####**	**428,606**	**167,776**	**83,251**	**0**	**0**	**0**	**0**	**0**	**20,676**	**####**	**123,574**	**479,846**	**33,577**	**####**	**####**	**####**

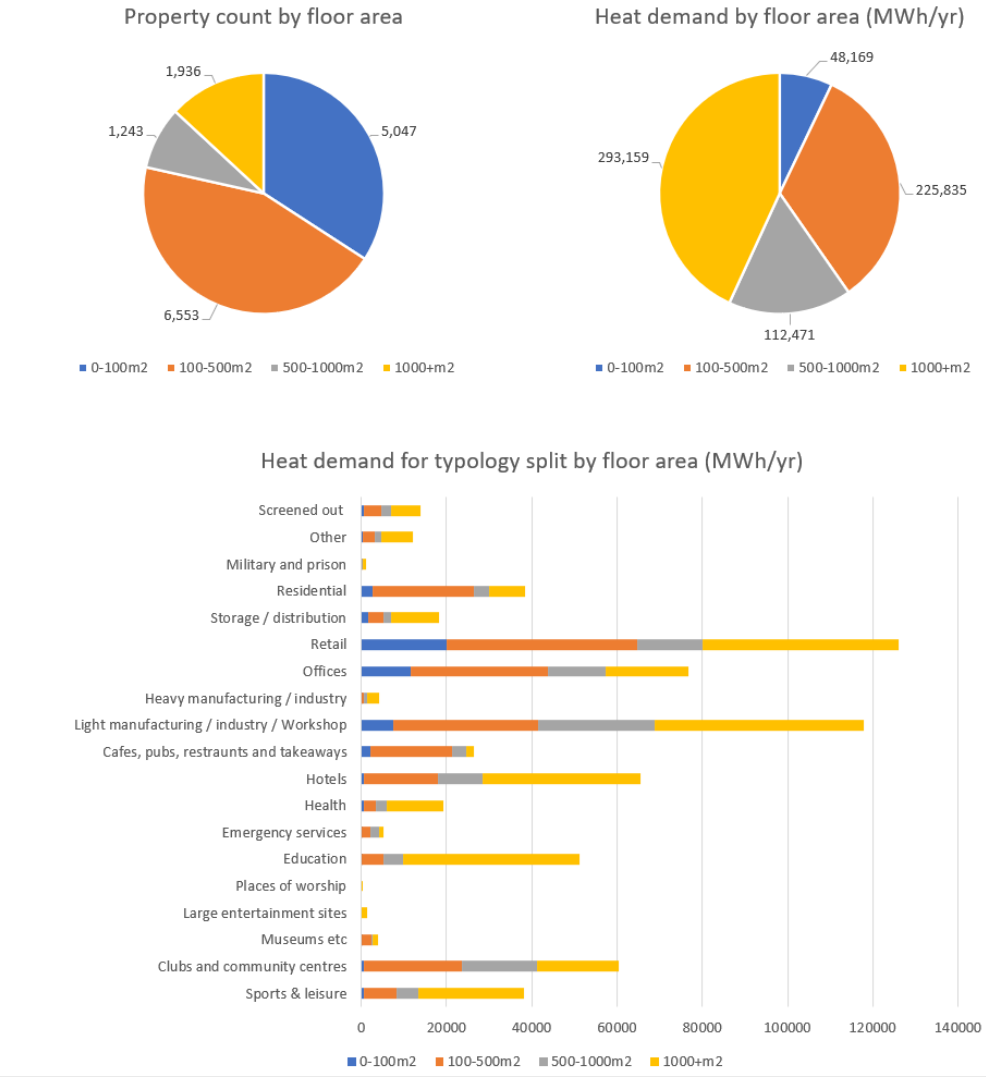
Tool tabs: Stock Summary

Non-domestic building stock summary

Local authority: Fife

Main typology	By typology	Summary type	By floor area category				By age category				By heating system fuel type			
			0-100m2	100-500m2	500-1000m2	1000+m2	Pre-1919	1919-1945	1945-1980	Post-1980	Electricity	Mains Gas	Other	Oil
General sports & leisure	379	Property count	41	148	47	143	128	34	70	147	240	104	21	14
	38,259	Heating demand (MWh/yr)	462	7,666	5,222	24,909	13,939	3,483	5,842	14,996	22,695	12,611	2,124	829
Clubs and community centres	874	Property count	52	541	170	111	430	68	168	208	446	386	17	25
	60,373	Heating demand (MWh/yr)	467	23,170	17,499	19,237	29,265	4,313	12,252	14,543	22,785	35,326	1,128	1,135
Museums, art galleries, libraries, law courts	50	Property count	6	33	3	8	23	5	13	9	16	32	1	1
	3,800	Heating demand (MWh/yr)	43	2,364	275	1,119	1,830	478	597	895	876	2,867	53	4
Large entertainment sites (e.g. theatres, cinemas, conference centres)	5	Property count	0	0	0	5	2	1	1	1	0	4	1	0
	1,229	Heating demand (MWh/yr)	0	0	0	1,229	234	187	17	791	0	1,212	17	0
Places of worship	1	Property count	0	0	0	1	0	1	0	0	1	0	0	0
	117	Heating demand (MWh/yr)	0	0	0	117	0	117	0	0	117	0	0	0
Education	384	Property count	10	103	50	221	185	33	76	90	187	177	9	11
	51,244	Heating demand (MWh/yr)	70	5,046	4,576	41,552	24,105	4,578	10,898	11,663	19,043	29,686	1,992	523
Emergency services	44	Property count	6	24	5	9	9	1	11	23	15	27	0	2
	5,229	Heating demand (MWh/yr)	55	2,058	2,016	1,100	1,127	16	1,355	2,732	723	4,279	0	227
Health	206	Property count	45	79	28	54	75	15	62	54	103	98	1	4
	19,229	Heating demand (MWh/yr)	486	3,020	2,436	13,287	4,252	1,696	9,107	4,173	8,392	10,748	54	34
Hotels	437	Property count	43	220	58	116	248	31	51	107	232	168	21	16
	65,407	Heating demand (MWh/yr)	478	17,362	10,528	37,040	38,925	4,464	5,187	16,831	20,857	34,982	5,720	3,848
Cafes, pubs, restaurants and takeaways	550	Property count	150	361	27	12	303	48	100	99	283	230	7	30
	26,296	Heating demand (MWh/yr)	2,000	19,383	3,145	1,769	13,508	3,303	4,750	4,736	7,817	17,505	336	639
Light manufacturing / industry / workshop	2,670	Property count	585	1,315	359	411	486	103	774	1,307	791	863	80	936
	117,883	Heating demand (MWh/yr)	7,454	33,991	27,474	48,964	17,021	3,482	35,517	61,862	30,658	55,712	2,919	28,593
Heavy manufacturing / industry	43	Property count	3	17	6	17	7	2	10	24	16	14	5	8
	4,255	Heating demand (MWh/yr)	31	537	778	2,909	454	128	1,129	2,544	919	2,186	756	394
Offices	2,678	Property count	1,269	1,088	172	149	1,036	172	469	1,001	1,323	1,124	102	129
	76,683	Heating demand (MWh/yr)	11,665	32,009	13,751	19,258	30,269	9,196	12,615	24,603	26,038	45,696	2,420	2,528
Retail	4,747	Property count	2,330	1,787	219	411	2,401	419	847	1,080	3,271	989	46	441
	126,094	Heating demand (MWh/yr)	19,881	44,845	15,330	46,039	50,612	9,411	24,654	41,417	69,213	44,102	1,993	10,787
Storage / distribution	425	Property count	188	128	23	86	35	4	171	215	70	109	8	238
	18,264	Heating demand (MWh/yr)	1,506	3,693	1,723	11,341	1,900	401	3,625	12,336	4,588	7,327	876	5,472
Residential	812	Property count	219	502	29	62	417	47	94	254	473	239	19	81
	38,395	Heating demand (MWh/yr)	2,654	23,707	3,682	8,351	20,626	2,855	4,123	10,791	15,751	16,025	2,228	4,390
Military and prison	14	Property count	0	6	3	5	4	2	5	3	5	8	0	1
	996	Heating demand (MWh/yr)	0	188	262	546	328	156	273	239	239	752	0	5
Other	200	Property count	41	85	15	59	75	4	30	91	147	21	13	19
	12,070	Heating demand (MWh/yr)	393	2,631	1,597	7,449	4,743	119	1,941	5,267	7,307	2,058	2,196	510
Screened out	260	Property count	59	116	29	56	91	19	52	98	158	63	7	32
	13,809	Heating demand (MWh/yr)	524	4,165	2,175	6,945	3,501	1,103	3,770	5,435	6,808	4,873	452	1,676
Total Count	**14,779**		**5,047**	**6,553**	**1,243**	**1,936**	**5,955**	**1,009**	**3,004**	**4,811**	**7,777**	**4,656**	**358**	**1,988**
Total Heat demand (MWh/yr)	**679,633**		**48,169**	**225,835**	**112,471**	**293,159**	**256,639**	**49,487**	**137,653**	**235,855**	**264,827**	**327,947**	**25,265**	**####**

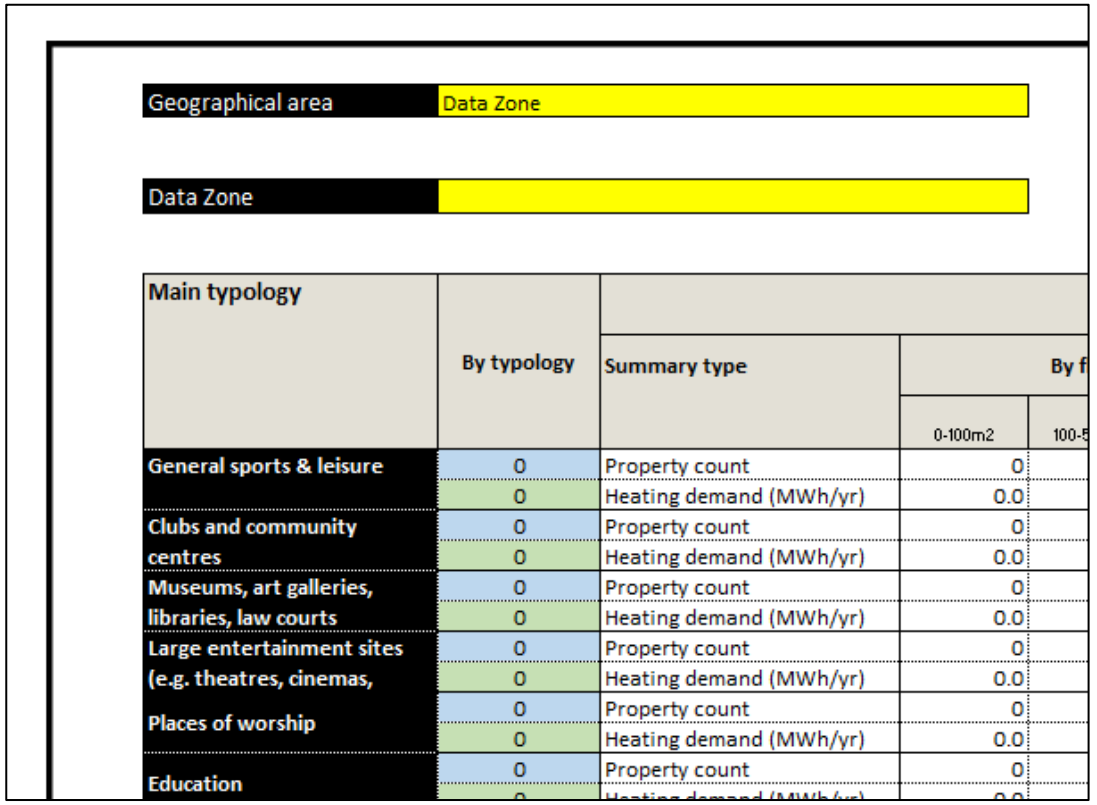
Floor area summary



Tool tabs: Geographic Unit Summary

1. Select Area for Summary
    - Select Geographical Area Type (i.e. LA, IZ, DZ, Ward)
    - Select Specific Zone

- Automatically populated once ***Selected***
- Similar indicator outputs from “Stock Summary”
- Useful in assessing building stock characterisation at greater granularity.
- Useful in identifying areas for consideration measures.



Geographical area	Data Zone
Data Zone	

Main typology	By typology	Summary type	By f
			0-100m2
General sports & leisure	0	Property count	0
	0	Heating demand (MWh/yr)	0.0
Clubs and community centres	0	Property count	0
	0	Heating demand (MWh/yr)	0.0
Museums, art galleries, libraries, law courts	0	Property count	0
	0	Heating demand (MWh/yr)	0.0
Large entertainment sites (e.g. theatres, cinemas,	0	Property count	0
	0	Heating demand (MWh/yr)	0.0
Places of worship	0	Property count	0
	0	Heating demand (MWh/yr)	0.0
Education	0	Property count	0

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Energy and Low Carbon Heat

3.1) Consideration Analysis - Heat Networks

Supports consideration of non-domestic heat network connection suitability at a local authority level

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Heat Networks Consideration

Non-Domestic Baseline Tool:

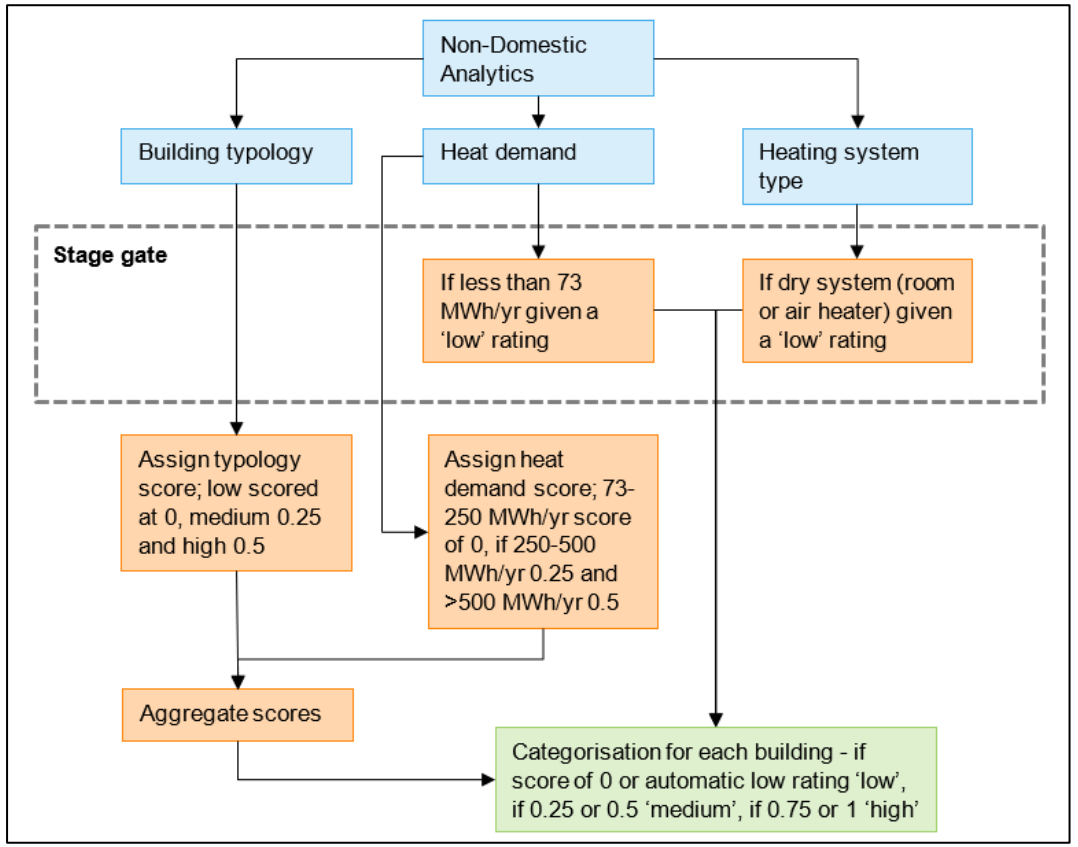
This analysis provides an indication of which buildings could be most suited for a heat network connection.

Suitability Category:

Low ratings can still be considered for connection, however, impacted by counts and proportion of other suitabilities on early indications of network viability.

Screened Out if the heat demand is <=0), or the building typology listed as screened out e.g. Timber Storage, Beach Hut.

Suitability categories
"High Suitability" properties
"Medium Suitability" properties
"Low Suitability" properties
"Screened Out" properties



Heat Networks Consideration

1. Local Authority Summary:
   - Automatically populated
   - Count & Heat Demand or **ALL** non-domestic properties in LA
2. Heat Network Suitability:
   - Automatically populated
   - Count & Heat Demand or **ALL** non-domestic properties in local authority **by Suitability Category**

Summary Tables

Local Authority Summary

Local Authority	Total number of non-domestic properties	Total heat demand of non-domestic properties MWh/yr
Fife	14,779	679,633

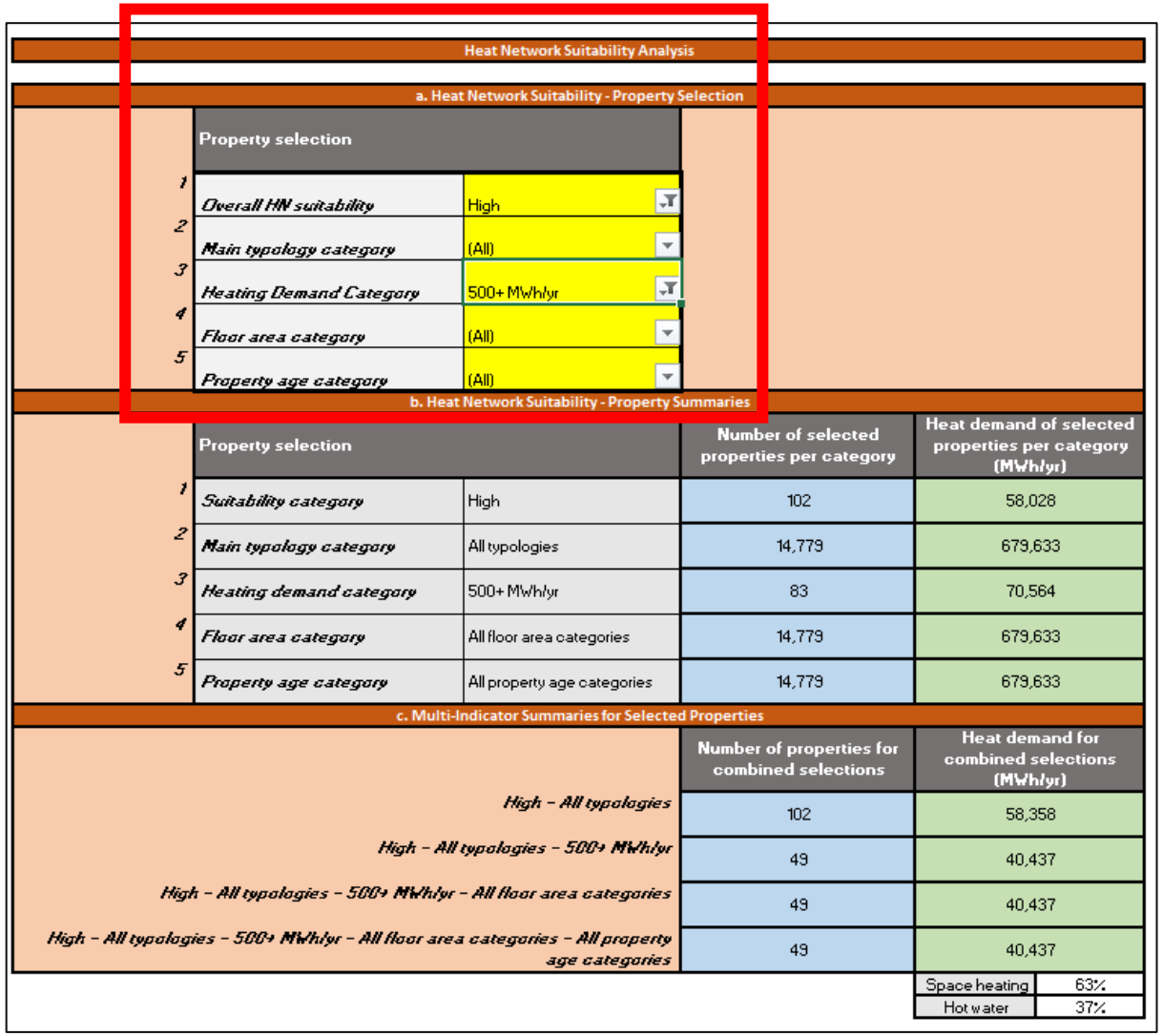
Heat Network Suitability

Suitability categories	Number of properties	Heat Demand (MWh/yr)
"High Suitability" properties	102	58,028
"Medium Suitability" properties	2,322	134,993
"Low Suitability" properties	12,095	472,803
"Screened Out" properties	260	13,809

Heat Networks Consideration

3. Heat Network Suitability – Property Selection:

- The user must create a selection of different stock subsets based on ***up to 5*** property characteristics.
- Supports the consideration of non-domestic heat network connection suitability at a local authority level, through user-selection of specified property characteristics.
- Being able to select only properties with certain characteristics helps focus analysis.
  - For example, examine the number of historic buildings which could be key anchor loads for heat networks. Thus, select non-domestic properties with:
  1. A high overall HN suitability,
  2. A demand category of 500+MWh/yr,
  3. Property age category of pre-1919.



Heat Network Suitability Analysis

a. Heat Network Suitability - Property Selection

	Property selection	
1	*Overall HN suitability*	High
2	*Main typology category*	(All)
3	*Heating Demand Category*	500+ MWh/yr
4	*Floor area category*	(All)
5	*Property age category*	(All)

b. Heat Network Suitability - Property Summaries

	Property selection		Number of selected properties per category	Heat demand of selected properties per category (MWh/yr)
1	*Suitability category*	High	102	58,028
2	*Main typology category*	All typologies	14,779	679,633
3	*Heating demand category*	500+ MWh/yr	83	70,564
4	*Floor area category*	All floor area categories	14,779	679,633
5	*Property age category*	All property age categories	14,779	679,633

c. Multi-Indicator Summaries for Selected Properties

	Number of properties for combined selections	Heat demand for combined selections (MWh/yr)
High – All typologies	102	58,358
High – All typologies – 500+ MWh/yr	49	40,437
High – All typologies – 500+ MWh/yr – All floor area categories	49	40,437
High – All typologies – 500+ MWh/yr – All floor area categories – All property age categories	49	40,437

Space heating	63%
Hot water	37%

Heat Networks Consideration

4. Heat Network Suitability – Summaries:

- Automatically populated following ***Selection***
- ***HN Suitability Summary:***
  - Count and heat demand
  - **Individual analysis** of selected indicators within the **LA**
- ***Multi Indicator Summary:***
  - Count and heat demand
  - **Concurrent analysis** of selected indicators within the **LA**

Heat Network Suitability Analysis

a. Heat Network Suitability - Property Selection

	Property selection	
1	*Overall HN suitability*	High
2	*Main typology category*	(All)
3	*Heating Demand Category*	500+ MWh/yr
4	*Floor area category*	(All)
5	*Property age category*	(All)

b. Heat Network Suitability - Property Summaries

	Property selection		Number of selected properties per category	Heat demand of selected properties per category (MWh/yr)
1	*Suitability category*	High	102	58,028
2	*Main typology category*	All typologies	14,779	679,633
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Space heating	63%
Hot water	37%

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Energy and Low Carbon Heat

3.2) Consideration Analysis - Heat Decarbonisation

Summary and ranking of non-domestic properties from the perspective of energy efficiency and building level heat decarbonisation, based on selections from different typologies and property system characteristics.

Heat Decarbonisation Consideration

1. Geographical Unit Selection:

- Select the ***Area Category*** and ***Specific Region*** for analysis from dropdown.
- Useful in assessing building stock characterisation in greater detail.

2. Property Selection:

- The user must create a selection of different stock subsets based on ***up to 6*** property characteristics, from the dropdown menus.
- Supports the consideration of non-domestic heat decarbonisation, through user-selection of specified property characteristics. To focus analysis

	a. Heat Decarbonisation Analysis - Geographical Unit selection	
	Geographical Unit selection	
	Geographical area category	Intermediate Zone
	Ward	(All)
Select	Intermediate Zone	(All)
	Data Zone	(All)
	b. Heat Decarbonisation Analysis - Property selection	
	Property selection	
1	Main typology category	(All)
2	Property age category	(All)
3	Floor area category	(All)
4	Main fuel type	(All)
5	Primary heating system	(All)
6	Secondary heating system	(All)

- Example Selections:
  - Specific off-gas grid public sector properties which often offer a good potential for improvement:
  1. Typology type of **education**,
  2. Main fuel type of **oil**.
  - Small retail units with an electric heating system which are likely to be better suited to efficiency improvements over heating system changes:
  1. Floor area **0-100 m^2**,
  2. Typology type of **retail**,
  3. Main fuel type **electricity**.

Energy and Low Carbon Heat

Heat Decarbonisation Consideration

3. Local Authority Summary:

- Automatically populated following ***Selection***
  - Count and heat demand
  - **Individual analysis** of selected indicators within the **LA**

4. Heat Decarbonisation – Summaries:

- Automatically populated following ***Selection***
- ***Heat Decarbonisation Summary:***
  - Count and heat demand
  - **Individual analysis** of selected indicators
  - Within the **specific selected geographical area**
- ***Multi Indicator Summary:***
  - Count and heat demand
  - **Concurrent analysis** of selected indicators
  - Within the **specific selected geographical area**

c. Heat Decarbonisation - Local Authority Summary

	Property characteristics		Number of properties	Heat Demand (MWh/yr)
1	*Main typology category*	All typologies	0	0
2	*Property age category*	All property age categories	0	0
3	*Floor area category*	All floor area categories	0	0
4	*Main fuel type*	All main fuel types	0	0
5	*Primary heating system*	All main heating systems	0	0
6	*Secondary heating system*	All secondary heating systems	0	0
Heat Decarbonisation - Total for Local Authority Selected Subset				
	Total			0

d. Heat Decarbonisation - (All) Summary

	Property characteristics		Number of properties	Heat Demand (MWh/yr)
1	*Main typology category*	All typologies	26964	0
2	*Property age category*	All property age categories	26964	0
3	*Floor area category*	All floor area categories	26964	0
4	*Main fuel type*	All main fuel types	26964	0
5	*Primary heating system*	All main heating systems	26964	0
6	*Secondary heating system*	All secondary heating systems	26964	0

e. Multi-Indicator summaries for selected properties in - (All)

	Number of properties for combined selections	Heat demand for combined selections (MWh/yr)
All typologies - All property age categories	26,964	0
All typologies - All property age categories - All floor area categories	26,964	0
All typologies - All property age categories - All floor area categories - All main fuel types	26,964	0
All typologies - All property age categories - All floor area categories - All main fuel types - All main heating systems	26,964	0
All typologies - All property age categories - All floor area categories - All main fuel types - All main heating systems - All secondary heating systems	26,964	0

Heat Decarbonisation Consideration

5. All Rankings of Geographical Areas :

- Automatically populated following ***Selection***
- Ranking of all areas by **count and heat demand**
- Of **concurrent analysis** of selected indicators

Heat Decarbonisation Ranking

Ward	Total number of non-domestic properties	Heat demand (MWh/yr)	Ward Ranking by count	Ward Ranking by demand
(blank)	0	0	23	23
0	0	0	23	23
Kirkcaldy East	1118	40052	3	6
West Fife and Coastal Villages	509	25648	15	13
Burntisland, Kinghorn and Western Kirkcaldy	470	19585	16	17
Kirkcaldy North	193	12652	22	22
Lochgelly, Cardenden and Benarty	594	23661	13	15
Inverkeithing and Dalgety Bay	653	27839	12	11

6. Top 12 Ranking of Geographical Areas:

- Automatically populated following ***Selection***
- Visualisation of top 12 ranked Geographical Areas from above
- Ranking of **concurrent count and heat demand**
- Rankings are useful in identifying areas to explore in further detail or to focus on using spatial analysis techniques.

isation Analysis

f. Wards - Top 12 Ranking

Rank	Ward - Ranking by Count of Properties	Ward - Ranking by Heat Demand (MWh/yr)
1	Dunfermline Central	Dunfermline Central
2	East Neuk and Landward	East Neuk and Landward
3	Kirkcaldy East	Cupar
4	Glenrothes Central and Thornton	St Andrews
5	Kirkcaldy Central	Kirkcaldy Central
6	Cupar	Kirkcaldy East
7	St Andrews	Glenrothes West and Kinglassie
8	Glenrothes West and Kinglassie	Glenrothes Central and Thornton
9	Howe of Fife and Tay Coast	Cowdenbeath
10	Leven, Kennoway and Largo	Leven, Kennoway and Largo
11	Cowdenbeath	Inverkeithing and Dalgety Bay
12	Inverkeithing and Dalgety Bay	Howe of Fife and Tay Coast

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Energy and Low Carbon Heat

4) Baseline Tool Data Export

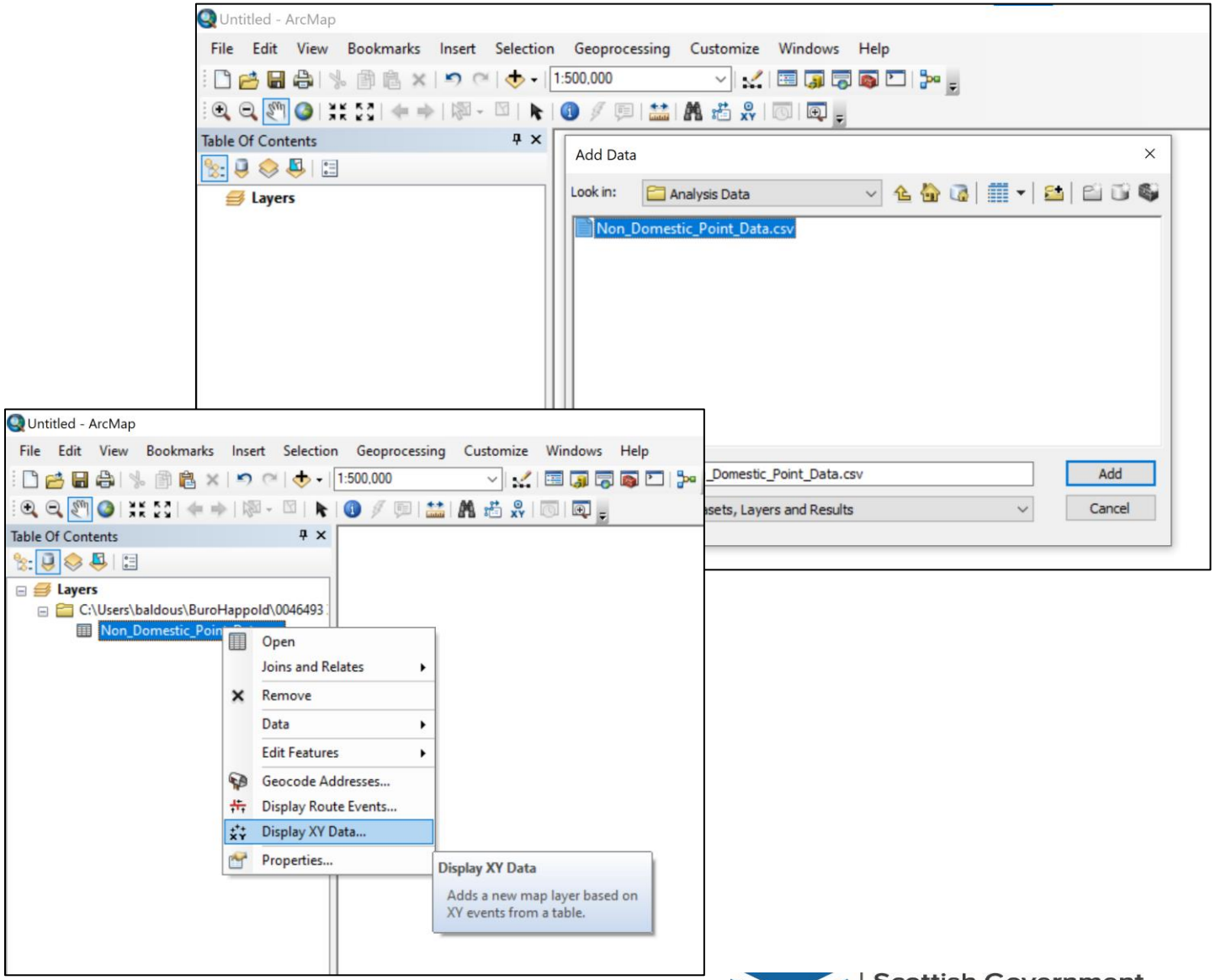
Baseline Tool Data Export

1. Export from Baseline Tool:

- While within the “GIS Output” tab
- Save As “Comma Delimited” **.csv** file

2. Import into GIS:

- Import .csv file of point data
- Display XY Data



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Stage 4 – Local Authority Level Analysis (Strategic Level)

- What to visualize
- Example outputs

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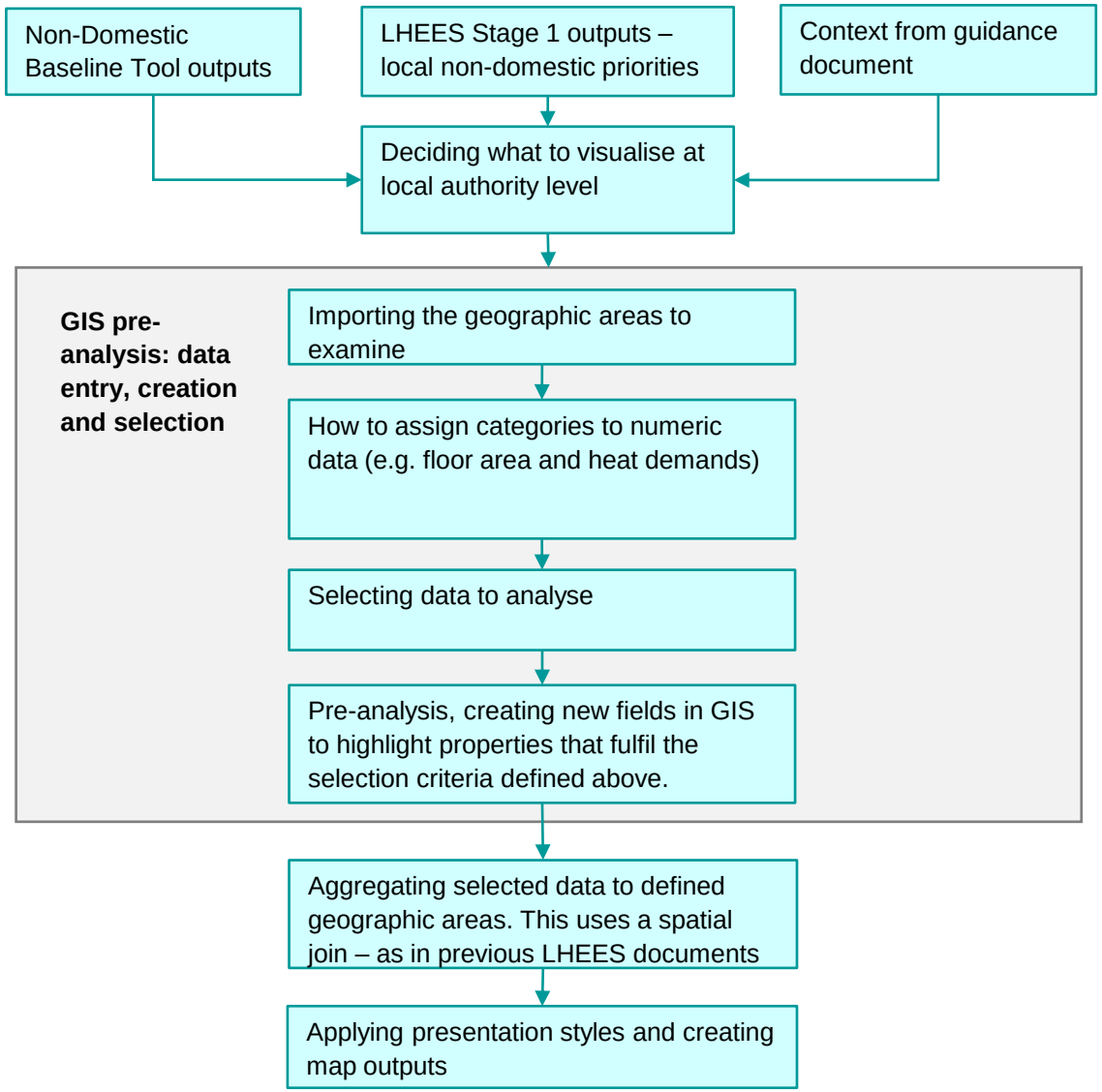
Local Authority Level Analysis (Strategic Level)

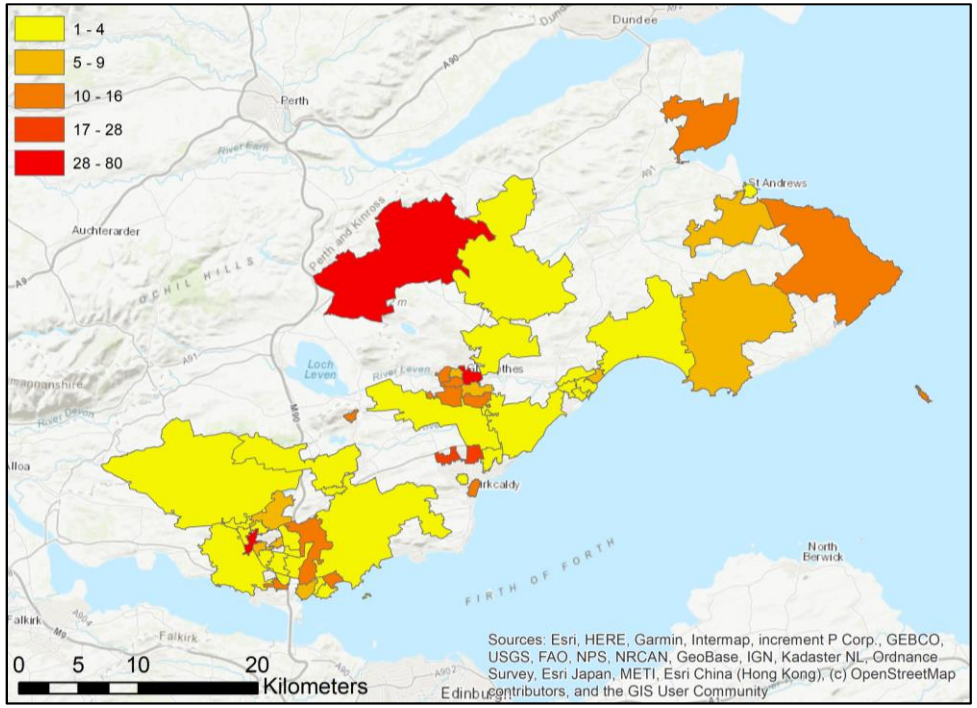
- This is most likely to be to Intermediate Zones (IZs), aligning with other Stage 4 approach documents, but could also be to Ward or Data Zone.
- Provide an understanding of non-domestic properties at a strategic level.
- Aid in identifying spatial areas for a more detailed zone and point level investigation.



Local Authority Level Analysis (Strategic Level)

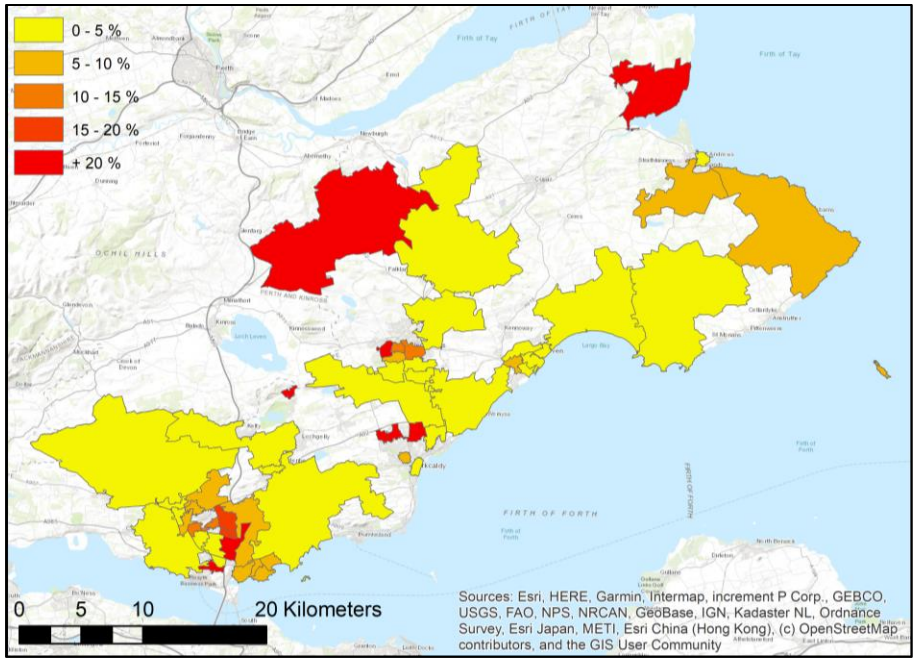
- Example Strategic Level Aggregations (what to visualize):
  - Filter selections from the Baseline Tool can help guide what to visualize.
  - Can focus on one indicator or a combination as with the Baseline Tool.
- Data can be presented in 3 ways
  - Count e.g.
    - Retail – count per IZ
    - Oil Systems – Identify no. low regrets oil heating systems for early action.
    - Schools & Oil Systems – Count of Schools (likely public) with oil derived systems for implementation
  - Percentage e.g.
    - Retail – Percentage of retail properties by IZ
  - Sum e.g.
    - Retail – Total retail floor area by IZ
    - Oil Systems – Sum of Oil derived heating demands by IZ
    - Schools & Oil Systems – Sum of oil derived heat demands from schools

Local Authority Level Analysis (Strategic Level)



Count of properties

Variable	Selected criteria
Property age	Post-1983
Main fuel type	Electricity
Main heating system	Heat pump



Percentage of properties

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Stage 4 – Zone and Point Level Data Visualisation (Delivery Level)

- What to visualize
- Example outputs

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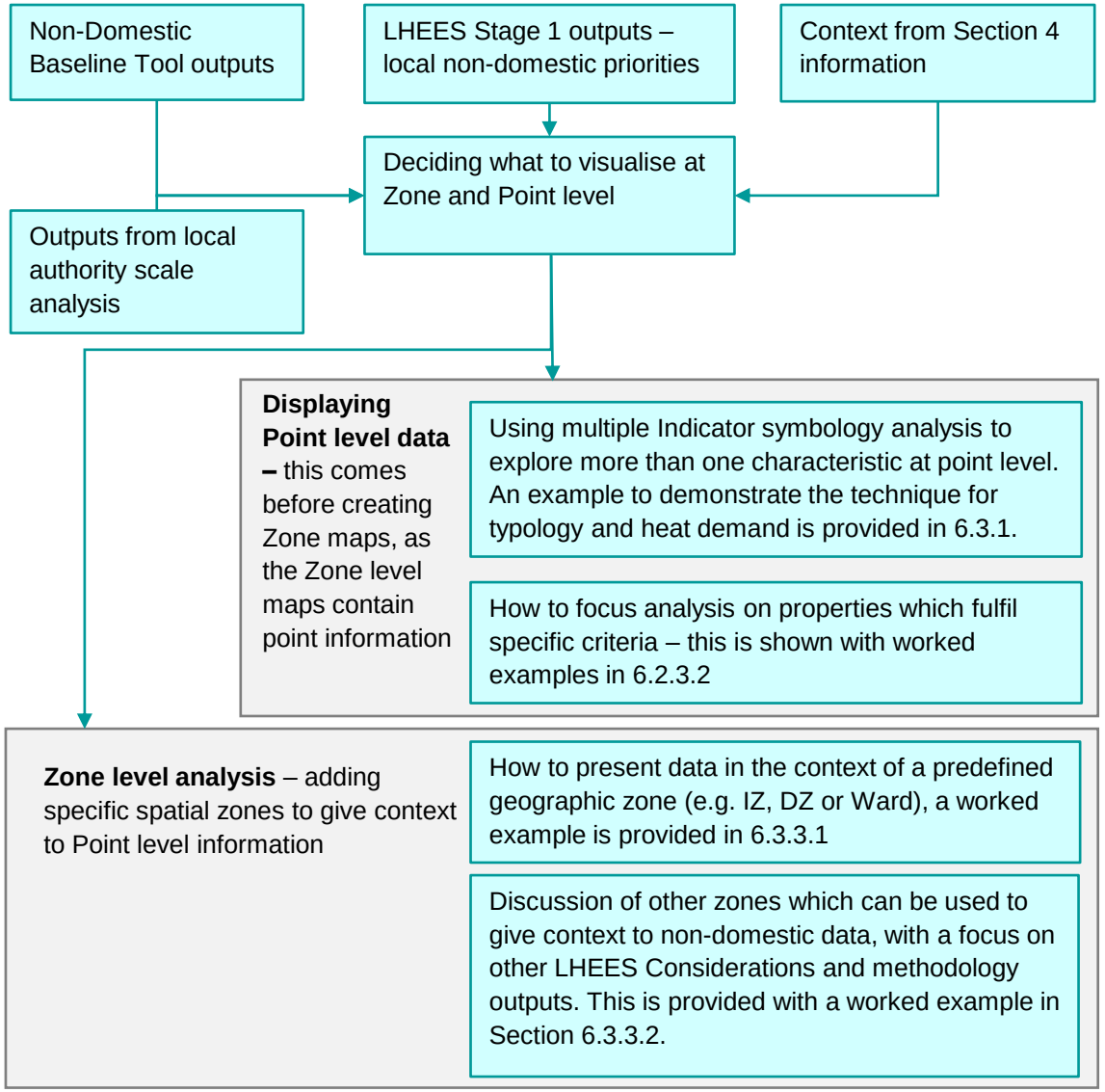
Zone and Point Level Visualisation (Delivery Level)

- The most detailed level is individual property or point level.
- Viewing point data gives a precise understanding of the geographic context of a property.
- Often useful to view in the context of a defined geographic unit (IZ or DZ) or output from another LHEES priority (e.g. potential heat network zone)
- Point level information can also be considered without a zone context.
- Point level maps are not restricted by the size of a zone, making them more adaptive.



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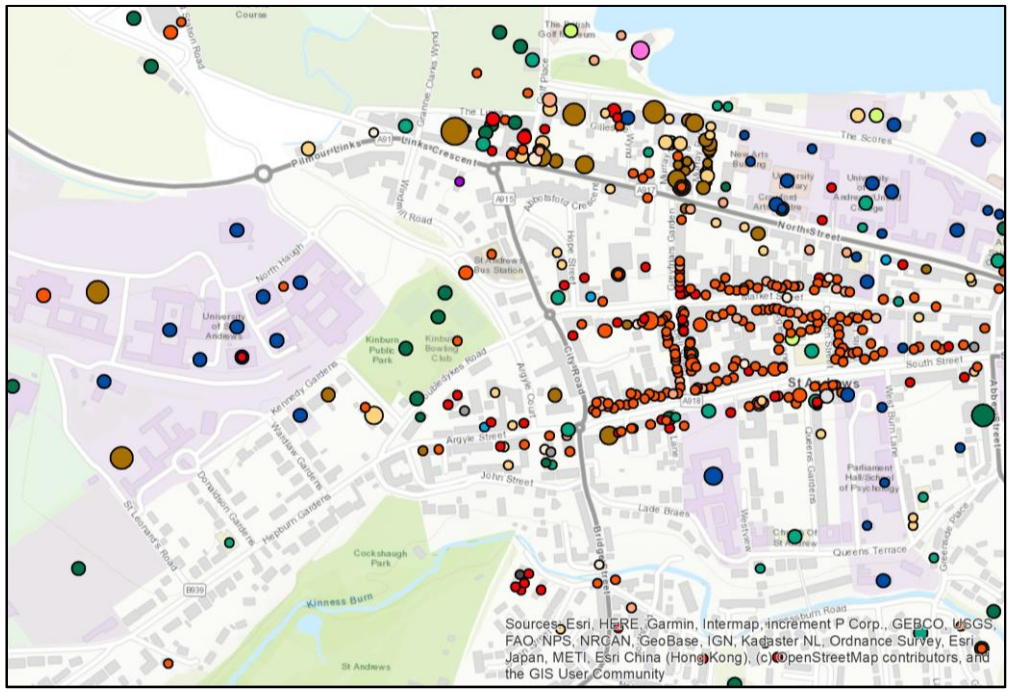
Zone and Point Level Visualisation (Delivery Level)

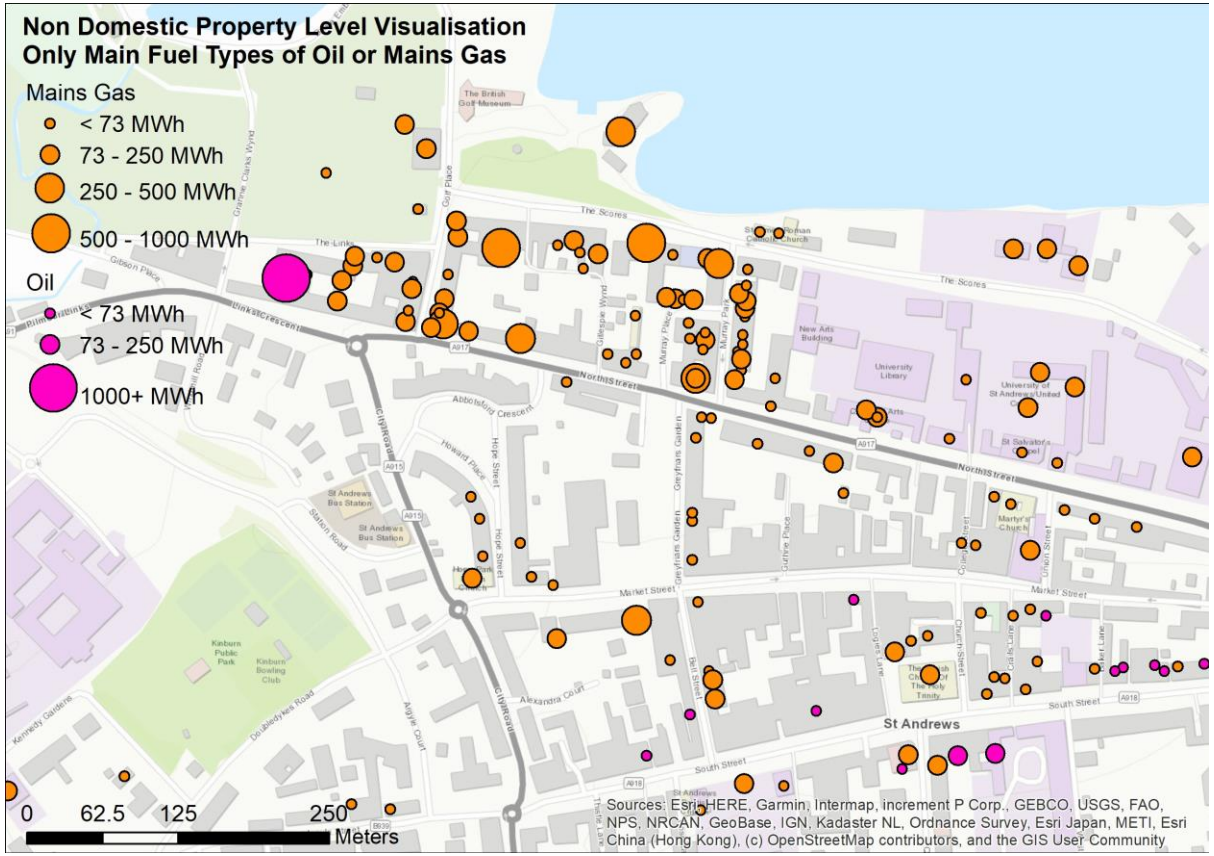
1. **Point level data symbolised by typology and heat demand**
   - Simultaneously colour by “Main Typology” and sizing dependent on heat demand.
   - Useful for informing strategy as a high number of public sector typologies with large demands (e.g. education) will be a likely early focus for decarbonisation.



Offices	Retail	Hotels	General sports & leisure	Clubs and community centres	Education	Heavy manufacturing / industry	Military and prison
	Cafes, pubs, retraunts and takeaways	Residential	Large entertainment sites (e.g. theatres, cinemas,	Places of worship	Health	Light manufacturing / industry / Workshop	Other
			Museums, art galleries, libraries, law courts		Emergency services	Storage / distribution	

Zone and Point Level Visualisation (Delivery Level)

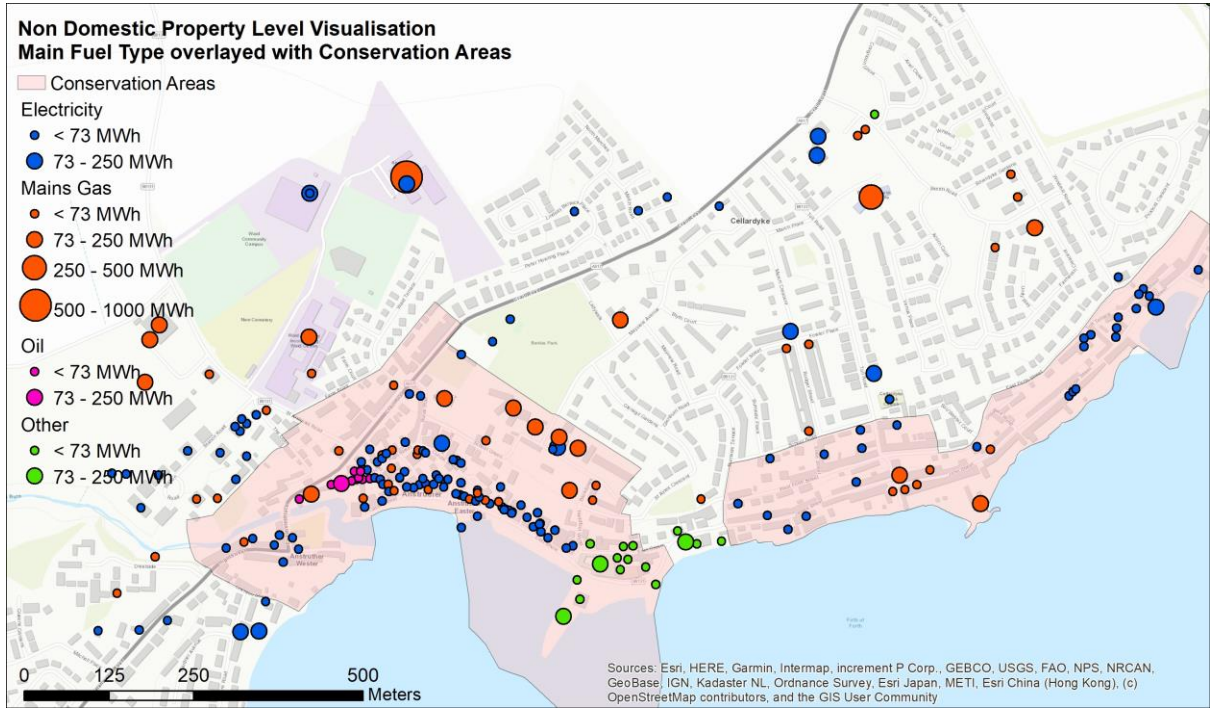
2. **Visualisation of specific field values and/or parameters**
   - Useful to explore, for example: a specific typology, heat network suitability score or main fuel type
   - Multiple screenings can be combined e.g. education and health typologies with oil heating

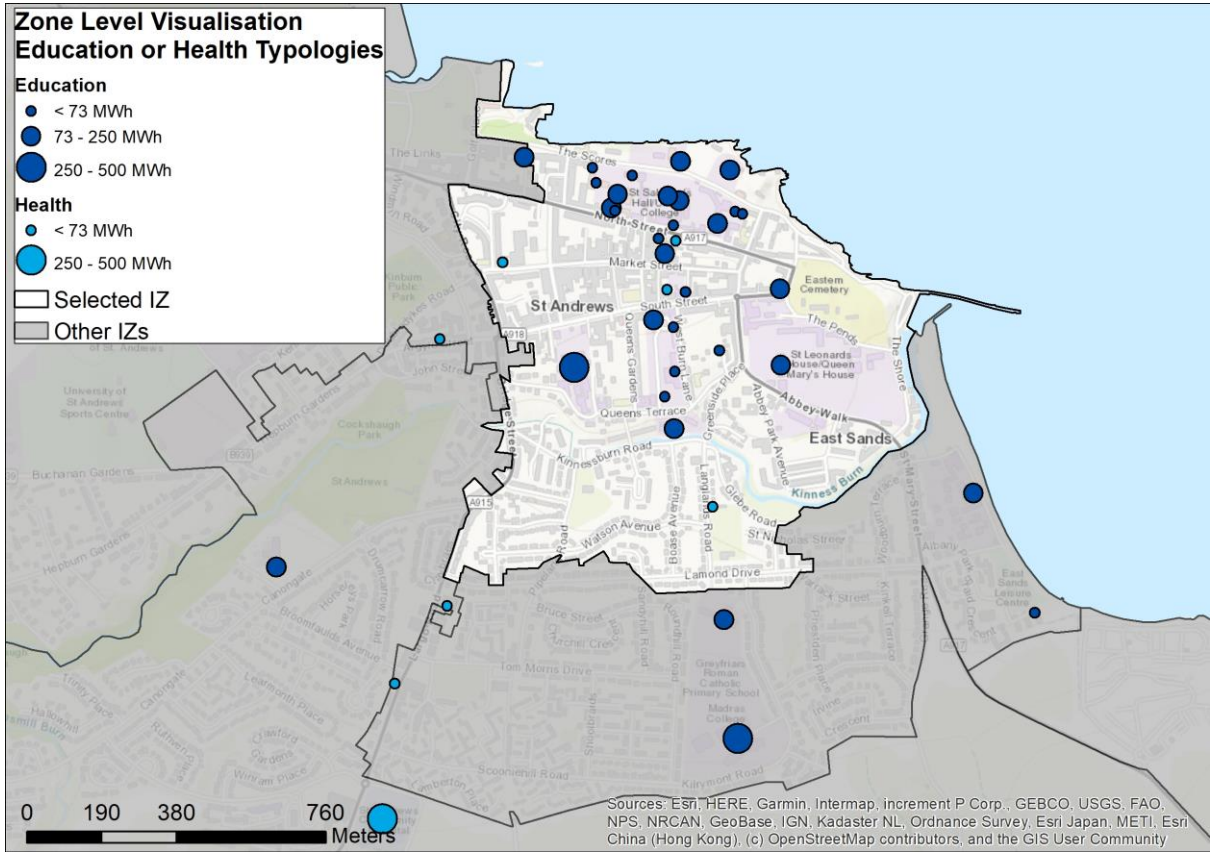


Zone and Point Level Visualisation (Delivery Level)

3. Zone Level Visualisation

- Zone level visualisation incorporates point data and an overview level (zone level) e.g. specific **individual Intermediate Zone** or and output from other **LHEES Stage 4 Considerations**.





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Energy and Low Carbon Heat

LHEES Capacity Building Workshop

Non-Domestic Approach – Overview and Demonstration

27/04/2023

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