

Local Heat and Energy Efficiency Strategy (LHEES): Technical Report Burghead Specific Extract

Methodology and Findings of the LHEES Pilot
Project for **Moray Council**

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EXECUTIVE SUMMARY

The aim of a Local Heat and Energy Efficiency Strategy (LHEES) is to set a framework and delivery programme for how each local authority will reduce the energy demand and decarbonise the heat supply of buildings in their area. This project is a pilot to test the LHEES concept and build a knowledge base for local authorities, should the LHEES become a statutory duty.

This Technical Report outlines the work undertaken by Changeworks and Moray Council (the Council) to identify the tools, data, skills and resources required to develop and deliver an area based LHEES for Moray.

Baseline Data Analysis

The baseline reporting provides an overview of the domestic housing stock, their energy efficiency and insulation status (average and range in variation), fuel types, present renewable heating used, and the heat demand of the area.

The analysis focuses on the entire council area of Moray and uses data from Home Analytics (version 3.5), Corporate Address Gazetteer data and EPC data.

Overall council area of Moray

- Moray has a representative tenure mix compared to the rest of Scotland.
- Moray holds a larger proportion of houses compared to the rest of Scotland.
- The average energy efficiency of the domestic properties is lower by five SAP points than the national average.
- The proportion of domestic properties using mains gas as their main heating fuel (64%) is much lower than the national level (81%).
- The proportion of domestic properties using electricity as their main heating fuel (14%) is higher than the national level (10%).
- Proportionally, a lot more households are using oil as the main heating fuel (17%) compared to the national level (6%).
- The insulation levels of domestic cavity wall properties in the LHEES area (54%) are considerably lower than national levels (73%).
- Domestic loft insulation rates are similar to that of national levels.
- Two-fifths of non-domestic buildings with an EPC have the lowest band of G.
- A small proportion of non-domestic buildings have an EPC band C or greater.

The Burghead area

- A higher proportion of owner-occupied properties compared to the rest of Moray.
- A higher proportion of pre-1919 domestic properties compared to the rest of Moray.
- A higher proportion of houses compared to the rest of Moray.
- Average energy efficiency of the domestic properties is lower by seven SAP points than the rest of Moray.
- Predominant fuel types in domestic properties are oil (53%) and electricity (40%).
- A high proportion of walls in domestic properties are of a solid construction (45%).
- A small sample of non-domestic buildings (five buildings)
- Three-fifths of non-domestic buildings with an EPC have the lowest band of G.
- None of the five non-domestic buildings have an EPC band C or greater.

Potential Energy Efficiency and Heat Decarbonisation Measures

The purpose of this section is to produce a shortlist of potentially suitable energy efficiency and heat decarbonisation measures for the LHEES area, based on the baseline data analysis. The main data source used in this analysis was the Energy Saving Trust's Home Analytics (v3.5). Census data was also used to provide information on demographics at the various geographic locations.

EPC data was provided for non-domestic properties; however, this does not account for the overall non-domestic property stock and it is unknown how representative the non-domestic data is for the whole stock.

The Burghead area

- The LHEES area of Burghead covers 917 domestic properties, all of which are off-gas.
- Over one-third of domestic properties are recommended internal wall insulation.
- The potential for domestic low carbon space heating measures is much higher than the overall council area, with 37% of properties recommended air source heat pumps and 21% recommended biomass boilers.
- Installing all possible domestic fabric upgrades is estimated to cost **£2.7m**, installing all identified low carbon space heating upgrades would cost **£6.5m**.
- The average total household cost for installing fabric and heating measures is estimated to be **£13.8k**, with average fuel bill savings of **£356** per annum.
- Installing all the domestic measures is estimated to save 3.3 kilotonnes of CO₂ per year, which equates to 3.7 tonnes per household.
- EPC data was available for only five non-domestic properties.
- The most common recommendation for all non-domestic categories was double glazing, and/or secondary glazing.
- Wall insulation was recommended for three of the non-domestic properties, as was a loft/roof measure.

Socioeconomic Analysis and Workshop

Sweco was commissioned to provide a socioeconomic analysis in the form of a multi-criteria analysis and a workshop. In contrast to technical and financial analysis, socioeconomic analysis evaluates the wider impacts of projects and programmes not typically captured in business cases.

Appropriate criteria for the analysis were agreed which measure the net benefit to society of installing energy efficiency or low carbon heating measures across the whole of Moray, the

Burghead area or the Elgin area. The net benefits include indicators such as carbon reduction, job creation, air quality, wellbeing and building the local supply chain.

- The analysis indicated that domestic energy efficiency measures across the whole council area are marked highest with regards to realising net benefits.
- The top six measures for net benefits all relate to measures targeting domestic improvements.
- The higher scores for the overall areas reflect the number of homes impacted, approx. 28.5 – 32 thousand homes.
- For non-domestic, scale of deployment was also prioritised to ensure that the potential for local economic growth is maximised.
- The emphasis on scale means that for both energy efficiency and heat decarbonisation measures, the overall area in Moray ranks highest in terms of socioeconomic benefit.

CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION AND CONTEXT	7
1.1 Policy and Strategy Context	7
1.2 Local Context.....	8
2. BASELINE DATA REPORT	8
2.1 Key Findings	8
2.1.1 Non-domestic stock	9
2.2 Domestic Housing stock.....	9
2.2.1 Tenure.....	9
2.2.2 Property types and age	10
2.3 Energy efficiency of domestic stock.....	11
2.3.1 Energy Efficiency ratings and heating costs	11
2.3.2 Heating fuel types.....	13
2.3.3 Off gas areas	13
2.3.4 Loft and wall insulation status	15
2.4 Non-Domestic Stock.....	17
2.4.1 Non-domestic EPC results.....	17
2.4.2 Non-domestic heating and energy use.....	17
3. POTENTIAL ENERGY EFFICIENCY AND HEAT DECARBONISATION MEASURES.....	18
3.1 Summary and Key Points	18
3.1.1 Domestic stock	18
3.1.1 Non-domestic stock	18
3.2 Fabric improvement and heating upgrades	19
3.2.1 Potential fabric upgrades.....	19
3.2.2 Potential low carbon heating upgrades.....	20
3.3 Running cost and carbon savings	21
3.3.1 Installation costs and savings.....	22
3.3.2 Carbon savings.....	23
3.4 Non-domestic upgrades.....	24
3.4.1 Fabric upgrades.....	24

3.4.2	Low carbon heating measures	25
4.	ZONING USING HEAT MAP	25
4.1	Methodology	25
4.2	Results.....	25

1. INTRODUCTION AND CONTEXT

1.1 Policy and Strategy Context

The recently published Draft Heat in Buildings Strategy¹ outlines how the Scottish Government intend to reduce greenhouse gas emissions from Scotland's homes, workplaces and community buildings and to remove poor energy performance as a driver of fuel poverty. To meet these objectives the Scottish Government is supporting a place based, locally led and tailored approach to heat decarbonisation and energy efficiency.

The key element of the approach is targeted area-based schemes led by local authorities: Local Heat and Energy Efficiency Strategy (LHEES). The aim of an LHEES is to set a framework and delivery programme for how each local authority will support the reduction of the energy demand and decarbonisation of heat supply of buildings in their area.

LHEES will provide a long-term framework for taking an area-based approach to planning and delivery of the heat transition, including through zoning linked to regulation. LHEES will also form a basis for local public engagement and will be in place for all local authority areas by the end of 2023. LHEES have a wide-ranging scope that can be summarised as:

- Long-term (20 years) including targets covering all buildings (domestic and non-domestic).
- Reflective of, and dovetailing with, national and local targets and policies covering fuel poverty, carbon reduction, energy efficiency and heat at a local level.
- Understanding of current energy performance and heat use of buildings and identifying opportunities for reducing heat demand, increasing energy efficiency, low carbon heat sources and heat storage.
- Designating heat zones that take into consideration area based, local socio-economic assessment.
- Costed and phased planning and zoning for delivery including area-based energy efficiency improvements, installation of low carbon heat supplies and implementation of new low carbon energy supply infrastructure.
- Quantifying short term benefits and longer-term impacts on the local economy and employment.

¹ Scottish Government (2021) [Draft Heat in Buildings Strategy](#)

1.2 Local Context

Moray is a geographically varied region of Scotland, incorporating the Moray Firth coastline, lowlands, and mountainous areas which are part of the Cairngorms National Park. The area covers just over 2,200 square kms and has a low population density. Moray has higher percentages of people aged over 45 when compared with the Scottish average. In particular, the data indicates there are higher percentages of older people in more coastal and rural areas.

Moray is home to more than 45 distilleries, and its recent history has been inextricably linked with the Royal Air Force and the bases at Lossiemouth and nearby Kinloss (now barracks).

Moray Councils pilot LHEES project will focus predominately on carbon reduction potential, replicability and integration into longer term planning. The areas of Moray to be focused on include Burghead, area wide rural and a low carbon masterplan for Elgin.

2. BASELINE DATA REPORT

The baseline reporting provides an overview of the domestic housing stock, their energy efficiency and insulation status (average and range in variation), fuel types, present renewable heating used, and the heat demand of the area.

This report focuses on the entire council area of Moray. To create the Baseline Data Report for Moray Council Local Heat and Energy Efficiency Strategy (LHEES), we used data from Home Analytics (version 3.5). Corporate Address Gazetteer data from Moray Council was also referred to. EPC data was provided for the non-domestic stock throughout Moray; however, this does not account for all non-domestic properties and it is unknown to what extent this data represents the overall non-domestic stock.

2.1 Key Findings

Key findings for the Burghead area

- A higher proportion of owner-occupied properties compared to the rest of Moray.
- A higher proportion of pre-1919 properties compared to the rest of Moray.
- A higher proportion of houses compared to the rest of Moray.
- Average energy efficiency of the domestic properties is lower by seven SAP points than the rest of Moray.
- Predominant fuel types are oil (53%) and electricity (40%).
- A high proportion of walls are of a solid construction (45%).

2.1.1 Non-domestic stock

Key findings for the Burghead area

- A small sample (five buildings).
- Three-fifths of buildings with an EPC have the lowest band of G.
- None of the five buildings have an EPC band C or greater.

2.2 Domestic Housing stock

This analysis covers the entire housing stock in the Moray Council area. Usable data was available for 46,901 properties in Home Analytics.

Analysis has also been carried out on two geographical areas:

- Burghead (917 properties) (2% of overall stock)
- Elgin (10,832 properties) (23% of overall stock)

From Home Analytics, there were 46,901 usable entries of domestic properties across the council area. Data on a further 346 properties was excluded, as no useful data was provided (i.e., Home Analytics showed 'unknown' for the relevant variables). The Home Analytics data on the 46,901 properties has formed the basis for the current analysis.

2.2.1 Tenure

Tenure (Burghead)

Almost three-quarters (72%) of the properties in the Burghead area are owner occupied, a higher proportion to the overall Moray council area (64%). Consequently, there are lower proportions of social (18%) and privately rented (9%) compared to the overall council area (23% and 13%, respectively).

Table 1: Tenure for flats and houses (Burghead)

Housing type	Social rented	Owner Occupied	Privately rented	Totals
Flats total	9	62	28	99
Houses total	158	602	58	818
Sub-total	167	664	86	917

As for property types, the majority of rented properties (both privately and social renting) are houses (85%), compared to 70% of the overall council area and double the national average of 42%². Figure 1 compares the property types and tenures against the national average.

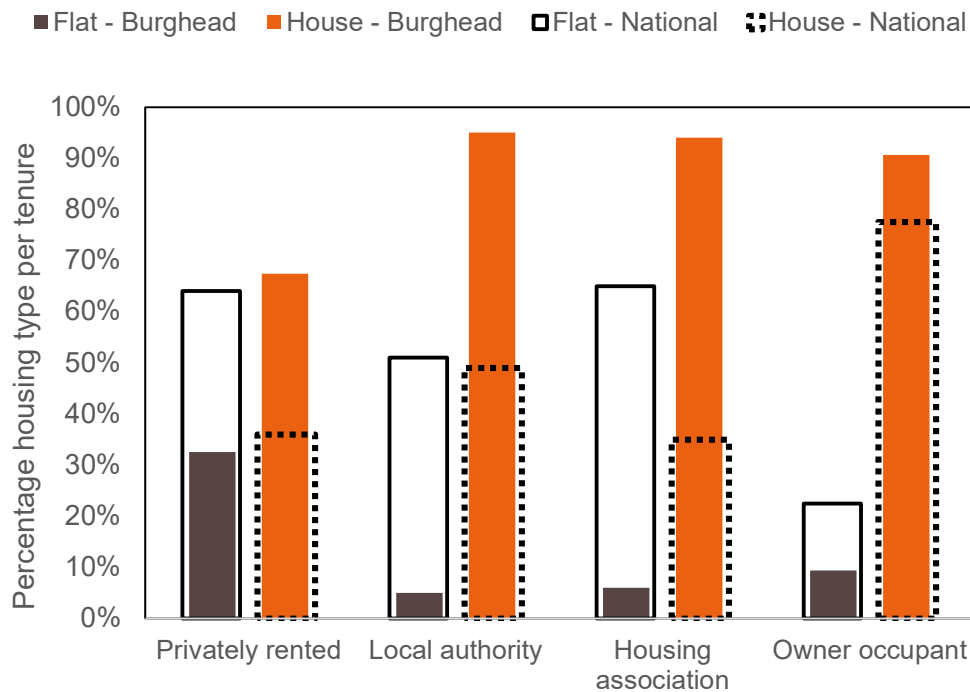


Figure 1: Flats and houses per tenure type for Burghead (filled bars) and the rest of Scotland (outlined bars)

2.2.2 Property types and age

Property types and age (Burghead)

In the Burghead area, 89% of the properties are houses, and the remaining 11% are flats, indicating Burghead proportionally more houses than the overall council area (83%) and the national average (63% houses, 37% flats)³.

The data indicates that one-third of the Burghead properties were built before 1919, a larger proportion when compared to the overall council area (25%) and national average (18%). Proportionally less properties were built in the 1950-1983 period (27%) compared the overall council area (40%), and the national average (43%).

²[Scottish Housing Condition Survey: 2018 Key Findings](#): Scottish Government (2020)

³[Scottish Housing Condition Survey: 2018 Key Findings](#): Scottish Government (2020)

Table 2: Property types and age-bands of the domestic properties (Burghead)

Property type	Pre-1919	1919-1949	1950-1983	1984-1991	1992-2002	Post-2002	Totals
Flats (total)	6%	<1%	1%	1%	1%	2%	11%
Houses (total)	28%	6%	26%	9%	9%	12%	89%
Detached house	9%	1%	8%	4%	6%	9%	38%
Semi-detached house	8%	3%	10%	4%	1%	2%	28%
End-terraced house	5%	<1%	4%	<1%	<1%	<1%	11%
Mid-terraced house	6%	1%	4%	<1%	<1%	1%	12%
Totals	33%	6%	27%	9%	10%	15%	

2.3 Energy efficiency of domestic stock

2.3.1 Energy Efficiency ratings and heating costs

Energy Efficiency ratings and heating costs (Burghead)

The average modelled heating costs across all properties in Burghead is £1,255, which is higher than the overall council average (£1,138). This is likely resultant from the heating fuel mix in Burghead, which has a higher proportion of expensive heating fuels (see Section 2.3.2).

The average Energy Efficiency rating (EE rating) of 53 is below the council average by 7 points and 12 points below the national average⁴. Overall, post-2002 built houses have the highest average EE rating with an average of 73 equivalent, to a high EPC C-band. Pre-1919 buildings have the lowest EE ratings, with pre-1919 houses scoring an average 43 points, equivalent to an E-band, and pre-1919 flats scoring an average 49 points, equivalent to an E-band. Modelled energy bills are highest for pre-1919 houses.

Table 3: EE rating/ band and estimated heating bills per housing type (Burghead)

Housing type		Pre-1919	1919-1949	1950-1983	1984-1991	1992-2002	Post-2002	Average
Flats	EE rating/ band	49 (E)	55 (D)	56 (D)	56 (D)	72 (C)	72 (C)	57 (D)
	Estimated energy bill (£/yr)	£1,166	£1,301	£1,002	£703	£523	£509	£920
Houses	EE rating/ band	43 (E)	50 (E)	52 (E)	55 (D)	61 (D)	73 (C)	53 (E)
	Estimated energy bill (£/yr)	£1,604	£1,279	£1,264	£1,209	£1,132	£850	£1,296
Overall averages	EE rating/ band	44 (E)	50 (E)	52 (E)	55 (D)	62 (D)	72 (C)	53 (E)
	Estimated energy bill (£/yr)	£1,530	£1,280	£1,254	£1,173	£1,051	£801	£1,255

⁴[Scottish Housing Condition Survey: 2018 Key Findings](#): Scottish Government (2020)

Looking at the EE bands in the Burghead LHEES area, proportionally there are more flats than houses in the A-C band. There are a similar proportion of flats and houses sitting in the D-E band. A higher proportion of houses are in the lowest banding (F-G) than flats (Figure 2).

When compared to the national pattern, a lower proportion of both flats and houses in the Burghead LHEES area are in the higher band (A-C), with a similar proportion of houses and larger proportion of flats in the D-E banding. For all property types, a higher proportion are in lowest banding (F-G).

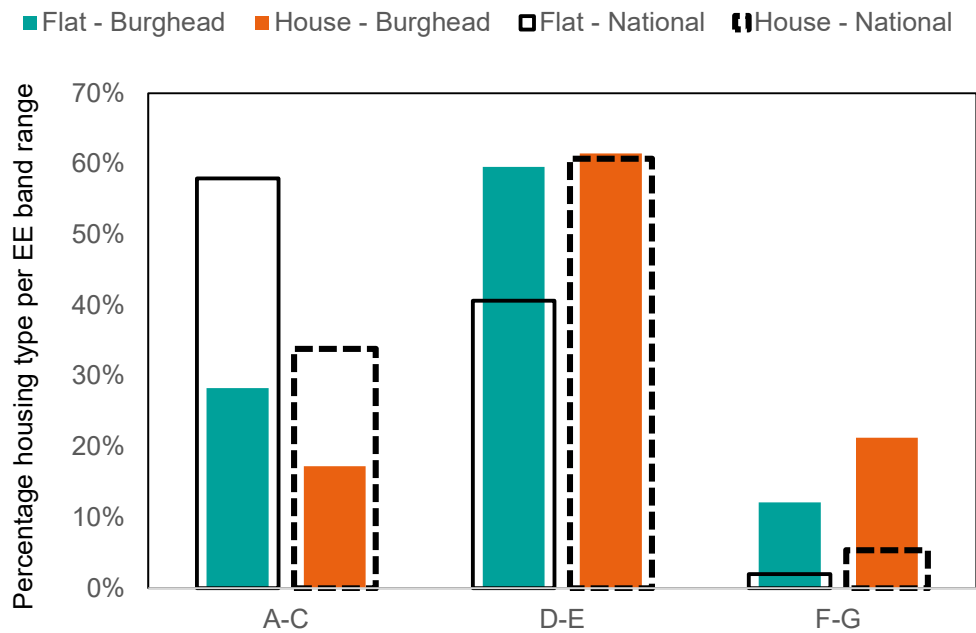


Figure 2: Spread of the EE banding of the flats and houses in Burghead (filled bars) and in Scotland (outlined bars)

Socially rented properties are estimated to have the lowest heating bills. The highest modelled heating bills are estimated for owner occupied houses. The most efficient are privately rented flats (Table 4). This is unlike the overall council area where social rented are the most efficient and privately rented the least. It is worth noting that there is a small sample of privately rented properties in Burghead (86 properties which equates to 9 % of the stock).

Table 4: SAP rating and estimated heating bills per tenure type (Burghead)

Housing type		Social rented	Owner Occupied	Privately rented
Flats	EE rating/ band	60 (D)	53 (E)	65 (D)
	Estimated energy bill (£/yr)	£691	£1,032	£746
Houses	EE rating/ band	54 (E)	53 (E)	52 (E)
	Estimated energy bill (£/yr)	£1,142	£1,339	£1,262
Overall averages	EE rating/ band	54 (E)	53 (E)	56 (E)
	Estimated energy bill (£/yr)	£1,118	£1,310	£1,094

2.3.2 Heating fuel types

Heating fuel types (Burghead)

Oil is the main heating fuel type for 53% of the households in the Burghead area (Table 5), which is considerably higher than the overall council area (17%) and the national average of 6%. Electric heating accounts for 40% of the properties, compared to 14% in Moray overall and 10% nationally. There are no properties heated by mains gas.

Table 5: Main heating fuel type per property type (Burghead)

Housing type	Mains gas	Electricity	LPG	Oil	Biomass/Solid	Communal
Flats	0%	8%	0%	2%	<1%	0%
Houses	0%	32%	2%	50%	5%	0%
Total	0%	40%	2%	53%	5%	0%

2.3.3 Off gas areas

The proportion of off-gas properties across Moray is 36%. The distribution of data zones, showing the proportion of off-gas properties is shown in Figure 3.

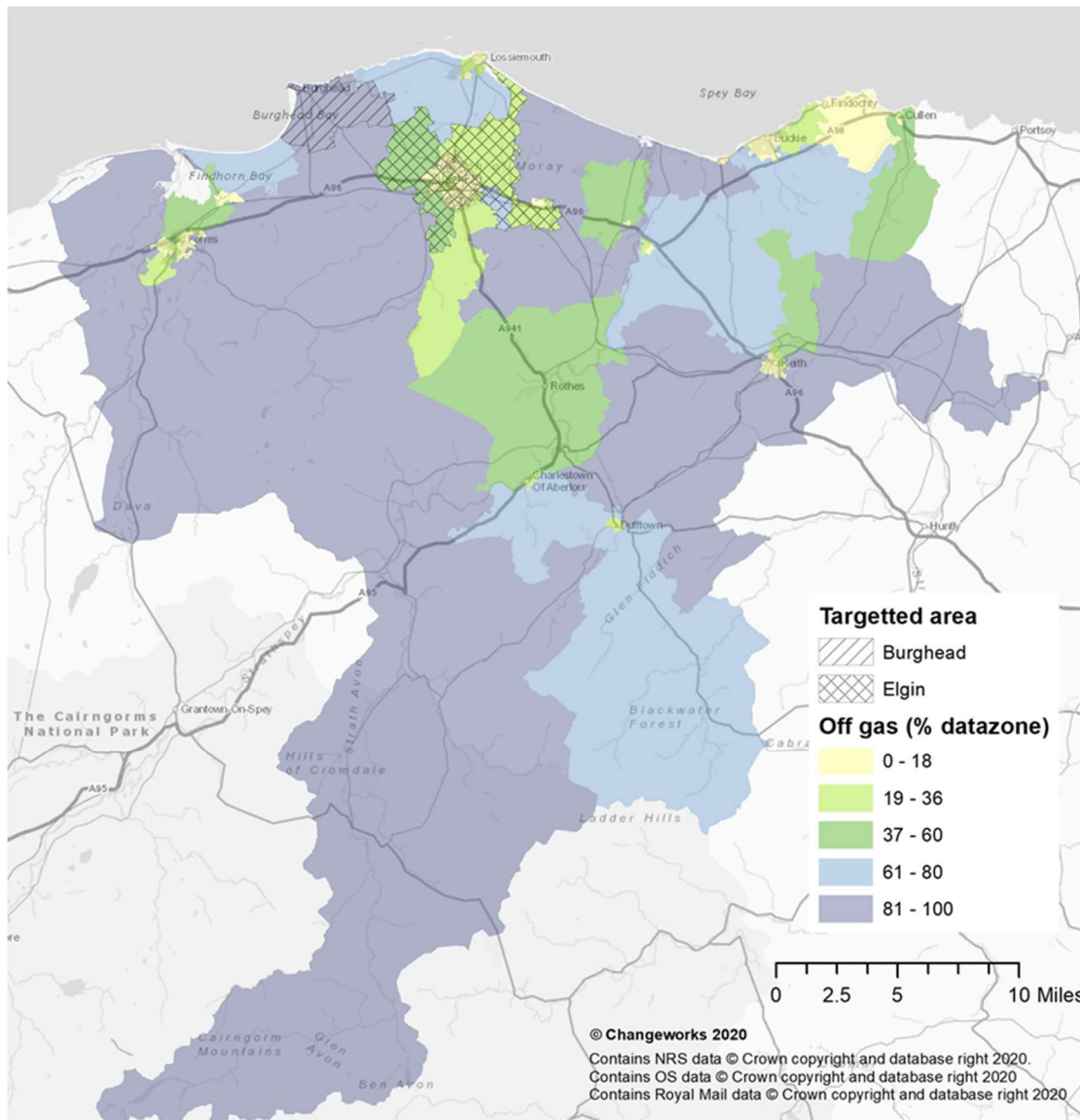


Figure 3: Spread of off-gas areas across Moray.

The areas of Burghead and Elgin are highlighted below in Figure 4, showing the proportion of off-gas properties in the data zones. As shown previously, the Burghead area is off-gas.

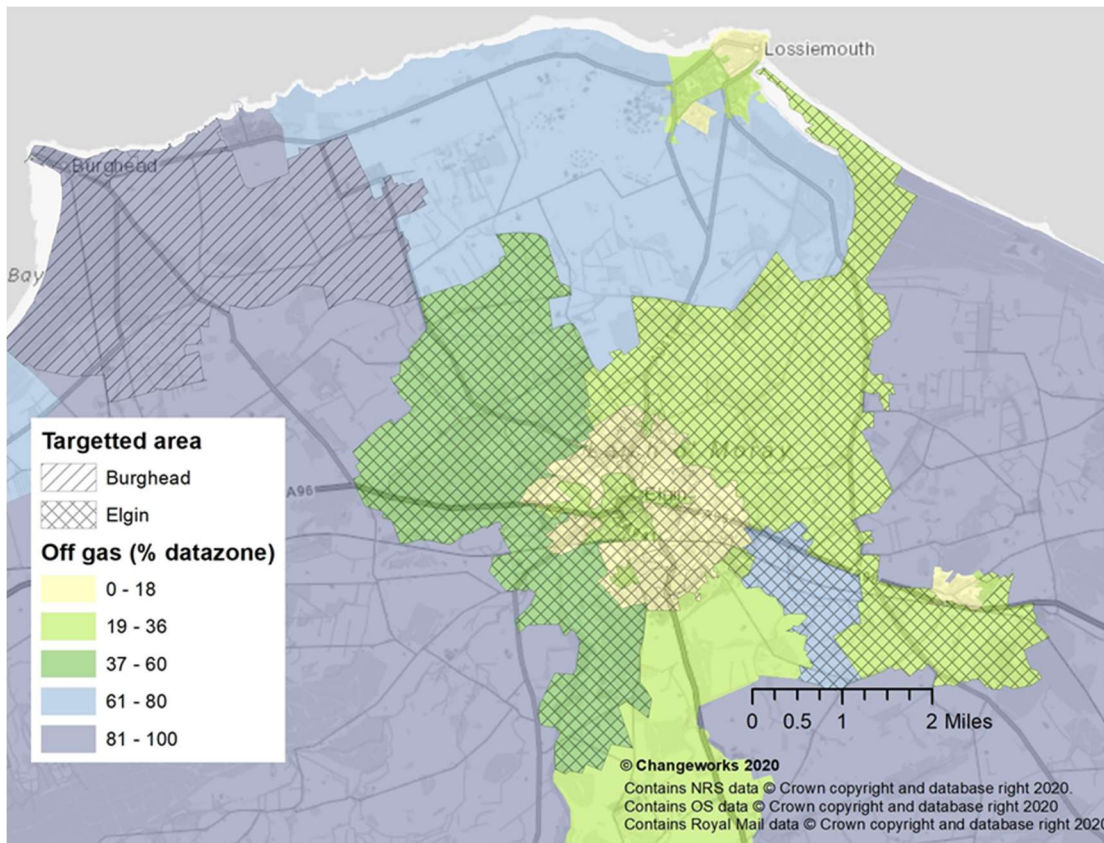


Figure 4: Spread of off-gas properties across Burghead and Elgin.

2.3.4 Loft and wall insulation status

Wall insulation (Burghead)

The predominant wall construction in Burghead is solid wall (45%), resultant from the high proportion of properties built before 1919.

The insulation levels of the cavity wall properties (46%) are less than for Moray overall (54%) and the national average (73%). Proportionally, socially rented properties are more likely to have cavity wall insulation (53%).

Most Burghead solid stone or brick properties have uninsulated walls (81%), which is slightly lower than the overall council area (84%), and on par with the national average.

Table 6: Wall construction and insulation status of tenures (Burghead)

Tenure type	Cavity Construction	Solid Brick or Stone	System Built	Timber Frame
Privately rented	8	55	0	23
Uninsulated walls	5	46	0	5
Uninsulated walls (%)	63%	84%	0%	22%
Social rented	96	33	5	33
Uninsulated walls	45	22	4	13
Uninsulated walls (%)	47%	67%	80%	39%
Owner Occupied	120	322	13	209
Uninsulated walls	70	263	9	53
Uninsulated walls (%)	58%	82%	69%	25%
Totals	224	410	18	265
Uninsulated walls	120	331	13	71
Uninsulated walls (%)	54%	81%	72%	27%

Loft insulation (Burghead)

Less than half of properties with lofts in Burghead have loft insulation over 250mm (47%), similar to the overall stock in Moray and the national average of 46%⁵. As for tenure, privately rented properties have the least percentage of lofts with insulation over 250 mm. There are no lofts in 5% of Burghead's stock.

Table 7: Loft insulation status of domestic properties and of tenures (Burghead)

Housing type	0-99mm	100-249mm	250mm+	No Loft	Total lofts
Privately rented	15	28	25	18	68
(%) of lofts	22%	41%	37%		
Social rented	7	88	68	4	163
(%) of lofts	4%	54%	42%		
Owner Occupied	99	228	317	20	644
(%) of lofts	15%	35%	49%		
All	121	344	410	42	875
(%) of lofts	14%	39%	47%	(5% of stock)	(95% of stock)

⁵[Scottish Housing Condition Survey: 2018 Key Findings](#): Scottish Government (2020)

Derived from adding the number of lofts in SHCS with insulation levels at 300mm or more and halving those in SHCS with levels between 200mm and 299mm. This allows a comparison to the category in Home Analytics for 250mm+.

2.4 Non-Domestic Stock

There is currently no equivalent stock list like Home Analytics for non-domestic properties that models property variables for those without an EPC or other data available. As such, there is no definitive number of non-domestic buildings to report on, only those for which EPC data was provided.

According to the Council's available data there are approximately 5900 non-domestic records, but this number covers a large range of classifications which some may or may not have a building.

For 650 non-domestic properties in Moray an EPC record was provided and analysed. It is not possible to give an indication of how representative these are for the entire stock.

2.4.1 Non-domestic EPC results

Non-domestic EPC results (Burghead)

There are only 5 non-residential EPC records provided for Burghead, for which the majority had a G-band (Table 23).

Table 8: Representation of the Energy Efficiency bands in the non-domestic EPC data (Burghead)

EE band	No.	% EPCs
D/ D+	1	20%
F/ F+	1	20%
G	3	60%

2.4.2 Non-domestic heating and energy use

Non-domestic heating and energy use (Burghead)

According to the EPC certificates, there are only 5 non-residential EPC records provided for Burghead, 2 are heated by electricity, 1 by oil, 2 by mains gas. However, given that Burghead is on off-gas area, it is likely the latter are heated by LPG rather than mains gas.

Table 9: Main heating fuel from EPC sample (Burghead)

Main heating fuel	No.	% EPCs
Grid Supplied Electricity	2	40%
Natural Gas	2	40%
Oil	1	20%

3. POTENTIAL ENERGY EFFICIENCY AND HEAT DECARBONISATION MEASURES

The purpose of this section is to produce a shortlist of potentially suitable energy efficiency and heat decarbonisation measures for the LHEES area, based on the baseline data analysis.

3.1 Summary and Key Points

A full address list with insulation and heating upgrades, as well as summaries of potential installations at town/ settlement, output area and data zone level are provided in separate files. This document provides an overview of the most important findings.

The main data source used in this analysis was the Energy Saving Trust's Home Analytics (v3.5). Census data was also used to provide information on demographics at the various geographic locations.

EPC data was provided for non-domestic properties; however, this does not account for the overall non-domestic property stock and it is unknown how representative the non-domestic data is for the whole stock.

3.1.1 Domestic stock

Key findings for the Burghead area

- The LHEES area of Burghead covers 917 domestic properties, all of which are off-gas.
- Over one-third of properties are recommended internal wall insulation.
- The potential for low carbon space heating measures is much higher than the overall council area, with 37% of properties recommended air source heat pumps and 21% recommended biomass boilers.
- Installing all possible fabric upgrades is estimated to cost **£2.7m**, installing all identified low carbon space heating upgrades would cost **£6.5m**.
- The average total household cost for installing fabric and heating measures is estimated to be **£13.8k**, with average fuel bill savings of **£356** per annum.
- Installing all the measures is estimated to save 3.3 kilotonnes of CO₂ per year, which equates to 3.7 tonnes per household.

3.1.1 Non-domestic stock

Key findings for the Burghead area

- EPC data was available for only five non-domestic properties.
- The most common recommendation for all categories was double glazing, and/or secondary glazing.

- Wall insulation was recommended for three of the properties, as was a loft/ roof measure.

3.2 Fabric improvement and heating upgrades

The overall LHEES area baseline data reporting contains 46,901 domestic properties. This report first summarizes the overall potential fabric and heating upgrades and subsequently presents the findings for the specific areas of this LHEES. It should be noted that currently there is no additional data available for the 'system built' properties, which can vary in the type of construction and the suitability for external wall insulation.

3.2.1 Potential fabric upgrades

Potential fabric upgrades (Burghead)

For 69% of the properties in Burghead, loft and wall insulation opportunities were identified (637), with the majority of measures being top-ups of loft insulation (Table 10). For 280 properties no wall or loft insulation measures were identified.

Wall insulation measures are suitable for 46% of properties, with the prevailing measure being internal wall insulation (35%). Given the proportion of pre-1919 properties in Burghead (one-third), this is to be expected.

Table 10: Total potential fabric upgrades (Burghead)

Measure	Number of suitable properties	% of domestic housing stock
Loft insulation virgin	121	13%
Loft insulation top-up	344	38%
Cavity wall insulation	87	9%
External wall insulation	13	1%
Internal wall insulation	320	35%
Households requiring at least 1 fabric upgrade measure	637	69%
Households requiring both a loft and wall insulation measure	248	27%

These improvements are mapped in Figure 5. Please note that each point can represent a cluster of properties as opposed to a single property. Please also note that because of the amount of data points representing different measures, not all data points are shown in the map.

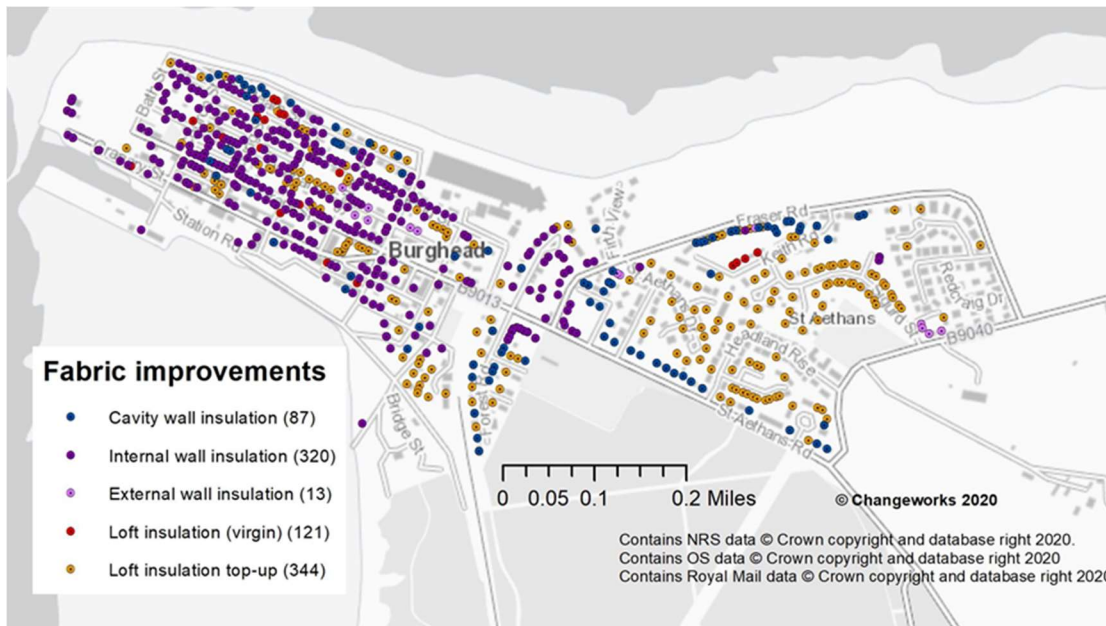


Figure 5: Fabric improvement opportunities (Burghead)

3.2.2 Potential low carbon heating upgrades

Potential low carbon heating upgrades (Burghead)

As Burghead is an off-gas area, there is a much higher proportion of properties suitable for air source heat pumps (37%) and biomass (21%) when compared to the overall council area (12% and 11%, respectively). In addition, 14% of the housing stock is potentially appropriate for high heat retention (HHR) storage heaters (Table 11 and Figure 6).

Please note that each point on the map can represent a cluster of properties as opposed to a single property. Please also note that because of the amount of data points representing different measures, not all data points are shown in the map.

Table 11: Total potential domestic low carbon heating upgrades (Burghead)

Measure	Number of suitable properties	% of domestic housing stock
Air source heat pump	341	37%
Biomass	193	21%
High heat retention heaters	124	14%
Solar thermal	727	79%
Households requiring at least 1 low carbon heating measure	858	94%
Households requiring both low carbon space heating and solar measures	400	44%



Figure 6: Low carbon space heating upgrades (Burghead)

For a very small proportion of the housing stock in Burghead, no suitable upgrade (for either fabric upgrades or heating upgrades) was identified (2%). From these 15 properties with currently no suggested improvement, 7 properties have an energy efficiency band D or worse.

3.3 Running cost and carbon savings

The Scottish Government Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 set legally binding targets to achieve net zero greenhouse gas emissions by 2045, with interim targets requiring a 75% reduction by 2030, and 90% by 2040. Given these interim targets, a significant amount of the change required by 2045 must be delivered in the 2020s. Achieving significant carbon emission reductions from heating will therefore be a requirement.

For all running cost and CO₂ savings, standard estimates from the Energy Saving Trust⁶ were used, apart from savings from HHR heaters. Looking at the absolute estimated savings in carbon emissions and running costs, most savings can be achieved with internal wall insulation, as there seems to be most potential for this measure and it has a high savings potential (**Error! Reference source not found.**and **Error! Reference source not found.**).

It should be noted that the estimated costs and calculated payback periods do not consider potential purchase cost savings that can be made through a bulk purchase scheme or area-based scheme, i.e., options were buying measures collectively or in a large quantity lowers the unit price. According to BEIS, savings up to 10% can be made through economies of scale⁷. This is similar to the experience of the Project Management team at Changeworks,

⁶[Energy Saving Trust](#)

⁷Department for Business, Energy and Industrial Strategy (2017) [What does it cost to retrofit homes?](#)

who have been responsible for area-based schemes across multiple local authority areas and report savings of 10-20% on capital costs for wall insulation schemes through area-based schemes.

3.3.1 Installation costs and savings

Installation costs and savings (Burghead)

Table 12 shows for each measure the potential costs and Table 13 shows the potential annual savings and payback period to recoup the purchase costs through running cost savings. It shows that all insulation measures combined would cost **£2.7m** across all the stock, with most of these costs attributed to internal wall insulation (87%). Installing solar thermal on all appropriate properties is estimated to cost **£3.3m**. Low carbon space heating measures are estimated to cost **£6.5m**. The average total cost to a household is estimated at **£13,791**, which is considerably higher than the overall council area average (£9,160). However, the average annual household savings if all the measures were installed is estimated to be **£356**, which is higher than the overall council area average (£256).

Table 12: Total modelled costs for fabric and low carbon heating measures (Burghead).

Measure	Number of suitable properties	Total potential costs	Potential costs per household
Loft insulation virgin	121	£38,038	£252 - £395
Loft insulation top-up	344	£86,587	£203 - £290
Cavity wall insulation	87	£46,100	£345 - £610
External wall insulation	13	£185,147	£10,674 - £16,695
Internal wall insulation	320	£2,357,484	£5,375 - £9,503
Air source heat pump	341	£3,410,000	£10,000
Biomass	193	£2,702,000	£14,000
High heat retention heaters	124	£342,680	£2,650 - £2,970
Solar thermal	727	£3,271,500	£4,500
Total	902 (properties with at least 1 measure)	£12,439,536	£13,791 (average total cost)

* Note that these are individual purchase costs, they can be lower when applied in larger quantities through area-based schemes or through bulk-purchasing schemes.

Table 13: Total modelled running costs savings for fabric and low carbon heating measures (Burghead).

Measure	Number of suitable properties	Total	Potential savings per household	Payback period (years) ⁸
Loft insulation virgin	121	£20,172	£109 - £250	2 yrs
Loft insulation top-up	344	£5,805	£10 - £25	12 - 21 yrs
Cavity wall insulation	87	£18,565	£85 - £280	2 - 4 yrs
External wall insulation	13	£3,595	£145 - £375	45 - 74 yrs
Internal wall insulation	320	£73,320	£105 - £375	25 - 51 yrs
Air source heat pump	341	£119,208	£88 - £840	12 - 113 yrs
Biomass	193	£8,751	£-70 - £543	26 - 528 yrs
High heat retention heaters	124	£22,360	£175 - £190	15 - 16 yrs
Solar thermal	727	£49,260	£60 - £100	45 - 75 yrs
Total	902 (properties with at least 1 measure)	£321,036	£356 (average total savings)	39 yrs

3.3.2 Carbon savings

Carbon savings (Burghead)

If all the measures in the Burghead area were installed, 3.3 kilo-tonnes of CO₂ per year could be saved given the current carbon intensity of heat. This equates to 3.65 tonnes per household, which is considerably higher than the overall council average (2.24 tonnes). This is resultant from the higher proportion of properties suitable for air source heat pumps and biomass, combined with the high estimated carbon savings for these measures.

⁸If insulation costs through area-based schemes or economies of scale are reduced with 10-20%, payback periods are reduced proportionally (i.e. with 10%-20%) as well.

Table 14: Total CO₂ savings for fabric and low carbon heating measures (Burghead)

Measure	Number of suitable properties	Total potential CO ₂ savings (tonnes/yr)	Potential CO ₂ savings per household (tonnes/yr)	Cost per tonne of CO ₂ saved
Loft insulation virgin	121	82	0.43 - 1.03	£463
Loft insulation top-up	344	23	0.04 - 0.1	£3,830
Cavity wall insulation	87	76	0.34 - 1.15	£604
External wall insulation	13	15	0.59 - 1.54	£12,510
Internal wall insulation	320	301	0.43 - 1.54	£7,825
Air source heat pump	341	1,257	1.15 - 10.15	£2,712
Biomass	193	1,188	1.29 - 10.45	£2,274
High heat retention heaters	124	97	0.76 - 0.83	£3,521
Solar thermal	727	253	0.21 - 0.66	£12,931
Total/Average	902 (properties with at least 1 measure)	3,293	3.65 (average total savings)	£3,778 (average cost per tonne CO₂ saved)

3.4 Non-domestic upgrades

In the Baseline Data Reporting we established there are at least 650 non-domestic properties in Moray, based on EPC records. From these properties, 619 (95%) EPC records contain recommendations for fabric and heating upgrades.

Most recommendations on the EPC certificates concerned upgrading the lights to more energy efficient options (76%). Measures associated with air tightness and ventilation accounted for 53% of the properties. Likewise, many of the EPC certificates included control upgrades to the existing heating system (58%). Below we specify the fabric upgrades and low carbon heating options more specifically.

For the two geographical areas of Burghead and Elgin:

- Only 5 non-domestic EPCs were available for Burghead.
- 227 non-domestics EPCs were available for Elgin, which accounts for just over one-third of all non-domestic EPCs in Moray.

3.4.1 Fabric upgrades

Non-domestic fabric upgrades (Burghead)

Out of the five non-domestic EPCs for the Burghead area, the most common recommendation for all categories was double glazing, and/or secondary glazing (Table 15). Wall insulation was recommended for three of the properties, as was a loft/roof measure.

Table 15: Recommended fabric measures from the non-domestic EPC records (Burghead)

Measure	No.	% EPCs
Loft insulation	2	40%
Roof insulation	1	20%
Cavity wall insulation	2	40%
Internal wall insulation	1	20%
Glazing	4	80%

3.4.2 Low carbon heating measures

Non-domestic low carbon heating measures (Burghead)

Only three non-domestic properties in Burghead with an EPC were recommended solar thermal. There were no low carbon space heating measures recommended to any of the properties with an EPC.

Table 16: Recommended low carbon heating measures from the non-domestic EPC records (Burghead)

Measure	No.	% EPCs
Solar thermal	3	60%

4. ZONING USING HEAT MAP

This section presents the methodology and results of a desktop analysis exercise to identify potential heat network opportunities. The exercise assessed heat demand and density using BRE standards for heat networks, Scotland's Heat Map and Home Analytics. In particular, the analysis focussed on the potential of using the many distilleries in the local authority area and public buildings like schools, hospitals and local authority buildings as anchor loads.

4.1 Methodology

The data used in this analysis is drawn from the Scotland Heat Map developed by the Scottish Government. The Scotland Heat Map consists of a number of layers, combining heat demand and heat generation data⁹.

4.2 Results

Burghead potential

Due to local interest and the potential for the distillery in Burghead to be connected to another facility to the South owned by the same company with a private gas connection, an analysis was undertaken to determine suitability for a heat network.

⁹Scotland Heat Map website: <http://heatmap.scotland.gov.uk> Note that local authorities have access to Heat Map layers with property specific data in addition to this openly available map

As can be seen in Figure 7 the heat demand of the distillery does highlight the potential for heat network development, with most of the village within the 4MWh/m/yr buffer zone. However as per **Error! Reference source not found.** above there are areas that have higher potential within the Local Authority area.

Although there are no figures on the waste heat from the distillery it should be considered when undertaking more detailed feasibility work for a heat network in Burghead.

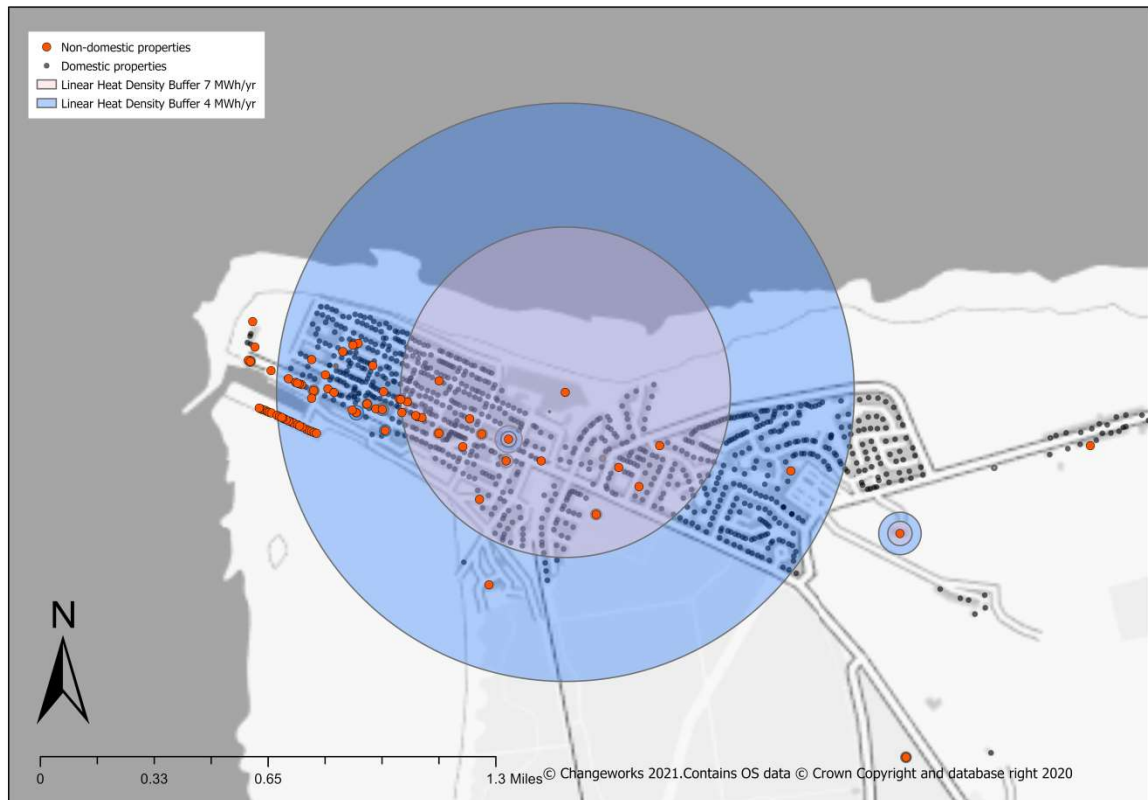


Figure 7: Linear heat demand buffers for Burghead