



**HERDMANFLAT  
MASTERPLAN**  
MEETING OUR CHANGING NEEDS

## Appendix 10.8 Proposed Energy Strategy November 2023

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# **Herdmanflat Redevelopment Proposed Energy Strategy**

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220022-RSP-XX-XX-RP-ME-99006

8<sup>th</sup> August 2023

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# Introduction

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The following report has been prepared to demonstrate how the approach to the energy strategy for the redevelopment of Herdmanflat shall comply with the various National Policies for housing and energy targets

The site has three areas that may have a different energy strategy – new building housing, existing buildings refurbished for housing, and the Garlton Building, which is likely to be developed as either a community or mixed-use facility.

The energy solution for the new housing is still under review as part of a wider consultation involving other developments, however this report has been compiled to show that all the options would consider compliance with the appropriate polices.

Key Policies that will be reviewed as part of the Development are;

- Compliance with National Planning Framework 4
- The Energy Efficiency Standard for Social Housing (EESH)
- Scottish Building Regulations

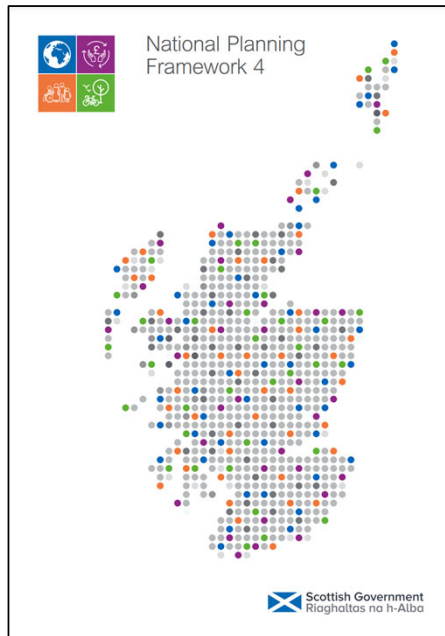
Prepared By			Approved	Date
Carol Lock / Alan Affleck			Alan Affleck	8 <sup>th</sup> August 2023
Rev	Date	Clause	Rev Description	Approved
P01	08.08.23	-	1 <sup>st</sup> Issue	AA

# Policy, Guidance & Legislation

## NATIONAL POLICY

The new National Planning Framework (NPF) 4 was implemented in February 2023 and provides spatial principles, regional priorities, national developments and national planning policy which helps local authorities develop their Local Development Plans over the coming years. It provides high level policies which shall help ensure Scotland has a just and fair transition to net zero carbon by 2045.

The policies from the National Planning Framework 4 which are addressed by this report are Policies 1 and 2. These policies prioritise the global climate emergency as a key consideration in all plans and decisions and ensure emissions from new development shall be minimised.



### Policy 1

When considering all development proposals significant weight will be given to the global climate and nature crises.

### Policy 2

- a) Development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible.
- b) Development proposals will be sited and designed to adapt to current and future risks from climate change.
- c) Development proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change will be supported.

There is no requirement within these standards to set up heat networks as it is recognised that these are not always the best solution for new developments.

Other policies from NPF 4 relevant to the development are generally in terms of site location, reuse of existing buildings, waste and transport amongst others. These shall be addressed separately as the energy strategy has little impact on these.

# Policy, Guidance & Legislation

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## ENERGY EFFICIENCY IN SOCIAL HOUSING

The Energy Efficiency Standard for Social Housing (ESSH) aims to improve the energy efficiency of social housing in Scotland. It will help to reduce energy consumption, fuel poverty and the emission of greenhouse gases.

The standard will also contribute to reducing carbon emissions by 56% by 2020, 75% by 2030, 90% by 2040 and net-zero emissions of all greenhouse gases by 2045, in line with the requirements set out in the Climate Change (Emissions Reduction Targets) (Scotland) Act.

### The ESSH milestones

The ESSH was introduced in March 2014 and set a first milestone for social landlords to meet for social rented homes by 31 December 2020. A second milestone (ESSH2) was confirmed in June 2019, for social rented houses to meet by December 2032.

The ESSH2 milestone is that:

*All social housing meets, or can be treated as meeting, EPC Band B (Energy Efficiency rating), or is as energy efficient as practically possible, by the end of December 2032 and within the limits of cost, technology and necessary consent.*

In addition, no social housing below EPC Band D should be re-let from December 2025, subject to temporary specified exemptions

### The ESSH2 review

The Scottish Government proposes to review the ESSH2 in 2023 to strengthen and realign the standard with the target for net zero heat in houses from 2040, as set out in the Climate Change Update, the Heat in Buildings Strategy, and the Housing to 2040 Route Map.

The review will look at progress towards ESSH2, elements of the standard, air quality, alignment with the net zero target, and how the standard fits with changes needed across other tenures.

Changes and developments associated with ESSH2 may have an impact on this development.

**The Energy Efficiency Standard for Social Housing  
post 2020 (ESSH2)**

**Scottish Government Guidance for Social Landlords**

This guidance supersedes the Scottish Government Guidance for Social Landlords on the Energy Efficiency Standard for Social Housing (ESSH Guidance, last version published March 2020) from 1 April 2021.

**March 2021**

# Policy, Guidance & Legislation

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## **SCOTTISH BUILDING REGULATIONS 2023**

Changes to Section 6 of the Scottish Building Regulations were implemented in February 2023.

For Domestic standards the main changes are summarised below:

The standard is intended to achieve a reduction in emissions of new homes by approx. 32% compared to the 2015 regulations.

Under the 2022 changes gas boilers can still be installed in new buildings (both domestic and non-domestic) but there are additional requirements now to be met where these are used. You need to have a plan in place for replacement with low carbon options.

SAP calculations now include a calculation of Delivered Energy Rate for both the modelled building – BDER and notional building – TDER.

The TDER/BDER calculation will now be the only one required for zero emissions heating systems i.e. electricity and heat networks. Where fossil fuel systems are still used compliance shall require the TER/BER calculation for CO2 emissions in addition to the new calculation.

PV is only applied to the notional building for areas (or proportion of heat demand for non-domestic) where space heating is not provided by heat pumps, note that this would include instances where heating is supplied from a heat network regardless of the energy source of the heat network. Where 100% of space heat demand is provided by individual dwelling heat pumps the notional building shall have no PV applied.

PV shall need to be directly connected to a dwelling to result in any improvement in the emissions rate.

New Overheating standard introduced as Section 3.28, requires more detailed analysis of overheating risk at design stage.

## **Electric Vehicle Charging – new regulations from June 2023**

Where parking is provided within dwelling curtilage allow for 1 No. 7kW EVC point per dwelling (excludes car parks within the building footprint).

For apartments with general parking, all additional spaces (beyond the 1 per dwelling requirement above) should be provided with enabling infrastructure.

All domestic EVC provision is subject to cost analysis and a cost cap is applicable.

# Energy Strategy Delineation



The existing buildings (shown in grey within the red boundary) will be treated differently to the new builds.

The existing buildings have more constraints in terms of Planning & Systems integration.

# Proposed Energy Strategy - Compliance with National Planning Framework 4

Reduce Energy Demands

- New Build – assess optimum form factor and glazing orientation, fabric first approach for thermal elements
- Refurbishment - consideration of the implications of improving insulation and thermal bridging on the existing fabric but with a view to maximising the opportunities for improvements.
- On all properties, utilise MVHR to reduce energy demands and ensure good indoor air quality. MVHR could be central or on a unit-by-unit basis.

The above strategies comply with the NPF 4 Policy 2 as follows:

National Planning Framework 4 - Policy 2	Explanation of Compliance with National Planning Framework 4
a) Sited and designed to minimise lifecycle greenhouse gas emissions	New dwellings shall be designed to optimise the form factor and glazing orientation to benefit from useful heat gains in winter but reduce overheating risks in summer. New fabric and glazing shall be selected to minimise energy demands. Attention to detail of junctions shall ensure no unexpected heat losses.
b) Sited and designed to adapt to current and future risks from climate change	Excellent fabric performance to minimise exposure to climate change impacts. Overheating analysis shall be carried out and designs shall minimise risks accordingly. MVHR shall be provided to assist in ensuring good indoor conditions without a need to open windows.
c) Support of proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change	Existing buildings shall be refurbished to improve fabric performance and air tightness where possible. MVHR shall be provided to recover heat that would otherwise be lost and ensure good indoor air quality.

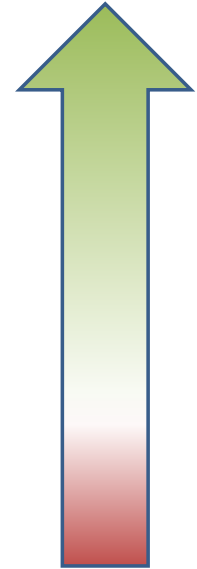


# Proposed Energy Strategy - Compliance with National Planning Framework 4

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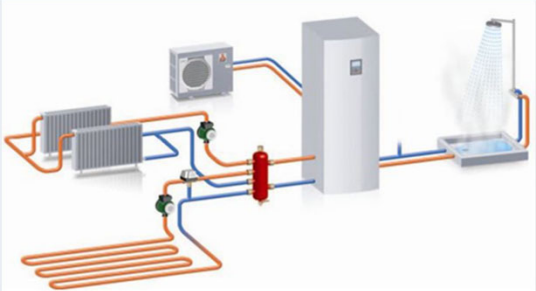
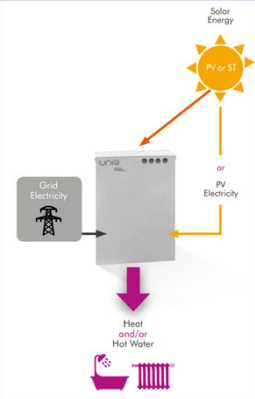
## Low Carbon Heating Systems in Order of Priority

1. Where size of dwelling and fabric performance allows – a compact heat pump should be provided which combines both heat pump and MVHR.
2. Where the above is not possible standard heat pumps should be provided which generate space and water heat, this could be possible for individual dwellings if they are houses or low rise flats or a communal, district heating system for a larger block of flats if the operational set up allows for a body to operate such a communal scheme (e.g. BTR (Build To Rent)?)
3. Where the above is not possible and only for refurbishments (this is not a feasible solution for new build) direct electric space heating and hot water may be the only possible fossil fuel free solution. The implications of running costs and grid impacts need to be carefully considered and all opportunities should be taken in these instances to reduce energy demands through fabric improvements, heat recovery, PV generation and battery storage (either off peak dynamic storage or thermal battery storage such as 'Sunamp' may be a possible solution).



All of the above options can comply with the new National Planning Framework 4 as shown on the next page.

# Proposed Energy Strategy - Compliance with National Planning Framework 4

Heating System Option		Explanation of Compliance with National Planning Framework 4
<p>Combined MVHR Heat Pump</p> <p>Suitable for small apartments with low heat loss.</p>		<p>Fossil fuel free heating system</p> <p>Energy efficient heat pump technology</p>
<p>Air Source Heat Pump for</p> <p>Suitable for larger dwellings or apartments where there is space for a separate external unit(s). This could be a system for a whole building of apartments or per dwelling.</p>		<p>Fossil fuel free heating system</p> <p>Energy efficient heat pump technology</p>
<p>Direct electric heating</p> <p>Only applicable to refurbishments where either of the above options are not feasible.</p> <p>Where using direct electric this should be combined with solar PV and battery storage provision.</p>		<p>Fossil fuel free heating system.</p> <p>Combine with PV and battery storage to supply renewable heating.</p> <p>Only used where refurbishments are not able to utilise heat pumps.</p>

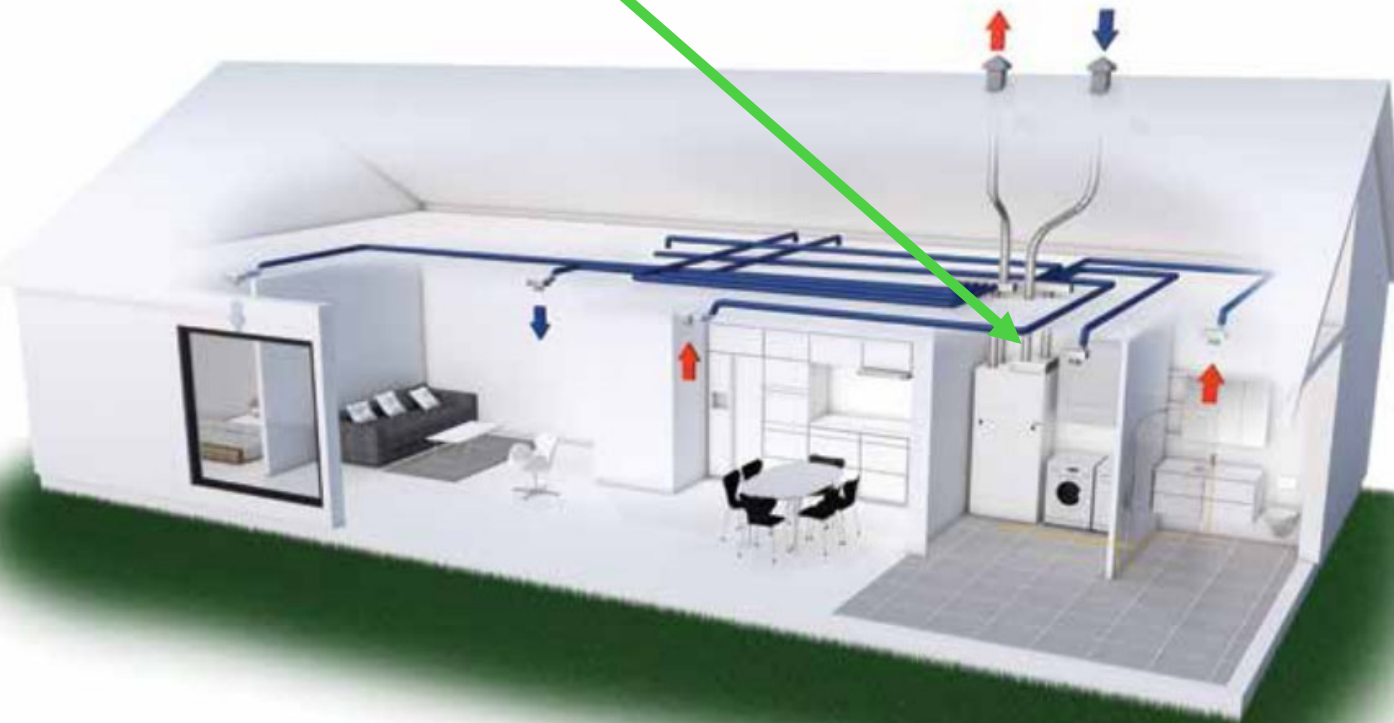
# Residential Heating Strategy - System 1 – Air Source Heat Pump with integral MVRH



## SMALL APARTMENTS

For small apartments and in particular, those that have been designed to high insulation standards, there are products that can heat, ventilate and provide domestic hot water, all from one product .

In the cases of smaller properties, there is no need for an external condenser unit, the indoor air source heat pump is all that's needed.



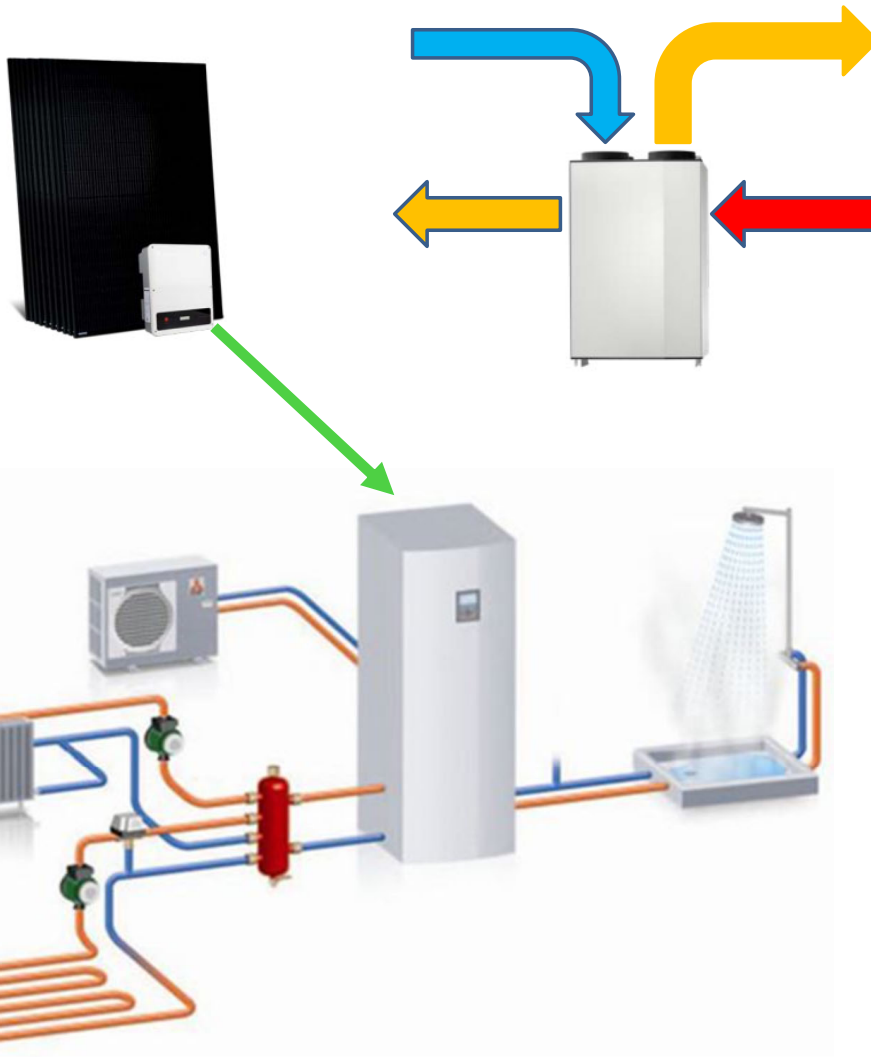
These units work by using the return air from the house to not only preheat the fresh air coming in, but also drive the heat pump to provide further heating into the supply air coming into the home.

As it's a heat pump, it can also be reversed to cool the fresh air coming into the building.

The system can also work with PV panels to reduce the costs of grid electricity further.

## Residential Heating Strategy – System 2 – Air Source Heat Pump with separate MVHR

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### LARGER APARTMENTS

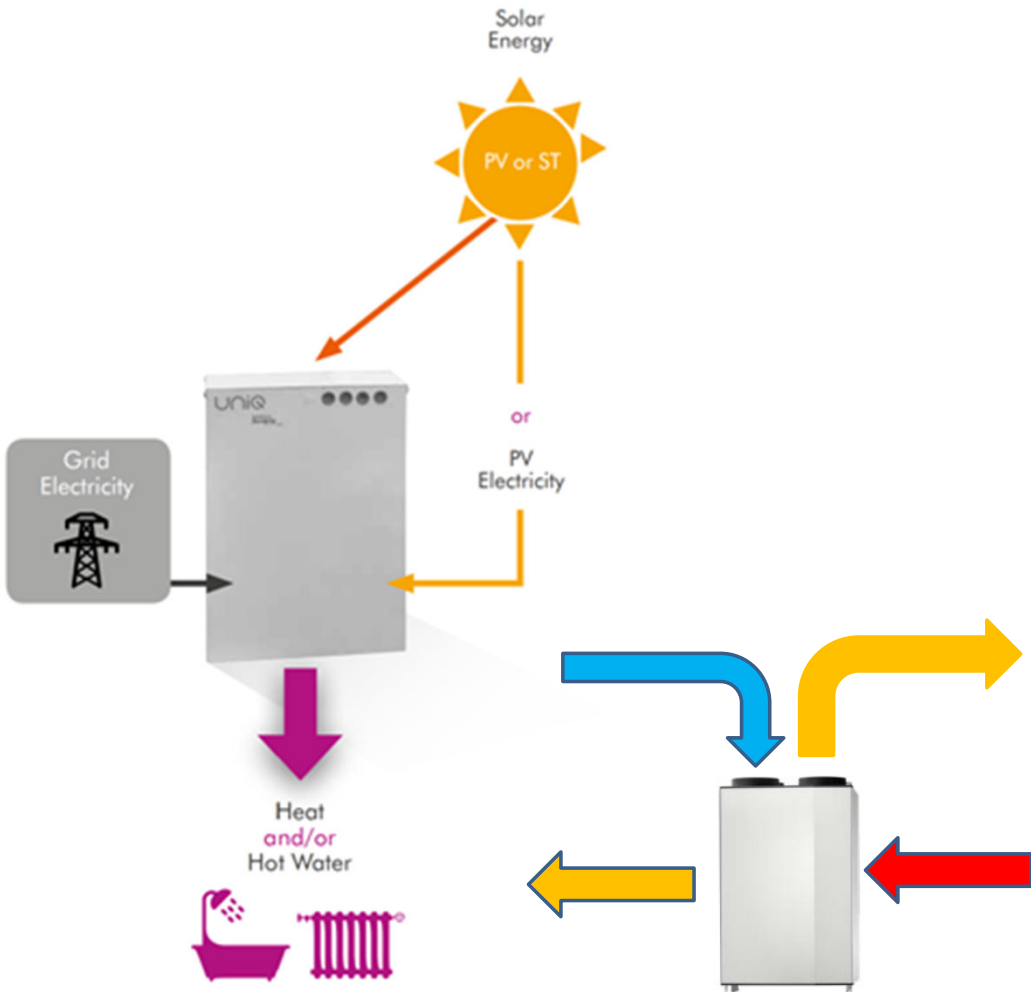
For larger apartments, the MVRH air volume normally outweighs that manageable by the ASHP and therefore these need to be separate systems.

The air source heat pump provides hot water for heating as well as for domestic hot water.

For optimum efficiencies of heat pumps and to provide an even heat distribution, which can be appreciated by older people, underfloor heating is the optimal match.

The heat pump can work well in conjunction with solar thermal panels, solar PV and battery storage.

# Residential Heating Strategy – System 3 – Existing Building Direct Electric with battery storage and separate MVHR



## Option for Refurbished Properties

For the refurbishment blocks only where it is not feasible to utilise heat pumps, either Option 1 or 2, direct electric systems shall be used in combination with battery storage and solar PV or solar thermal systems as far as possible.

Separate MVHR units would be provided in this case.

Direct electric systems are still fossil fuel free however are not considered low carbon technology due to the impacts on the grid and substantial running costs. However when combined with good fabric performance, renewable electricity and battery or thermal storage then can work well.

One study in East Lothian looked at a thermal storage battery combined with PV installation and found that 100% of annual hot water demand could be supplied by renewable electricity depending on occupant use patterns.

# What About a Heat Network?

The table to the right is a good example of a decision making process for a heat network from Fife Councils Low Carbon Supplementary Guidance.

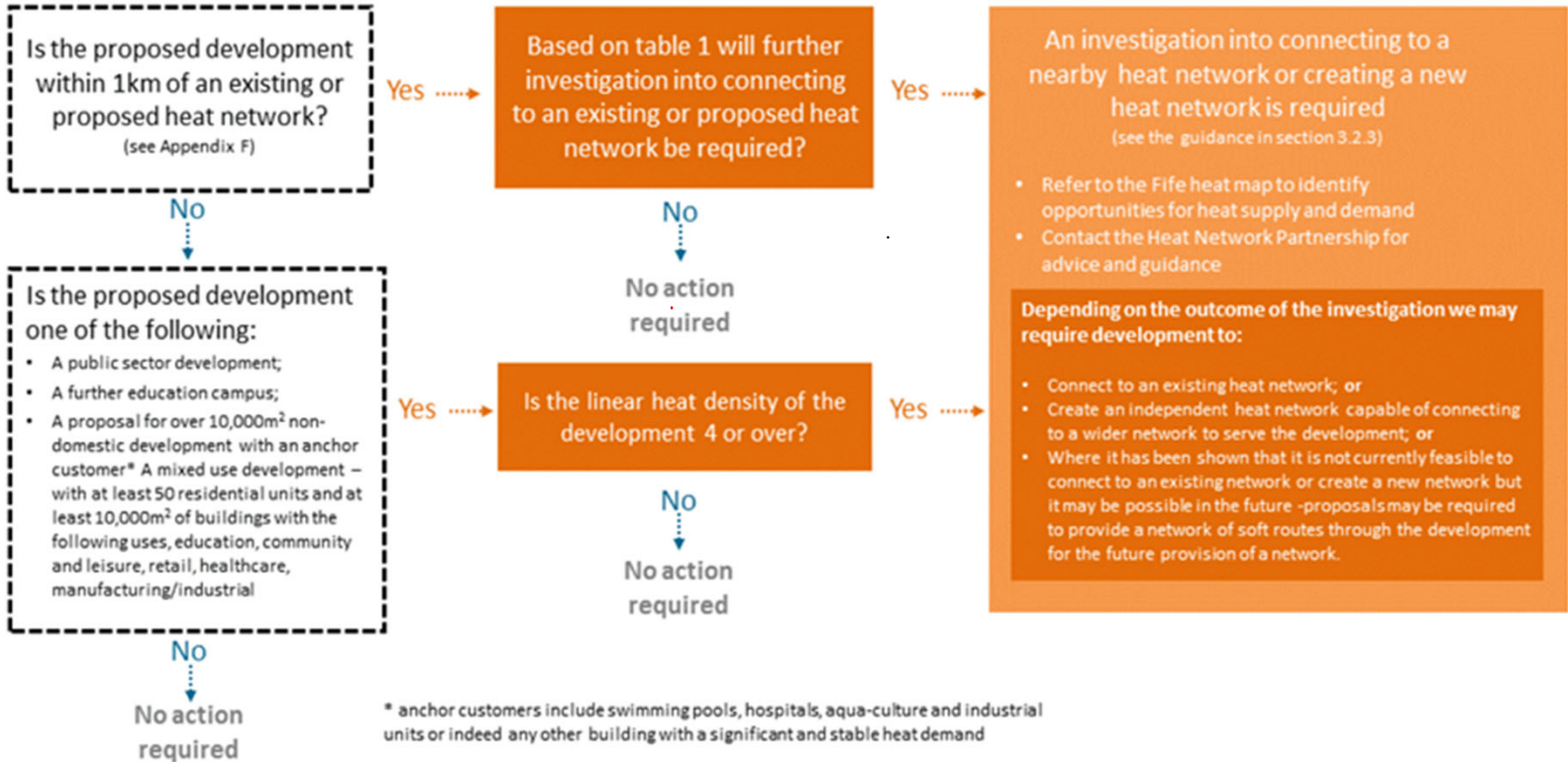
It identifies the need for heat networks to either connect to a development that has surplus heat or one that utilises sufficient heat for it to be economically viable.

In this case applying a calculation of a “linear heat density”, which relates heat load to the length of pipework being installed to serve the development.

When considered with the drop off in the projected heat demand for new homes it indicates that a heat network is more suited to older buildings, that may be limited in their thermal performance than newer developments.

### District Heating Process map:

#### Developments which have a Heat Demand:



#### Developments which create Surplus Heat:



# What About District Heating:?

With the decrease in new domestic heating requirements as shown in the graph below, the need for a heat network for new build construction becomes less economically viable in terms of efficiency and commercial viability, should be manageable by Air Source Heat Pumps.

The difficulty will come with the retained listed buildings which are to be refurbished.

At this stage the level of thermal performance and air tightness to be achieved for the refurbished buildings is still be analysed so the following options for heat source are all still under consideration (all would utilise solar PV and MVHR for winter ventilation):

- Air Source Heat Pump with or without external Condenser
- Direct Electric Heating or Storage Heating
- Heat Network

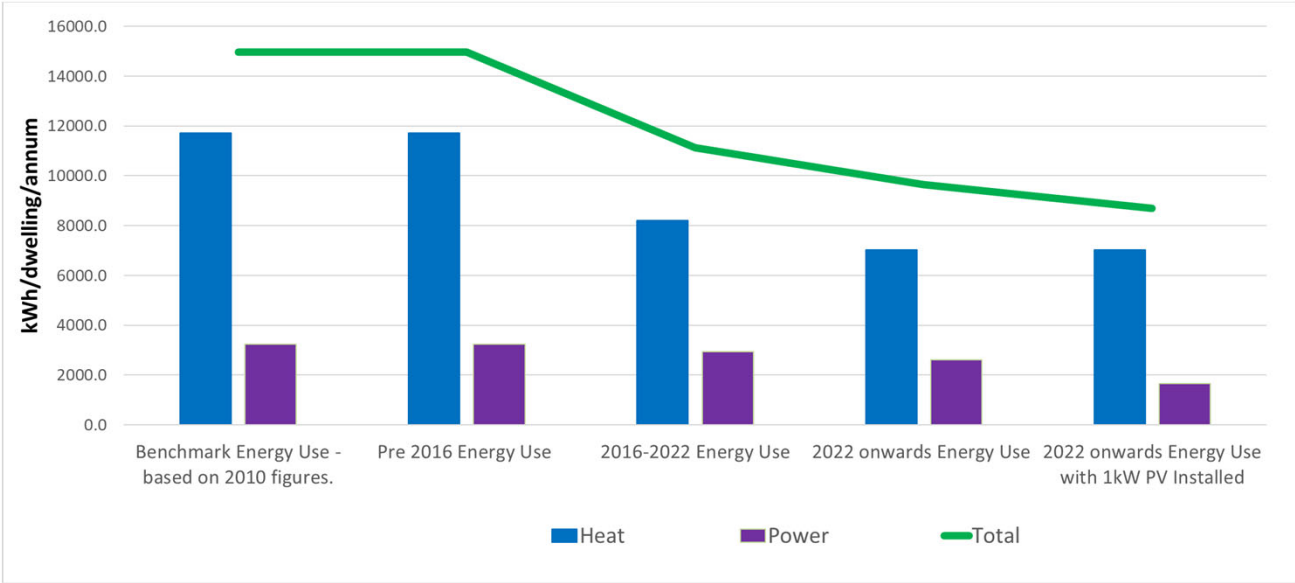


Fig: Illustration of decreasing domestic energy use

If a heat network is utilised for the refurbished accommodation, to improve the economic viability and to help manage the load profile, the Garlton Building and the lodge should also be connected into it.

The main difficulty in this case is expected to be getting an operator for the heat network.

Heat networks are considered low carbon and there is legislation coming into place which shall ensure all new and existing heat networks have a plan in place for transition to low carbon energy sources even if they utilise fossil fuels at present.

**Heat networks, which would in this case be combined with a fabric first energy efficiency strategy and PV panels to supply renewable energy, would be compliant with Policies 1 and 2 of the National Planning Framework 4.**

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