

Strategy to address thermal comfort and fuel poverty

Powys County Council
Housing Services



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Executive summary

Optimum thermal comfort is achieved through a balance of heating, insulation and ventilation. Complaints show a trend of residents feeling cold, and concerned about their or family's health. Some tenants report they have high bills or cannot afford to fully heat their homes.

Medical or psychological needs can result in some residents having demands for higher temperatures, or more prolonged periods of heating use than average. Rising fuel costs are causing fuel poverty, and this can be worse for those in off gas areas, and for those on pay meters.

Landlords have a responsibility to their tenants under legislation to provide a safe, warm and damp free home. The Welsh Housing Quality Standard (WHQS), and Housing Health and Safety Rating System 2006 (HHSRS), set out the requirements to meet, and the risks to address.

Powys have installed 1680 heating systems and externally insulated 1058 of properties in the last five years. The programme of works to ensure properties meet the Welsh Quality Homes Standard will conclude by December 2018.

Powys has the highest proportion of off gas stock in Wales, and are responding to the Welsh Government's initiatives to obtain additional funds to improve heating and insulation standards. Significant investment has been made in renewable heating technology, though there have been isolated cases of incorrect maintenance, or improper use, that have caused high heating bills.

There has also been significant investment in external wall insulation, but recent validation of data has shown unreliable assumptions and poor historic data. As a result more comprehensive programmes of roof insulation are needed.

Despite the improvements, a recent sample survey of 300 residents conducted by the Welsh Audit Office, states that 20% of residents reported concerns about their homes not being warm enough.

It is proposed to build on work carried out over the last year, and put in place a structured approach to dealing with hard to heat issues. This will start from the first contact and actions by Heart of Wales Property Services (HOWPS) or Powys County Council officers, and extend to advanced approaches to dealing with persistent problems.

Step 1 – ensure as much information is collected about reports of cold or hard/expensive to heat homes.

Step 2 – provide information to residents to assist them managing the thermal comfort within their homes.

Step 3 – Adopt a consistent approach with Heating Partnering Contractors to ensure there is a balanced approach to assessing a residents needs and choices with regard to the type of heating system required.

Step 4 – Adopt a whole house assessment considering ventilation and insulation of the property in difficult cases where residents' medical needs or vulnerabilities are a factor.

Step 5 – where no heating design or insulation faults are apparent, provide further information to residents to assist them managing their thermal comfort.

1. Introduction

Thermal comfort is optimised by achieving the right balance of heating, insulation and ventilation. It is impacted by the efficiency of the heating system, the buildings insulation levels, and design and orientation of the property. The ease of controlling the heating system, and ability to adjust the heat output in different rooms is important. Ventilation of the property also needs to be balanced and controllable to avoid excess draughts or heat loss.

Reports of feeling cold, or the home being too expensive to heat, can be due to any or all of the factors above, but also human issues such as medical conditions or budget available to heat the home. The Welsh Government states

“A household in Wales is in fuel poverty if they spend 10% or more of their income on energy costs, including Housing Benefit, Income Support or Mortgage Interest or council tax benefits on energy costs.

A household is in severe fuel poverty if they have to spend 20% or more of their income on energy costs.”

People who struggle to heat their homes warm usually have low incomes and are often the most vulnerable people in our communities. The latest estimate is that there are 291,000 households living in fuel poverty equivalent to 23% of households in Wales”.

For the purpose of this strategy the Housing Health and Safety Rating System (HHSRS) Operating Guidance is referred to in terms of risk. Part A of the guidance relates to PHYSIOLOGICAL REQUIREMENTS, Section 2 extreme cold, and 3 refers to extreme heat. This strategies focus is on Section 2 Excess Cold. This details the highest risk group is persons over 65, that health effects can be caused with building temperatures below 19°C, and become very serious below 16°C.

Powys Context

Powys County Councils Housing Service manages approximately 5,400 properties, spread across Powys. In 2012 Powys County Council’s Housing Service commissioned Savills to carry out stock condition surveys and energy surveys (EPC) to all its stock. The findings were that the average energy rating (SAP) for Powys stock was 65 and 35% fell below the energy rating required by the Welsh Housing Quality Standard. This is contributed to by the proportion of ‘off gas’ stock, as explained under the Regional Problem heading below.

The Councils Welsh Housing Quality Standards components replacement programme was determined from these surveys. Internal process were amended in 2017 to ensure that there was an increased focus on targeting properties with lowest energy ratings. Prior to this, the priority for the external wall insulation programme was system-built precast concrete properties. This followed recommendations from Michael Dyson Associates for measures to preserve the structure of the buildings. These system built properties did lack insulation, and

their energy ratings are improved. However, it has become increasingly apparent that crosswall construction properties did not have insulation behind tile, timber or UPVC cladding.

In 2017 concerns started to develop with the accuracy of the data received from Savills, and a process was adopted to audit the data. Following this, meetings were held with Savills which resolved that a sample survey was required to check and validate information. This process and the findings are detailed in section 3.2.

In response to a request from the Welsh Government, an action plan was developed to ensure that Powys fully understand its position with the energy rating of its stock. This plan is shown at Appendix 1.

A Regional Problem

One of the biggest challenges for public landlords with rural stock is difficulty providing efficient and affordable heating for residents. Since the properties are 'off gas', the cheapest and most efficient form of fuel is not available.

Powys is a very large rural County, with the greatest number of 'off gas' properties in Wales (approximately 31,000). Powys County Council have 1,484 properties which do not have mains gas heating. This is over a quarter of the stock. Of these, 495 properties do not have a central heating system, and are heated either by room heaters or night-time storage/e; electric panel heaters.

History of Building Regulations over time

Requirements for heating and insulation were limited until 1985, when Part L of the building regulations was introduced. This contains a requirement to make reasonable provision for the conservation of fuel and power, with an approved document giving guidance on how to comply.

Part L was updated in 1995 and then again in 2002. It focused initially on energy efficiency and then from 2002 on Carbon Emissions.

In 2003, the Energy Performance of Buildings Directive (EPBD) was adopted. This required EU member states to adopt a whole-building calculation method for assessing the carbon emissions of new buildings and gave them three years in which to do this. For existing properties the EU directive enabled requirements for landlords to produce an EPC certificate for any new tenancies, and these requirements were put in place in 2006

Wall Insulation requirements

The compulsory requirements for wall insulation were not fully introduced until the 1985 building regulations. Some properties were built with 25mm of insulation following a change in the building regulations in 1976, though this related to exposed properties only. It was not until the building regulations in 1990 that requirements were introduced for thicker insulation.

It is worthwhile noting the measure of thermal efficiency, known as U Value and measured in W/m^2K , was 1.7 in 1965, compared to 0.6 in 1990, and currently 0.3.

Loft Insulation

The requirements for loft insulation started in the 1965 building regulations, however this could be only 25-50mm thick. The requirements increased to

- 75mm in 1973
- 100mm in 1985
- 150mm in 1990
- 200mm in 2002.

The measure of thermal efficiency, again as a U Value in W/m^2K , was 1.4 in 1965, compared to 0.35 in 1990. It is currently 0.17.

2. Background

2.1 Thermal Comfort

A property should be heated to maintain a temperature between 18 and 21 degrees, and radiators/heaters should be utilised in all rooms to avoid a cold spot in the house where condensation of water vapour generated in the home can occur. However, whole house heating can present a conflict with affordability, particularly for those in 'off gas' areas, or with key meters.

The walls and roof should be adequately insulated, and door and windows should be draught proofed. For existing buildings orientation to the prevailing weather, north facing aspect and solar gain are predetermined. The effects will vary with the seasons.

Ventilation should be designed to have permanent background air flow, and mechanical boost to extract steam in kitchens and bathrooms. It should not cause excessive heat loss. However, tenants can complain or feel uncomfortable with draughts from ventilation systems, and express concern this will cause heat loss raising bills.

2.2 Regulatory Requirements

The Welsh Housing Quality Standard

The WHQS standard has an overriding requirement for properties to be 'Adequately heated, fuel efficient and well insulated' It sets out

"All dwellings must be capable of being adequately heated at an affordable cost to the residents. Dwellings with inadequate heating cause discomfort and can pose a health risk.

Whether the dwelling can be adequately heated depends on the cost of providing the heat required and the ability of the resident to afford it. The eradication of fuel poverty, the inability to afford to heat one's dwelling, is a strategic priority for the Welsh Assembly Government as set out in 'Better Homes for People in Wales'.

Meeting the cost of heating bills can be difficult for many residents. Landlords should do whatever they reasonably can to minimise the cost of heating dwellings to a comfortable level".

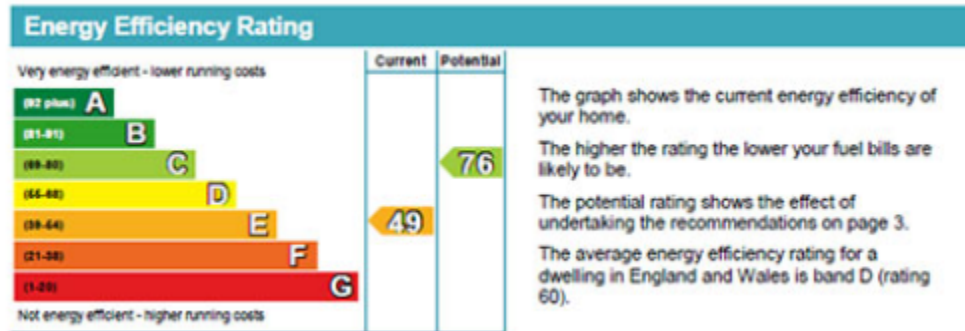
The standard treats thermal comfort as a primary requirement i.e. one that affects safety of residents. Its requirement is that properties must achieve a minimum SAP rating of 65.

The more detailed requirements have been adopted into Powys County Councils WHQS Compliance Policy, and the extract is shown in Appendix 2.

Energy Performance of Buildings Regulations (2012)

There is a compulsory requirement for landlords to provide is an Energy Performance

Certificate to residents under the Energy Performance of Buildings (England and Wales) Regulations 2012. This adopts and clarifies the requirements of the **Energy Performance of Buildings Directive** 2002, implemented in the UK in 2006. The certificate contains a rating from A to G and a simplified RD SAP rating, as example below.



These certificates are the same as those required for owner occupiers selling properties. They can only be provided by assessors trained and accredited by one of the Governments approved EPC Energy Software Providers. The quality of EPC's varied considerably in early years, due to Assessor competence or interpretation, software design and scoring methodology limitations. It should be noted that a 5 point plus or minus tolerance in scoring was allowable. Tighter audit controls have been put in place, and the software requirements and scoring methodology were revised in 2015. Most of Powys EPC's use the older system.

Building Regulations

The full measure of thermal comfort for new build properties, as required by Part L of the building regulations, is the Standard Assessment Procedure (SAP) 2012. It too accounts for the buildings construction, insulation levels and includes costs of fuels used to heat the property. However, it works at a more detailed level than the RD SAP used with the EPC process. This will apply to Powys Housing Development Programme.

2.3 Wellbeing Implications

Risks from excess cold

The Housing Health and Safety Rating System (HHSRS) Operating Guidance sets out the potential for harm, and identifies that those over 65 being at greatest risk.

Health effects.

The guide sets out a healthy indoor temperature is around 21°C, with a small

risk of health effects below 19°C. Below 16°C, there are serious health risks for the elderly including greatly increased risks of respiratory and cardiovascular conditions. Below 10°C a great risk of hypothermia, especially for the elderly, so sleeping in cold bedrooms is an added risk.

Full detail of the risks identified is shown at Appendix 3, though key points are

- Excess Winter Deaths, is greater in Britain than in most other countries of continental Europe and Scandinavia.
- Cardiovascular conditions (e.g. heart attacks and stroke) account for 50 per cent excess winter deaths.
- Respiratory diseases (e.g. 'flu, pneumonia, bronchitis) account for another third.
- Excess cold can also cause an increase in blood pressure/reduce resistance to infection because of the effect of cold air on bronchial lining and immune system/worsen symptoms of rheumatoid arthritis.

2.4 Fuel Types, efficiencies and costs

Gas – Gas is the most efficient and cheapest fuel, and cleanest type with its carbon emissions (CO₂) half those of oil-fired central heating and a third of those from coal.

LPG – LPG can be supplied from communal tanks or through use of cylinders (bottled gas). It is not as efficient as natural gas, and while a cleaner fuel, can be more expensive than oil.

Oil – provides an effective fuel source, and has lower carbon emissions than coal. It is cheaper than electricity in off gas areas. However, the cost of supply can cause issues, with minimum delivery volumes set by providers, and risk of sudden price increases. A storage tank is required in the garden, and its location and specification needs to comply with OFTEC regulations.

Solid Fuel – this may be in the form of coal, or wood, and dry storage for the fuel is required. Such systems usually require high user intervention to maintain the fuel source. Coal has similar costs to oil, and is cheaper than wood where there is not free supply. Wood requires a large amount of storage if used for whole house heating.

Electric – typically this will be in the form of a dual tariff, such as economy 7 or economy 10, though may be standard rate. The cheaper rate period is used to warm up the storage heaters, and hot water in the tank, and other electric use during the period will be cheaper. The peak rate is used at other times, and boosting heating and hot water can cancel out savings. Combined this is still twice the cost of gas, solid fuel and oil. The standard rate is three times the cost of gas. Unless generated by wind farms or water power, electricity produces high carbon emissions given the power plants used to generate it.

The Energy Savings Trust monitors and publishes average fuel prices as below

Table 1 – Fuel prices published by Energy Savings Trust

Fuel prices	Average price (pence/kWh)*	Standing charge (£/year)	Carbon dioxide factor (kgCO ₂ /kWh)
Gas	3.63	86.15	0.184
Coal / solid fuel	4.03	-	0.315
Oil	4.06	-	0.245
Wood pellet	5.44	-	0
LPG	6.53	-	0.214
Electricity (off peak economy 7)	8.08	81.76	0.381
Electricity (standard rate)	14.33	74.22	0.381

Fuel prices last updated in March 2018, based on average fuel costs over the previous 12 months

The Energy Savings Trust also report the savings that can be made using renewable technology. These are shown at Appendix 4. The most relevant comparator for Powys Stock is against electric systems and newer LPG boilers, as there are few G rated boilers fitted now.

Air Source Heating – typically £380 – £545 compared to newer LPG or electric heating systems but up to £900 compared to older storage heater system around £1,000 - compared to older LPG

Photovoltaic Panels (PV)

PV roof panels generate electricity that can be used by the householder, or can be fed back into the electricity grid. The savings on bills depend on the residents lifestyle, as the electricity generated is instant, and therefore only occurs during the warmer day light hours. The table below shows a resident that is home all day will achieve over twice the savings of someone that is out most of the day. Recent developments have seen batteries introduced to PV systems to store some of the electricity, and this will close the gap on savings.

<i>Location</i>	<i>Savings on bills (£/year)</i>					
	<i>Home all day</i>	<i>Home in the mornings</i>	<i>Home in the afternoons</i>	<i>Out all day until 4pm</i>	<i>Out all day until 6pm</i>	
<i>Aberystwyth, Wales</i>	<i>£210</i>	<i>£170</i>	<i>£155</i>	<i>£105</i>	<i>£90</i>	

Not all properties will be suitable for PV panels, as the roofs need to have a southerly aspect to capture the sun, and not be subject to shading from parapet walls, other buildings or trees.

Solar Panels

Solar Panels provide the primary source of hot water heating. However, the savings are moderate compared to the outlay. The cost of installing a typical solar water heating system is £4,000 - £5,000, whereas the savings are only £50-£95 per year depending on the main fuel water source. The system can provide most of your hot water in the summer, but much less during colder weather, when peak rate electricity is used. For this reason Solar Hot Water is only likely to be used as an exception. The savings depending on fuel source are shown in Appendix 4.

2.5 Common thermal comfort problems

Some rooms not warm enough – this may be due to the orientation of the property, or rooms that may have more than one external wall. Rooms in extensions to a property can often suffer from such reports, since they have three external walls, and can have a separate roof to the main property. The walls and roof to the extension may lack, or be insulated differently to the main building. A more simple cause may be a fault with the heat emitter in the room e.g. airlock in radiator.

Whole house not reaching or holding onto the required temperature – this can be caused by several reasons

- Faults with heating units causing lack of efficiency
- Design faults due to a boiler having inadequate capacity, or radiators not being correctly sized.
- Lack of, or faults with the insulation of the property
- Tenants not being aware of the need to adjust controls and time clock settings for colder conditions

Costing much too much to heat the property – this may be due to reasons above, though the cost of the heating fuel type, meter and tariff arrangements, and residents pattern of heating use are all considerations here.

Draughts – typically tenants report draughts around doors and windows, though this can be caused by cold shed due to the temperature of the glass being much lower than the room.

All of Powys properties have double glazing, and wherever possible radiators are placed under windows to minimize cold shed.

Ventilation draughts - As set out in Powys Damp Strategy, ventilation is important to create air changes that prevent damp in a property by controlling the humidity within the home. However, some residents will close or block up vents, or turn off mechanical ventilation, due to draughts, and put themselves and their home at risk of condensation problems.

2.6 Legal and Insurance implications

There has been a recent increase in claims from residents for high heating bills, and there is potential for claims of effects to health caused by inadequate heating. If there are faults with the heating and buildings insulation, the Council may fall liable for these costs. Care is therefore needed to ensure that complaints are investigated in a controlled way.

2.7 Current Policy and Standards

Powys WHQS Compliance Policy replicates the requirements of the WHQS standard and is set out Appendix 2.

The Quality of Accommodation Service Standard, otherwise referred to as the letting standard, sets out that properties should have a heating system that is safe, works and has an instruction manual. The standard was recently amended to ensure a property has at least 200mm of loft insulation. It requires the kitchen to have a fan.

The Repairs and Maintenance Service Standard sets out that heating breakdowns are be treated as emergencies, and temporary heating will be provided until faults are fixed. It highlights the importance of prioritising repairs for the elderly and vulnerable.

The Quality of Accommodation Service Standard is due to be reviewed by the Tenant Scrutiny Panel, and the impact of this Strategy will considered as part of that process.

3. Thermal Comfort in Powys' housing stock

3.1 Stock Survey Data

Heating requirements

The stock surveys carried out in 2012 identified over 2150 properties which required replacement heating within 5 years, based on simple visual inspection or lifecycles. However, the life of the boiler component is not the only indicator. Some boilers can be economically maintained beyond their lifecycle, while others may have design or component faults that lead to premature replacement. The annual servicing programme and breakdowns are therefore a significant driver for the programme of heating works. A poor energy rating or complaints from residents can also prompt replacement.

It should be noted that nearly all of Powys properties have a form of heating that complies with the WHQS requirements, though some residents choose not to have installed or use what is in place. These cases are recorded as acceptable fails. The mix of types of systems installed is explained at Appendix 5.

Insulation requirements

The survey identified that around 555 properties may not have wall insulation. Of these 460 were solid wall or system built, so would be on the External Wall Insulation programme.

3.2 Energy ratings

At the time of Savills survey in 2012, the average SAP for the stock was 65.6 and there were 1875 properties with a SAP below 65.

Powys current records show the averages SAP rating across the stock is 65.43, which is detailed below;

EPC Rating	Numbers or homes	SAP Band	Average SAP within Band
B	9	81 - 91	84
C	1982	69 - 80	72
D	2674	55 - 68	63
E	352	39 - 54	50
F	25	21 - 38	33
G	2	1 - 20	14

It should be noted that due to the QL Asset Management System not having an energy module, Powys use the EPC data which is held at Landmark for its energy ratings. Historically, these EPC's were not always updated following energy works, so Powys officers were trained

to do this. There have been complications with registration, so at present essential EPC's for voids or energy funding claims are outsourced.

Data Audit

In 2017 concerns started to develop with the accuracy of the data received from Savills, and a process was adopted to audit the data. The findings of the audit were that

- Properties that had LPG supplied as part of a district system with large remote communal tanks, were treated as having natural gas
- There was concern about accuracy of loft insulation records
- There was a trend of over estimation of floor areas
- No adjustments had been made for properties with cross wall construction, to reflect the different insulation levels of tile, timber or shiplap cladding

A meeting was held with Savills to discuss these concerns, and it was acknowledged by the Council that previous staff may not have provided accurate information regarding points 1 and 2. With point 2, this impacted on assumptions made at the time of the survey where access to lofts not possible.

Savills did acknowledge that they had not taken account of mixed construction on a property, but could do so as they had recorded that data as part of their stock condition survey. They also accepted there may be errors with floor areas, and they could not identify where assumptions about loft insulation were made.

The meeting resolved that sample survey of 68 properties was required to check and validate information and clarify the impact of anomalies. The results were

- that on average there was a 3% reduction in the SAP score in the sample, and
- most properties fell within the 5 point tolerance when amended.
- 12 properties had a negative change from 5 to 22 points lower
- 3 properties had an improved rating

It needs noting though this is in part due to the impact of changes in the governments methodology for scoring SAP. A further meeting was held to discuss the results of the survey, and resolved there is a need to remodel the wider data set, to take account of these anomalies, and include updates for work carried out by Powys.

Savills have been able to carry out this remodeling for 2000 properties, and have positively lifted the energy rating to 66.4 for those properties.

3.3 History of Improvements

Wall Insulation

Much of Powys stock was built before the requirement to insulate walls was made compulsory from the mid 1980's. Most of these had cavity wall insulation installed when grants were made available in the 1990's. Much of this work was carried out through energy companies who were able to access the funding for this. In Powys a mixture of Urea Formaldehyde Foam, blown mineral fibre and polystyrene beads were installed. Some faults are becoming apparent with these works, as set out in Powys Damp Strategy.

There are several estates in Powys with timber, upvc and tiled cladding on the upper half of the wall, and these areas were not insulated at the time cavity wall insulation was installed. As stated earlier there is a need to better reflect the impact of this on the energy rating. Some of these homes with early timber frame wall construction, may have 15-25 mm of mineral wool or fibre insulation, though this may not be accurately reflected in the EPC.

Loft Insulation

Since requirements started in 1965, more of Powys properties were built with loft insulation, though most of these would be well below the current standards. Historic records of loft insulation and topping up programmes are poor and unreliable

We are therefore largely reliant on EPC surveys, which we have found can make incorrect assumptions when a roof cannot be accessed. Based on 2016 Landmark data, around 1800 lofts are below the WHQS recommendation of 200mm, and around half of these properties had a SAP below 65. Recent contract records for roofing where insulation is topped up are available, and this information is being collated.

Recent WHQS programme

In areas with mains gas supply, Powys policy is to replace with a gas system. In off gas areas residents are given a choice of oil, or air source. If residents wish to remain on solid fuel or electric heating their needs are accommodated if possible. As part of the programme

1680 properties have had heating systems installed in the last 5 years, and a further 320 are planned for this year.

1058 properties have had External Wall Insulation fitted, and an additional 260 are planned for this year

3.4 Powys response to the regional problem

We have installed 236 air source heat pumps in our 'off gas' properties, and have carried out extensive engagement with our tenants, tenant representatives and Housing Officers. Many of our off gas estates will already have a property on the estate with air source heating already installed. Heating Contractors and Officers provide controls advice once a new system has been installed so ensure that savings are realised and that the householder is happy with their system.

Our preferred heating solutions for off gas properties are condensing oil heating and air source heat pumps to reduce running costs and levels of fuel poverty. Both systems have their merits and drawbacks in terms of reducing levels of fuel poverty. For air source, it is important that people are not overpaying on their electricity tariffs, so we promote switching and sources of information for help with switching and changing from a prepayment to standard meter by referring to Citizens Advice energy advisers. The person is important, particularly for air source because we have vulnerable tenants and some would struggle to adapt to new heating controls, or due to medical reasons (e.g. circulation or mobility issues) they may heat the property to a higher temperature than is normal. We also want tenants to be happy with their choice of heating in the long term. The property is important because air source heating is more suitable for well insulated properties with good levels of loft insulation and cwi/ewi.

For oil, some people struggle with the high upfront payment required. It is important to consider these issues to reduce the fuel poverty gap as much as possible.

We have existing funding secured for heating works under the Welsh Housing Quality Standard, and will look to supplement our established air source programme with other renewable energy projects. We will

- 1) Fund and carry out pilot schemes for hybrid heating systems, PV panels and ground source heating
- 2) seek additional funding opportunities to enable us to target properties in a different way, e.g. adding solar heating as a supplement to existing full heating systems
- 3) considering underfloor heating with air and ground source with underfloor heating. This measures will be part of our WHQS plus approach referred to in Section 4.

3.5 Funding Opportunities

The current key direct funding opportunities for local authority housing include.

- Feed in Tariff (PV Panels)
- Renewable Heat Incentive (Air Source and Ground Source)
- ECO (some streams where council tenants are on benefits, e.g. CERO for loft insulation)
- Warm Homes Fund
- ARBED Am Byth (targeted at private sector but can include mixed tenure schemes)
- Fuel Poor Gas Connection Vouchers

Occasionally additional funding streams also become available on an intermittent basis. However, Powys data on the heating and insulation of its homes is sometimes too poor to fully evidence and meet the detailed criteria and evidence requirement for the bids. Powys therefore need to fully develop the correct resource to able to ensure data is accurate, and can fully evidence bids

Citizens Advice, their partners and some third sector organisations are sometimes able to access small amounts of funding for tenants too e.g. top up for some prepayment meters and white goods etc.

4. The Way Ahead

It is proposed to continue to follow the current programmes, and also to pilot a WHQS standard plus approach to maximising thermal comfort for residents. This will take a combined approach to heating, insulation and ventilation improvements, and account for the properties energy rating, and resident medical needs and vulnerabilities. The aim will be to ensure the best levels of comfort are achieved for a tenants circumstances.

4.1 Proposed WHQS plus programme

The current WHQS programme comprises

- Heating replacements based on lifecycles of system, or breakdowns
- Some Heating replacements/upgrades for medical need or vulnerability issues
- External Wall Insulation to system built and high priority cross-wall construction properties
- Insulation top ups as part of the roofing programme, and voids

The proposed WHQS plus approach will add or increase

- Heating and insulation replacements for medical need or vulnerability issues
- Upgrades of heating timer and thermostatic controls for elderly or vulnerable persons
- A targeted and combined approach to improving heating and insulation to properties with an EPC rating below band D
- Top up of loft insulation when any other energy efficiency works or WHQS works are carried out or where the need is identified
- Ensure there is balanced insulation to properties with mixed construction
- Affordable EPC and ventilation measures when properties become void

4.2 Approach to dealing with reports of coldness or high heating bills

Receipt of tenants call reporting cold homes

As stated earlier, control is needed with complaints about cold homes or excess bills, and the process is set out below. A script will be agreed for HOWPS / Powys County Council contact center staff to follow. This will attempt to establish as much information about the problem, and categorise it under one of the thermal comfort problem headings. If not possible to do that, the matter must be recorded as 'tenant reports cold or high heating bills, investigation required'.

The proposed process for heating requests (not breakdowns)

1. Requests for replacement heating made to HOWPS or Powys County Council Contact Centres will be referred to Powys Heating Services and Renewables Officer.
2. Where property is on the WHQS programme it will be referred onto the appropriate contract officer to arrange work with the WHQS framework contractor

3. Where the property is not on the programme, or the request is because the tenant wants to change a heating system to a different type, the Heating Services and Renewables Officer will visit the resident to review and discuss options with the tenant
4. The design of the heating system will take account of the EPC for the property, and the tenants lifestyle, to ensure accuracy with heat loss calculations
5. Measures recommended by the EPC will be considered and ordered with the appropriate WHQS contractor or HOWPS
6. If there are no EPC records, the insulation levels should be checked on Powys component database, and validated during the pre-works survey as required. An EPC survey should be commission
7. The Councils Contract Officer will recommend the work required too, and obtain approval from, the Planned Maintenance and Improvement Team Leader

Process for heating breakdowns

- 1) Where heating breaks down, and is considered to beyond economic repair, it is will be referred to Powys Heating Services and Renewable officer, to review
- 2) If the decision is made to replace the system then the process above will be followed

Requests to insulate a property

- 1) Requests for loft insulation will be referred to the Housing Surveyor who will consult with the EPC & rewiring records to establish if this can be topped up.
- 2) Requests for insulating the walls of a property made to HOWPS or Powys Council Contact Centres will be referred to Powys Affordable Warmth and Renewable Energy Officer Heating Services and Renewables Officer.
- 3) Where property is on the WHQS External Wall Insulation programme it will be referred onto the appropriate contract officer to arrange with the WHQS framework contractor
- 4) Where the property is not on the programme, or the request is because the tenant is complaining about the current insulation levels, the Affordable Warmth and Renewable Energy Officer will review the EPC and Councils insulation records, and contact the resident to review and discuss options
- 5) Where the property has an E, F or G rating both loft and wall insulation improvements will be considered
- 6) If the property has a D or higher rating, the medical needs and vulnerabilities of the resident will be taken into account. Wall insulation works will be carried out where it is considered economical and essential for the resident to stay in their home
- 7) If the property has no EPC one will be arranged.
- 8) The design of the insulation will take account of the EPC for the property, and the heating type, to ensure needs of the resident and the property are met.

Complaints about high heating bills

These will be referred to Powys Heating Services and Renewable officer who will investigate

the adequacy and condition of the heating, insulation and ventilation of the property. Where there are no technical weaknesses or solutions, support with billing will be provided by the councils' tenancy support officers, and referrals made to Citizens advices where appropriate.

Hard to Heat cases

- 1) We will consider installing photovoltaic, or solar panels, on properties where low energy ratings or fuel poverty, cannot otherwise be addressed. The orientation of the property needs to be suitable before considering photovoltaics or solar panels.

4.3 Properties with low energy ratings

27 properties have an EPC rating of F or G, and 352 a rating of E. We propose to target these least efficient properties first. These are located across the county.

EPC Recommendations Programme

At present public landlords are not obliged to carry out all the recommendations on an EPC certificate to improve the energy efficiency. Such recommendations are system generated, subject to assumptions made by EPC Assessors, and can include impractical options such as wind turbines. Therefore, they are best used as a guide to further works. In 2016 Landmark made available a download of EPC data for landlords. This is being reviewed alongside Powys records of work undertaken. The aim will be to establish a pro-active programme of energy efficiency improvement works as part of Powys' future 'WHQS plus' programme.

Meanwhile it is proposed that the EPC will be reviewed when a property becomes void, or has any heating or insulation or ventilation improvements carried out, and affordable and practical recommendations that will assist are carried out.

We will also conclude the review all properties with an E, F or G EPC rating and target improvements to these.

4.4 Operational delivery

Works will be carried out by specialist contractors where relevant, to secure long term guarantees. Heating and External Wall Insulation works and associated ventilation works will be delivered by WHQS contractors. Loft Insulation will be delivered by HOWPS on voids, and WHQS contractors during roofing works. We will work with HOWPS and suppliers to develop a process and work stream for one off ventilation upgrades

4.5 Consulting with residents

To maintain openness and transparency, the Investing in Homes Sub Group will be consulted with on this strategy. They will continue to be kept up to date with progress on cases, and will be encouraged to assist with communications with residents and have a representative at any meetings with residents should wider programmes of heating and insulation works be

developed. The group will be used to approve the information and communication information to be developed and made available to residents.

We understand that there are fears about health risks associated with cold homes so propose to raise awareness by the following means:

- Article in 'Investing in your Home' newsletter
- Discussions with tenant representatives at Tenant Scrutiny Panel and Investing in Homes sub-group
- Development of information leaflets.
- Availability of leaflets and CD's to hand out at estate days and events
- Briefing notes to inform Councillors and Assembly Members of the initiative, and should wider targeted investigations or work programmes take place

4.6 Costs

Initial Investigation Costs

Powys employs officers to inspect properties and specify what heating work is required, so this included in the Asset Team salary budget. The costs of the design for heating is included in the WHQS arrangements with framework contractors.

The cost of investigation and works to establish insulation levels currently costs £600 per property. Training is being arranged, and equipment purchased, to allow Powys officers to carry such surveys as part of future workload. This cost can be absorbed within current salary budgets.

Budget

There is currently £2.16 million set aside in 18/19 for heating replacements, which includes provision for air source heating in off gas areas. A further £2.4 million is allocated for the next four years.

Provision has been made for £200,000 per annum over the next five years to allow additional renewable energy solutions such as photovoltaic panels or solar hot water. This will be targeted to improve energy ratings in hard to heat cases. Unit costs may vary depending on the scope of work required, and typically between £4,000 and £6,000.

There is £1.47 million available for External Wall Insulation in 18/19, and a further £3million to 2023. Other insulation improvements are budgeted within the roofing allocation (loft insulation), and the £500k per annum damp alleviation budget.

4.7 Asset Management

We are planning to commence a 20% sample of stock surveys from 2019. Were further trends

develop of reports of cold properties in a street, or on an estate, surrounding properties will be prioritised for the first batch of those surveys

To improve data on loft insulation, we will measure this when the property is void, and discuss with HOWPS the possibilities of their heating contractor recording this at the time of a heating service.

4.8 Consultation with members

Recommendations from the Health, Care and Housing Scrutiny Committee

- The Council should investigate how it can assist tenants in the bulk buying of fuel such as oil and LPG.

The council will make enquiries if funding can be obtained through the Arwain scheme to support resource to develop bulk buying scheme for oil and lpg.

- That the Portfolio Holder for Housing make representations to the Minister and Welsh Government to bring pressure on utility companies to extend energy networks to reduce fuel poverty in Wales.

Representations have already been made by the council at the Welsh Housing Quality Managers meeting with the Welsh Government, these will be followed up in writing by Housings Portfolio Holder.

- That local energy co-operatives and local energy production be included in the strategy.

The council will investigate opportunities presented by established local energy co-operatives, and opportunities to facilitate growth in such arrangements.

- That other energy systems such as ground source heating and air source hybrid systems be included in the strategy.

Please refer to section 4.8. The council have drawn up a list of sites with small local LPG are networks, and will work with its air source supplier to carry out feasibility studies, and identify pilot scheme for retrofit hybrid measures.

Appendix 1 – Energy Rating Action Plan

Key Steps	Responsible Officer	Accountable Officer	Consulted (who needs to input)	Informed (who needs to be informed)	Start Date	End Date	Status
Request Information regarding Process and Approach	Phil Dark	Phil Dark		Roger Francis	26 th October 2017	29 th November 2017	Done
Identify and Collate information for properties with no Energy Performance Information	Catrin Sneade/Cathy Green	Roger Francis		Phil Dark	26 th October 2017	29 th November 2017	Done
Meet to review information and the way forward	Roger Francis	Phil Dark		Brendon Burd	20 th November	20 th November 2017	Done
Develop programme of surveys to address 430 properties with no Energy Performance information	Catrin Sneade	Phil Dark	EPC4U Framework Contractor, delivering EPC's	Roger Francis	26 th November 2017	11 th December 2017	Done
Deliver EPC's and Sap ratings to 430 properties that have no Energy Performance Information	EPC4U/Catrin Sneade/Martin Harbour/Andrew Dowell/ Neal Parry	Roger Francis		Phil Dark	1 st December 2017	31 st October 2018	Ongoing
Arrange monthly progress meetings to evaluate progress and highlight non-access/refusals on programme	Catrin Sneade	Phil Dark		Roger Francis	27 th November 2017	30 th November 2017	Ongoing
Develop programme to survey properties and re-assess energy efficiency in F & G Banding	Martin Harbour/Andrew Dowell/ Neal Parry	Gary Knight		Cathy Green	1 st December 2017	28 th February 2018	Done yet to lodge EPC
Collate information and cross reference all properties that have received Heating and Insulation improvements since previous EPC was delivered	Cathy Green	Phil Dark	Catrin Sneade	Roger Francis	20 th November 2017	22 nd December 2017	Done
Review Banding E properties with SAP score of less than 65, analyse the recommendations and develop programme of works	Catrin Snead	Phil Dark	Martin Harbour/Andrew Dowell/ Neal Parry	Roger Francis	23 rd November 2017	31 st Sept 2018	Ongoing

Identify properties that are not viable to raise above SAP 65, and log constraints in categories Physical, Financial, Tenant and log as Acceptable Fails.	Catrin Sneade/Cathy Green	Phil Dark	Roger Francis		23 rd November 2017	31 st March 2018	Done but review per new Strategy
Analyse all above information and set 5 year programme to have all Housing properties surveyed and new EPC and SAP rating by 2023 as per 10 year rule	Phil Dark	Phil Dark	Catrin Sneade	Martin Harbour/Andrew Dowell/ Neal Parry	8 th January 2018	31 st January 2018	
Develop risk profiling template	Philip Dark	Phil Dark	Catrin Sneade	Roger Francis	27 th November 2017	31 st January 2018	
Review process for improving energy performance in voids, on Roofing and Heating Contracts, and update data.	Roger Francis	Phil Dark	Catrin Sneade/Cathy Green	Contracts Team	26 th October 2017	31 st December 2017	Done

Appendix 2 - Extract from Powys WHQS Compliance Policy

3(a) Heating systems must be reasonably economical to run and capable of heating the whole of the dwelling to a comfortable level in normal weather conditions

Primary

Powys standard

- A. Existing heating systems must be reasonably economic to run. A "reasonably economic to run" heating system would be one that is programmable (i.e. residents can control the temperature and timing), and of a size recommended for the dwelling it serves.
- B. The annual energy consumption for space and water heating must be estimated using the Government's Standard Assessment Procedure for Energy Rating of Dwellings 2012 (SAP 2012) method. A minimum rating of 65 out of 100 must be achieved.
- C. Lack of adequate ventilation and poor thermal performance of external walls and windows, in addition to inadequate background heating levels, are significant contributors to condensation in older dwellings. Of particular concern are kitchens and bathrooms in which large amounts of moisture are generated. All cost effective opportunities to upgrade the thermal and ventilation performance of the dwelling must be taken.
- D. Other factors that will impact on the overall SAP for the energy rating of a dwelling are as follows.
 - I. Loft insulation:
It is recommended that at least 200 mm of glass wool insulation, or the thermal equivalent, is provided in the loft. Whenever replacing or topping up existing insulation this thickness could be reduced when using materials with greater insulation, such as thermal quilting.
 - II. Ensuring that all the pipes and tanks in the roof space are lagged.
All pipes and tanks in the roof space should be lagged. 20 - 25mm is the minimum thickness of pipe insulation that should be used. There are two types of insulation. The preferred industry type is preformed foam cylinders that are split along their length so that they can be easily slipped onto the pipe. Insulating tape is used to seal the splits and join the sections. If using the preformed cylinders is not practical, then felt can be used. This should be double thickness and closely wrapped to the pipe.
 - III. Ensuring that the thermal performance of the external walls is adequate to avoid the likelihood of condensation:
All necessary steps should be taken to ensure the thermal performance of external walls is adequate to avoid the likelihood of condensation.

3(b) External doors and windows must be sufficiently well fitting so that they do not cause severe draughts

Primary

Powys standard

External doors and windows must be sufficiently well fitting so that they do not cause severe draughts without reducing background ventilation. Additional draught stripping may be considered adequate.

3(c) The main entrance door should not open directly into the living room

Secondary

Powys standard

The main entrance door should not open directly into the living room. The provision of a lobby area in a living room entered directly by the front door will cut down on unnecessary heat loss.

3(d) The hot water tank must be effectively insulated (Primary)

Primary

Powys standard

The hot water tank must be effectively insulated. A factory foam jacket would be considered adequate. Existing unlagged hot water tanks should have a jacket fitted. This should cut heat loss by around 75%. If there is already a jacket fitted to the hot water tank, it should be at least 75mm (3") thick. If not, it should be replaced with a new heat saving one.

2.6 Acceptable fail: Cost of remedy

- a. In off gas areas it may not be possible to achieve the minimum SAP rating of 65, despite adequate insulation and heating. This is considered to be an acceptable fail.

Appendix 3 - Extract from Housing Health and Safety Rating Standard 2006, Operating Guidance

2 Excess cold

Description of the hazard

2.01 This category covers the threats to health from sub-optimal indoor temperatures.

Potential for harm

Most vulnerable age group and statistical averages

2.02 The most vulnerable age group is all persons 65 years or over.

Excess Cold							
Average likelihood and health outcomes for all persons aged 65 years and over, 1997-1999							
Dwelling type & age		Average likelihood 1 in	Spread of health outcomes				Average HHSRS scores
			Class 1 %	Class II %	Class III %	Class IV %	
Non HMOs	Pre 1920	330	34.0	6.0	18.0	42.0	1,066 (C)
	1920-45	340	34.0	6.0	18.0	42.0	1,035 (C)
	1946-79	400	34.0	6.0	18.0	42.0	880 (D)
	Post 1979	530	34.0	6.0	18.0	42.0	664 (D)
HMOs	Pre 1920	340	34.0	6.0	18.0	42.0	1,035 (C)
	1920-45	290	34.0	6.0	18.0	42.0	1,213 (C)
	1946-79	370	34.0	6.0	18.0	42.0	951 (D)
	Post 1979	350	34.0	6.0	18.0	42.0	1,005 (C)
All Dwellings		380	34	6	18	42	926 (D)

Basis of Estimates

2.03 The averages relate to persons aged 65 years or over who suffered illness, including fatal illness, as a result of cold homes in England and Wales in the years 1997, 1998 and 1999.

- The statistics for Class I were derived from data for cold/winter related mortality .
- The estimates for Class II and Class III include cardiovascular and respiratory illness serious enough to lead to hospital admission and are calculated from Hospital Episode Statistics.
- Class IV estimates are based on new GP consultations from the General Practice Research Database and the Fourth Morbidity Survey of General Practice.

2.04 The statistical evidence shows that there is a continuous relationship between indoor temperature and vulnerability to cold-related death. The colder the dwelling, the greater the risk. There are indications that with temperatures up to 19°C there will be some excess death. However, for these statistics it has been assumed that no cold-related deaths occur in dwellings which achieve 18°C hall temperature when the external temperature falls to 5°C.

Excess Cold

Health effects

2.05 A healthy indoor temperature is around 21°C, although cold is not generally perceived until the temperature drops below 18°C. A small risk of adverse health effects begins once the temperature falls below 19°C. Serious health risks occur below 16°C with a substantially increased risk of respiratory and cardiovascular conditions. Below 10°C the risk of hypothermia becomes appreciable, especially for the elderly.

2.06 There are approximately 40,000 more deaths between December and March than expected from the death rates in other months of the year. This seasonal fluctuation, Excess Winter Deaths, is greater in Britain than in most other countries of continental Europe and Scandinavia.

2.07 Cardiovascular conditions (e.g. heart attacks and stroke) account for half the excess winter deaths, and respiratory diseases (e.g. influenza, pneumonia and bronchitis), account for another third. The increase in deaths from heart attacks occurs about 2 days following the onset of a cold spell, the delay is about 5 days for deaths from stroke, and about 12 days for respiratory deaths.

2.08 Although there is some excess winter deaths in all age groups, it becomes significant for those in the 45+ age group. The risk increases with age in a roughly linear pattern up to the 85+ age group, after which there is a marked increased risk.

2.09 The main causal factor for excess winter deaths appears to be changes in ambient (outdoor) temperature, but seasonal infections, and changes in behavioural patterns, air pollution levels and micronutrient intake may also account for some of the seasonal pattern.

2.10 The extent to which housing contributes is not clearly known, but the indication is that people living in dwellings that are poorly heated are at significantly greater risk. There is less evidence on the relationship between housing characteristics and health other than mortality. However, it is very probable that the findings in relation to cold-related mortality can be extended in broad terms to cardio-respiratory morbidity and health related quality of life.

2.11 Low temperatures can impair the thermoregulatory system of the elderly, and the very young whose thermoregulatory system is immature. Both these groups may spend a greater time indoors in cold weather and both will not move about as much as other groups in the cold.

2.12 Cold air streams may affect the respiratory tract and can slow the heart temporarily, increasing cardiovascular strain. When the whole body is cooled, blood pressure increases. The effect of cold air on the bronchial lining and immune system can reduce resistance to infection. Thus, sleeping in cold bedrooms has been shown to substantially increase risk.

2.13 The symptoms of rheumatoid arthritis can be worsened by cold. Low temperatures also aggravate sickle cell anaemia and the related thalassaemia, and can affect the healing of leg skin ulcers.

Appendix 4 – Savings brought by the use of renewable technology

Air Source Heating - Figures are based fuel prices as of April 2018.

Existing system	Fuel bill saving (per year)	Annual RHI payments (installations between 1st January 2018 to 31 March 2018)	Carbon savings (per year)
Old (G-rated) gas boiler	£400 - £465	£875 - £1,030	3,300 - 3,900 kg
New (A-rated) gas boiler	An increase of £35 - £55		1,200 to 1,400 kg
Old electric storage heaters	£800 - £990		4,600 - 5,700 kg
New electric storage heaters	£465 - £545		3,200 - 3,800 kg
Old (G-rated) oil boiler	£460 - £545		5,200 - 6,100 kg
New (A-rated) oil boiler	An increase of £45 - £55		2,300 - 2,700 kg
Old (G-rated) LPG boiler	£1,145 - £1,350		4,200 - 4,900 kg
New (A-rated) LPG boiler	£380 - £450		1,700 - 2,000 kg
Coal	£425 - £525		6,900 - 8,300 kg

Solar Panels

Solar water heating systems can achieve savings on your energy bills. Based on the results of a field trial, we conducted across a range of household and system sizes, typical savings from a well-installed and properly used system are £50 per year when replacing gas heating and £80 per year when replacing electric immersion heating. Savings will vary from user to user

Existing system	Fuel bill savings (£/year)	Carbon dioxide savings (kgCO ₂ /year)
Gas	£50	270 kg
Oil	£55	350 kg
Coal	£65	540 kg
Electricity	£80	390 kg
LPG	£95	310 kg

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Appendix 5 Heating Descriptions and Definitions

Heating system types

Full central heating – all rooms are heated with radiators, served from a central heat source. The hot water may be provided directly by the boiler, or via a hot water tank.

Full heating – Electric storage/panel heating – most typical in off gas areas, or in blocks of flats. Hot water is provided by a water tank.

Partial central heating – typical of solid fuel systems, here not all rooms have radiators, some may have secondary heaters.

Partial heating – most commonly solid fuel or electric storage heaters in some rooms

Secondary heating – this describes different forms of heating to the main heating type and may be fixed or portable

Portable heating only – while less common, as not compliant with regulations, some residents may choose to only use plug in electric or oil radiators, and any original boilers could be decommissioned.

1.5 Central Heat Sources

Combination or System Boiler

A combination boiler provides the heating and hot water, with no additional storage of hot or cold water. The hot water is instantly heated providing a constant source.

A system boiler works in conjunction with a hot water cylinder and cold water feed and expansion tanks in the loft.

Powys policy is to install combination boilers where possible to reduce maintenance and service costs, and free up storage space.

Back boiler – traditionally boilers were located behind the fire in lounge or dining room, and within a chimney stack. Older installations, particularly solid fuel, only had capacity to serve a limited number of radiators. These are system type boilers with a hot water cylinder

Communal boiler – blocks of flats, or houses in multiple occupation may be served by a communal boiler. This will provide all heating requirements. Hot water may be a communal supply, or via hot water tanks in each flat or room

Forms of renewable Energy

Heat Pump – this is a central heating unit that captures natural energy from the environment,

and converts it to generate heat. Air Source takes natural energy from the air, via a unit located outside. Ground Source takes heat from a liquid in pipes installed in bore holes or trenches in the ground.

Solar Heating panels – these capture the energy from the sun and warms water in a tank which can be used to supply hot water.

Photovoltaic panels – the panels capture the energy of the sun converting it into electricity, which supplies the house, and feeds back into the grid. The energy is instantly used, so full benefit will not be received when the property is not occupied. Recently batteries to store the electricity have made this more viable option.

Appendix 6 - Further reading and sources of information

Housing Health and Safety Rating Standard 2006

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf

Welsh Housing Quality Standard

<https://gov.wales/docs/desh/publications/141030-whqs-guide-for-social-landlords-en.pdf>

Powys WHQS Compliance Policy

https://customer.powys.gov.uk/media/2765/WHQS-Compliance-Policy-2017-2018/pdf/WHQS_Compliance_Policy_2017-2018_June_2017_ENG.pdf