



Warmer homes

Responsible officer

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1.0 Summary

1.1 This paper provides an overview of the work that the council undertakes to ensure that people in Shropshire live in homes that they can afford to keep warm. It also provides information about potential schemes that Shropshire could adopt to support this work.

2.0 Recommendations

2.1 Committee members to:

- scrutinise the work the council undertakes
- evaluate potential schemes and
- recommend trials of any schemes that it feels merit further investigation.

3.0 Fuel poverty in Shropshire

3.1 There are over 135,000 properties in Shropshire.

- 106,701 are privately owned
- 31,000 solid wall properties, which cannot employ cavity wall insulation
- 65,577 lack a gas connection 46% compared to 13.7% nationally
- 17,607 or 13.1% in fuel poverty
- over 21,000 employ electrically heated storage heaters and room heaters
- 5,000 are heated using solid fuel, mostly coal

3.2 Shropshire has a low wage economy with high levels on in-work poverty. The average wage of jobs advertised across the county is £24,000.

Shropshire also has a higher than average percentage of older people.

4.0 The cost of fuel poverty

4.1 According to AGE UK 2012 “Cold homes cost the NHS between £850m - £1.36b each year ... overall poor housing represents a similar risk to the NHS as physical inactivity, smoking and alcohol”.

The Marmot Review on health inequalities noted that:

- Countries which have more energy efficient housing have fewer excess winter deaths.
- There is a relationship between excess winter deaths, low thermal efficiency of housing and low indoor temperature.
- Excess winter deaths are almost three times higher in the coldest quarter of houses in England than in the warmest quarter
- Around 40% of excess winter deaths are attributable to cardiovascular diseases.
- Around 33% of excess winter deaths are attributable to respiratory diseases.
- There is a strong relationship between cold temperatures and cardio-vascular and respiratory diseases.
- Children living in cold homes are more than twice as likely to suffer from a variety of respiratory problems than children living in warm homes.
- Mental health is negatively affected by fuel poverty and cold housing for any age group.
- More than 1 in 4 adolescents living in cold housing are at risk of multiple mental health problems compared to 1 in 20 adolescents who have always lived in warm housing.
- Cold housing increases the level of minor illnesses such as colds and flu and exacerbates existing conditions such as arthritis and rheumatism.
- Cold housing negatively affects children’s educational attainment, emotional well-being and resilience.
- Fuel poverty negatively affects dietary opportunities and choices.
- Cold housing negatively affects dexterity and increases the risk of accidents and injuries in the home.

5.0 Present schemes in Shropshire

5.1 Keep Shropshire Warm

This provides advice on all things relating to home energy including access to government and private grants and charity awards such as the Energy Company Obligation, the Domestic Renewable Heat Incentive, Feed-in Tariffs, tariff switching and energy debts.

It works in partnership with national and local groups such as AGE UK, Citizens Advice Shropshire, Stretton Climate Care, Ludlow 21 and Shropshire Rural Communities Charity.

In conjunction with the charity Marches Energy Agency, it undertakes briefing and training sessions for hospital discharges and Integrated Community Services.

5.2 HeatSavers

HeatSavers provides emergency heating repairs and replacements, for owner-occupiers on low incomes with limited savings. Please see Appendix B for more information.

5.3 Warm Homes Fund

This is a £150 million fund administered by National Grid and the Community Interest Company, Affordable Warmth Solutions, to address some of these issues of fuel poverty. It incentivises the installation of affordable heating solutions in fuel poor households who do not use mains gas as their primary heating fuel. The fund will be used to supplement local strategic plans and other funding.

The fund is being administered over a number of rounds. Awards made to date amount to in excess of £60m and will deliver over 16,000 improvements to fuel poor households.

Warm Homes Fund - Round 2a

£1.8m split between Herefordshire Council and Shropshire Council to provide first-time central heating. The fund is aimed at owner occupiers and private tenants.

- Cat 1 = urban = 150 properties within 23 metres of the gas main receive a gas connection and free wet central heating system
- Cat 2 = Rural = 150 properties further than 2km from gas main get a liquid petroleum gas wet central heating system.

Warm Homes Fund - Round 3

£8.5m split again between Shropshire Council and Herefordshire Council to provide first-time central heating.

- Cat 1 = urban = 450 properties
- Cat 2 = rural = 460 properties. 90% Oil, 10% liquid petroleum gas as much renewable energy generation as we can lever in, plus solid wall insulation.

5.4 Flexible Eligibility Statement of Intent (SOI) for Energy Company Obligation

Our statement of intent reflects the unique situation in Shropshire. This includes taking into account the low-income economy, use of high cost fuels as well the large geographical area which leads to the need to travel increased distances to work. The fact that we have large areas off the gas network and a large proportion of “hard to treat” properties. Without this option it is likely that many fewer residents would benefit from the Energy Company Obligation scheme.

6. Future work

6.1 The HeatSavers and Keep Shropshire Warm schemes are set to continue for the foreseeable future but we have ambitious plans to be a driver in future schemes and push them to deliver far more than previous schemes have attempted. Over the past few years there has been a growing feeling in the industry that the aspirations of national schemes have been severely reduced, especially since the end of Warm Front.

Recent changes in government schemes such as Energy Company Obligation and the introduction of industry schemes such as the Warm Homes Fund have highlighted the fact that though they have some aspirations to provide a wide range of options the focus on cost of measures based on lifetime financial and carbon emissions savings, has meant in reality their scope is exceedingly limited.

The volatility in the price of fossil fuels and the knock-on effects to household energy prices has made it almost impossible to make inroads in to the numbers of households suffering from fuel poverty. With government now starting to focus on the need to de-carbonise domestic heating as well as reducing fuel poverty it is time to rethink the strategy.

6.2 The situation in Shropshire is an extreme example of that faced nationally. If schemes can be made to work here they can work anywhere in the country. Our attempts to get the Warm Homes Fund to cover the cost of solid wall insulation is a recognition of the problems with the Energy Company Obligation scheme and an attempt to rectify its shortcomings.

The only way to address both aims of reducing fuel poverty and decarbonising domestic heating is to adopt a whole house approach. This means

- making sure the building walls and roof have the highest level of insulation possible
- fitting triple glazed windows and energy efficient doors and
- ensuring proper ventilation, including heat recovery.

Only at this point does it then make sense to attempt to sort the heating system. If

you do not do things in this order, the heating system will end up oversized and inefficient, costing far more to run. After that, you can look to heat the property via renewable technologies, some of which like ground source heat pumps can also offer the authority a source of income and help pay for themselves.

Appendix A has more information about retrofitting an existing property.

Installing heat loops and sinks or stores are believed to be one of the most effective ways to enable decarbonisation of domestic heating. This approach also has the benefit of reducing demand on the energy grid. This is especially viable in the case of new build properties.

- 6.3 When looking at both new build and retrofit schemes a sustainable energy plan needs to be adopted right from the planning stage. The combining of solar panels and batteries on domestic properties along with larger-scale battery storage at a development level should be the norm. This alleviates the problems of connection to the ever more fragile national grid and **offers the possibility of bringing significant income to the authority**. Ofgem and BEIS are encouraging the development of battery storage systems to enable a balancing service for the National Grid..
- 6.4 Tackling properties in this way will remove the chance of any future resident finding themselves struggling to decide whether to heat their home or eat. Fuel poverty can be wiped out by improving the housing stock even in a low-income economy like Shropshire. Any future improvements to income will then lead to improved lifestyles rather than being swallowed up by ever-increasing fuel costs.

7.0 Working with Cadent

- 7.1 We are member of a small group advising Cadent (the Gas network operator for most of Shropshire) on their future obligations toward reducing fuel poverty. Following our advice, Cadent now propose changes to their fuel poverty work. Rather than merely supplying gas connections to those in fuel poverty that meet certain eligibility criteria, it proposes a scheme that would have all operators and distributors pooling their funding to be used for a whole house retrofit scheme starting with all properties with an energy rating of E,F or G.

This is definitely the shape of schemes to come and if we in Shropshire can find a way to deliver this type of approach now,we could be a leading authority in the country.

8.0 New builds

8.1 The focus of our work going forward will be on whole house retrofit projects and high efficiency new build schemes. Our input into the “One Scheme” has mainly focused on the need for the properties to meet the highest possible efficiency standards and to encourage the sustainable energy planning mentioned above. To that end we have been promoting the building of dwellings to the Passivhaus standard. To meet this standard a property must have a maximum energy demand equal to or less than 15kWh per m² per year. As the average property is 75 -125m² this means the maximum yearly energy bill for a typical property would range between £160 and £280 per year.

9.0 Potential income generation

9.1 *Selling battery-stored energy*

Off-gas retrofits also allows for some new and novel methods of generating income for the council. If the council owns the equipment that it installs, it can use it to ‘build’ a virtual power station. The technology now exists to aggregate the energy in these batteries and trade it to help balance the grid. You can enhance this technology by having large-scale battery storage facilities that can be deemed to be charged by these systems even though they may be geographically far apart, effectively creating a ‘micro-grid’.

9.2 *Peer-to-peer trading*

This is a very new area and a lot of development is happening as we speak. It is a major line of research within Ofgem along with the future of local energy and its implications for the National Grid. This is a fast moving area that the authority needs to be part of to be able to make the most out of emerging options for income generation.

9.3 *Sheep wool insulation*

Sheep’s wool is one of the most effective insulation materials available. The council is therefore exploring the opportunity to build a sheep’s wool insulation manufacturing plant in Shropshire. At present we are in the early phase of feasibility talks with the local NFU and British Wool Marketing Board but it seems to be a highly popular proposal.

List of Background Papers (This MUST be completed for all reports, but does not include items containing exempt or confidential information)

None

Cabinet Member (Portfolio Holder)

Cllr Lee Chapman, Adult Services, Health, Social Housing

Local Member

All

Appendices

- Introduction to Heat Savers
- Retrofitting an existing property

Appendix A retrofitting existing properties

Off gas retrofit

The council's focus is necessarily on the off-gas households in the county. It is very keen to develop a whole house approach that can be used across all tenures. This is obviously a very difficult space to work in as is shown by the mixed results of recent government schemes such as Eco and Green Deal.

The aim is to be able to treat every property with a full range of measures that will leave the property fit for the future with the lowest energy bills and carbon emissions possible. The measures would include:

- Solid wall insulation both internal and external
- Cavity and loft insulation.
- Triple glazed windows and energy efficient doors
- Ventilation with heat recovery
- Renewable heating, preferably Ground Source Heat Pumps but dependent on the situation
- PV and battery system
- Rain water and grey water harvesting

Addressing the envelope of the building first is the most effective way to improve the efficiency of a property. Once this is as air tight and insulated as possible the heating and other services can be properly sized to further maximise efficiency. Like single wall insulation, replacing glazing has been a problem under previous government schemes as the financial and carbon savings are not huge given the costs.

Unfortunately, if you do not tackle glazing then the maximum gains from energy efficiency and CO² reduction will never be realised.

This is the approach taken when building to *Passivhaus* design standards. These houses are 70% more efficient than houses built to traditional standards, using technology to achieve the required standard. This also addresses a major problem within the building industry known as the 'performance Gap'. The house looks good on paper but the resident still ends up with energy bills of hundreds of pounds every year. Draughts and cold bridging around the frame and off the glass will mean the resident feels cold and consequently uses more heating than should be necessary.

Once you have made the building envelope secure the next step is ventilation. Over many years of running government backed insulation schemes it has become very apparent that ignoring ventilation is a mistake. Registered social landlords have experienced an explosion in cases of black mould and condensation problems due to installing insulation and not looking to improve ventilation. Ventilation systems can be either passive or active. The main difference is that active systems have an electric element to heat the air. Passive systems use a heat exchanger rather than an element to heat the incoming air. There are other obvious advantages of ventilation systems in removing airborne particulates and helping residents with

asthma as well as protecting from damp and mould. The heat recovery element of the ventilation system is critical. As humans we constantly generate heat from carrying out our day to day activities if you then add in the heat generated by the appliances and technology we use. This essentially free/waste heat can provide the vast majority of the heat demand for a properly insulated and ventilated house.

Next, we have the renewable heat source. Our preferred method is for a Ground Source Heat Pump attached to a heat loop. This gives the council the chance to recoup its costs for installation and to sell any excess energy generated. It also allows for another stream of income by charging for access to the system.

The PV and battery systems are there to make sure that the residents get the full benefit of generating their own electricity, since most people are not using the energy when the sun is actually shining.

Climate change is wreaking havoc on our existing systems for providing water and sanitation services. Grey water and rain water harvesting and reuse is going to be essential going forward and so should be looked at now while we are already doing so much for the property. Collecting all surface run off water also offers the chance for the resident to get a reduction on the water bills.

At present we are awaiting the results of the application for Warmer Homes Fund 3. This has a solid wall insulation component and renewable heating option. If this is successful this would seem to be an excellent opportunity to trial this kind of whole house approach. We are working to find ways to fund the interventions. We are also working to find other ways to gain an income from these schemes for the authority.

One of these is to set up a Sheep's wool insulation manufacturing plant in Shropshire. At present we are in the early phases feasibility talks with the local NFU and British Wool Marketing Board but it seems to be a highly popular proposal.

On gas retrofit

This is essentially the same as the off-gas project but the rationale for the project is different. The government via Ofgem has identified decarbonising domestic heating as a priority going forward. There is a growing body of research on the way to achieve this goal. We wish to run our own trial based on the Shropshire situation to see how best we should approach this problem. Therefore, we wish to run a similar whole house approach scheme but based on gas centrally heated properties.

At present Ofgem has been looking at hybrid heat pumps in combination with gas central heating. On examining their results so far and getting a better idea of the parameters they set, it seems that a major driver for the research they carried out so far is to be able to reduce demand on the national grid by designing these systems to be remotely controlled to allow switch over from the heat pump to the gas boiler during peak times. This hardly seems in keeping with the original claims for the research but also leaves a gap for us to research. The research so far does not look to tackle the whole house before installing the heating system. Retrofitting of heat

pumps is a difficult enough proposition already but made worse if you do not tackle the whole house. Heat pumps work better when run constantly rather than in cycles as a gas system does. This is because the heat pump will struggle to meet high demand quickly. It is therefore necessary to reduce the demand to the lowest level possible to allow the heat pump to work at its most efficient. It is likely that given a whole house approach the gas system would end up only being used in exceptional circumstances such as at times of extremely cold weather. This work is unlikely to be carried out by energy companies under their obligations as it will have a negative impact on their business models.

The funding for this work is subject to the same considerations as that of the above project.