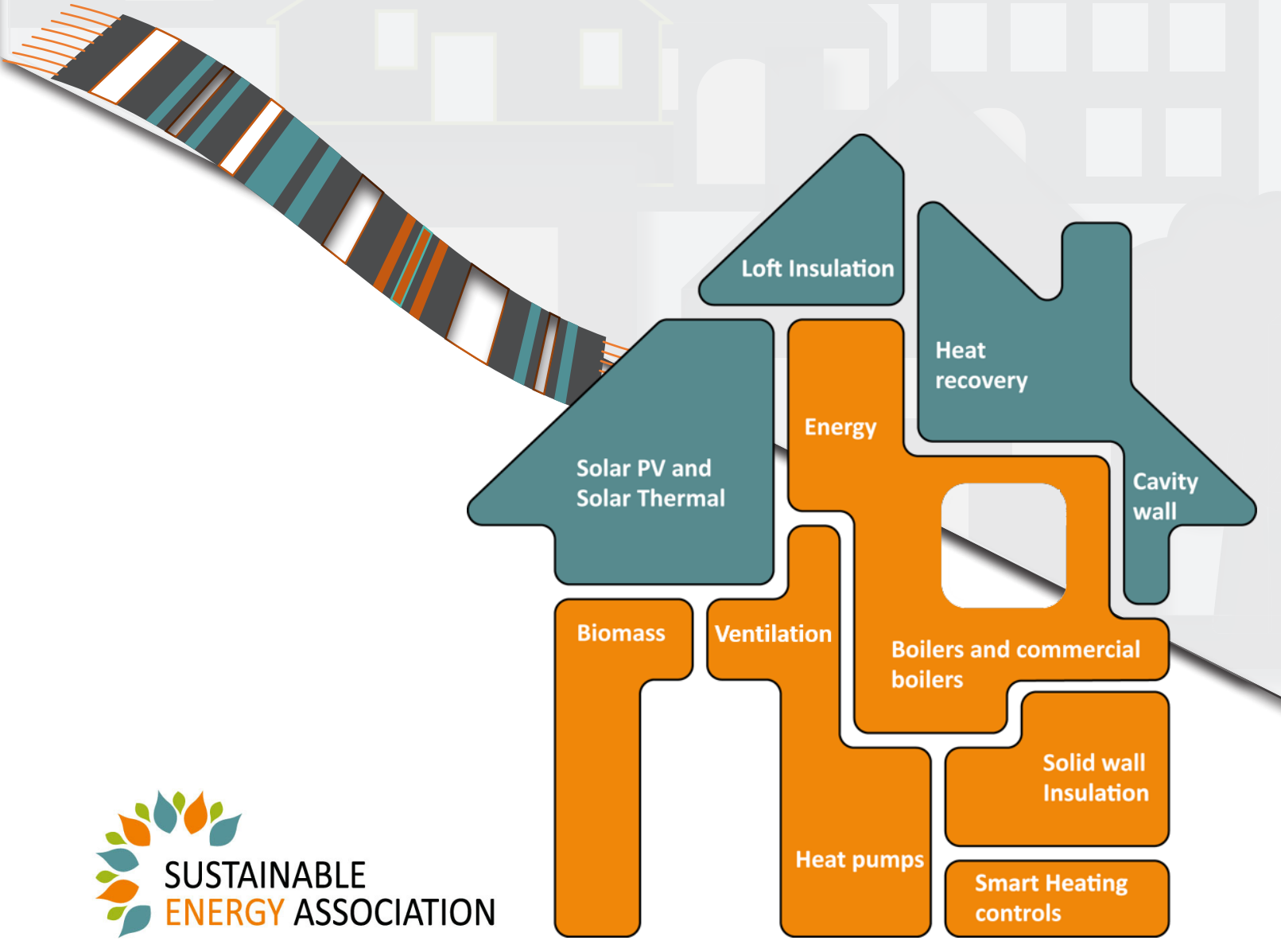
Wrap then Heat

A holistic strategy for making our homes and buildings healthier, cheaper and more sustainable



SUSTAINABLE ENERGY ASSOCIATION

The Sustainable Energy Association (SEA)

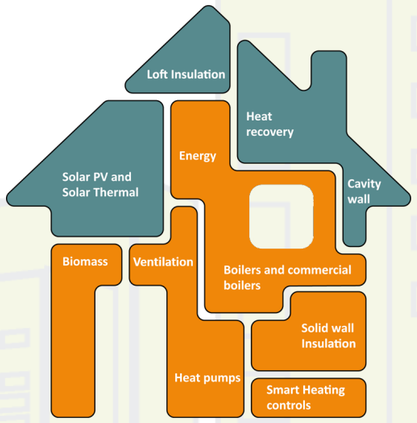
The Sustainable Energy Association (SEA) is a member based industry body. The SEA takes an objective 'whole building approach' that recognises that there is no single solution to the building energy challenge faced by the UK.

We champion an approach founded on the principle of 'wrap then heat ' because energy efficiency and heat are integral parts of the challenge. The available technology solutions work better together. Increasing the energy efficiency of the building fabric helps to maximise the gain from efficient heating solutions. To address one without the other leads to sub-optimal results for homeowners, investors and Government.

SEA is governed by a committee of members who discuss and authorise the policy positions that have been developed through member-led working groups.

Collectively we believe in a collaborative and constructive problem solving approach based on robust analysis which recognises the realities of the challenge. We seek to engage in the development of long term policy, which gives directional certainty for investors and drives market change.

SEA member's manufacture, distribute, retail or regulate a range of technologies including the following:



The SEA takes a whole house technology neutral approach.

We champion "wrap then heat".

Our housing provider members own and manage properties.

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Foreword

Buildings are the foundation of modern British society. For most of us our homes are our biggest expenditure: they are where we are nurtured as children, where we play and learn, increasingly a place to work from and the refuge we retire to at the end of the day. Non-residential building stock also plays a vital role, offering workspace, health, education, entertainment and much more. The energy we use in these buildings represents one of the biggest operational costs, as well as a major proportion of our total energy consumption.

As we strive to increase national productivity, improve industrial competitiveness, reduce energy costs, provide sufficient homes and protect the environment for future generations, buildings will continue to be pivotal in all our lives.

However, some of us live in homes that are cold and draughty – conditions which have been proven to contribute to ill health. Too many of our homes and buildings are poorly insulated, heated by old inefficient heating systems and inflexible to the possible future demands of a more complex energy system. Where our homes are warm, we often neglect to consider the cost of delivering that warmth.

As well as impacting the nation's health, our buildings are contributing to poverty. The Resolution Foundation in its 2016 briefing "Hanging on: the stresses and strains of Britain's "just managing" families"[1] reported that rising housing costs mean that the proportion of income spent on housing [which includes energy costs] within the group has increased sharply by the equivalent of an extra 14 pence on income tax. Nearly 200,000 of these families are behind with their energy bills according to the foundation's latest figures. A more energy efficient home would help every one of them.

[1] Shelter (2016) Living Home Standard http://www.shelter.org.uk/__data/assets/pdf_file/0011/1287848/living_home_standard_full_report.pdf

The comfort within people's homes is something they care about and warmth is of paramount importance to comfort. In research carried out by Ipsos Mori [2], people stated cold homes "impacted ....physical health... emotional wellbeing.... children having a comfortable environment to do homework". Of the aspects of home decency tested "heating the home was the most important".

The SEA believes that much more can be done to tackle this issue and this document sets out ideas on how to improve the energy performance of our existing buildings and also how the Government can achieve its ambitions for new housebuilding; delivering healthy homes that are of sufficient quality to keep warm at low cost. The building of a house is the optimum time to get the fabric, insulation and heating system right so the building of new houses presents a significant opportunity.

Lastly, at a time when the Government is focussed on national productivity and developing an industrial strategy, it is vital the role energy efficiency and sustainable technologies can play in the success of that strategy is recognised. Some of the most exciting sustainable energy products are manufactured here, whilst home and building retrofits will be delivered by an army of entrepreneurs spread right across the UK.

At the SEA, we believe 'wrap then heat' makes sense, and whilst it is right that we as a nation celebrate our unique architectural heritage, it is time to invest in making our buildings healthier and lowering their running costs. In doing so we improve our health, reduce greenhouse gas emissions, stimulate industry and increase prosperity for us all.

Richard Burnley

Managing Director - Kingspan Insulation

Britain & Ireland

Chairman of the SEA Executive Committee

Lesley Rudd

Chief Executive

Sustainable Energy Association

[2] Shelter (2016) Living Home Standard http://www.shelter.org.uk/__data/assets/pdf_file/0011/1287848/living_home_standard_full_report.pdf

Introduction

In 2015 the SEA produced a manifesto outlining proposals that offered a blue-print for the demand side of the UK energy sector. Since then we have taken that work further and in this document put forward proposals for policy interventions and market mechanisms that will deliver a positive economic outcome for the UK and enable demand side energy policy to transition away from subsidies towards regulation of a self-sustaining building energy market.

Our Proposals

STRATEGIC

- The UK Government should set out a clear long term national strategy to improve the energy efficiency of the UK's buildings and move to low carbon heating
- Government should set a target to bring all domestic properties up to EPC[3] band C
- Energy Efficiency should be included in the Industrial Strategy
- Stable policy is required to reduce carbon emissions from new build

REFOCUS EXISTING SUPPORT/POLICY

- Enhance and focus existing policies and follow up with a plan to provide long term stability post RHI and ECO
- Building regulations should be used in a staged and progressive manner to make buildings and their heating systems more efficient and 'renewables ready'

MARKET SIGNALS

- Encourage home energy efficiency improvements in the 'able to pay' sector
- Use carbon pricing as a tool to encourage low carbon solutions

APPROACH

- Implementation of policy should be devolved where possible allowing for distributed energy and distributed leadership
- Government policy should take a whole house, technology neutral approach

[3] Introduced under the Housing Act 2004, Energy Performance Certificates (EPC) provide information about a property's energy usage and typical energy costs, plus recommendations about how to reduce energy use and save money http://www.legislation.gov.uk/ukpga/2004/34/pdfs/ukpga_20040034_en.pdf

Why tackling energy in buildings matters

Homes and buildings play a crucial part in society. Wasteful buildings impact our health and wider society

Many people consider waste to be what they put in the bin, but just as a leaky tap can waste gallons of water, so too a leaky house can waste energy. Heat can escape through the roof, the walls and the doors, and inefficient heating systems with no or basic controls can also waste energy unnecessarily.

Too many UK homes are poorly insulated and heated. These wasteful buildings are impacting the nation's health and wellbeing, and contributing to fuel poverty.

> *The Committee on Fuel Poverty Report "Currently, 2.38 million households (10.6%) are in fuel poverty and are struggling to afford to heat their homes to acceptable levels. Not only do these households have low incomes; they also live in energy inefficient housing. What this means in practice is that huge numbers may be indebted to energy suppliers and suffer from ill-health resulting from cold homes. Other outcomes from fuel poverty include excess winter mortality levels, increased demands on the National Health Service, social isolation and poor outcomes for younger people."* [4]

[4] Committee on Fuel Poverty (2016) A report on initial positions https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/553931/CFP_report_-final.pdf

The Department of Business, Energy and Industrial Strategy (BEIS) provide the following definition of fuel poverty: A household is considered to be fuel poor if:

- They have required fuel costs that are above average (the national median level);
- Were they to spend that amount, they would be left with a residual income below the official poverty line.[5]

Where this definition is not so clear is that the required spend on fuel is from income after housing costs have been paid. This is an important clarification because rising housing costs in the UK are projected to wipe out much - if not all - of two decades of income growth for many households.[6] Conditions in the UK's housing market are therefore having an increasingly negative impact on living standards within the UK and the poor quality of the UK's housing stock is only adding to the problem.

> *The Resolution Foundation in its 2016 briefing "Hanging on: the stresses and strains of Britain's 'just managing' families"* [7] *reported that rising housing costs mean that the proportion of income spent on housing [which includes energy costs] within the group has increased sharply by the equivalent of an extra 14 pence on income tax. Nearly 200,000 of these families are behind with their energy bills according to the foundation's latest figures.*

[5] DECC (2016) Annual Fuel Poverty Statistics Report, England https://www.gov.uk/government/statistics/annual-fuel-poverty-statistics-report-2016

[6] Resolution Foundation (2016) The housing headwind: the impact of rising housing costs on UK living standards http://www.resolutionfoundation.org/app/uploads/2016/06/The-Housing-Headwind.pdf

[7] Resolution Foundation (2016) Hanging on: the stresses and strains of Britain's 'just managing' families http://www.resolutionfoundation.org/wp-content/uploads/2016/09/Hanging-On.pdf

Installation of internal wall insulation in four 10-storey tower blocks in Dundee, Scotland

Premium performance insulation from Kingspan Insulation has been used in the £3.5m refurbishment of four 10-storey tower blocks in Dundee known as Dryburgh Gardens. The residential buildings are owned by Abertay Housing Association. A Green Deal Advice Report recommended that in order to improve the energy efficiency of the buildings, internal wall insulation systems should be installed to the stringent requirements of PAS 2030.

The Kingspan Kooltherm Internal Wall Insulation System was selected for the job. This required 82.5mm and 32.5mm Kingspan Kooltherm K18 Insulated Plasterboard to be installed on a new timber batten frame to the inside of all external walls, whilst all internal partition walls were lined with 32.5mm Kingspan Kooltherm K18 Insulated Plasterboard. Finally, 25 mm Kingspan Kooltherm K10 Soffit Board was applied to the ceiling to provide the maximum insulation values to each individual room.

Richard Hands, Director at FBN Passivhaus commented: *"The retrofit met the original feasibility design targets we set of raising the EPC ratings for all flats from an F rating up to B. This should dramatically reduce the tenants' energy bills and meet the recommendations of the Energy Saving Trust for all homes to reach a B standard by 2050."*

Our homes and buildings need upgrading

UK housing stock is old relative to most European countries with many houses dating from the Victorian era.[8] Properties built before 1919 tend to have external walls of a solid brick construction which lets through twice as much heat as a cavity wall.[9] Cavity walls which had become more common by the first decade of the 20th century were initially developed to provide protection from the elements, such as driving rain[10] which was a cause of damp in exposed properties. However cavity wall insulation to reduce thermal losses wasn't introduced until the 1970's[11] in response to the energy crisis and only became compulsory for all new buildings in the 1990's. This evolution of UK property characteristics is illustrated in Figure 1 below.

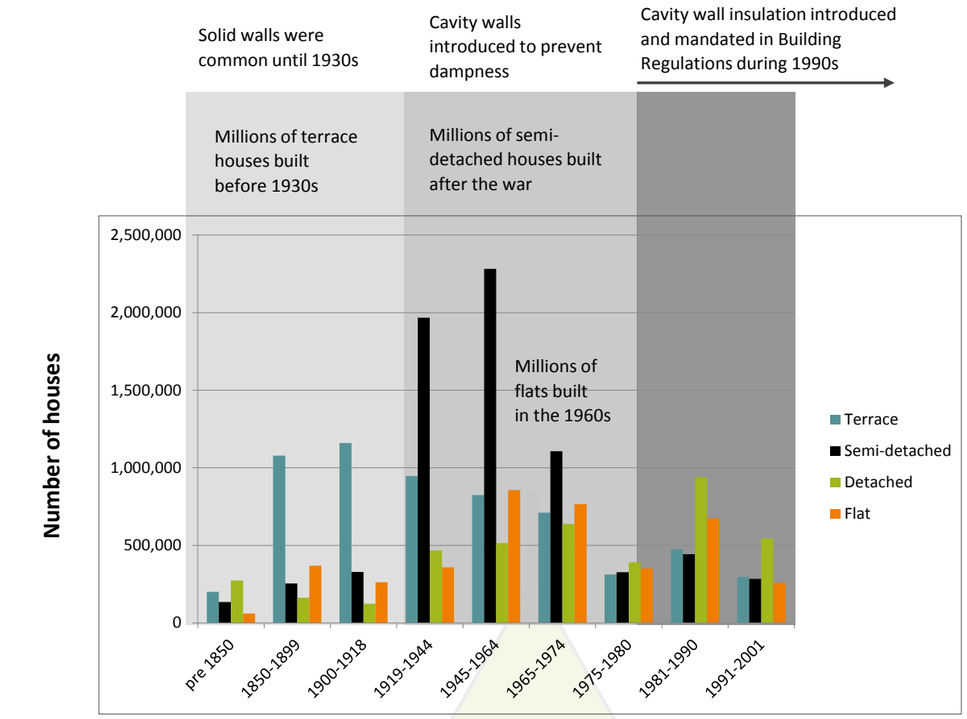


Figure 1: House wall insulation evolution from 1850 to 2001. Source: CLG 2001 English House Conditions Survey. Table A1.3. Dwelling Type by age category.

[8] BEIS (2016) Energy Consumption in the UK https://www.gov.uk/government/collections/energy-consumption-in-the-uk

[9] Energy Saving Trust (2016) Home Insulation: Solid Wall http://www.energysavingtrust.org.uk/home-insulation/solid-wall

[10] Historic England (2016) Energy Efficiency and Historic Buildings: Early cavity walls https://www.historicengland.org.uk/images-books/publications/eehb-early-cavity-walls/

[11] London Damp Company (2016) The Cavity Wall: A Brief History http://www.londondampcompany.co.uk/the-cavity-wall-a-brief-history/

Approximately 25% of the properties in England and Wales with an Energy Performance Certificate[12] are rated at the lowest bands of E, F or G[13], the majority of which were built before cavity wall insulation was introduced[14]. Figure 2 shows the marked improvement cavity wall insulation had on the energy efficiency of buildings built post 1990 with a substantial proportion rated the highest at EPC bands of C and above.

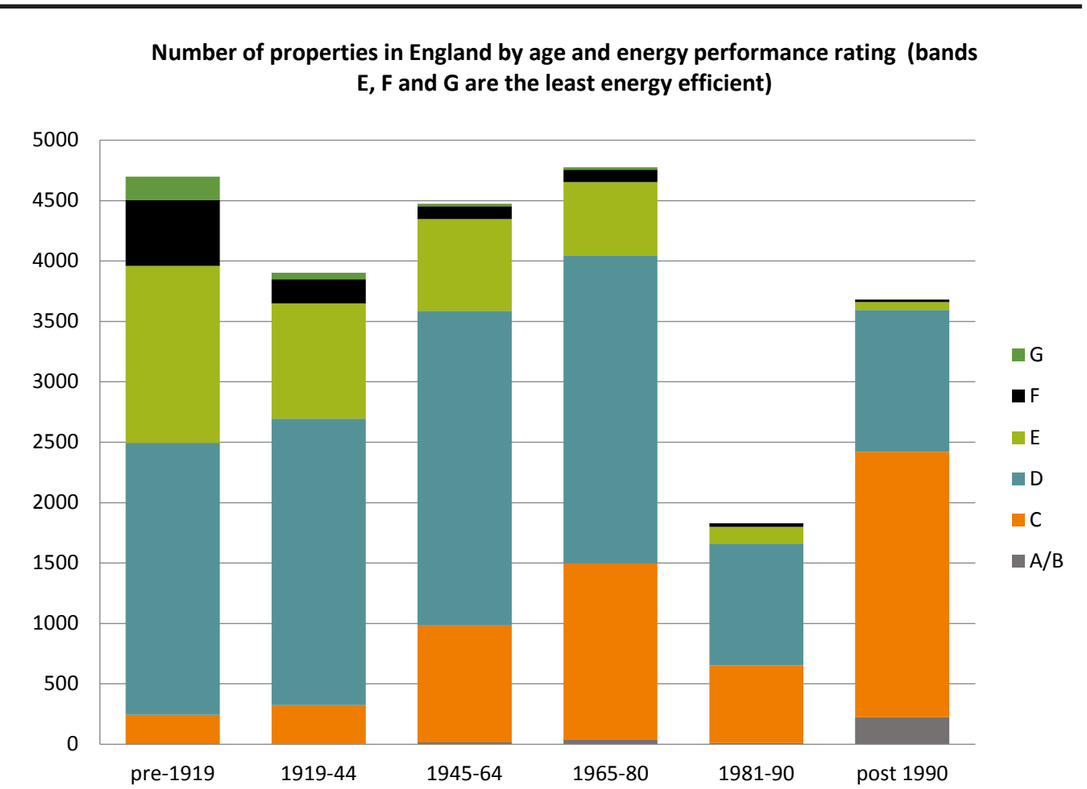


Figure 2: Energy performance of dwellings over time. Source: 2014 English Housing Survey, Department for Communities and Local Government.

[12] Introduced under the Housing Act 2004 Energy Performance Certificates (EPC) provide information about a property's energy efficiency and how to reduce energy costs. They are a legal requirement for rental properties and the sale of homes with three bedrooms or more.

[13] BEIS (2016) Energy Performance of Buildings Certificates in England and Wales: 2008 to September 2016 https://www.gov.uk/government/collections/energy-performance-of-buildings-certificates

[14] The Green Age (2015) How Building regulations have changed over time http://www.thegreenage.co.uk/building-regulations-changed-time/

NOTTINGHAM COMMUNITY HOUSING ASSOCIATION

Tackling fuel poverty with innovative technology
Our Health & Innovation Programme

An innovative energy project has been implemented across Nottinghamshire, thanks to funds from National Energy Action (NEA). This project involved two members of the SEA; Nottingham Community Housing Association (NCHA) who committed to upgrade its existing homes to improve energy efficiency and help reduce fuel bills for residents and Dimplex who supplied the equipment to achieve this. NCHA received a charitable grant to deliver the project in Nottingham to tackle fuel poverty and cold homes.

The grant has funded the replacement of Economy 7 storage heaters, which were unpopular with residents, with Dimplex's High Heat Retention, Smart Storage Heaters High and Heat Retention Hot Water Cylinders alongside further complimentary energy saving measures such as Voltage Optimisation and LED Lighting. Additionally, tenant training, tariff switching guidance and better temperature control has helped individuals to change old habits and save even further.

Andrea Griffiths-James from NCHA said: "*We were delighted to be awarded this grant to enable us to work with Green Vision Energy Ltd to deliver this energy saving programme." The programme took a whole house approach which improved the EPC ratings of the properties with over 90% now achieving EPC band C. As a result, our tenants have seen reductions in energy bills and are more comfortable.*"

Security of supply

The energy crisis in the 1970s prompted many European countries to seek ways to reduce their reliance on fossil fuel imports and deploy renewable technologies.[15] The UK on the other hand was soon to become fairly self-sufficient in energy due to relatively large indigenous reserves of coal, oil and gas which with hindsight accommodated a level of complacency[16] over its supply and usage.

In the same way that cheap fuel in the US encouraged fuel-inefficient or 'gas guzzling' cars, so the UK's large reserves of energy allowed us to overlook our inefficient homes. The US congress established Gas Guzzler Tax provisions in the Energy Tax Act of 1978[17] to try to change consumer behaviour. Having become a net importer of energy in 2004, increasingly reliant on external providers[18], the UK needs to address the issue of its inefficient 'gas guzzling' buildings. The UK's journey towards a smarter, lower carbon energy system and innovative technologies has already started; we need to, not just maintain the momentum, but accelerate the change. The UK must reduce its reliance on energy imports to protect the economy and its citizens against the risks of energy supply security and reliability, as well as price levels and volatility.

Energy prices

An energy bill includes five main components; wholesale costs, network costs, policy costs, operating costs and VAT. These costs move over time. At different times each area may put upward or downward pressure on consumer bills.

Between 2010 and 2015 the average standard combined energy bill for domestic consumers rose faster than the rate of inflation (25%[19] versus Consumer Price Index inflation at 16% for the equivalent period[20]). Energy costs may continue to rise as the UK becomes more dependent on imports and increasingly exposed to global energy markets.

[15] EurActiv (2012) EU renewable energy policy http://www.euractiv.com/section/science-policymaking/linksdossier/eu-renewable-energy-policy/#ea-accordion-background

[16] NATTA (2017) Renewable Energy in the UK: A NATTA Guide for Newcomers http://eeru.open.ac.uk/natta/natta-guide.html

[17] US Congress (2016) H.R.5263 – Energy Act 95th Congress (1977-1978) https://www.congress.gov/bill/95th-congress/house-bill/5263

[18] House of Commons Library (2013) Energy imports and exports http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN04046

[19] BEIS (2016) National Statistics - Quarterly Energy Prices: September 2016 https://www.gov.uk/government/statistics/quarterly-energy-prices-september-2016

[20] Bank of England (2016) How the inflation calculator works http://www.bankofengland.co.uk/education/Pages/resources/inflationtools/calculator/how.aspx

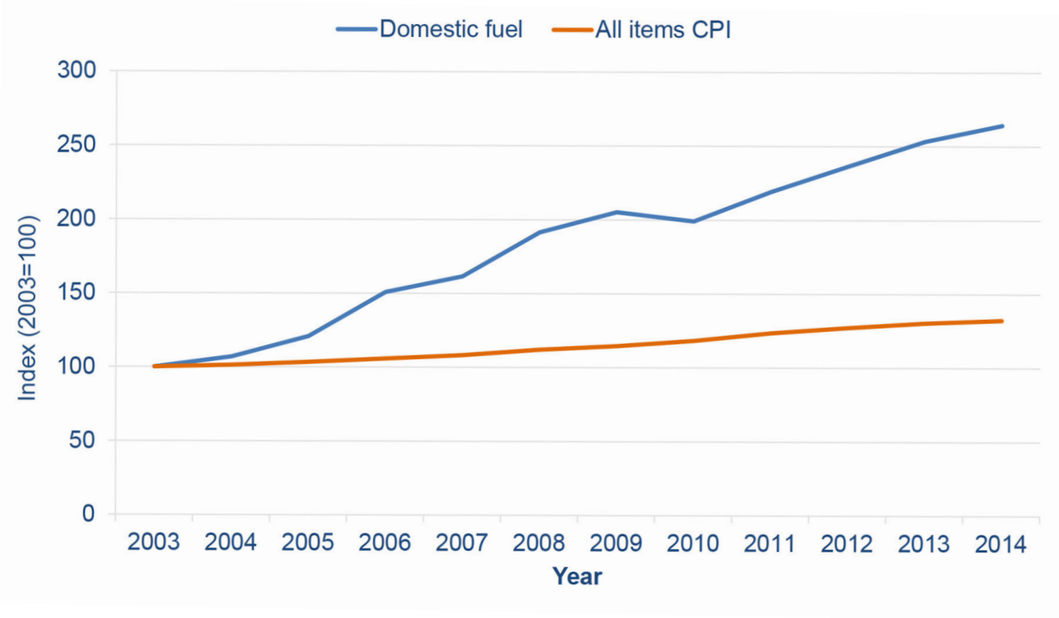


Figure 3: Domestic energy prices and Consumer Price Index (cash terms) 2003-2014. Source: Annual Fuel Poverty Statistics report 2016, June 2016, Department for Energy and Climate Change.

If we do not improve the energy efficiency of the UK's housing stock then more and more UK households will likely struggle to pay their fuel bills.

> *"Improving home energy efficiency is a 'win win' for households and the UK as a whole. It enhances the UK's energy security, cuts the carbon emissions from our building stock, and reduces costs – the cheapest energy is the energy that we don't use. From the consumer perspective, the benefits include lower energy bills, warmer homes that are more comfortable to live in, and improved wellbeing. Insulating draughty homes can also save vulnerable people from fuel poverty—a problem which remains unacceptably prevalent across the UK." [21] House of Commons Energy and Climate Change Committee.*

[21] Energy and Climate Change Committee (2016) Home Energy Efficiency and Demand Reduction http://www.publications.parliament.uk/pa/cm201516/cmselect/cmenergy/552/552.pdf

Impacting the environment

It is now widely accepted that climate change is happening and that it is caused by our actions. Successive UK governments have acknowledged this and have made commitments to tackle climate change including the enactment of the Climate Change Act 2008[22]. This progressive legislation, which was the first of its kind globally, gives the UK Government a legal obligation to reduce the UK's greenhouse gas emissions by at least 80% below 1990 levels by 2050. Under its commitment to the Paris Climate Change Agreement[23] the UK has promised to work towards capping global temperature increases to 2^0 C over temperatures in the pre-industrial era.

> *The Committee on Climate Change (CCC), an independent body mandated to report on the UK's progress against its carbon reduction targets, has expressed concerns about the scale of the challenge these obligations present given that progress has stalled. "Heating and hot water for UK buildings make up around 40% of the UK's energy consumption and 20% of the greenhouse gas emissions. It will be necessary to largely eliminate these emissions by around 2050 to meet the targets in the Climate Change Act and to maintain the UK contribution to international action under the Paris Agreement."* [24]

Although the UK has made progress, current policies are not driving carbon reductions fast enough to hit future carbon budgets. This is illustrated by the policy gap in figure 4.

[22] Climate Change Act 2008, Chapter 27, Part 1 Carbon Target and Budgeting, Clause 1 The target for 2050, item (1)

[23] DECC (2015) Press Release: World agrees historic global climate deal https://www.gov.uk/government/news/world-agrees-historic-global-climate-deal

[24] Committee on Climate Change (2016) Next Steps for UK Heat Policy https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/

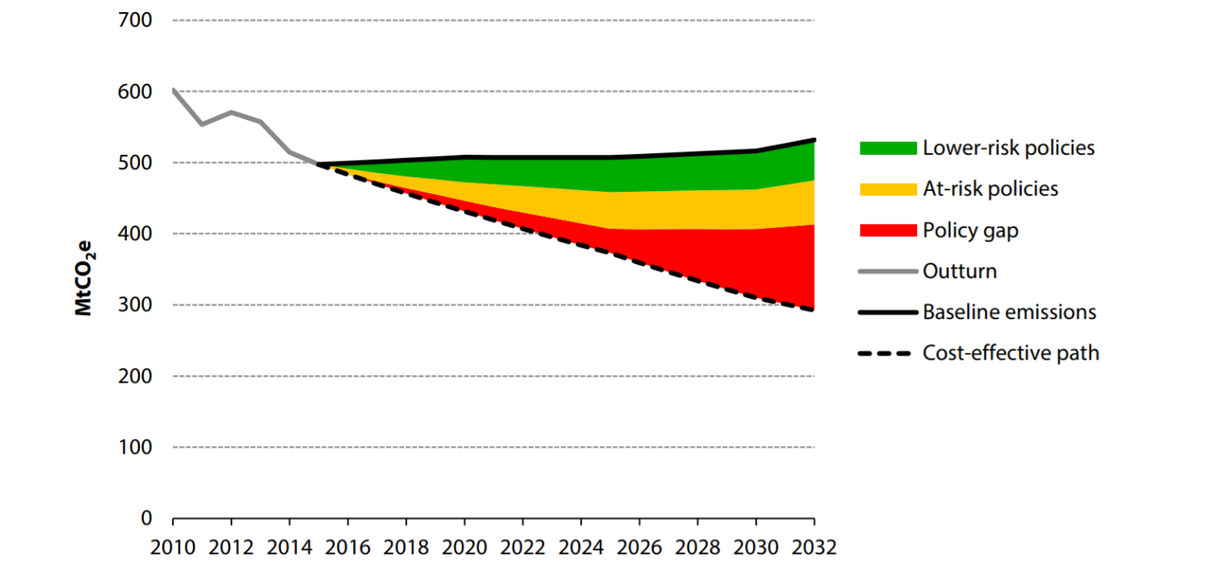


Figure 4: Assessment of current policies against the cost-effective path to meet carbon budgets and 2050 target

Source: DECC (2015) Energy and emissions projections; CCC analysis.

> *The Advisory Group to the Committee on Climate Change report that "Energy performance improvements in buildings are currently running at 1% per annum, rather than the 2-3% required for the 2030 carbon budgets. We need to increase the rate of improvement to more than building owners or the existing supply chain will do without market intervention."* [25]

The UK Government has made a commitment to tackling climate change which was supported and recommended by leading experts and committees. The Government will set out how it intends to meet the targets set out in the fifth carbon budget published in 2016 through the emissions reduction plan (referred to as the clean growth plan). We have the knowledge and the technology to reduce our impact on the climate. To date, more progress has been seen in terms of decarbonising electricity compared to heat. In order to to meet climate change targets, progress must be made on decarbonising the heating sector and therefore a new heat strategy is needed. Innovation and developments in insulation, heating and heating controls are now available and this document outlines how Government policies including regulation can drive improvements to help minimise the UK's impact on climate change.

[25] Committee on Climate Change (2016) Heat and Energy Efficiency: Making Effective Policy: Advisory Group Report https://www.theccc.org.uk/wp-content/uploads/2016/10/Heat-and-Energy-Efficiency-Advisory-Group-Report-Making-Effective-Policy.pdf

VIESMANN

Northamptonshire village makes the switch to a biomass district heating scheme

A sustainable and unique district heating network

The picturesque and historic village of Castle Ashby, Northamptonshire, is made up of 73 commercial and residential dwellings and dates back to 1306. Many of the residents suffered from high energy bills from using a mixture of electric heaters, oil boilers and inefficient domestic gas boilers for heating and hot water. Lord Compton, the owner of the Castle Ashby estate sought to reduce the carbon emissions of the village and lower fuel bills for the residents. He championed a sustainable district heating network using high quality biomass grown on site as a way of removing the reliance on fossil fuels.

The spacious yard of Castle Ashby Home Farm previously used as a milking parlour now contains the heart of the sustainable heating system in two Pyrot biomass boilers, a unique top loader fuel storage and transfer system and two 10,000 litre buffer vessels. Originally designed for the movement of compost and soil, the top loader system feeds woodchip from the estate into a common hopper that then feeds both biomass boilers simultaneously. Hot water from the boilers is pumped into two 10,000 litre storage tanks and distributed across three independent heating circuits throughout the village, via highly insulated underground pipes.

Each Castle Ashby property has replaced its previous heating system with a heat interface unit, which records the energy used, allowing for effective monitoring of the district heating scheme. The individual systems have now been replaced by two centrally located biomass boilers which generate over 2,500,000 kWh of heat per year resulting in carbon savings of 625 tonnes per year and greatly reduced fuel bills for Castle Ashby residents.

Our Proposals

STRATEGIC

The UK Government should set out a clear long term national strategy to improve the energy efficiency of the UK's buildings and move to low carbon heating

Long term policy stability is key to providing investor confidence, driving innovation and encouraging change

Recent policy modifications and cancellations have severely damaged investor confidence resulting in the failure of some policies to deliver the benefits expected. A clear long term strategy needs to be adopted and followed in order to provide certainty and enable the transition to a low carbon future.

This strategy should recognise the interplay between thermal insulation and heating system performance and include policies to capitalise on that relationship.

A study commissioned by the Department of Energy and Climate Change (DECC)[26] to look at the drivers of growth in European renewable heat technologies[27] found no simple correlation between the number of legislative and policy drivers and the levels of deployment across the comparison countries, but what was apparent was that stability in this respect had been a critical factor.

Policy intervention alone will not reduce the energy consumption and losses from the UK's housing stock however a national strategy with a long term vision and stable market interventions that engage building owners and encourage a range of solutions from industry is crucial.

[26] The Department of Energy and Climate Change is the predecessor to the Department of Business, Energy and Industrial Strategy

[27] DECC (2016) Drivers of Growth and Cost Changes in European Renewable Heat Technologies https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/498970/European_deployment_of_RHts_Phase_2__FInal_Report_DECC_Template_V4_.pdf

Government should set a target to bring all domestic properties up to EPC band C

Policy objectives should be simple and clear, and accommodate regional variations

Government should set a simple but clear target of bringing all domestic buildings up to EPC band C.

This should be a national strategy with local delivery to:

- "Make Britain a country that works not for the privileged few but for every one of us";[28]
- Reduce fuel bills for the millions in fuel poverty or 'just managing';
- Boost investor confidence in the low carbon energy sector to help the UK achieve its CO_2 reduction obligations;
- This policy which could be revenue neutral,[29]could reduce domestic CO_2 emissions by 13.6Mt p.a. by 2030 i.e. one third of total projected domestic emissions.

The Decent Homes Standard[30] is a standard for improving the quality of social housing and an example of where consistency in policy has been effective in delivery. Introduced in 2001 in a drive to improve the standard of social housing, the objective of the policy was to bring all the social stock up to a basic standard of decency by the end of 2010. The 2010 target was not achieved but very significant progress was made. Only 1.3% of local authority owned homes in England are rated EPC band F or G and only 1.6% of housing association homes in England are rated either F or G.[31]

The success of the policy has been put down to firstly the clarity and simplicity of the objective and secondly that councils and practitioners were presented with practical tools to implement the programme and were generally allowed to get on and do it.[32] A similar approach could be successfully adopted to bring all properties up to EPC band C.

[28] Theresa May speech July 2016

[29] SEA outline of revenue neutral programme to make domestic buildings energy efficient

[30] A Decent Home: Definition and guidance for implementation, June 2006, Department for Communities and Local Government

[31] Warmer & Greener: A guide to the future of domestic energy efficiency policy, April 2016, Westminster Sustainable Business Forum

[32] http://penfoldassociates.co.uk/the-decent-homes-standard/

Energy Efficiency should be included in the Industrial Strategy

By including energy efficiency in the Industrial Strategy, Government could create nationwide demand for energy efficiency measures including low carbon heating which will provide business and employment opportunities, wide reaching prosperity and increased living standards across the UK

The inclusion of energy efficiency in buildings within the Industrial Strategy presents an opportunity for economic growth that politicians should seize upon. Achieving mass market engagement in energy efficiency will stimulate opportunities not only for the technology manufacturers and suppliers, but also for the many small to medium sized businesses; those providing and installing heating systems, insulation and glazing. These are the very entrepreneurs, self-starters and employers that are key to the growth of the UK economy; delivering employment opportunities and earnings benefits lower down the supply chain and across all regions of the UK.

The installation of low carbon heating and energy efficiency measures often uses local labour and this investment has the potential to boost employment and economic growth. There is also potential for longer term benefits to result from the lowering of energy bills which enable higher disposable income for domestic consumers and a reduction in running costs for business; the benefits of which can be spent elsewhere in the economy. The geographic spread of demand means that the supply chains and manufacturers that support the energy efficiency industry are likely to be located outside wealthy areas and provide sustainable jobs across the UK, rather than rely on in-commuting to urban regions.

In addition, many companies that currently import novel low carbon technologies want to manufacture in the UK; to be close to the market where they see the greatest growth potential. This inward investment in the UK's manufacturing sector brings opportunities for home grown technology innovation and exports.

If the drive to improve the energy efficiency of buildings is also linked to the new house building programme[33] there will be a legacy of heathier and more affordable homes for future generations.

[33] DCLG (2016) Press release: New £18 million fund to accelerate house building https://www.gov.uk/government/news/new-18-million-fund-to-accelerate-house-building

Stable policy is required to reduce carbon emissions from new build

Policy stability is crucial

The Zero Carbon building policy announced in 2006 would have ensured that all new build housing from 2016 would generate as much energy on-site – through renewable sources, such as wind or solar power – as they would use in heating, hot water, lighting and ventilation. This was to be supported by tighter energy efficiency standards that would have come into force in 2016 to make new homes carbon neutral. The policy was scrapped in the 2015 Summer Budget[34] announcements following concerns that the higher standards for buildings would hinder delivery of desperately needed new homes. The announcement means that carbon emissions reductions from new builds is stalled at 2013 Building Regulation standards and there is currently no trajectory for future standards.

> *"My Lords, the Government's attempt to solve the current housing crisis needs, at the same time, to address the issue of what types of homes are built. They should be of high quality and high energy efficiency standards which drive down future energy bills, help to protect against fuel poverty and provide healthy living environments." Baroness Parminter, House of Lords* [35]

This is an example of where instability in policy is damaging in the long term. The building sector's initial reaction to the Zero Carbon buildings policy was to oppose the changes it introduced, but nine years later the sector had resigned itself to the policy and had made provisions for its introduction. The sudden scrapping of the policy in 2015 was more damaging than its introduction as it wasted the sector's preparations and was a lost opportunity to prevent buildings adding to the legacy stock of poor housing in the UK. Housebuilders, planners and green groups condemned the government for turning its back on the policy. The Government introduced a 12 month review of the energy efficiency standard for new homes.

> *"It may not have been perfect but the zero carbon policy was an attempt to provide confidence to the construction sector, setting out future standards with enough notice for industry to be able to deliver. Scrapping the policy sends a terrible message to the industry and undermines all those who have put time and energy into making it work." Mike Roberts Managing Director at HAB Housing*

[34] HM Treasury (2015) Fixing the Foundations: Creating a more prosperous nation https://www.theguardian.com/environment/2015/jul/10/uk-scraps-zero-carbon-home-target

[35] Parliamentary Hansard Report (2016) House of Lords – Amendment 54A http://www.publications.parliament.uk/pa/ld201516/ldhansrd/text/160308-0001.htm

EDF Energy & Landmark Energy Partnership
Norbiton & Mount Pleasant Estate, London

EDF Energy, in partnership with Landmark Energy, has provided the Royal Borough of Kingston with Energy Company Obligation funding to assist with the installation of external wall insulation (EWI) in homes in Norbiton and Mount Pleasant. The homes are primarily semi-detached, council-built houses constructed between 1925 and 1930. EWI was a major part of the refurbishment plan which also included double glazing and replacement heating systems. The work started in April 2014 and finished in July 2016.

The following materials were used during the project:

- Epsitherm EPS: Comprising of expanded beads of polystyrene incorporating a graphite component providing improved thermal insulation;
- Fixings: The green insulation anchors are nylon helping prevent thermal bridging and reducing energy loss from the building;
- Silicone render: A flexible anti-crack finish was applied providing long-life, durable, and low maintenance finish.

It is estimated that the refurbishments will result in lifetime carbon savings of 8,000 tonnes and occupants have reported that since refurbishment they are making significant savings on heating costs (averaging at £270 per household per annum). In addition to these benefits EWI will also:

- Provide occupants with a more comfortable, windproof, and weatherproof home;
- Reduce or eliminate moisture and condensation issues (with adequate ventilation);
- Eliminate draughts;
- Provide protection to the existing building envelope;
- Benefit from a durable low maintenance finish which improves the appearance of the properties and will do so for many years to come.

REFOCUS EXISTING SUPPORT/POLICY

Enhance and focus existing policies and follow up with a plan to provide long term stability post RHI and ECO

Manage a transition away from 'boom-bust' subsidies towards sustainable regulations and market based incentives

Government policies such as the Renewable Heat Incentive (RHI)[36] and the Energy Company Obligation (ECO)[37] have been useful tools in subsidising the early deployment of low carbon technologies and energy efficiency in the UK.

These policies, however, were never intended to be a long term solution and their design incorporates an inbuilt limited life expectancy in the form of deployment limits and capped budgets. Uncertainty about the longevity of these policies, interim amendments and delays in their launch has contributed to a perception of high investment risk and market instability.

> *"We need the government to set a clear direction of travel and to stick to it. Businesses want to get on with building new low-carbon infrastructure, but there is still too much policy uncertainty." Katja Hall, Chief Policy Director for the CBI[38]*

[36] The Renewable Heat Incentive (RHI) is a UK Government scheme set up to encourage uptake of renewable heat technologies amongst householders, communities and businesses through financial incentives

[37] The Energy Company Obligation (ECO) is a government energy efficiency scheme to help reduce carbon emissions and tackle fuel poverty. Under the scheme, larger energy suppliers have to deliver energy efficiency measures to homes in Great Britain.

[38] Katja Hall, Chief Policy Director for the CBI (2011) Guardian Article: CBI calls for end to delays on renewable energy https://www.theguardian.com/business/2011/apr/26/cbi-green-energy-projects

The continuance of the RHI scheme is welcomed by the SEA as are the rises in tariff payments to increase the appeal and hopefully hasten the uptake of qualifying renewable technologies. However SEA challenges whether this will be enough to trigger a further surge in RHI applications or whether we are nearing the point of peak demand from the early adopter market.

The demand led approach of the RHI scheme has got us so far, but we need to step up a gear to make real progress on the deployment of renewables. Potentially the time has come to introduce an element of supply push by allowing the assignment of rights to RHI payments to third parties who can aggregate demand and achieve economies of scale through local campaigns.

ECO is a scheme whereby the larger energy suppliers fund the installation of energy efficiency measures in households through a levy on energy bills. Critics of the policy argue that this subsidy based approach has led to an expectation that energy efficiency should be provided free of charge which has undermined the value of energy efficiency to the public.[39]

ECO has led to the successful deployment of measures across the UK, however more needs to be done to incentivise the uptake of measures in hard to treat and fuel poor households. From April 2017, the scheme is due to be replaced with a new supplier obligation to reduce carbon emissions and focus on the fuel poor.[40] The SEA supports the Government's proposal to refocus the scheme towards the fuel poor. The involvement of local authorities and a devolved approach to delivery will give more discretion and initiative to local actors, which is needed to ensure that those in most need are supported and that the right measures are installed in the right homes. We believe that eligibility could be extended somewhat to be more inclusive of 'just about managing' households.

Energy companies involved in ECO have been subjected to a stop-start funding regime which has had significant impacts on the energy saving installers and the supply chain. In addition to cuts to the ECO programme, the closure of the Green Deal has left the energy efficiency industry struggling, with heating and insulation businesses feeling the impacts of stop start policy and unstable basis for investment. For the longer term we need to move away from 'boom-bust' subsidies towards sustainable regulations and market based incentives. We need a plan to stimulate the market for low carbon heat post RHI and a stable framework to support the deployment of energy efficiency measures. Regulation can, as outlined in the next section, be used successfully to stimulate the market and standards can be progressively raised as part of a long term plan.

[39] Taylor (2015) The 'able to pay' energy efficiency market https://www.energy-uk.org.uk/press-releases/energy-uk-blogs/5358-the-able-to-pay-energy-efficiency-market.html
[40] Ofgem (2017) About the ECO scheme https://www.ofgem.gov.uk/environmental-programmes/eco/about-eco-scheme

Building regulations should be used in a staged and progressive manner to make buildings and their heating systems more efficient and 'renewables ready'

Consultation proposals to mandate improvements to heating systems and weather compensation should be implemented as soon as possible, with further improvements implemented later this Parliament to make the UK housing stock 'renewables ready' in the longer term

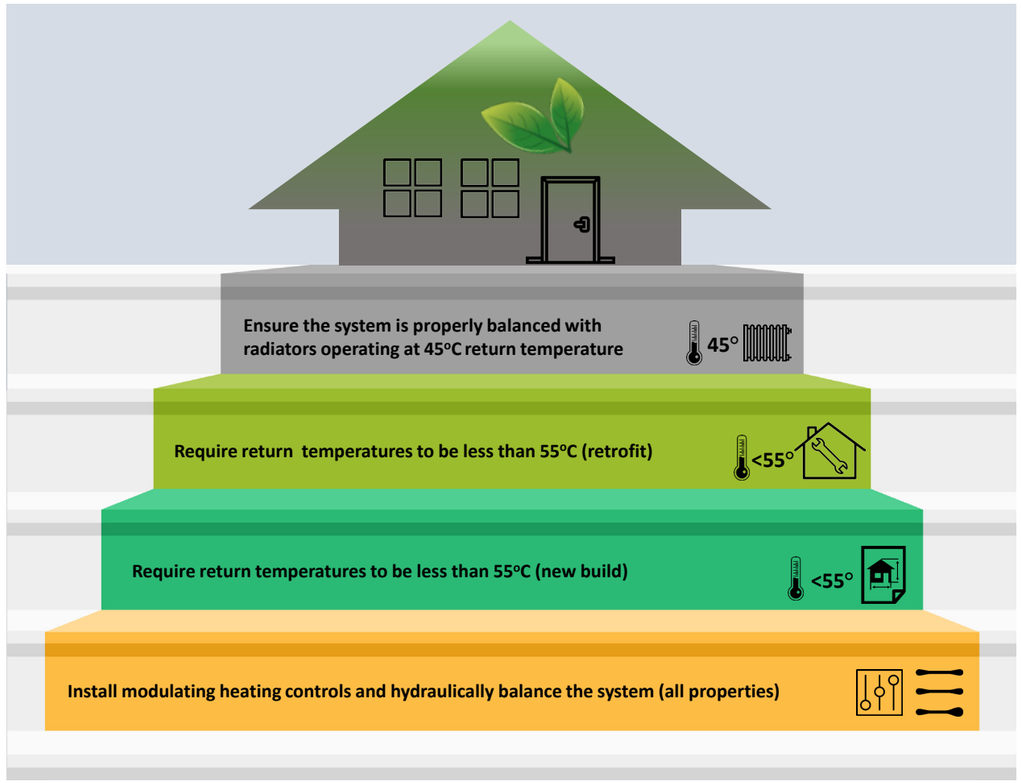
In 2005, the Building Regulations were amended to set a higher standard for boiler efficiency. The action proved to be very successful and drove the mass roll out of condensing boilers. However, more than ten years later technology has progressed but standards have remained the same.

In addition, there is a lack of clarity around the requirement for heating systems to be modified and balanced as appropriate to ensure boilers perform at optimum efficiency when in situ. This means that there is a lost opportunity as customers may not achieve the full benefits (increased comfort and reduced fuel bills) of their new heating system. To install a new heating appliance and then not optimise the overall system operation is wasteful in terms of both energy and carbon and the consumer is unlikely to be aware that the new system is not operating as well as it could.

Heating System Plus[41] is a proposed amendment to the Building Regulations for heating systems that would impact both retrofit and new build housing. It provides a progressive approach to making building heating systems more efficient and 'renewables ready' whenever this is possible and cost effective. The efficiency enhancements deployed at each stage are based on existing mass market technologies and industry know-how, making Heating System Plus readily achievable and consistent with other policy areas.

[41] SEA Heating System Plus policy paper http://www.sustainableenergyassociation.com/wp-content/uploads/2017/03/SEA-Heating-System-Plus-Report.pdf

The Government Consultation issued in December 2016 'Heat in Buildings - The Future of Heat[42] was welcomed by the SEA and it is hoped it will be used to inform progressive policy which uses Building Regulations to introduce a series of changes to improve heat in buildings as outlined in the SEA Heating System Plus paper.[43] The below graphic outlines the SEA's proposed staged approach to improving heating system efficiency.



Taking a progressive approach to the deployment of low carbon technologies and making properties 'renewables ready' is not new. In April 2016, San Francisco became the first major US city to require all new buildings to install rooftop solar PV. The ordinance (law) builds on a California requirement for new buildings to set aside 15% of the roof area to be 'solar ready', meaning the space should be clear and unshaded (City and County of San Francisco, 2016). [44]

[42] BEIS (2016) Heat in Buildings - The Future of Heat Consultation https://www.gov.uk/government/consultations/heat-in-buildings-the-future-of-heat

[43] SEA Heating System Plus policy paper http://www.sustainableenergyassociation.com/wp-content/uploads/2017/03/SEA-Heating-System-Plus-Report.pdf

[44] IRENA (2016) Renewable Energy in Cities Renewable http://www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_Energy_in_Cities_2016.pdf

DAIKIN

Daikin Smart Communities Project in Manchester

The Smart Community Manchester project, primarily funded by the Japanese Government's New Energy and Industrial Technology Development Organization (NEDO) and the Greater Manchester Combined Authority (GMCA), is a one-of-a-kind initiative and the largest ever installation trial of smart heat pumps in the UK.

Delivered in partnership with the GMCA, Wigan & Leigh Homes, Northwards Housing and Six Town Housing, the project aimed to demonstrate the feasibility of electricity aggregation systems to monitor residents energy savings, and to share knowledge among housing providers of the benefits of heat pumps. The project's three-year demonstration phase runs to the end of March 2017.

During the project, traditional boilers in 550 social homes were replaced with Daikin Altherma air-water heat pumps. Each home was equipped with the most appropriate technology depending on the specific requirements:

- The Daikin Altherma Hybrid heat pump is an advanced way to replace an existing gas or LPG boiler as it combines the familiarity of a combi boiler with the added efficiency of a renewable energy heat pump. With an energy label of A++, it is up to 35% more efficient than a condensing gas boiler;
- The Daikin Altherma LT Split heat pump is very flexible as the outdoor unit can be sited away from the property to tackle outdoor space, aesthetic and noise restrictions;
- The Daikin Altherma Monobloc heat pump is ideal for homes with indoor space restrictions as all the necessary system components are located in the outdoor unit.

The housing providers have already recognised a number of benefits from installing heat pumps, including:

- Tennent heating bills cut by as much as half - taking big steps to reducing fuel poverty;
- Homes kept at a more consistent warmth by day and night - but with far less energy required;
- The removal of unnecessary service charges.

MARKET SIGNALS

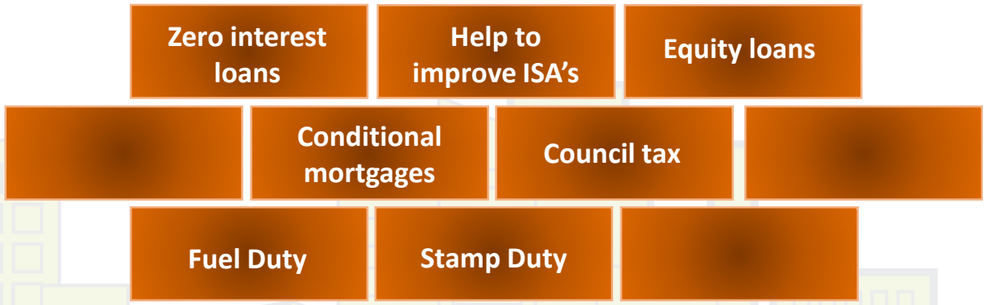
Encourage home energy efficiency improvements in the 'able to pay' sector

Introduce a policy framework which provides market signals to reflect the value of energy efficiency and stimulate its uptake in the 'able to pay' market

Although many energy efficiency measures have been proven to be highly cost effective[45] most people have not taken them up. The promise of energy cost savings in the long term has not been a sufficient motivator to overcome the barriers of the upfront capital costs and disruption of installation. The change to ECO creates a policy vacuum for the rest of the market.

We need a policy framework that assigns a 'value' to energy efficiency that the public will recognise; either reflected in increased property values (more enduring than a new kitchen or bathroom) or the introduction of penalties for wasting energy. To stimulate the 'able to pay' market the policy framework will therefore need to include a combination of regulations (that direct change), targeted incentives and funding mechanisms that nudge consumer behaviour.

The SEA paper 'Energy Efficiency – A Policy Pathway'[46] sets out a selection of ideas to be used individually or in combination to incentivise or nudge the 'able to pay' market. Some of the policy ideas contained within that paper are shown in the graphic below.



Polices to incentivise energy efficiency take up

[45] Behavioural Change and Energy Use, 2011, Cabinet Office, Department for Energy and Climate Change and Department for Communities and Local Government

[46] Energy Efficiency – A Policy Pathway - http://www.sustainableenergyassociation.com/wp-content/uploads/2017/03/SEA_energy-efficiency-policy-proposals-report.pdf

Use carbon pricing as a tool to encourage low carbon solutions

Carbon Pricing

A perhaps more radical step could be the gradual introduction of fuel duty on all forms of energy used in buildings (in proportion to carbon content) as a price signal to consumers reflecting the negative externalities associated with its use and to emphasise that energy is a valuable commodity. Carbon pricing is a method for reducing global-warming emissions which is favoured by many economists. The principle is that a charge is applied to those who emit CO_2 for their emissions. That charge, called a carbon price, is the amount that must be paid for the right to emit one tonne of CO_2 into the atmosphere. The setting of a carbon price would send a signal to the market and encourage the adoption of low carbon technologies. At present levies on electricity bills are increasing as power is being decarbonised, however the same is not true of heating fuels such as oil and gas and renewable heating technologies often struggle to compete with these even when benefiting from the renewable heat incentive.

In a bid to cut carbon emissions from transport the fuel duty on diesel was reduced in the 2001 Budget to encourage motorists to drive diesel cars. The intervention was very effective as sales of diesel cars in the UK rose 138% in under ten years.[47] It was subsequently found that although diesel cars emit less carbon per kilometre (than petrol) they emit higher levels of particulates causing damaging levels of air pollution in urban areas. Whilst the unintended outcome of this policy intervention negatively impacts public health, this example does demonstrate how effective fuel duty can be in influencing consumer behaviour.

Carbon pricing is a potentially more controversial course of action given the unpopularity of fuel duty on transport fuels and the growing proportion of those in society who are 'just about managing' or in fuel poverty. However as a tax at the point of sale (gradually introduced over time), it provides a strong linkage between energy usage, price and carbon emissions. It would also provide an additional tax revenue stream which could be used in a positive way, perhaps to fund other building energy efficiency initiatives and crucially it is within the Governments control unlike global energy prices.

[47] McCann (2016) Transport Secretary: Diesel taxes could be hiked to cut air pollution http://www.telegraph.co.uk/news/2016/06/07/transport-secretary-diesel-taxes-could-be-hiked-to-cut-air-pollu/

Supafil Party Wall Insulation in Salford

Challenge

It is estimated that there are 7.4 million existing uninsulated party walls that have been built with a cavity across the UK. Although these walls provide fire and acoustic separation to meet the requirements of relevant building regulations, the thermal performance of party walls have not previously been considered.

Working alongside Bridgewater Surveyors and others, City West wanted to improve the energy efficiency of their tenants' properties and are continually looking for other ways to reduce energy costs and consumption. Knowing that by insulating the cavity party walls of properties they could lower energy bills for their tenants, they embarked on the trial project with the aim of a possible roll out across other areas in the North West.

Solution

Supafil Party Wall prevents heat loss through party separating cavity walls by fully filling the cavity. Supafil Party Wall is an in-situ formed unbonded, non-combustible glass mineral wool. Knauf Insulation have now completed an extensive research programme to develop a proven methodology for installation into existing homes to add to the product's use in new build applications. As part of the Salford project, houses were tested before and after the installation took place. The reduction in the heat loss was equivalent to an improvement in the effective U-value of the party wall of at least 0.5 W/m2K. This shows there is a significant beneficial impact for tenants by fully filling cavity party walls with Supafil Party Wall Insulation.

When completed, the trials will measure the extent of customers' energy bill savings – estimated to be up to £90 a year – as well as the carbon emission reduction.

APPROACH

Implementation of policy should be devolved where beneficial, allowing for distributed energy and distributed leadership

Regional differences affect the cost of heating our buildings, the carbon emissions produced and the level and depth of fuel poverty. A devolved strategy is therefore needed to address the different challenges faced across the UK. The strategy should deliver distributed energy savings through distributed leadership where beneficial

England	The North East, Yorkshire and the Humber, West Midlands and the South West of England have the highest proportion of households in fuel poverty compared to the East and South East. Rural areas have a much higher proportion of households that are not connected to the gas grid, and therefore, a higher level and depth of fuel poverty. [48]
Scotland	Eilean Siar, Orkney Islands and Highland have the highest rates of fuel poverty whereas Central Belt areas show much lower rates. This variation is partly due to the limited coverage of the mains gas network which leads to some rural communities in Scotland being off-grid. Households in these areas are often more dependent on expensive alternatives to mains gas such as heating oil. [49]
Wales	Welsh Government figures estimate that 22 per cent of households in urban areas were in fuel poverty, compared to 42 per cent of rural areas. [50]
Northern Ireland	Northern Ireland has the highest prevalence of fuel poverty in the UK and one of the highest in the European Union, with the current official estimate indicating that 42 per cent of households are experiencing fuel poverty [51]

In England, the age of a building interacts with fuel poverty levels. Older dwellings have a higher proportion of households in fuel poverty compared to newer dwellings. In 2014, 19.9% of households living in a dwelling built pre-1850 were fuel poor. This is compared to just 3% of dwellings built post 1990. A similar pattern is

[48] DECC (2016) Annual Fuel Poverty Statistics Report, England https://www.gov.uk/government/statistics/annual-fuel-poverty-statistics-report-2016
[49] SPICe (2016) Fuel Poverty in Scotland, Financial Scrutiny Unit Briefing 16/18 http://www.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB_16-18_Fuel_poverty_in_Scotland_2016.pdf
[50] National Assembly for Wales (2011) Fuel Poverty Quick Guide http://www.assembly.wales/Research%20Documents/Fuel%20Poverty%20-%20Quick%20guide-15022011-210270/qg11-0002-English.pdf
[51] AgendaNI (2014) Fuel Poverty in Northern Ireland http://www.agendani.com/fuel-poverty-in-northern-ireland/

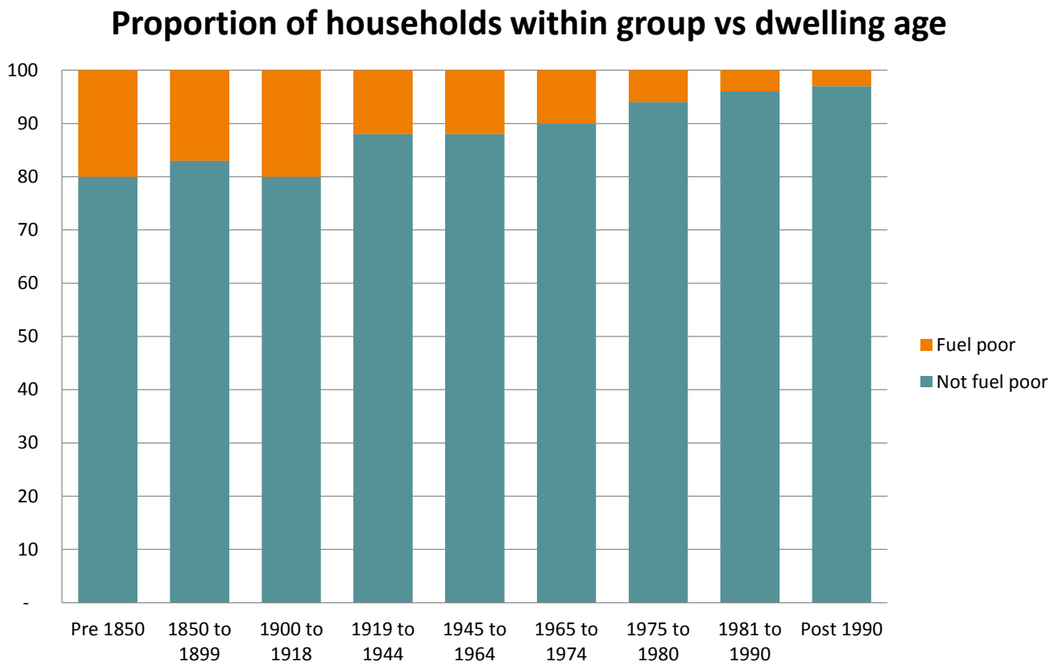


Figure 5: Fuel Poverty by age of dwelling, Fuel Poverty Statistics Detailed Tables 2014, 30 June 2016, Department of Energy and Climate Change.

The Advisory Group for the Committee on Climate Change[52] considered the pros and cons of an area-based model for building retrofit vs targeting a particular category of buildings. The evidence reviewed did not favour one approach over the other. However, it did show that 'what works' is contingent on socio-economic circumstances, indicating the value of local and regional decision-making.

The SEA's experience is that there are many stakeholders up for the task of deploying low carbon technologies in their own surroundings. Their approaches may differ, but that in many ways reflects differences in housing stock, climatic conditions, local income levels, availability of funding, local supply chain readiness etc. Because local authorities are closer to the point of delivery, they can have a greater understanding of their particular needs than compared to national decision makers. This intimacy with local needs can engender higher levels of trust within local communities and a more personalised engagement with consumers. It is therefore important for Government policy to be flexible enough to accommodate these regional differences and to support pilot projects and collaboration between stakeholders.

s in

[52] CCC (2016) Heat and Energy Efficiency: Making Effective Policy: Advisory Group Report https://www.theccc.org.uk/wp-content/uploads/2016/10/Heat-and-Energy-Efficiency-Advisory-Group-Report-Making-Effective-Policy.pdf

Whilst energy related policies have in recent years mainly been enacted at a national level, devolved administrations and local and city authorities have an increasingly key role to play. Using their devolved authority, local administrations and communities can lead the deployment of distributed energy including efficiency and low carbon technologies, in their own locality.

Regulations – Air quality, planning and building control are just some of the regulatory instruments local government can use for the enforcement of national policies.

Targets – As well as governing the implementation of national policy, local authorities can also set their own targets specific to their local needs and circumstances. Setting local targets ensures that stakeholders are aligned behind common objectives; delivery of the objectives could involve welfare providers, charities, energy suppliers, and local business among many others.

Consumption – Local authorities are themselves significant consumers of energy through government and public buildings. Many local authorities are seeking ways to improve the energy efficiency of these buildings to make fuel costs savings.

Salix Finance is a not-for-profit organisation funded by the Welsh Government to provide interest free loans for energy saving projects in Wales. Carmarthenshire County Council with Salix's assistance, has delivered lighting refurbishments and insulation measures across more than 90 schools, leisure centres and offices in the county. The results are annual financial savings in excess of £217k and CO_2 savings of over 1,200 tonnes a year. [53]

Local authorities also have responsibilities for social housing - their own local authority housing portfolios or through overseeing the services of third party providers – and therefore have a key role to play in raising the energy efficiency standard of these properties.

Advocacy – Local authorities have a key role to play in raising local awareness of the need and drive towards energy efficiency and low carbon technologies. We have already mentioned regulations, but crucially the value of the 'contagion affect' on areas in the vicinity of authority led deployment projects should not be underestimated. Property owners and residents will learn of local campaigns and aspire for the same benefits of comfort and warmth. A new social norm for building energy efficiency will be driven by seeing and hearing real life examples of improvement options, costs, impacts and benefits.

[53] Salix Finance (2016) Energy Efficiency Loans in Wales http://salixfinance.co.uk/system/public_files/wales_flyer.pdf

Operation – In some countries municipal authorities are owners and operators of utilities. Through this role they can influence the mix of energy supplies as well as invest in renewable power and district heating/cooling networks.

> *Launched by Nottingham City Council 'Robin Hood Energy' is the UK's first local authority owned energy company and operates on a not-for-profit basis to provide low cost energy to consumers.*[54]

Financing – Local authorities also control substantial financial resources. They have the capacity to raise revenue from council tax and business rates, and can access regional development funds through programmes such as the European Structural and Investment Fund (ESIF).[55] Through leveraging such resources, they can perform the role of financier, offering incentives and low interest loans for the deployment of energy efficiency and low carbon technologies.

Government policy should take a whole house, technology neutral approach

Policy should take a balanced and technology neutral approach which recognises and capitalises on the crucial relationship between energy efficiency and heat

The thermal performance of building fabric is a key factor in the energy performance of homes and buildings. The SEA champions "wrap then heat" because this saves energy and avoids the risk of an oversized heating system leading to a sub-optimal return for homeowners, investors and Government.

A heating system may be efficient in laboratory testing, but in-situ conditions can mean it is working harder and longer than necessary to achieve the required level of comfort due to the heat losses through the building's walls, roof and floor. In order to maximise the gain from efficient heating solutions, the energy efficiency of the building fabric must be increased.

[54] Robin Hood Energy (2017) Website https://robinhoodenergy.co.uk/

[55] Local Government Association (2015) 2014 – 2020: A guide to EU funding for councils http://www.local.gov.uk/documents/10180/6869714/L15_292+Stuctural+Funds+and+Beyond_v11.pdf/09ee0508-7770-419b-8f46-c572a8cec6b7

All heating systems will operate more efficiently in a well-insulated building. Improving the thermal performance of the building will minimise heat demand and also help make low carbon technologies such as heat pumps a more cost competitive solution. For example, for a given heat load, the incremental cost of a larger sized air source heat pump (ASHP) is considerably more than for a larger condensing boiler. However, if the heat load is reduced through improving the thermal performance of the building, a smaller, and therefore cheaper ASHP can be deployed.

The SEA advocates a technology neutral balanced approach to energy in buildings. There is no single solution to decarbonising energy in buildings. As the case study below demonstrates, a range of technology solutions, financing models, delivery methods are required to address a variety of market segments.

Cosy Homes in Lancashire (CHiL)

In 2014, 13% of households in the UK county of Lancashire were classified as fuel poor, with that figure rising to 18% in the city of Blackpool, the highest percentage in England. The county includes high numbers of hard-to-treat homes, with solid walls or cavities that are too narrow or irregular to insulate, and the region has a high level of exposure to wind and rain, which can cause damp problems when wall cavities are filled in the normal way.

Driven by Public Health and Energy Officers joining forces, CHiL's major achievement has been to get all 14 local authorities and Lancashire County Council working together to subsidise energy efficiency measures for the most vulnerable households.

The scheme has assisted more than 7000 households to date, focusing on the oldest properties in the most deprived areas.

Extract from Climate Change Group project Home 2025 (2016) [56]

[56] Extract from Climate Change Group project Home 2025 (2016) How local authorities are reducing fuel poverty through energy efficiency in the UK: Christine Smith and Norman Walsh https://www.theclimategroup.org/news/how-local-authorities-are-reducing-fuel-poverty-through-energy-efficiency-uk-christine-smith

Concluding Remarks

As we strive to increase national productivity, improve industrial competitiveness, reduce energy costs, provide sufficient homes and protect the environment for future generations, buildings will continue to be pivotal in all our lives. A much needed upgrade to the UK's buildings can provide healthier, cheaper to run and more sustainable homes and buildings.

The UK Government should set out a clear long term national strategy to improve the energy efficiency of the UK's buildings and move to low carbon heating. It should provide the context for new policy interventions and clearly signpost the direction of travel towards improving the energy efficiency of buildings in the UK. Once set, the policy should be seen through.

The majority of consumers are unaware of the change that has happened in the UK's energy supplies and so far they have not had to experience the supply shortages and price hikes of the 1970s. But it is a change that impacts everyone in the UK and equally requires all of us to respond.

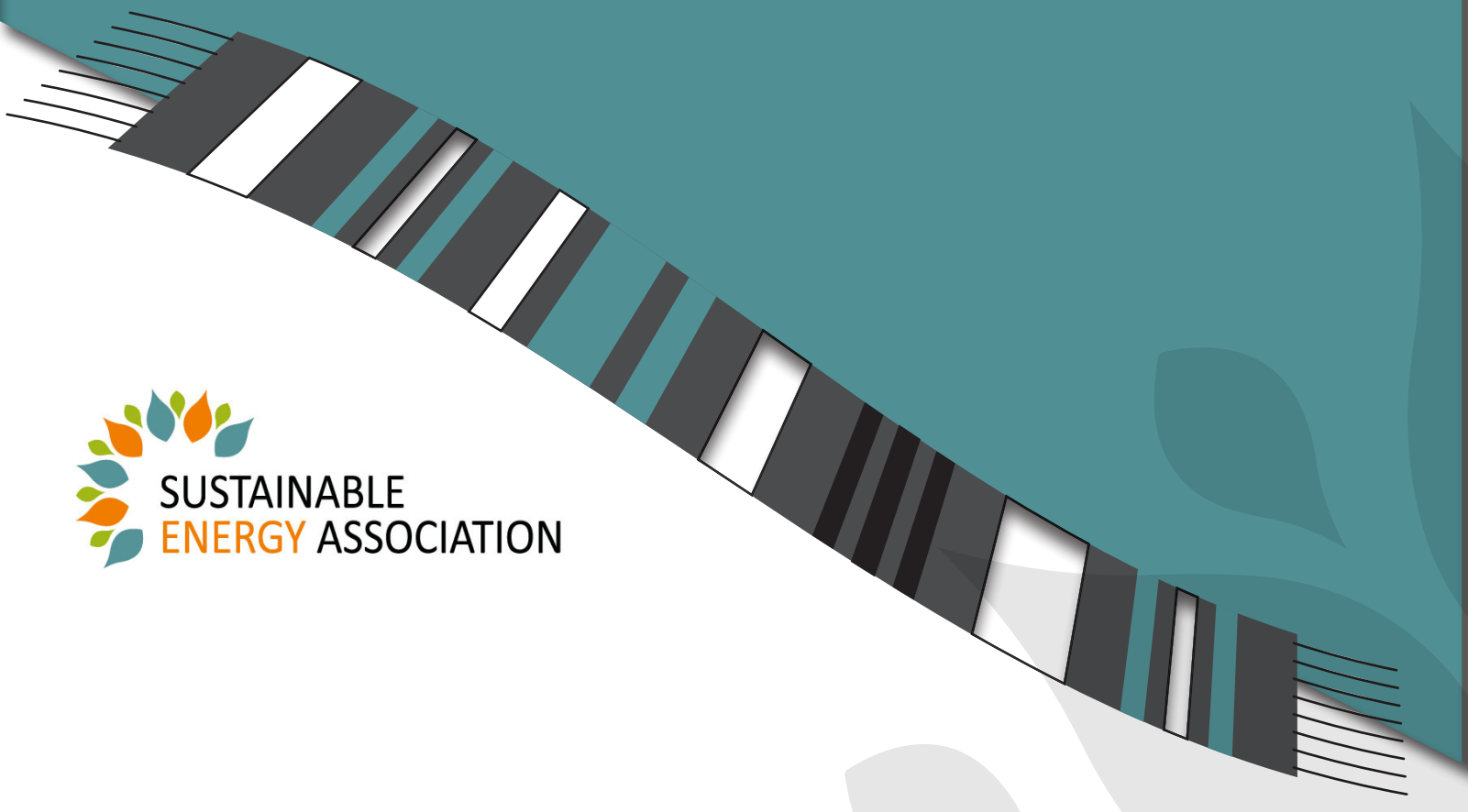
Carbon emission reductions and energy cost savings have not been sufficiently engaging arguments to convince people to change their behaviour towards energy usage. We still leave our appliances on standby, our lights on in empty rooms and boil a full kettle for one cup of tea. This change, however, requires us to address more than just simple energy use habits, rather it requires interventions within our homes and buildings – our places of privacy and sanctuary. The difficulty for Government is how to permeate this sanctuary and engender the response of the public without evoking any adverse reaction.

A national strategy to address the standard of UK housing has the potential for a more inspiring message; modernising the UK's aging building infrastructure, improving the welfare of the populace, in particular the fuel poor, creating nationwide benefits and employment opportunities and preparing society for the energy market of the future.

Setting out this vision of the future would provide the context for new policies that will bring about improvements to the quality of the UK's housing stock and give a strong signal of the direction of travel. Devolving delivery and involving local communities will support the personalisation of interventions to suit individual needs. It will also garner involvement and goodwill in local communities and facilitate a feeling of being part of a solution rather than a problem.

Policy should take a technology neutral whole house approach and adopt a more structured research and development approach including field trials and or pilots. This is vital because of the diversity within the UK's building stock arising from differences in construction fabric and local climatic conditions e.g. a solid wall construction is thermally inefficient in a rural, exposed location, but in a built-up urban area it is afforded some protection from heat losses due to shielding from the elements. Equally, the energy demand and usage patterns for a building will be different if occupied by a single person in contrast to a family with children.

Whilst the performance of individual technologies needs to be assessed, in practice reducing the energy needs of buildings requires a multi technology solution tailored to the circumstances of the building and its occupants; a whole house, technology neutral approach which starts with the fabric – **wrap then heat.**



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