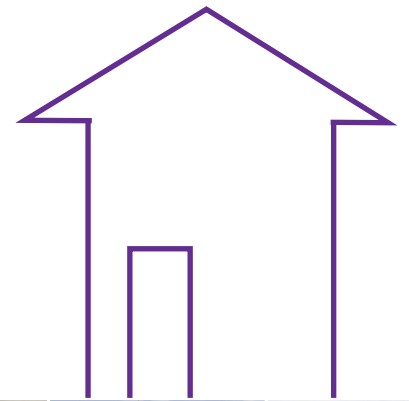
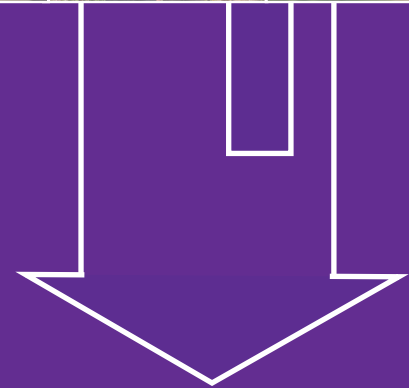


achieving zero

delivering future-friendly buildings



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EXECUTIVE SUMMARY

Environmental *Change* Institute



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Achieving zero provides the policy framework to ensure that all energy use in all buildings in the whole UK results in zero carbon emissions by 2050. This covers 26 million homes and 2 million business (ie non-domestic) properties. The study views the challenges from a people’s perspective – the roles of the property owner and the occupant – with the implications for energy supply one of the results. The emphasis on energy services, rather than energy purchases, shifts the debate on to demand reduction rather than energy supply and on to lower, not higher, bills. Investing in greater energy efficiency provides users with a better standard of living: a future-friendly property is one that it is warmer, more comfortable, healthier.

Zero carbon emissions do not mean zero energy use. The energy services that people want can be obtained with reduced energy demand combined with fuels of a low carbon intensity and building-integrated renewables. In this strategy, the 477TWh of gas and oil and 200TWh of electricity are reduced to a demand for 100TWh of renewable electricity supplied by the grid. The emissions in 2050 would be zero carbon.

The policy framework is developed through a market transformation strategy, whereby a series of policies are designed to interact to lower energy use in buildings. Several of the individual policies exist in embryonic form as isolated actions, but have not previously been welded together. A strong, clear market transformation strategy enables each policy to achieve its full potential as a result of becoming part of a powerful, coherent whole that moves towards low energy use in buildings.

The strategy builds on two sets of natural divisions at the level of an individual property:

- o the different roles of the building owner and the building occupant;

- o the energy use that results from the characteristics of the building (mainly gas for space and water heating, but including electricity in fixed lighting) and the energy use that results from the behaviour of the occupant, including the use of the contents of the building (mainly electricity for appliances and equipment).

Together these form the core policy matrix (Table 1). Responsibility for reducing building-related energy use is given to the building owner, through minimum standards based on the energy performance certificates (EPCs). The occupant has responsibility for the energy used in appliances and equipment and for the standard of energy services generally. In businesses, this is linked to the display energy certificates (DECs) and in households through some other policy that covers all energy use, such as personal carbon allowances (PCA).

	Property owner Theoretical energy use: mainly gas	Occupant Actual energy use: includes all electricity
Residential	Minimum standards based on EPC 82% of all energy in 2009	Personal carbon allowances 100% of all energy
Business	Minimum standards based on EPC 69% of all energy in 2009	Display energy certificates 100% of all energy

Table 1: Proposed over-arching policy instruments

It is an essential component of the strategy that more energy-efficient buildings become worth more than energy-inefficient ones. Several policies are designed specifically to ensure this happens and are combined with making

the property owner clearly responsible for the standard of energy efficiency of the property. This provides the property owner with a return on investments in energy efficiency, through higher property values. And conversely, that the property diminishes in value (relatively, if not absolutely) as a result of inaction.

The link between greater energy efficiency and higher market values is created by the introduction of mandatory minimum standards for buildings that are progressively increased. These standards are based on the bands in the energy performance certificates, with the first phase being to take action on F- and G-rated properties, in all tenures, whether residential or business.



The steady ratchetting up of the minimum standards, together with other policies, is designed to ensure that the average existing property is at the top of band A on the energy performance certificate by 2050. At this level, it uses zero net energy – any energy required is provided by on-site renewables.

At least until 2025, the expectation is that gas will remain the main heating fuel, rather than electricity, while the carbon intensity of electricity remains high. The natural gas system will be decarbonised through the addition of green gas from anaerobic digestion thus prolonging the period of its carbon acceptability. Beyond 2025, the need for any space heating will disappear as properties are made low-energy or brought up to passivhaus standard.

Beyond the EPC, the remaining 18% (in homes) and 31% (in businesses) of energy is mainly electricity used in (non-fixed) lights, appliances and equipment. The European Commission is introducing a suite of policies to improve the energy efficiency of these products, which increasingly means that all purchases have to be of energy-efficient models. If made sufficiently ambitious, together with some gentle constraint by building users, the demand for electricity use in lights and appliances, per property, could be halved by 2050. The 2050 targets cannot be obtained without some positive involvement by people, as building occupants.

For larger businesses, gentle pressure already comes from the need to pay the carbon reduction commitment and, in public buildings, to show a DEC. Policies are proposed that will reinforce this pressure, for instance requiring a DEC on all business buildings, clear statements on energy use and carbon emissions in company annual reports and publicity ranking companies on their DECs. This remains an uncertain, but essential policy area. These soft-measures, involving naming and shaming, will be most successful when businesses realize the financial benefits that come from lower energy bills, better conditions for the workforce and the enhanced value of their properties.

For householders, the proposal is to develop a similar policy for all energy use in the home, for instance through the introduction of personal carbon allowances. This free allocation identifies the level of carbon emissions from energy use that is their current free entitlement. By lowering that entitlement over time, the choices of the household contribute to achieving

the nation's targets and are not made in ignorance of them. PCAs provide a method of increasing awareness and responsibility, at the same time and fit well with minimum standards for buildings and products as these latter policies are helping to deliver the reduced demand required by PCAs.

A range of fiscal incentives and policies are suggested to ensure that the costs of this transformation can be met. Because all property owners, by definition, have a capital asset, the policies are designed to utilise that asset. The role of grants is minimised and replaced with government subsidies on loans to make them affordable for low-income property owners. Other financial inducements come in the form of reduced tax liability (stamp duty, council tax, VAT), but are at a scale required to ensure popular support in conjunction with the regulatory framework. The size of financial incentives is inversely proportional to the certainty of the regulatory environment, particularly on minimum standards. The emphasis on demand reduction results in the most cost-effective cuts in carbon emissions, with lower bills and greater comfort for consumers. The alternative of new electricity-generating capacity implies considerably higher bills for users, thus pushing more households into fuel poverty, without providing any improvement in the level of energy services.

There are strong and important roles for every group in society if *Achieving zero* is to be accomplished. The most urgent one is for clear government announcements on the strategy and firm statements about the timescales for action, particularly minimum standards. The role of government is to formulate and announce the plan. The first step has been taken by the government with the declaration that it will be illegal for a privately-rented F- or G-rated property, whether residential or business, to be let after 2018.

Local authorities have a primary role in the delivery of that plan, at a geographical level. It is their responsibility to ensure that important components are enacted, for instance that:

- o minimum standards are delivered,
- o there is a local database of the energy efficiency of all properties;
- o there are low carbon zones, primarily to upgrade the homes of the fuel poor.

Through this geographical coverage, every household and every business will be involved, monitored and encouraged to take action.

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These two tiers of government, central and local, also have an important role in the delivery of exemplars. Both government offices and social housing can implement the high standards being required for low-energy buildings and, through these exemplars, help to train the construction industry in the necessary new and innovative practices.

The construction industry will be required to deliver large numbers of low-energy properties from now onwards and ensuring that the skills are there to do this is a major challenge. In order to deliver the targets required on fuel poverty, 1.2m homes have to be improved up to a minimum of a B-grade (SAP 81+) each year between 2012-16, and for climate change, the target is 720,000 properties each year brought up to a standard of the top of the A-grade (a SAP or SBEM of 100) from now until the end of 2050. Policies are required that will deliver these targets and shift the

present distribution of the housing stock (the purple line in figure 1) to the 2050 distribution (the black line).

The proposed components of a market transformation strategy for energy use in buildings, as encompassed in the figure, would also include:

- o complete coverage of the building stock with energy performance certificates and address-specific databases at a basic level by 2013, for fuel poverty eradication. This is the pre-requisite for all other policies;
- o extension of display energy certificates to every business property and the publication of league tables to encourage action and improvements;
- o high minimum standards in the Building Regulations for new buildings, covering all energy use as soon as possible;
- o Building Regulations for existing properties to require consequential improvements, so that major changes to the building do not increase its overall energy consumption;
- o Building Control Officers to have a role as mentor for individual properties, to ensure they are on a low-energy trajectory that is understood by the owner;
- o financial and fiscal incentives to encourage both take-up of the most energy efficient products and buildings and improvement of the least efficient;
- o education to alert consumers to the importance of energy efficiency and the extent to which it varies between products, properties and lifestyles;
- o computer-based networks and directories to facilitate information exchange on innovative products and services between producers, purchasers and communities;
- o the immediate development of a Low Carbon Zone in each local authority to take action on the worst housing, occupied by the poorest people.

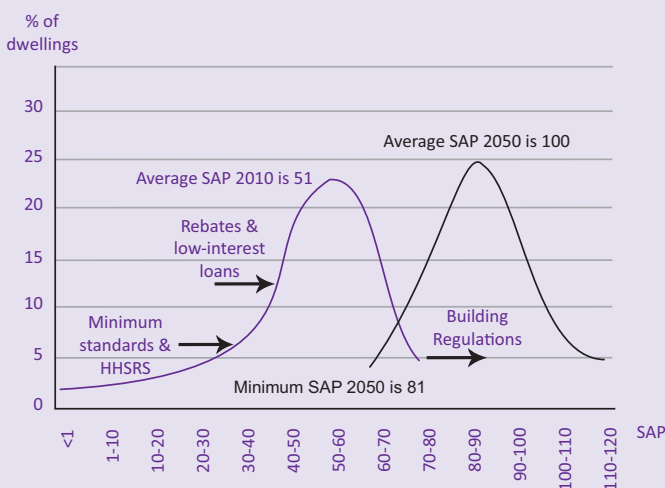


Figure 1
Market transformation strategy for housing, UK, 2010-2050

Note: SAP stands for standard assessment procedure, the government’s preferred method of indicating the energy efficiency of a home. High numbers are best

The UK cannot meet its legal obligations on eradicating fuel poverty by 2016 and 80% reduction in greenhouse gases by 2050 without most, if not all, of the proposed initiatives.