beyond green
sustainable communities
sustainable lifestyles
sustainable developments

The House and Home of 2025 and 2050

A Beyond Green paper for *Tomorrow's England*

By Marietta Vafea Beyond Green Junior Consultant and Tomorrow's England volunteer
Sam Kimmins Beyond Green Senior Consultant

2007

Top 10 features of the house of the future

1. Heating bills – no longer billed for gas or electric heating, but only for a small fan that will move warm air around the rooms.
2. External appearance – redbrick might be replaced by a light-coloured paint to reflect the sun's rays and avoid overheating in the summer.
3. Insulation – at first living space might be slightly reduced due to addition of insulating materials inside the walls, but their effect will be less and less noticeable.
4. Temperature – it will fluctuate less inside the home.
5. Shades – added to windows.
6. Doors – will remain shut in uncomfortable external temperatures and will have draft proofing fitted.
7. Bathrooms – water meters will be standard.
8. Toilet flush – will have two options, 6 or 4 litres.
9. Alternative energy – solar thermal and photovoltaic panels will be added on roofs.
10. Green roofs!!!

The House of 2025 and 2050 1
Top 10 new features of the house of the future 2
Introduction 4
1. The House of 2025 and 2050 5
What will my house be made of? 5
What will my bathroom be like? 5
How will my house be powered and where does all this energy go? 6
What appliances will I use? 10
How will my garden grow? 11
What will it look like? (Case studies) 12
What will it cost me? 20
What will it cost me? 21
2. Government Legislation 23
The Energy Performance Certificate (EPC) and the Code for Sustainable Homes 23
Current government incentives 25
Possible future government incentives 25

Introduction

After the Industrial Revolution in the 18th century, housing had to adapt to a rapid increase in population density in large cities. Centralised water supply and sewage systems were introduced to which all houses were connected. Although a huge project for its time, looking back to it now, it is clear that it was inevitable and it is hard to imagine life without it.

The 21st century presents us with a very different need, which is, however, also related to health concerns. The challenge facing our future homes is maintaining the comfortable living conditions we have been developing for so long at an affordable rate while at the same time sustaining it for the generations to come. Can you imagine all houses being able to produce their own energy? It is almost the same as asking if you could imagine living in a house without running water and a toilet!

After the Industrial Revolution, the most popular construction materials were redbrick and steel. The Victorian homes built at a later stage featured a wooden timber frame because it was cheaper and lighter. Glass buildings painted the town red at the end of the 20th century, but what is the future likely to hold?

This report describes the likeliest case scenario for the house of 2025 and 2050, built to mitigate and adapt to the effects of climate change. The first section focuses on what the house will be made from and look like, where its energy will come from, and the appliances that will power. The second section gives some background on government legislation likely to shape the house of the future.

1. The House of 2025 and 2050

What will my house be made of?

Driving the choice of materials for houses will be the need to use less energy and produce fewer carbon emissions.

Houses will still be made of a timber frame because it gives the best balance between on- and off-site emissions. The main way of offsetting reduced energy consumption and yet retaining comfortable living temperatures is by means of increased insulation in roofs, walls and floors. At the moment, insulation can slightly reduce living area because of thicker walls, however, with emerging technology these effects can be expected to be minimal – barely noticeable – by 2025 and even less so by 2050.

Houses built in northern Europe according to the highest environmental standards show that the insulating material inside the timber frame varies in cost and quality; the cheaper version would be mineral wool with or without expanded polystyrene (EPS) foam and the more expensive alternative would be Neopor, a synthetic material used in Germany, which takes up less space. Roofs can be insulated either with the same materials as the walls, or by soil and/or plants, making up green roofs. Windows cause most of the heat loss, so double or even triple glazing might become the norm to provide sufficient insulation – even if that causes slightly limited visibility due to the glass layers and argon filling. To reinforce insulation in the envelope of the building, high quality cladding materials are more likely to be used. Materials used for the building envelope as such are also likely to be of high quality, as the envelope should be rigid enough to resist possible subsidence and heave. Subsidence will be more pronounced as drier summers approach. Increased insulation will require increased natural ventilation, which could simply be a ventilation pipe.

Overall, the materials used for new houses will have to adhere to the aesthetic standards set by the market, so they might be what would be described today as futuristic, but they need not be so. Even though futuristic houses have been associated with increased amounts of glass, this is unlikely to be the case because glass will lose heat in the cold winter and let too much sun in, in the summer. On the contrary, even the few windows that will be installed will, in all likelihood, be protected by external shades, in order to avoid direct sunlight overheating the houses in the summer. The shades might slide sideways, parallel to the building, or they might open outwards, just like windows do now; in either case, windows will no longer open outwards. In addition to the shades, in order to minimise solar gain in the summer, redbrick is likely to give way to white paint; albeit untraditional it gives a nice, light feeling.

What will my bathroom be like?

Rainfall is expected to increase in the winter, but drought is expected to increase even more dramatically in the summer, leading to a net effect of water shortage, which will inevitably be reflected in household water appliances and domestic water use. There are two things to consider in the bathroom in relation to water use efficiency; minimising waste and water recycling. The maximum water consumption is likely to be about 80 litres per person per day, almost half of what it is today.[1]

Water can be recycled from the shower and garden. Mechanisms to recycle greywater from the showers are most likely to be bolted on the bathroom wall (which might need cleaning every now and then). These mechanisms will collect the water used and direct it either to the toilet flush, or the gardening water reservoir. Rainwater might also be collected into that same reservoir from the roof and garden.

In order to minimise waste, it will become mandatory for all new houses to be fitted with water saving appliances (inefficient appliances are likely to be out of stock by 2010) and to add water metres. An example of a water saving appliance is the low-flush facility fitted in the toilets, which may also recycle greywater collected from the shower or garden. It is highly likely that by 2025 dual flush toilets will be fitted in all houses. Considering the water hose pipe ban in the summer of 2006, it does not sound too extreme that power showers might no longer be installed and baths might be frowned upon or even banned; a 5 minute shower uses about a third of the water of a bath, but a power shower can use more water than a bath in less than 5 minutes.[2] In a milder –and likelier– case, typical baths might be smaller by designing them to be narrower at the feet end. To further increase water efficiency, spray or aerating taps might be installed, which can reduce water flow by 50%. It is likely that by 2025, leak detectors will have been added.

How will my house be powered and where does all this energy go?

Switching to a green energy tariff is often a first step to reducing greenhouse gas emissions. At the moment (March 2007) only 1% of all households are on green tariffs. It is highly likely that by 2025 most households will have switched. There are currently two green tariff schemes; the Green Supply and the Green Fund. In the former case the electricity company ensures that for every unit of electricity one uses, a set proportion of green electricity is generated. However, as supply companies have a Renewables Obligation set by the government to supply a minimum level of renewable electricity (currently around 5%) some companies use the renewable electricity they sell as a green tariff towards meeting their own obligation or, through certificate trading by which they allow other suppliers to meet theirs. The net effect of this is that, although consumers on the green tariff may be getting more renewable electricity, everyone on the standard tariffs is getting less. In the latter case, the electricity company invests some of what you pay on your bill in new renewable energy projects.

The Department for the Environment, Food and Rural Affairs estimates that space heating requirements in new houses can be more than halved. Given this potential greatly reduced energy demand, energy sources that are considered inefficient compared to oil and gas will actually be able to provide enough energy to cover a substantial percentage of this demand –if not all of it. As good as a green tariff may sound, by no means is it enough to sustain a significant amount of the population, which is where microgeneration comes in.

[1] http://www.sustainable-development.gov.uk/regional/summaries/16.htm
[2] http://www.thws.co.uk/home/ah_we_house.shtml

Microgeneration

Alternative energy resources that have very low or even zero carbon emissions and are used on a small scale, such as to power a house are collectively referred to as microgeneration. Microgeneration can be divided into three broad categories: generators that can be used for heating space (micro-CHP and heat pumps), heating water (solar panels, biomass boilers) and electricity generators (wind turbines, biomass and PV). A combination of the above has been shown to generate enough energy to cover the new demands. The main advantage of microgeneration versus macro-generation is that it minimises losses by fitting the needs of a specific consumer and by minimising the distance over which the energy has to travel to reach the consumer. Further advantages include minimising storage capacity and complexity.

Combined heat and power (CHP)

Any electricity generator will dissipate energy in the form of heat or steam while producing electricity used in domestic appliances. Combined Heat and Power (CHP) is a method based on the principle that the heat or steam disregarded as a by-product can be captured and re-used constructively to heat our homes instead. This principle gives rise to various forms of CHP, named after the type of electricity generator. One of the most promising kinds of CHP is fuel cell CHP, which, despite its high cost now, is highly likely to become the norm by 2025 and even more so by 2050, as it is not only highly efficient, but clean and quiet. One problem with CHP in general at the moment is that it is too good at producing heat: fuel cell can produce almost 800°C simply by recombining hydrogen and oxygen. However, by 2025 it is likely technology will have developed with efficiency to match the additional amount of heat it dissipates and for economies of scale to set in, reducing costs.

Heat pumps

There are various kinds of heat pumps, a heating system that uses a pump to push water or some other liquid along a pipe and then uses the heat transferred by the liquid to heat space. The pipe is a closed loop that runs from a room inside the house (usually in the basement or ground floor) to outside the house, beneath the earth. Depending on the maximum depth it reaches, it can be a plain heat pump or a geothermal heating system (although the latter is unlikely to be used residentially). At a depth of a few metres below the surface of the earth (roughly at about the equivalent height of a one-storey building) the temperature is constantly about 12-15ºC – regardless of external weather conditions. A heat pump operates under the principle that it can use this temperature in the winter to heat up our home and in the summer to cool it down (when a liquid or gas absorbs heat, it becomes less dense, and hence lighter, so it moves upwards). Inside the house, it can be connected to the house's ductwork and can therefore transfer its heat to the air in the duct. If a fan is used, it can manoeuvre the warm air along the ductwork and inside the house, thus heating our home. Heat pumps are so popular, because they do not generate the heat, but transfer it, thus requiring minimal amounts of energy; heat pumps only consume electricity for a pump to force the liquid along the pipes.

Solar panels

Solar panels accumulate the heat from the Sun to warm water directly. Panels installed on the roof of each house (over a total area of $5m^2$ – the size of a small bathroom) are enough to cover 50% of the energy required for domestic hot water. Biomass, photovoltaics, wind turbines and other alternative energy resources can cover further electricity requirements.

Photovoltaic panels convert energy in the sun’s rays into electricity. In Germany, photovoltaic panels meet a significant percentage of total electricity needs and in Greece the government heavily subsidises capital costs. Photovoltaics are a very clean and quiet form of electricity generator, but are inefficient compared to wind turbines and have high capital costs (although minimal maintenance costs as opposed to wind turbines). However, it is highly likely that by 2025 the technology will have increased their efficiency and their mass production will have reduced their cost, thus rendering them one of the main alternative energy resource options.

Biomass

Another relatively inexpensive resource is biomass. Biomass refers to living or recently living biological material (usually plant, but also animal matter) being used as fuel or for the production of fibres, chemicals or heat. The main disadvantage of biomass is that huge areas need to be deforested for relatively small amounts of energy to be produced. Nonetheless, biomass boilers that burn wood-chip are often cautiously considered carbon-neutral because they only emit as much carbon dioxide as they absorbed during their lifetime.

Cost

The table below gives an indication of cost ranges for some types of alternative energy resources.

Type	Cost Range (£/kW)
Solar panels	750 – 3,500
Photovoltaics	2,500 – 6,500
Biomass	1,000 – 2,500
Wind	250 – 2,500

Table 1: Range of cost for different types of alternative energy resources.

It is clear that the technology to relieve us from hefty energy bills already exists. The main barrier to utilising this technology is, rather ironically, its cost; but it is highly likely that by 2025 the government will have put in place better subsidy schemes. It might be worth mentioning that out of the current UK energy consumption, 25% is zero- or low-carbon, but this includes nuclear plants (20%), which might slowly be phased out. Even though nuclear fission releases no carbon dioxide, the problem is that it produces radioactive waste, which remains active and deadly for many years. A number of nuclear plants are closing down now. Whether these are replaced by more nuclear plants remains to be seen.

How much will alternative sources be used?

Power generation will be greatly affected by emerging technologies and strictness of future legislation on carbon emissions. Over the winter 2006-07, almost 50% of electricity generation came from coal-fired stations and another 7% came from Combined Heat and Power (CHP) plants. This figure is bound to increase over the next few years, as CHP has proved to be one of the most efficient means of heating in the sustainable developments in northern Europe.

The first government target for renewable resources is set to 20% of total energy by 2020 and an optimistic 70% by 2050.

Energy Source	2020	2050
Wind	0%	1%
PV	12%	22%
Micro-CHP Fuel Cell	0%	35%
Micro-CHP Stirling Engine	25%	15%
Community Heating	63%	27%

Table 2: Projected residential electricity generation by UK zero- or low-carbon emission technologies for 2020 and 2050.

Overall, the likeliest scenario for 2025 is that there will be a shift towards biomass or fuel cell CHP at a neighbourhood scale, as it is far more effective than each house having its own energy resource installation. As production of photovoltaic panels increases in China, their price is bound to reduce by 2025. There is probably a limitto reductions at about half of current price, due to the high cost of silicon (the main material the panels are made of). Research is already underway to replace silicon, and as photovoltaics provide such a credible energy resource with a large lifespan, governments are very likely to subsidise them heavily.

In contrast to photovoltaics, wind power plants have proven unreliable in urban areas, which is exactly what the table above shows; wind turbines are unlikely to produce a significant proportion of the total energy requirements due to lack of efficiency. Nevertheless, wind turbines could become “gadgets” in which case an increased number of homes are likely to have one. In the future, energy companies might rent rooftops to install their own solar thermal panels, or communities invest in their own small-scale renewable power plant in order to reduce their reliance on increasingly expensive grid electricity.

Energy requirements are likely to increase due to the creation of new appliances, but on the other hand, these appliances will be extremely energy-efficient. Smart metres that show the water and energy consumption in real-time will be installed in every house and will help us to get used to monitoring our energy and water use and to make sure we don’t waste any of either.

What appliances will I use?

Over the years, the effects of greater energy efficiency have largely been cancelled out by increases in the number of domestic electric appliances. The most energy-consuming appliance is the fridge and freezer, which consumes over a third of the energy the dishwasher consumes and almost twice as much as the washer dryer.

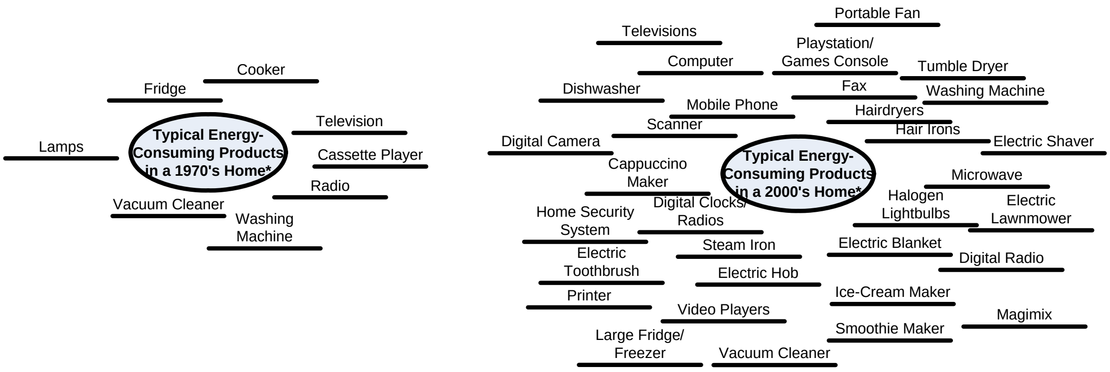

Figure 1: Typical energy consuming appliance in the 1970's and 2000's.

Appliances are moving towards a more generalist approach. Our mobile phones can already play music and take pictures, so it may well be the case that our coffee machine will also be used as a kettle and an alarm clock with reduced overall energy requirements. Furthermore, the first solar air-conditioning unit and solar barbeque have been released in the market, so this might be another possibility for the future of our appliances. Finally, it is highly likely that all appliances will be connected to sensors that will switch them completely off once they have been inactive for a certain amount of time, and there are no people in the room.

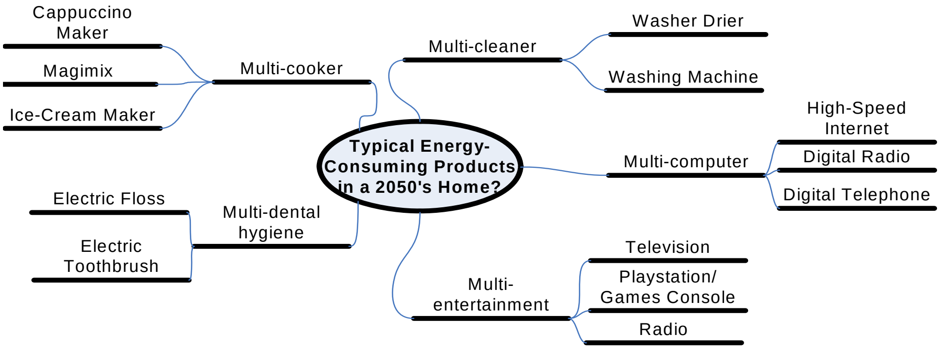

Figure 2: Possible energy consuming appliances in a 2050s home.

It has been shown that energy produced by microgeneration can be enough to cover modern energy requirements; in the sustainable development in Beddington there is spare energy to charge electric cars' batteries.

How will my garden grow?

In an ideal situation, gardens would provide natural ventilation and natural shading from deciduous trees. The type of preferred vegetation is subject to conflicting interests in the winter, when increased rainfalls are expected and in the summer, when we may experience excessive drought. In the winter the garden will protect the house from flooding by either absorbing or draining the rainwater. In order to absorb it, it would be better off unpaved. In order to drain it, it is best practice for Sustainable Drainage Systems (SuDS) where increased vegetation is used instead of a lawn. If the garden were to be paved, the paving would be made of a permeable material. Furthermore, the garden is likely to be downward sloping, so that any precious water run-off can be collected in a reservoir for re-use in the toilet flush and gardening.

Wormeries for compostable waste to use in the garden and biological waste storage facilities will be common.

Figure 3: Sedum usually makes up "green roofs".

Although extremely beneficial, gardens are most likely to become increasingly limited due to the growing population and the increasing price of land and housing. A far more feasible and, hence, likely solution is green roofs, which are covered by soil and/or vegetation.[3] Green roofs provide a means of insulation and can be used to collect rainwater and to grow vegetables, fruits and decorative plants. Furthermore, they can provide a solution to uncomfortably high temperatures in the summer and the urban heat island effect in large cities. The most common plant for a green roof is the sedum (pictured). It is aesthetically pleasing and it can absorb a lot of rainwater, which it slowly releases afterwards, producing a cool and fresh atmosphere, especially in dry summers.

In order to minimise the effects of a potential flood, the house's ground floor might be slightly elevated from the actual ground level and ground level rooms might be converted for water-proof uses, such as car parking, or storage.

[3] http://en.wikipedia.org/wiki/Green_roof

What will it look like? (Case studies)

In practical terms the changes in the house of the future are likely to be minimal – but what about its external appearance? Here are two case studies: the Beddington Zero-Energy Development (BedZED) and Arup’s design for the house of the future.

The Beddington Zero-Energy Development

Figure 5: BedZED (front).

Figure 4: BedZED (top).

The zero-carbon houses in Beddington have a futuristic appearance, with glass walls and visible, brightly coloured ventilators. They feature green roofs, seen in the picture above, which provide roof insulation and may be used to collect rainwater.

These houses manage to generate more than enough energy to be sustainable. BedZED was one of the first, and most idiosyncratic, development of eco-homes in England..

Arup’s House of the Future

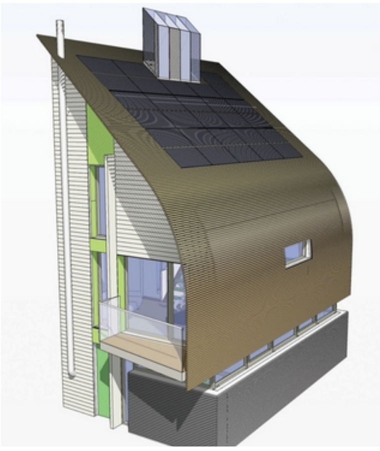

Figure 6: Arup's design.

This is a design by Arup’s sustainability department. It takes a different approach to BedZED. Natural light is minimal, which is certainly more cost-effective. Photovoltaic units are used instead of wind turbines and there is natural ventilation. However, there seems to be no possibility for a green roof, or rainwater collection.

The main difference between existing houses and a house built according to the highest environmental standards post-2016 will be in the insulation, inside the walls, so it will not be visible. A futuristic home such as those presented by Arup and at the Beddington development is possible, but not necessary. Alternative energy can take the form of prominent wind turbines, photovoltaic and solar panels, which are visibly located at the top of a building. It can also take the form of biomass, fuel cell, or geothermal, located in a corner in the back yard, or inside the Earth. Overall, therefore, the external appearance and massing of a new development is unlikely to be radically different to the buildings of today, unless people want it to be so. The likeliest case scenario is that houses will look just like the eco-homes built in Lancashire, shown on the right.[4] By 2025 it may be the case that photovoltaic panels are incorporated into the building envelope and their glass-like appearance might replace today's glass.

Figure 7: An eco-neighbourhood in Lancashire.

It was recently ruled that a zero-energy home built by wood, turf, straw and recycled materials in Pembrokeshire Coast National Park in Wales will have to be demolished because of lack of a building planning permission, despite having the landowner's permission. It seems like the Wrenches' home has been exemplary in more than one way; firstly by showing that it is possible to live a sustainable life and secondly by showing that the government will take a strict stand concerning planning laws.

Figure 8: A zero-energy home in Pembrokeshire Coast National Park, in Wales.

[4] http://images.google.co.uk/imgres?imgurl=http://www.barratt-investor-relations.co.uk/financialnews/media/EcoSmart1035.jpg&imgrefurl=http://www.barratt-investor-relations.co.uk/financialnews/media.aspx&h=2400&w=3000&sz=1549&hl=en&start=16&tbnid=AbZgrBHdV7MkdM:&tbnh=120&tbnw=150&prev=/images%3Fq%3Deco%2Bhomes%2Bthames%2Bgateway%26gbv%3D2%26svnum%3D10%26hl%3Den%26sa%3DG

What will it cost me?

Newly built houses

There are already zero-carbon two-bedroom flats that have been built at a cost of only £60,000.[5] This figure can only decrease as economies of scale set in and as technology improves. The cost of houses built post-2016 should not be an issue in 2025 and 2050, because all houses will be zero-carbon, so there will be no means of comparison with new houses that have not conformed to regulations. The only meaningful comparison will be between buying a house built pre-2007 which has been refurbished, and one that has not been refurbished.

Refurbished houses

Estimated refurbishing costs and savings are given below for a semi-detached house and for a flat.[6]

	Typical installation cost		**Average saving/yr**	
	Semi-detached ($100m^2$)	*Flat ($65m^2$)*	*Semi-detached ($100m^2$)*	*Flat ($65m^2$)*
Cavity wall insulation	£260	£230	£145	£45
Solid wall insulation (external)	£1,800	£1000	£320	£110
Solid wall insulation (internal)	From £4000	From £2600	£200	£100
Loft insulation (top-up)	£230	£240	£55	£75
Floor insulation	£100 (DIY)	£70 (DIY)	£45	£30
Replacing condensing boiler	£420	£210	£110	£55
Hot water tank insulation	£10 (DIY)	£10 (DIY)	£20	£20
Full heating control package	£200	£200	£65	£45
Draught stripping	£75	£75	£20	£10
Lighting (x 4)	Up to £15	Up to £15	£17	£17

Semi-detached: For a total cost of about £7,100 you get annual savings of almost £1000, which gives a 7-year payback period.
Flat: For a total cost of about £4,650 you get annual savings of almost £510, which gives a 10-year payback period.

The figures above assume today's energy prices, but this is not a realistic assumption. The UK has been a net importer of oil since the summer of 2005 and with imminent oil and gas peaking, prices could escalate beyond any precedent. In this extreme, but not unlikely, case scenario the payback period could be reduced by almost a half.[7]

The market value of these houses will certainly be comparable to that of the houses built according to 2007 environmental regulations.

[5] http://designformanufacture.info/page.aspx?pointerid=250A809698C74107997F34D480B52A5D
[6] Energy Saving Trust: Domestic energy primer – an introduction to energy efficiency in existing homes
[7] http://www.resurgence.org/energy/heac/index.htm

Old, non-refurbished houses

For a non-refurbished house, there are two options. People will either suffer due to uncomfortable climate conditions, or due to excessive air conditioning bills. Heating bills were an average of £800 for 2006. Energywatch warns of a 15% increase of this figure for 2007.[8] Under an average climate change scenario, assuming bills rise by the same percentage, heating bills will be almost £10,000 in 2025! In addition to excessive energy bills, non-refurbished houses might be prone to flooding and are extremely likely to be fitted with air conditioning units, especially for the summer.

Refurbishing one's house seems to be the only economically viable solution given environmental changes and limitations. Given escalating energy bills and the government's commitment to emissions reductions, it may well be the case in 2025 that the relative cost of bills versus refurbishing are a no-brainer. However, it requires a large bulk sum of money that people at the lower income ranges will have trouble getting access to much as they might want to. The question that arises is what can the government do to ensure that people at the lower income scale are not punished with excessive heating bills?

[8] http://www.thisismoney.co.uk/money-savers/article.html?in_article_id=406010&in_page_id=5

2. Government Legislation

The Energy Performance Certificate (EPC) and the Code for Sustainable Homes

The UK government is committed to a 20% reduction of national CO_2 emissions by 2012. Domestic energy consumption causes over 25% of national emissions, and heating uses 90% of energy in the home. If we could all reduce our household heat-loss by half that would cut national emissions by 10% and save us a lot of money, without even changing our lifestyles.[9] With this in mind, the Energy Performance Certificate and the Code for Sustainable Homes were launched.

The Energy Performance Certificate (EPC) shows the official energy efficiency rating of a property. By 2009 all buildings in the UK that are constructed, sold or rented out will have to have an EPC, in accordance with the European Energy Performance of Buildings Directive.[10] The Code for Sustainable Homes is a new national standard for sustainable design and construction of new homes that gives an environmental rating for each home. By integrating elements of this voluntary Code into new homes and obtaining assessments against the Code, developers will be able to obtain a 'star rating' for any new home which will demonstrate its environmental performance. It will provide valuable information to home buyers, and offer builders a tool with which to differentiate themselves in sustainability terms.[11]

Energy/CO_2 and water are rated on a scale from one star (★) to six stars (★★★★★★). For energy/CO_2 the criterion is the percentage improvement over the Target Emissions Rate (TER) as set by the 2006 Building Regulations Standard. For water the criterion is the internal potable water consumption level measured in litres per person. The minimum standards for each Code level have been set by the Environment Agency. The rest of the categories are only given a "pass/fail" rating for a Code level one (★) and are to be "mixed and matched" for different Code levels with a further four categories that include pollution, management, health and well-being and ecology. These last categories have no minimum standard. Rating criteria given for each of the categories energy/CO_2, water, materials, surface water run-off and waste are summarised below.

Code Level	*Minimum Standard*	
	Energy/CO2	**Water**
1(★)	10%	120 l/p/d
2(★★)	18%	120 l/p/d
3(★★★)	25%	105 l/p/d
4(★★★★)	44%	105 l/p/d
5(★★★★★)	100%	80 l/p/d
6(★★★★★★)	"Zero-carbon" home	80 l/p/d

9 http://www.resurgence.org/energy/heac/index.htm
10 http://www.homeinformationpacks.gov.uk/home.aspx
11 http://www.planningportal.gov.uk/england/professionals/en/1115314116927.html

Code Level 1(★)	Description	Minimum Standard
Materials	Environmental Impact of materials.	For a minimum BRE rating D, three out of the following five elements mush be achieved: - Roof structure and finishes - External walls - Upper floor - Internal walls - Windows and doors
Surface Water Run-Off	Surface water management.	Ensure that peak run-off rates and annual volume of run-off will be no greater than the previous conditions for the development site.
Waste	Site waste management.	Ensure there is a site waste management plan in operation that requires monitoring on-site waste and setting targets to promote resource efficiency.
	Household waste storage.	Ensure at least $0.8m^2$ per dwelling for waste management, or accommodate all external containers provided under the relevant Local Authority refuse collection or recycling scheme.

The Code for Sustainable Homes is voluntary at the moment, but is expected to be mandatory by April 2008. It is highly likely that the rating of a house will help to shape its value. It is, therefore, in the best interests of homeowners to achieve at least a Code Level 4 rating. By 2025 it may well be the case that homes of a standard lower than that will have lost a lot of their market value, whereas by 2050 Level 6 will be the norm.

Long-term goals and timeframe

2007 – Energy Performance Certificate for homeowners who want to sell their houses
2008 – Environmental Performance Reporting mandatory for all houses
2009 – Energy Performance Certificate mandatory for all houses that are constructed, sold or rented
2010 – Housing carbon emissions reduced by 25%*
2012 – Total UK carbon emissions reduced by 12.5%* (for the Kyoto protocol)
2013 – Housing carbon emissions reduced by 44%
2016 – Zero-Carbon emission requirement for all new houses*
2020 – Total UK carbon emissions reduced by 26%
2050 – Total UK carbon emissions reduced by 60%

* Total emissions from housing are 27% of total UK carbon emissions.

Current government incentives

- Stamp duty relief for zero-carbon homes under £500,000 until 2012.
- Grants worth £300 - £4,000 awarded to pensioners towards installing insulation and central heating.
- Budget for microgeneration grants for homes up by 50% (from £12m to £18m).
- Lobbying other EU countries to cut taxes on energy-efficient goods to 5% (from 17.5%).

Possible future government incentives

If the draft UK Climate Change Bill becomes law then the government will have put into statute serious targets for credible emissions reductions by 2050. Future incentives might include far more substantial subsidies on the capital costs of installing some source of renewable energy, or renewable energy-sourced heating systems (possibly fuel cell CHP). The government might also choose to penalise homeowners whose houses have low environmental ratings after, for example, as a means of motivation and gaining additional funds towards carbon emissions reduction projects. Many commentators are suggesting that water and energy/carbon rationing this might be seriously considered within the next decade, as the only way to achieve the necessary carbon reductions targets.