



By Tim Pullen

Sustainable Homes

The key issue is that sustainability has little to do with the way a house looks – although size is an issue you can have pretty much any style you like – but everything to do with how a house performs. How it meets the needs of the people living in it, how it will meet the needs of future generations and how much energy it uses in doing that.



The reality is that very few people want or need truly sustainable homes. What we want is a home that is comfortable, attractive and affordable, in terms of construction or purchase cost and running cost.

An estate house, built to current UK standards, will have a design life of up to 80 years and an energy consumption of 120kWh to 140kWh per square metre floor area per year. What we mean by a sustainable home is a house with a somewhat longer design life and significantly lower energy consumption.



The best standards we currently have, the Passivhaus standard and AECB Gold, have as their guiding principle an energy consumption for space heating of less than 15kWh per square metre per year, and less than 70kWh/m²/yr for all energy consumption. There is now the Activhaus standard coming out of Denmark which means that the house is a net contributor to the energy grid.



What we need to do is put energy consumption and longevity as key design parameters, rather than allowing them to be a consequence of the design.

Illustrations:

1. *Super E House*
2. *Kingspan lighthouse*
3. *Ruralized detached house*

New Build

If you are contemplating a new build you will have the freedom to choose from the full palette of options:

- Style
- Size
- Orientation
- Layout
- Construction method
- Insulation
- Air tightness
- Renewable energy

In the UK we tend to consider size first. We want the biggest house our budget will allow. Build a sustainable home will be more expensive and may mean sacrificing size for practicality. Often the decision that faces a self-builder is to build a ,say, 400m² conventional house or use the same budget to build a 350m² home that will last 200 years and might cost less than £100 per year to run.

Renovation

The palette of options available to a renovation project are more limited than for a new-build but there is still a lot of choice:

- Materials
- Room layout
- internal orientation
- Insulation
- Air tightness
- Renewable energy

It has to be considered that the renovator is one step up on the sustainability ladder. By retaining as much as possible of the original structure we are effectively recycling those materials and locking in their embodied energy.

Using the same design parameters as for a new build will result in a house that has great performance and the all the original architectural features.

Retrofit

There are 3 main issues in improving the sustainability of an established house :

- Regular and appropriate maintenance
- Improving insulation and air-tightness
- Installing appropriate renewable energy systems

Like any machine a house needs regular maintenance to keep it in good working order. Reducing the heat loss from a house with improved insulation and draught-proofing is relatively cheap and easy to do, and will have an immediate impact on fuel bills.

Renewable energy systems tend to be site specific – wind turbines don't work on urban roofs, small gardens don't suit ground source heat pumps – but there is usually something that will work and deliver good returns.

The Feed-in Tariffs are designed to encourage existing home owners to install renewable energy systems. Anyone considering any major works to their home would be advised to consider how renewable energy can help.

Taken together these measure mean that there is no reason why a Victorian semi should not go on providing a comfortable and affordable home for another 100 years.