Growing a green industrial revolution

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The first housing development built to meet Code Level 6 using the ruralZED™ zero carbon housing system is in Northampton.

A year ago most people would not have believed that the global economy would crash and the taxpayer would end up propping up the some of the world's biggest banks.
There was also a general aversion towards reducing CO^2 emissions and a reluctance to accept the relevance of sustainability – going green was seen by many as costly and unnecessary. Now many objections have been uprooted: we are better informed about how to make sustainable choices and as costs rise we want to become more efficient.

The collective conscious dictates that business should re-evaluate itself in light of global warming and the need for environmental protection. The challenge of turning the economic situation around is dwarfed by the scale of the sustainability problems the world faces and I believe that solving them starts at home with the way we live and the homes in which we live.

As an architect and a specialist in sustainable construction, I get to see every side of the argument from the informed developer to the builder who looks with humour at the green roof we have specified. Understanding the big picture is very much about what ZEDfactory, the architectural firm for which I work, does.

Everyone from supermarkets to car manufacturers is grappling with the conundrum of what sustainable products are and how to sell them. Global industries are reeling in the face of rising energy costs and changing consumer demand and in the future, unsustainable businesses will face extinction as funding from Governments and banks is likely to support those that have made the leap of faith towards a green future.

At a time when most people are cutting back on lifestyle choices such as holidays and consumables, the one thing people cannot change easily is their home – it's the purchase of their life and one which will have an effect on them for a very long time!

Most of the existing housing stock is incredibly inefficient and costly to run. This problem will get worse as running costs escalate, so it becomes critical not to add to it by creating new buildings that don't perform well.

The Government has introduced the 'Code for Sustainable Homes', with the highest level being Code 6. The current entry level is Code 3 with Code 4 coming into force for social housing in 2010. Code 6 goes beyond just being zero carbon, is very difficult to achieve and will be mandatory in 2016: this will have major implications for the way houses are built.

For those who say the construction industry cannot provide sustainable housing at the highest levels of the Code at an affordable price the message is clear – it can and it should as it has now been proven to work.

The first commercial private and social housing development to meet Code Level 6 was designed by ZEDfactory and is situated in Northampton. Utilising the ruralZED™ housing system, it gives people on low incomes the opportunity to live in the most efficient houses with annual energy bills not reaching more than a couple of hundred pounds per year. However, innovation and new products are certainly needed to construct the next generation of building.

Super insulation, thermal mass and the need for very high air tightness will challenge existing construction technologies and a completely new set of detailing and assembly methods will be required.

At ZEDfactory we set out to meet the highest levels of the Code from the start and have worked in partnership with industry to develop products and construction techniques that make delivering replicable sustainable solutions possible. This culminated in the launch of the ruralZED™ housing system with its unique upgrade path which allows homeowners to upgrade their homes from Code Level 4 when they can afford to do so.

This is particularly important for low income households as it becomes cheaper to invest in your home by borrowing money on your mortgage to install renewables than to pay rising energy bills. We can even add photovoltaic panels to power an electric car and payback the embodied energy of the materials used in the home's construction.

Timber, glass, eco-concrete, terracotta and recycled materials have been forged into new forms and importantly they work together in a rich eco-aesthetic way. Generally, heavy weight materials have a higher embodied energy than wood, for example, but the use of heavy weight materials as an internal finish regulates the internal temperature paying back the embodied energy many times over as the power used to run the building is reduced.

Renewable energy systems have also been used in combinations to make ruralZED™ zero carbon. These include using solar thermal with biomass fuelled boilers for heating and hot water, and using photovoltaic panels to meet the annual electrical demands of LED and compact fluorescent lights plus 'triple A' appliances. Providing building orientation is correct, passive solar gain can also harness the free energy of the sun.

The same principles can be applied to schools and offices bringing volume into the supply chain.

For renewables to be considered, the energy consumption of a home must be less than a third of a typical house built to today's building regulations otherwise it becomes prohibitively expensive to install them. For new housing, energy should be generated on site so that the problem is not exported elsewhere. While off site renewables are required for the existing building stock to achieve CO^2 reductions and replace the dwindling supply of cheap fossil fuels.

Life expectancy of the main building fabric components must also be considered and must be fully recyclable. ruralZED™ core building fabric lasts a minimum of five generations or 125 years. In comparison, short lifespan buildings will lose their value and become impossible to mortgage in perhaps 30 to 40 years so the message is, get the construction right now for future generations.

What's clear is there is no quick fix solution to energy and environmental problems and any solution must sustain economies and jobs. Sorting out the CO^2 problem is not just about bolt on microchip technology. The reality is much more down-to-earth and relies on simple replicable technologies and products produced on a large scale. Existing delivery systems and skills also need to be harnessed and redirected so that the solutions are practical and achievable now.

If the construction business is a bit like gardening then we are in the midst of a cold dark winter but by planning now with R&D and investment the economic warming of spring will bring forth the sustainable shoots of a green industrial revolution. The only question is which businesses will have planted the right crop for the inevitably warmer summer ahead? ❑

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The ZEDfactory has a track record of delivering Zero (fossil) Energy Development (ZED) building in the UK. For more information visit www.zedfactory.com