

Slash bills and save the world

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The exterior of Shiva Vencat's rotatable Domehouse in New York

In January this year, the UK government-backed group Zero Carbon Hub made little fuss when it published an important statistic. In the Zero Carbon International Compendium, the group announced that homes across the globe now account for up to 25 per cent of all man-made CO₂ emissions. What should have followed was a rush by all the many government-funded Green Building Council networks across the world to announce some agreement to reduce this figure.

But as the failure of the [Copenhagen Climate Change Conference in 2009](#) showed, consensus on any environmental matter is hard to come by.

John Alker of the UK Green Building Council, explains the complexity of getting countries to comply with the same code. "Countries only have domestic policy and building regulations for their own climatic situation. Each country is seen as regionally specific, so you can't compare apples with oranges."

The UK, seen as the leader in regulation, is, however, imposing stringent measures for the future. Still undecided over the exact meaning of the phrase "zero carbon", despite having announced that all [new homes built in the UK will be zero-carbon rated by 2016](#), the Zero Carbon Hub has the role of "co-ordinating delivery of low and zero-carbon homes". As Neil Jefferson, chief executive of Zero Carbon Hub says: "Zero energy is not zero carbon. There is an urgent need to clarify the meaning of 'zero carbon'."

Solitaire Townsend, who sits on the United Nations' Taskforce on Sustainable Lifestyles and was named Ethical Entrepreneur of the Year in 2009, summarises how countries see each other across the table on green housing. "The UK is seen as setting good standards; the US is seen as being innovative, coming up with the wild and wonderful ideas; and developing countries are thought of as being better at scale."



What is clear is that with legislation moving inexorably towards lowering emissions from domestic homes, and the European Union's Energy Performance in Buildings Directive recently rewritten to become even tougher, governments are looking towards commercial builders and innovative architects to show them the way.

The interior of Shiva Vencat's rotatable Domehouse in New York

In the race for the world's greenest domestic housing, it appears that pre-fabricated buildings are showing what can be done, not least because their building parts are assembled in factories, so they reduce energy in construction and produce no wastage of materials on site. The Green Revolution Huf Haus, for example, has been awarded the highest Code Level 6 from the UK Code for Sustainable Homes, a level only seven houses have accomplished since the code was introduced in 2007. Code Level 6 is comparable with the German Passivhaus rating, which around 2,000 homes in Germany have been awarded, not least because of the German government's incentive to homeowners to fit solar power.

Since 2000, Germany has been leading the way on "feed-in tariffs", giving money back to homeowners who fit photovoltaic panels on their roof to generate energy, as well as offering favourable loan rates to buy the panels through private partnerships with the publicly owned German bank KfW. Austria and Switzerland also have thousands of Passivhaus-rated homes.



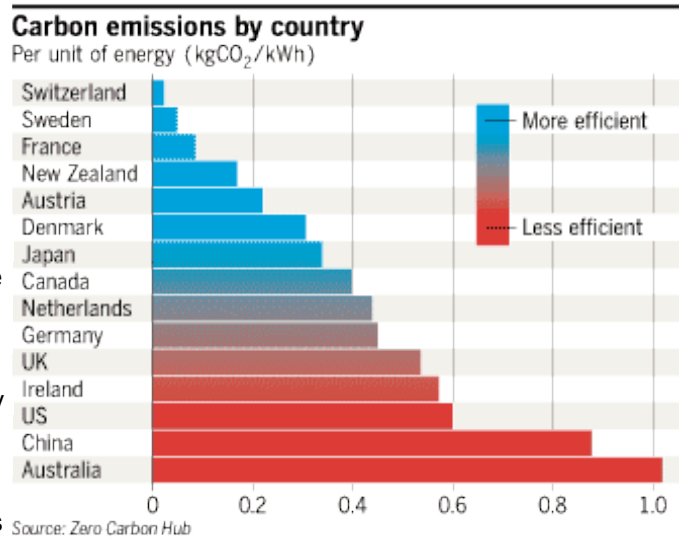
The Marrellos in Switzerland are the first pioneer family to live in the German prefab Green Revolution Huf Haus, having moved in three months ago. On a magnificent spot overlooking Lake Geneva, the architect Patrick Marrello, 45, describes the dream: "We waited four years for the right piece of land to come up, and now I have some of the best views in the world out of my bedroom window."

The Marrello family at home in Switzerland

Using the Huf Haus modules, Marrello designed the house himself in a month, and moved in with his wife Chantal, 40, and two children Oscar, 4, and Charlene, 1, in April. The plot, outside work – including a garage – and the prefabricated house with three bedrooms and two bathrooms, cost in total SFr1.6m (£1m).

Switzerland has the lowest carbon emissions per unit of energy in the world so the ecological benefits are understood. “Our heating in the apartment we lived in before was 10 times more expensive for the same square-footage”, says Marrello. The Huf Haus offers two sorts of renewable heating/air conditioning, and the Marrellos chose an air pump over the ground source pump, because the ground by the lake was too unstable for a 300ft borehole.

The US and the rest of the world use the Leadership in Energy and Environmental Design (LEED) standard, which not all eco-pioneers feel is rigorous enough. Shiva Vencat in New York, chief executive of Zero Pollution Motors, imports cars which run on compressed air from MDI in France, and built a Domehouse in New Paltz, New York. Using designs by a French mathematician called Patrick Marsilli, Vencat describes his UFO-like house, where he lives with his wife Veronique and son Rohan as being “far beyond LEED requirements. [LEED] is just a matter of spending money for a company to do a survey of the house to issue a LEED certificate. A couple of years ago, I had a company look into implementing geothermal to supplement heating and cooling. He checked the heat loss and said that we are already far superior to LEED specs.”



What makes the Domehouse so ingenious is its shape. “Since it’s a round house, the heat goes up and comes down. When the sun is outside and hits the windows, even if it is minus 20 below, we don’t need heating,” says Vencat. The Domehouse has a feature that marks it out as greener than green, and clinched its gold medal for the best invention in Geneva in 2005: the house can rotate 180 degrees on wheels, so it needs no heating during the day in winter and no air conditioning in summer because it can be turned away from the sun.

While America might lead the world with the “wild and wonderful”, it is in Asia that the more ambitious green city projects and high-rise buildings are to be found. The Met in Bangkok, Thailand, took the BCI Green Award for multiple housing this year. What distinguishes The Met, by Woha architects, from similar high-rises, is that the design does away with the need for energy-sapping air conditioning.

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‘If I go broke tomorrow, we can still live here’

The first Green Revolution Huf Haus to be built in the UK is set to be completed in September 2010. It will be awarded the highest Code Level 6 for Sustainable Homes. Even with five bedrooms and five bathrooms, the Huf Haus, lived in by the Potts family in Hampshire, south-east England, will produce more energy than it consumes.

Here’s how:

Photovoltaic System (total cost £33,000, \$50,431): 9.99k/w of solar electricity at peak production.
Ground Source Heat Pump (total cost £5,000). Drilling 350ft deep borehole for heat pump cost £10,000.

Greywater system (total cost £5,000) to harvest rainwater for all toilets and laundry.

So, with new Feed In Tariffs (FITs) effective in UK from April 2010, for every unit of electricity produced by the Photovoltaic, the Potts will be paid around 36p per unit.

David Potts, 53, estimates that up to £5,000 per year will be returned to him from the government's Feed In Tariffs, tax free. "My energy investment in the home will pay insurance, water, electricity, rates and council tax. So even if I go broke tomorrow, we can still continue to live here."