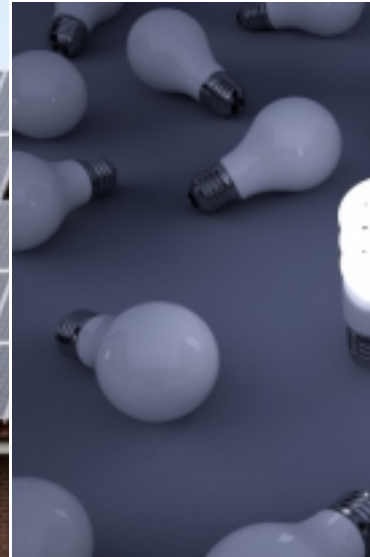


Making energy efficiency sustainable
By **Economist Intelligence Unit** | Published May 31, 2013



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How can governments and energy companies overcome the hurdle of engaging consumers?

On a hill overlooking the campus of the University of Nottingham, seven pilot houses showcase different versions of the future energy-efficient homes that the University's Department of Architecture and Built Environment's Institute of Sustainable Energy Technology has erected in partnership with utility and construction companies.

One two-bedroom structure, the state-of-the-art Nottingham H.O.U.S.E. (Home Optimising the Use of Solar Energy), was designed and built by the department's students with the sponsorship of Saint Gobain, a construction manufacturer and supply chain company.

Known as the Timber House, the building is constructed out of eight individual modular units and features photovoltaic panels, grey water recycling from the shower for use in the toilets, and air-tightness membranes to keep the structure draft-free, including compartmentalised living spaces to keep heat loss to a minimum. Designed according to the world's most stringent design codes—the



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German Passivhaus Institute and UK Code for Sustainable Homes Level 6, or zero-carbon—the building’s physics approach to design enables the house to regulate its temperature, making it essentially self-heating, with just a small top-up heat pump required to keep it warm.

The potential represented by the Timber House underlines the importance of getting the design of the building right from the beginning, says Professor Mark Gillott, chair in sustainable building design and co-director of the Institute of Sustainable Energy Technology at the University of Nottingham.

“What we are talking about is well-designed ventilation and draft-free structures,” he adds, noting that the energy consumed by the UK’s housing stock is responsible for around 27% of the country’s carbon emissions.

Building a policy consensus

The question of how to improve energy efficiency is hardly a moot point. More than US\$6.5bn of venture and private-equity capital has been directed towards investments in energy efficiency since 2007, according to Bloomberg New Energy Finance.

Policymakers are already seeking to build a global consensus around measures to which most governments can agree. The International Energy Agency (IEA) has issued 12 recommendations to the G8 group of governments, including limiting standby power use to one watt, establishing energy efficiency standards for television set-top boxes and digital television adaptors, strengthening energy-efficient requirements of building codes, and adopting international test procedures for measuring tyre rolling resistance.

“The cleanest, greenest, most affordable energy is the energy not used,” says Sara Bryan Pasquier, programme manager for energy efficiency at the IEA, noting that the combination of energy efficiency and conservation “will play a key role in helping countries achieve environmental and economic development goals, while also improving comfort, providing health benefits and lowering household bills”.

“Energy efficiency is also the lowest-cost means of accommodating energy demand growth in both the developing and the developed world,” Ms Bryan Pasquier adds.

In countries such as the UK, where energy markets are liberalised and customers can choose their energy provider, retail suppliers “use their energy-saving activities to retain existing customers and compete with other energy providers for new customers,” says Grayson Heffner, senior energy efficiency analyst at the IEA.

In 2011 energy providers spent more than €10bn on energy-saving activities, such as providing advice and assistance to their consumers, disseminating information about energy efficiency, and offering financial incentives and even financing for investing in energy-saving devices, according to the IEA.



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Engaging consumers and energy providers

Yet getting individual consumers on board can be the biggest hurdle for energy companies and governments. This challenge can be boiled down to three key problems, according to Stephen Fitzpatrick, the founder of Ovo Energy, one of the newer entrants to the UK's utility market. The first, he says, relates to language.

“Energy efficiency is really boring and for most people it's not very emotive,” he says. “Turning out one light saves a small amount of money even though over time it adds up, and although the contribution an individual family can make is very small, 26m households together make an enormous impact.”

“The thing that motivates me to promote energy efficiency is avoiding waste,” he adds. “Everyone can agree that waste is bad even if they don't agree that efficiency is good.” Yet a second difficulty, he notes, is helping individuals to understand where their contribution fits into the larger picture.

“The [UK] government needs to reduce carbon emissions by 20% in 2020,” he says. “The consumer needs to know what that equates to in his postcode, in his street. Then it becomes more personal and granular to individuals.”

Finally, energy companies need to be able to engage with customers and spell out the actual data relating to their energy usage, rather than using estimates. Smart metering can help energy suppliers engage with customers about their annual usage—base consumption today compared with last year, for example. It can also allow customers to see a breakdown of energy use by appliance, potentially helping them to choose more energy-efficient models.

“All new cars tell you how many miles per gallon you are getting,” Mr Fitzpatrick says. “It changes behaviour; when I look at that on the dashboard, I accelerate and break more gently. When you can get that information for gas and electricity, it starts to become more personal.”

In the area of smart meters, he notes, countries such as Italy, the Netherlands and Germany have taken the lead. The IEA has also produced 25 energy-efficiency tips for consumers, which include tracking energy spending, shopping around for energy models, taking advantage of incentives and ensuring that home appliances, lighting, vehicles and those at work meet the latest efficiency standards.

Back at the University of Nottingham, the next generation of new architects is training to envision the practical rather than pie-in-the-sky, with eco-houses “meant to work in terms of sustainability as a high-density solution,” Professor Gillott says. “One of the things we wanted to do was to make [the houses] accessible and not look out of the ordinary,” he adds. Equally important is finding ways of adapting older, existing housing stock that is prevalent in the UK and many other European countries.

While six of the Nottingham University homes are new-build, one is a retrofit of a British semi-detached council house, typical of many built in the 1930s and similar to many older homes in which

improving energy efficiency is more challenging.

In this home, as in other heritage houses with solid walls, many of which are protected from external alterations, designers are experimenting with alternative, micro-thin forms of interior insulation such as aerogel, which minimises heat loss while conserving space.

Meanwhile, the current economic backdrop could also provide a catalyst for further innovation in energy efficiency, Professor Gillott adds. “The construction industry at the moment is on its knees,” he observes. “In many ways, it’s a good time to take a step backward and look at research and development.”